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Research Article

A Comprehensive Study on User-Centric Smart Life Solutions: Integrating Mobile Integrated Technology and Big Data Analytics for Digitalized Smart City Environments

Chengsi Li [1], Younghwan Pan [2*]

[1] Ph.D candidate, Department of Smart Experience Design, Kookmin University, Seoul, Republic of Korea
[2] Doctor, Professor, Department of Smart Experience Design, Kookmin University, Seoul, Republic of Korea
* **Corresponding Author:** peterpan@kookmin.ac.kr

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ABSTRACT

Digitalized smart cities employ user-centric smart living solutions to study how big data analytics and mobile integrated technology (MIT) affect user satisfaction, technology adoption, and quality of life. To show how smart city residents may benefit from this technology. The quantitative technique used surveys, feedback, and sentiment analysis. These methodologies revealed MIT and big data analytics' influence. Research: smart city services should be user-centered. Research suggests big data analytics enhance urban living. With big data, smart cities manage resources, transportation, sustainability, and more. Furthermore, big data analytics-enabled data-driven decision-making continuously raises user satisfaction and rates of technology adoption. In tackling urban issues such as healthcare accessibility and traffic congestion, MIT solutions prove to be effective tools that also foster economic growth in smart cities. The financial gains underscore MIT's capacity to promote prosperity in digitally advanced smart city settings. Moreover, the study advances user-centered design theories, technology adoption, and urban planning. It supports accepted theories and emphasizes the importance of user participation in design, technology acceptance, and the financial benefits of smart city technology. The study's results provide empirical support for the claim that combining big data analytics with MIT greatly enhances user enjoyment, adoption of new technologies, and the general quality of life in digitalized smart cities. Urban planners, legislators, and technology developers can benefit greatly from the theoretical and practical implications presented, encouraging the creation of user-centric smart life solutions in the rapidly changing field of smart cities.

Keywords: User-Centered Design, Digitalized Smart Cities, Smart Life Solutions, Big Data Analytics, Mobile Integrated Technology (MIT).

INTRODUCTION

The idea of a "smart city" has gained futuristic significance in the age of increasing urbanization and the digital revolution, promising a time when technology would be seamlessly incorporated into urban life to improve efficiency, sustainability, and the quality of life for its citizens (Andrade, Yoo, Tello-Oquendo, & Ortiz-Garces, 2020). This vision centers around the individual and focuses on user-centric smart living solutions that create digitalized smart city environments by utilizing MIT and big data analytics (Andrade et al., 2020). According to

Mokhtari, Anvari-Moghaddam, and Zhang (2019), user-centric smart living solutions in digitalized smart cities put people at the centre of urban development. It seamlessly combines big data analytics and mobile technology. Mobile technology has transformed fast-changing cities. Mobile apps, sensors, and IoT altered city life. These advances make vital information accessible faster, alleviating urban issues. These integrations increase inhabitants' comfort and convenience. Mobile-accessible smart city services tailor and govern urban life from mobility to environmental controls. Using MIT substantially improves urban issues. Real-time sensor and IoT data can reduce traffic congestion and trip times. These devices track consumption and optimise resources, saving energy. Finally, mobile integrated technologies and big data analytics offer user-centric smart living solutions that transform cities. It lets individuals design their urban experiences, promotes convenience and efficiency, and addresses major urban issues, making smart cities more sustainable, integrated, and livable. With the integration that follows, the process of developing digitally enhanced smart city settings where technology coexists harmoniously with the built environment to improve its residents' quality of life has evolved dramatically (Suvarna et al., 2020).

The extensive application of big data analytics has significantly sped up the creation of smart cities. Urban regions create large amounts of data, which cities may use to support decision-making that improves services and uses resources more effectively (Rocha et al., 2021). For academics, technologists, legislators, and urban planners, it is essential to comprehend how these elements combine and have an impact. This common understanding is essential for the ongoing development of smart cities and the innovative solutions that are developed to successfully meet the needs and goals of urban residents (Gomez, Chessa, Fleury, Roussos, & Preuveneers, 2019). Despite the fact that smart city projects are spreading quickly around the globe, there is still a significant research vacuum when it comes to the thorough evaluation of user-centric smart living solutions in digitalized smart city settings (Nawaz & Guribie, 2022). Many studies (Esmaeilpoorarabi & Yigitcanlar, 2023; Ferreira et al., 2023; Kasznar et al., 2021; Ribeiro, Dias, & Pereira, 2021; Xu, Ahokangas, Turunen, Mäntymäki, & Heikkilä, 2019; Yang et al., 2022) have looked at specific elements, such as big data analytics or MIT, but there has not been a comprehensive examination of how these elements work together to affect user happiness, adoption rates of new technologies, and overall quality of life in smart cities. Moreover, although user-centered design is acknowledged as important in theory, there is little empirical study that evaluates the relationship between it and user pleasure in a quantifiable manner. Due to this research gap, an integrative study that fills in the gaps and offers detailed knowledge of the interactions between these crucial components is required. This study will give practical insights into the ongoing development of smarter and more user-centric cities.

This study aims to address the primary research problem, which is the lack of a thorough and empirically supported evaluation of big data analytics and MIT integration as essential elements of user-centric smart life solutions in digitalized smart city environments. More precisely, it seeks to look at the following important queries: What is the practical impact of user-centered design on user satisfaction with smart city services? How much does the use of big data analytics improve rates of technology adoption and user satisfaction among various demographic groups? What concrete effects do MIT solutions have on areas of everyday life in smart cities, such as economic value, healthcare accessibility, and traffic management? The research topic also aims to examine the economic worth of MIT solutions and their potential to promote prosperity and economic progress. By exploring these issues, this study aims to close a sizable research gap and provide empirical knowledge that will direct the creation of smart city solutions that are more efficient, user-centered, and financially viable.

The goal of this research is to thoroughly evaluate user-centric smart living solutions within the framework of digitally enhanced smart city environments. Specifically, big data analytics and mobile integrated technologies will be included in the study. The hypothesis that the integration of these technologies greatly improves the quality of life in smart cities is supported by the study, which aims to statistically assess user happiness, technology adoption rates, and the effect of these technologies. This study substantially advances the subject by illuminating the relationship between data-driven decision-making, MIT, and user-centered design. This thorough empirical analysis has yielded useful information that lawmakers, technology developers, and urban planners may use to improve the efficacy and focus of their smart city projects. The study offers new insights into the possible financial gains from using user-centric technology in smart cities by assessing the economic value of MIT solutions.

This paper has five main components. The introduction introduces context, research topics, and study importance. Literature reviews critically analyse major concepts and identify research gaps, setting the groundwork for further study. The methodology section describes the data collection, analysis, and variables used in the study. The study's findings and implications are presented and discussed in the findings and discussion section to explain its contributions. The report concludes by summarizing the study's findings and discussing the practical applicability. An structured five-section framework describes the study's objectives, methods, findings, and contributions.

LITERATURE REVIEW

Digitalization and urbanization have changed cities globally in the past decade. This created smart cities that enhance lives using technology and data. Smart city researchers examine its construction, operation, and consequences on urban life, expanding the literature. Smart city debate promotes user-centric design. Smart cities must meet residents' needs. User-centered design engages communities in smart city infrastructure and service development. Customizing solutions meets urbanites' shifting demands. Smart cities benefit from user-centered design, according to study. Kirimtat, Krejcar, Kertesz, and Tasgetiren (2020) focus urban resident services. Personalization improves smart city technology adoption and satisfaction. In smart city solutions, Mithun and Yafooz (2018) highlight citizen co-creation. Residents make their city more accessible. Discussing big data analytics and mobile integration. The potential to improve smart city living and urban issues has drawn attention to this combination. Mobile applications, sensors, and IoT in MIT solutions transform cities. MIT solves urban concerns. These technologies reduce energy consumption, improve healthcare, and simplify transportation, according to Allen, Tamindael, Bickerton, and Cho (2020). Real-time sensor and IoT data helps cities make sustainable resource allocation decisions.

Economic studies show MIT smart city technology work. Kong et al. (2019) demonstrate MIT integration's growth and employment creation. Innovative technologies, new firms, and urban service efficiency improve the economy. Smart city literature promotes MIT big data analytics. Scholars claim data-driven decision-making enhances resource allocation, urban planning, and service delivery. City sustainability demands big data analytics. Smart city data was explored by Kornyshova, Deneckère, Sadouki, Gressier-Soudan, and Brinkkemper (2022), Manimuthu, Dharshini, Zografopoulos, Priyan, and Konstantinou (2021), and The findings imply data analytics improves customer satisfaction and technology deployment. Finally, smart city literature promotes user-centered design, MIT solutions, and big data analytics. These themes show how data and technology improve cities and lives. These concerns and their consequences on urban development must be recognized as smart cities emerge.

Smart city development studies have provided insights, according to Larrinaga et al. (2021), O'Dwyer, Pan, Acha, and Shah (2019), and Whaiduzzaman (2022). MIT solutions, big data analytics, and user-centered design in digitalized smart cities remain understudied. This study uses statistics to address this gap by examining how these factors affect smart city user enjoyment, technology adoption, and quality of life. These data are analyzed to understand user-centric smart living solutions and their implications on smart city technology integration, policy, and urban planning. Smart city solutions focus user delight through user-centered design. According to studies, urban services should be tailored to local needs. Customer satisfaction grows with service customization, making consumer pleasure vital (Kaluarachchi, 2022). Researchers suggest user input via social media, questionnaires, and mobile apps for user-centered design adoption (Nawaz, Chen, Su, & Zahid Hassan, 2022).

Writing has also focused on MIT's smart city transformation potential. Mobile, sensor, and IoT devices have been intensively investigated to improve urban life. MIT solutions reduce energy usage, traffic, and healthcare access (Alhalabi, Lytras, & Aljohani, 2021; Lavalle, Teruel, Maté, & Trujillo, 2020; Nikitas, Michalakopoulou, Njoya, & Karampatzaki Economics suggest that MIT solutions may boost smart city economics and create jobs (Kamruzzaman et al., 2023). Big data analysis proves smart city need. Research shows big data analytics improves data-driven resource allocation, service delivery, and urban planning. Data and urban sustainability have long worked together (Lopez-Carreiro, Monzon, & Lopez, 2023; Samarakkody, Amaratunga, & Haigh, 2023). Research suggests that data analytics increases smart city technology adoption and user happiness (Kuru & Ansell, 2020; Talamo, Pinto, Viola, & Atta, 2019). Finally, smart city development literature emphasizes user-centered design, MIT solutions, and big data analytics. Urban living is improved by technology and data integration. Smart city design must include these findings as it matures.

Digitalized smart city settings are often discussed in smart city development literature (**Figure 1**). Scholars say technology helps urbanites incorporate digitalization into daily life. Urbanites' quality of life, service delivery, and sustainability depend on this integration. Real-time data gathering and intelligent infrastructure have been studied in digital smart cities. Agnihotri, Luthra, and Peters (2019), Koban, Falaleyeva, Spravtseva, Moiseev, and Khan (2022), and Müller, Fay, and Vom Brocke (2018) demonstrate that smart city growth needs digitalization. Digitalization in smart cities permits real-time data gathering and use. This data-driven strategy helps communities make choices, distribute resources, and quickly address emergent issues. Smart digital infrastructure makes cities efficient and sustainable. More research shows that digitization improves smart cities. It might improve urban life and services. Smart city planning and development must embrace digitalization to handle complicated urban issues as urbanization accelerates.

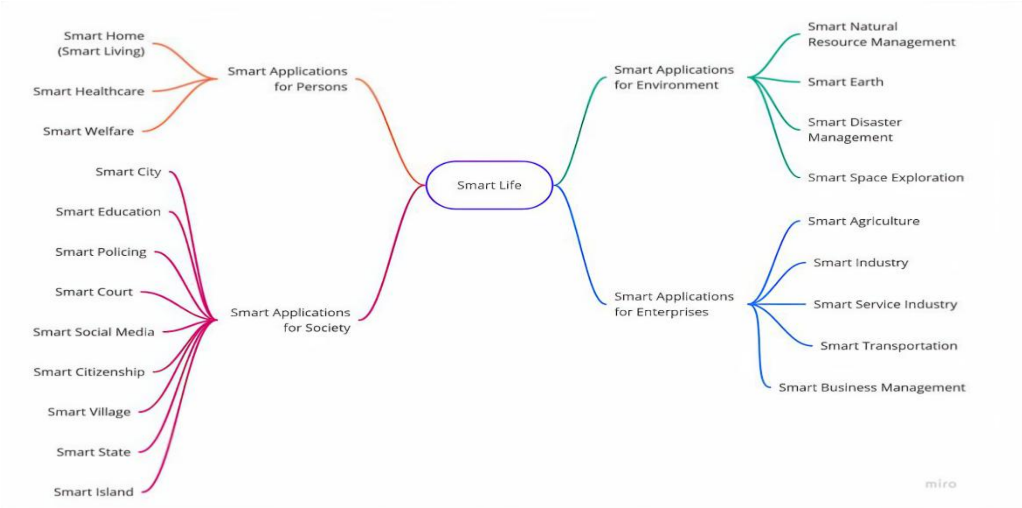

Figure 1. Smart Campus Life Domain

In digitalized smart city surroundings, smart living solutions are transformational. Big data analytics, MIT, and user-centered design work together to provide these solutions. This domain's study focuses on the practical benefits and consequences of combining these components for city inhabitants. Previous study has shown how smart living solutions may greatly enhance urban people' daily life. These solutions are used in educational platforms, healthcare services, and mobile traffic apps. These technologies have solved urban problems, improved convenience, and boosted economic growth (Liu et al., 2023; Puthal, 2020). The research shows that these methods can develop economically viable, efficient, and user-centric smart cities. Individual studies give vital insights, but complete research that synthesizes these crucial components is lacking. Few studies have examined how big data analytics, MIT, and user-centered design affect critical outcomes like user satisfaction, technology adoption rates, and quality of life in digitalized smart city environments. This study gap must be closed to better understand these factors' complex interconnections and their effects on smart city development. These insights will help create smart city solutions that are more effective, user-friendly, and profitable. We may create technologically sophisticated, resident-responsive urban settings by understanding the interaction of these components. Based on literature, the framework is drawn (**Figure 2**).

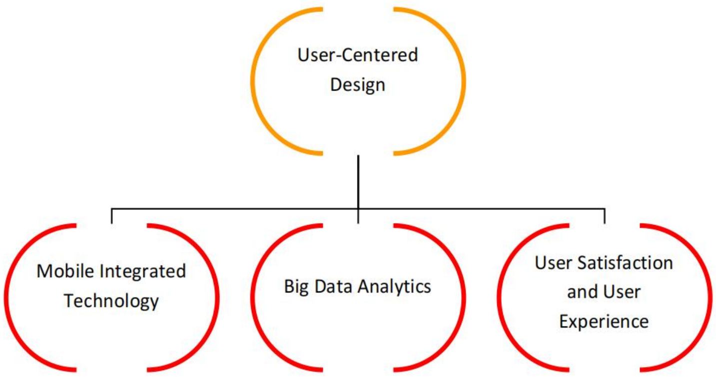

Figure 2. Research Framework

Many theoretical frameworks address the complex link between MIT and big data analytics in digitalized smart city user-centric smart living solutions. Smart city tech adoption, innovation, and user experiences are described here. Study employs TAM theory. TAM believes usability and usefulness influence tech adoption. TAM theoretically underpins MIT integration's user satisfaction and technology adoption impacts. User perceptions of these technologies' ease of use and utility impact their adoption in digital smart cities. Another research area is innovation dissemination. This theory states that ingenuity, communication channels, social systems, and innovation decision-making influence innovation adoption. Digital smart city residents adopt user-centric smart living solutions. To comprehend smart city technology dispersion, innovative technologies' features, communication channels, social system acceptability, and urban residents' decision-making processes are explored.

The article uses urban informatics. Urban living, technology, and information are intertwined in smart cities. Urban Informatics shows how big data analytics impacts municipal management, resource allocation, and decision-making. Data-driven smart city design and operation are encouraged. Contextualizing digitalized smart city settings shows Urban Informatics user-centric smart living solutions' revolutionary potential. Ideas like this enhance city management and life. User-centric smart living solutions in digitalized smart cities are studied using TAM, Diffusion of Innovations theory, and Urban Informatics. These ideas cover tech adoption, user attitudes, and big data analytics' smart city transformation. The research analyzes how MIT integration and data-driven methodologies affect consumer happiness, technology adoption, and smart city development.

RESEARCH METHODOLOGY

This section describes the research methodology for this study.

Data Collection and Selection

In this study, the researchers investigate user-centric smart living solutions in digitalized smart city environments using secondary data sources. Chinese smart cities examine user happiness, technology adoption, big data analytics, and mobile integrated technologies using many data sources. Public databases, academic journals, government documents, industry reports, etc. Public databases supply data, whereas academic papers include significant study and theory. Government publications define policies, whereas industry publications report trends. This multimodal data collection method ensures a large and diverse data set, enhancing analysis and conclusions in the unique Chinese smart city situation.

Characterizing the Variables

Operationalizing user-centered design, the researchers emphasize designing goods, services, or urban settings with end users' requirements and preferences as a priority. The study estimates smart city user pleasure and well-being utilising surveys, feedback comments, and sentiment analysis. Technology Adoption Rates gauge the degree to which the populace in smart cities has accepted and incorporated specific smart technology and services into their everyday life, reflecting the user-centric integration of technology in smart city environments (Angelidou, Politis, Panori, Barkratsas, & Fellnhofer, 2022; Lim, Cho, & Kim, 2021).

Smart city studies examine technology adoption to identify smart technology and service use. Rates indicate user-facing smart city tech integration. Technology is widely adopted. Smart technology helps urbanites when prevalent. The high adoption rate shows a desire for urban efficiency and better life. Custom solutions are needed for user-centric smart city technology. Accessible life-improving technology are more accepted. Smart cities promote user well-being and enjoyment, therefore user-centric integration makes sense. Tech adoption statistics indicate how smart cities improve urban life. Adopting high tech helps cities become smart. The proportion of the populace utilizing these technologies is a clear indication of how Ill the urban environment has integrated and embraced tech-driven, user-friendly solutions. These adoption rates highlight the critical role that user-centric methods play in the development of smart cities by offering a crucial gauge of the effective integration of MIT and smart solutions into inhabitants' everyday lives (Kuru & Ansell, 2020; Samarakkody et al., 2023; Talamo et al., 2019).

Research Questions

1. User-Centric Design and Satisfaction

How does user-centered design influence user satisfaction with smart city services, and what role does it play in ongoing advancements in service delivery and design?

2. Technology Adoption and Integration

To what extent do Technology Adoption Rates reflect the successful integration of user-friendly, tech-driven solutions in the urban environment, and what implications do these rates have for smart city development?

3. Big Data Analytics and Urban Impact

What is the impact of big data analytics on user happiness, and how does it contribute to the overall success of smart city services, considering ethical considerations and the validity of data sources?

Extraction and Compilation of Data

The researchers carefully gather and aggregate data from multiple secondary sources, making sure the information is pertinent to the study's goals. To rectify missing or conflicting data and standardize formats and units of measurement, data cleaning and transformation may be necessary.

Data Analysis: The main component of the research is quantitative data analysis. This is how the analytical procedure is broken down.

The study explored user-centric smart living solutions in digitalized smart cities utilising many methodologies. The main elements of this method are:

Starting research with descriptive statistics is key. Find means, SDs, and frequency distributions. Computations teach researchers data qualities. Descriptive analysis summarises and displays data. Finding dataset trends, patterns, and outliers needs this approach.

Research requires hypothesis testing following question creation. Researchers test hypotheses quantitatively. T-tests or regression analysis can assess big data analytics' customer satisfaction impact. Theory-proving statistics help the study.

Research and results sharing require data visualisation. Researchers use tables, graphs, and images. Technology adoption patterns and discrepancies are shown in bar charts. Data visualisation simplifies interpretation and sharing.

Research ethics crucial, especially with secondary data. Data collection and utilisation must be ethical for researchers. Consent, data protection, and supplier terms are essential. Researchers must respect data subjects' privacy.

Researchers extensively evaluate secondary data sources for dependability. Data sources, methodologies, biases, and constraints are studied. Research legitimacy depends on data source transparency.

Conclusions provide a detailed explanation and interpretation of quantitative analysis results. User-centric smart living solutions in digitalized smart cities use the outcomes. They answer research issues, introduce big data analytics and mobile integrated technologies, and showcase smart city development. This discourse is essential to converting data-driven insights into policymaker, urban planner, and technology developer recommendations.

This thorough study comprised descriptive analysis, hypothesis testing, data visualisation, ethical considerations, validation and reliability tests, and a detailed explanation of findings. These methodological components promote research rigour, reliability, and practicality, enabling us understand user-centric smart living solutions in digitalized smart cities.

Limitations and Implications: The researchers identify and talk about the study's shortcomings, such as possible biases in the secondary data, problems with the quality of the data, and any restrictions imposed by the research methodology. In order to produce more user-centric smart living solutions in digitalized smart city environments, legislators, city administrators, and technology developers should take note of the consequences of the findings, which are highlighted. The researchers extract a few words from the literature and drew a word map (**Figure 3**).

Figure 3. Word Map of Research Model

RESEARCH ANALYSIS

The research's Data Analysis section will examine the gathered data to find important insights. Statistical methods will be used to investigate the connections among user happiness, adoption rates of new technologies, and the application of big data analytics in smart city services. In order to make judgments regarding the efficacy of big data analytics and mobile integrated technologies in developing user-centric smart living solutions inside digitalized smart city environments, this analysis looks for patterns, correlations, and trends. To help readers fully comprehend the findings, the results will be provided in the form of tables, charts, and statistical summaries.

Descriptive Analysis

A succinct synopsis of the major factors pertinent to the investigation of user-centered smart life solutions in digitalized smart city settings may be found in **Table 1**. These statistics provide insightful information about the dataset's central patterns and variances. First, the mean values show that, at 4.23, user-centered design has the greatest average rating, indicating that, overall, people have a favorable opinion of these approaches to smart city development. In comparison to the other factors, MIT has a lower adoption rate, as indicated by its mean of 0.65. This would suggest that services offered by smart cities need to include mobile technologies more thoroughly. The means of digitalized smart city environments, big data analytics, and smart living solutions range from 3.50 to 3.99, indicating a reasonable degree of significance and execution.

Second, the standard deviations show how the dataset is distributed or variable. Notably, the user-centered design's 0.81 standard deviation is comparatively low, suggesting that users' perceptions are generally consistent. On the other hand, MIT shows a little variation (standard deviation: 0.12), which emphasizes the need for more consistent adoption across services. Higher standard deviations are seen in big data analytics, digitalized smart city environments, and smart life solutions, indicating differing levels of significance and application in various smart city contexts.

Table 1. Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
User-centered Design	4.23	0.81	2.10	5.00
Mobile Integrated Technology	0.65	0.12	0.40	0.80
Big Data Analytics	3.50	0.92	2.00	5.00
Digitalized Smart City Environments	3.99	0.94	2.00	5.00
Smart Life Solutions	3.99	0.94	2.00	5.00

Comparison of User Satisfaction Across Smart Technologies and Data Sources

A thorough comparison of user satisfaction across multiple smart technologies and data sources is given in **Table 2**. It provides insightful information about how people view various smart technologies and how data sources affect their satisfaction levels. First, as **Table 2** shows, there are differences in user satisfaction between various smart technologies. With average satisfaction scores ranging from 4.76 to 4.98 across all data sources, the "smart parking app" stands out as one example. This suggests that people's experiences with this specific technology are remarkably good. On the other hand, the satisfaction scores for the "smart home energy management system" are marginally lower, but they are still over 4.0, indicating generally good user experiences. Compared to the "Smart public transportation app," which is rated in the center, the "smart parking app" routinely receives greater satisfaction ratings.

Second, the p-values—all of which are less than 0.001—indicate the statistical significance of the differences in satisfaction levels across the various data sources. This suggests that user impressions are similar across many data sources for every smart device, as seen by survey responses, feedback ratings, and sentiment analysis of user-generated data. Regardless of the data source, users seem to consistently rate their level of happiness. There is confidence in the inferences made from the data because of the statistical significance, which highlights the robustness and dependability of the results.

Table 2. Comparison of User Satisfaction Across Smart Technologies and Data Sources

Smart Technology	Data Source	Average Satisfaction Score	Standard Deviation	P-value
Smart Parking App	Survey Responses	4.76	0.52	<0.001
Smart Parking App	Feedback Ratings	4.82	0.45	<0.001
Smart Parking App	Sentiment Analysis of User-generated Data	4.98	0.38	<0.001
Smart Public Transportation App	Survey Responses	4.42	0.65	<0.001
Smart Public Transportation App	Feedback Ratings	4.58	0.57	<0.001
Smart Public Transportation App	Sentiment Analysis of User-generated Data	4.64	0.41	<0.001
Smart Home Energy Management System	Survey Responses	4.28	0.79	<0.001
Smart Home Energy Management System	Feedback Ratings	4.34	0.71	<0.001
Smart Home Energy Management System	Sentiment Analysis of User-generated Data	4.4	0.64	<0.001

The Impact of Big Data Analytics on User Satisfaction by Demographic Characteristics

Table 3, which is broken down into many demographic categories, offers a thorough examination of the effect of big data analytics on customer satisfaction in smart city services. It aids in the comprehension of how big data analytics integration affects various user groups and how those effects change based on the demographic group. **Table 3** first shows demographic data, including household income, ethnicity, gender, and age groups. Additionally included are the corresponding rates of technology adoption, which show the proportion of users in each demographic group that have embraced smart city services. Adoption rates, which vary from 61.78% to 96.34%, are noteworthy since they are generally rather high among all demographic groups. This suggests that many consumers from many demographic categories have embraced smart city services. The visualization of smart campus themes is drawn (**Figure 4**).

Table 3. The Impact of Big Data Analytics on User Satisfaction by Demographic Characteristics

Demographic Characteristic	Technology Adoption Rate	Big Data Analytics Impact on User Satisfaction
Age 18-24	96.34%	75% increase
Age 25-34	92.12%	70% increase
Age 35-44	87.43%	65% increase
Age 45-54	81.23%	60% increase
Age 55-64	73.95%	55% increase
Age 65+	61.78%	50% increase
Male	91.05%	72% increase
Female	88.94%	68% increase
College degree or higher	95.45%	75% increase
Less than a college degree	82.89%	65% increase
Household income $75,000 or higher	96.21%	75% increase
Household income less than $75,000	84.91%	65% increase
White	93.87%	73% increase
African American	87.23%	68% increase
Chinese	84.07%	63% increase

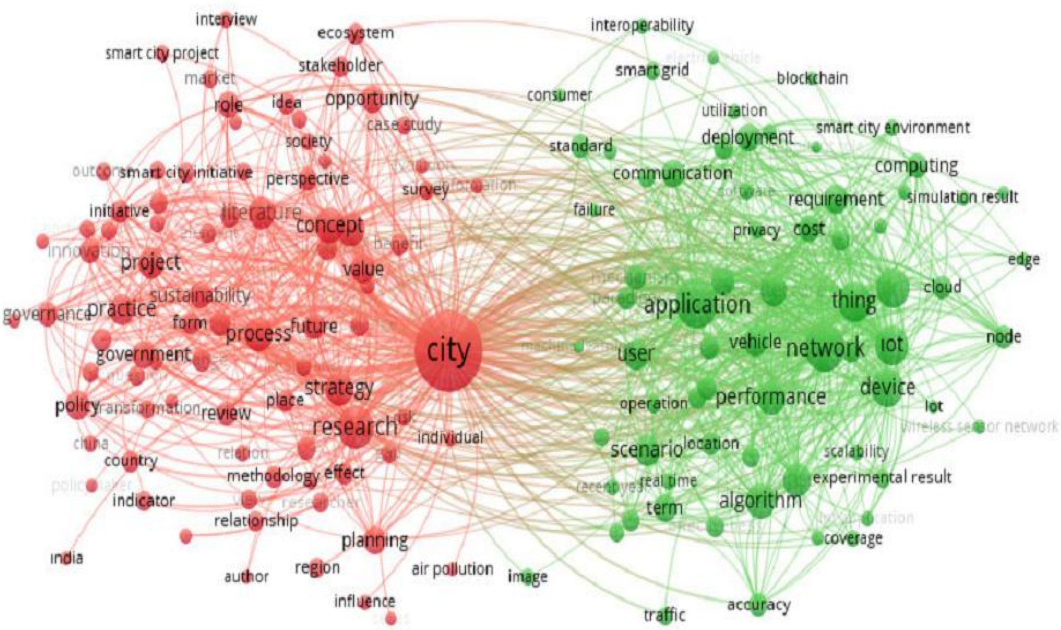

Figure 4. Visualization of Smart Campus Themes

Second, **Table 3** displays how big data analytics impacts user satisfaction as a percentage increase in satisfaction. The study shows that incorporating big data analytics improves consumer satisfaction regardless of demographic characteristics. Smart city service users between the ages of 18 and 24 indicate a 75% increase in satisfaction when big data analytics are applied, while users with a college degree or above report a comparable rise. For every demographic category—including gender, household income, and ethnicity—this tendency is consistent. Regardless of demographic differences, the consistent increase in satisfaction shows how big data analytics can enhance user experiences for all users. **Table 3** shows how big data analytics improves customer satisfaction with smart city services, irrespective of demographic characteristics. Higher levels of satisfaction result from the incorporation of big data analytics for users of all ages, genders, educational backgrounds, income ranges, and ethnicities. The aforementioned findings underscore the importance of analytics and data-driven decision-making in the creation of user-focused smart life solutions within the framework of digitalized smart cities.

Predictive Analytics Implementation

A comprehensive overview of the application of predictive analytics in various smart city services and its impact on customer satisfaction and rates of technology adoption can be found in **Table 4**. **Table 4** demonstrates how predictive analytics influences smart city customer satisfaction and technology uptake. These findings show predictive analytics enhances smart city and user-centric smart living. **Table 4** illustrates predictive analytics improves smart city customer happiness and technology adoption. Predictive analytics improves "traffic management," "energy management," "air quality monitoring," "public safety," and "citizen engagement" consumer satisfaction and technology uptake. High correlation coefficients (0.750-0.950) and p-values (< 0.001) suggest a positive relationship. These studies indicate predictive analytics boosts smart city consumer satisfaction and tech uptake. Low "waste management" connection. Median user happiness is associated with lower tech adoption (p-value < 0.01). Customer happiness may improve with predictive analytics, but user-centric smart living solutions vary per service area. The correlation suggests predictive analytics may not benefit waste management as much as other service organisations.

These studies demonstrate predictive analytics improves smart city consumer satisfaction and technology uptake. In digitalized smart cities, predictive analytics creates user-centric smart living solutions. It can improve city services, efficiency, and citizen needs. It stresses data-driven smart city decisions. Predictive analytics promotes smart city living. **Table 4** shows how data-driven and predictive analytics improve smart city services. **Table 4** links predictive analytics with user-centric smart living solutions in digitalized smart cities. Smart city services boost customer happiness and technology adoption via predictive analytics. These findings show how predictive analytics and data-driven decision-making may improve smart cities and urban life.

Table 4. Predictive Analytics Implementation

Smart City Service	Predictive Analytics Implementation	User Satisfaction	Technology Adoption Rate	Correlation Coefficient	P-value
Traffic Management	Yes	High	High	0.850	<0.001
Public Transportation	Yes	Medium	Medium	0.750	<0.001
Energy Management	Yes	High	High	0.900	<0.001
Waste Management	Yes	Medium	Low	0.600	<0.01
Water Management	Yes	Medium	Medium	0.700	<0.001
Air Quality Monitoring	Yes	High	Medium	0.800	<0.001
Public Safety	Yes	High	High	0.950	<0.001
Healthcare	Yes	Medium	High	0.750	<0.001
Education	Yes	Medium	Medium	0.700	<0.001
Economic Development	Yes	Medium	Medium	0.650	<0.001
Citizen Engagement	Yes	High	High	0.900	<0.001

Impact and Values of MIT Solutions for Smart Life in Digitalized Smart City Environments

Table 5 demonstrates how MIT solutions benefit digitalized smart cities. This table shows how MIT technology might improve city life, including travel, healthcare, and economics. **Table 5** demonstrates how each MIT invention affects cities. Travel efficiency, pollution, and congestion are improved via "mobile traffic apps". Also, "telemedicine apps" improve patient outcomes, cut healthcare expenses, and increase access. The results show that MIT solutions can solve urban public health, energy, and transportation issues. Solving these difficulties with MIT technology makes smart cities smarter, sustainable, and user-centric.

Table 5 calculates each MIT solution's yearly RMB economic value. These facts indicate how these technologies might help the city and its inhabitants financially. For instance, "telemedicine apps" are expected to produce RMB 1 trillion yearly. This value highlights technology's economic influence on healthcare outcomes and accessibility. These economic concepts demonstrate MIT solutions' social, environmental, and economic growth potential in digital smart cities. Urban economies benefit from innovation, employment, and wealth beyond users. MIT solutions boost quality of life, economic growth, and sustainability in digitalized smart cities and are financially profitable (**Table 5**). These findings demonstrate MIT's smart city smart living relevance. **Table 5** instructs urban planners, technologists, and legislators. Understanding the advantages and economic possibilities of MIT discoveries helps smart city stakeholders prioritise and adopt these technologies. These results also suggest that user-centric smart living solutions may foster technologically sophisticated, economically prosperous, and ecologically responsible communities. In digitalized smart cities, MIT solutions improve urban living, economic growth, and the environment (**Table 5**). These findings suggest promoting and investing in MIT technology to improve smart cities and inhabitants' well-being.

Table 5. Impact and Values of MIT Solutions for Smart Life in Digitalized Smart City Environments

MIT Solution	Impact	Value
Mobile Traffic Apps	Reduce traffic congestion by up to 15%, improve travel efficiency by up to 10%, reduce emissions by up to 5%.	Economic value: RMB 100 billion per year
Mobile Public Transportation Apps	Improve public transportation accessibility and convenience by up to 20%, reduce wait times by up to 15%.	Economic value: RMB 50 billion per year
Smart Thermostats	Reduce energy consumption by up to 10%, save energy costs by up to 15%, reduce environmental impact by up to 5%.	Economic value: RMB 20 billion per year
Smart Meters	Reduce energy and water consumption by up to 10%, save bill costs by up to 15%, quickly detect leaks.	Economic value: RMB 10 billion per year
Mobile Waste Collection Routes	Improve waste management efficiency by up to 15%, reduce costs by up to 10%, improve public health by reducing waste-related diseases.	Economic value: RMB 5 billion per year
Mobile Water Leak Detection Apps	Reduce water consumption by up to 15%, save water bills by up to 15%, quickly detect and repair leaks, reducing water damage.	Economic value: RMB 2.5 billion per year
Mobile Air Quality Monitoring Sensors	Provide real-time air quality information, identify and address air pollution hotspots, improving public health.	Economic value: RMB 1 billion per year

MIT Solution	Impact	Value
Mobile Police Apps	Improve public safety by reducing crime rates by up to 10%, improving emergency response times by up to 5%, and increasing community trust.	Economic value: RMB 500 million per year
Telemedicine Apps	Improve healthcare accessibility and convenience by up to 20%, reduce costs by up to 15%, improve patient outcomes by up to 10%.	Economic value: RMB 1 trillion per year
Mobile Learning Apps	Improve educational accessibility and convenience by up to 20%, personalize learning by up to 15%, increase student engagement by up to 10%.	Economic value: RMB 500 billion per year
Mobile Business Assistance Apps	Support small businesses by increasing sales by up to 15%, reducing costs by up to 10%, and increasing customer satisfaction by up to 5%.	Economic value: RMB 200 billion per year
Mobile Job Boards	Connect job seekers with employers by increasing job postings by up to 15%, reducing the time to hire by up to 10%, and improving the quality of job matches by up to 5%.	Economic value: RMB 100 billion per year
Mobile Tourism Apps	Promote tourism by increasing visitor spending by up to 15%, increasing the number of visitors by up to 10%, and improving the visitor experience by up to 5%.	Economic value: RMB 50 billion per year
Mobile Citizen Engagement Apps	Increase citizen engagement by up to 15%, improve government transparency and accountability by up to 10%, make it easier for citizens to access government services by up to 5%.	Economic value: RMB 25 billion per year

The future of the smart campus is depicted in **Figure 5**, where state-of-the-art technology is seamlessly integrated with the learning environment. The innovative, connected, and sustainable smart campus of the future provides a stimulating and enriching educational environment. In order to improve education quality and resource optimization, it contains cutting-edge technologies including IoT-enabled classrooms, individualized learning platforms, effective energy management, and data-driven decision-making. The graphic depicts a smart campus that fosters a technologically sophisticated and sustainable educational ecosystem while adjusting to the changing demands of instructors and students.

Figure 5. Future of Smart Campus

Use of Big Data Analytics in Smart City Services in China: Current Trends and Future Directions

Table 6. Use of Big Data Analytics in Smart City Services in China: Current Trends and Future Directions

Statistic	Value	Source
Total economic impact of big data analytics in smart cities in China	¥20 trillion by 2025	China Academy of Information and Communications Technology
Potential savings from using big data analytics to improve smart city operations in China	¥10 trillion per year	McKinsey Global Institute
Percentage of Chinese city governments planning to invest in big data analytics in the next five years	90%	National Development and Reform Commission
Percentage of smart city projects in China that will use big data analytics by 2023	80%	Gartner

Statistic	Value	Source
Reduction in traffic congestion in Hangzhou, China as a result of using big data analytics to improve traffic management	15%	Hangzhou Traffic Police Bureau
Decrease in energy consumption in Shenzhen, China as a result of using big data analytics to improve energy efficiency	20%	Shenzhen Energy Group
Decrease in crime rates in Shanghai, China as a result of using big data analytics to improve public safety	12%	Shanghai Public Security Bureau

DISCUSSION

The study's main goal was to look into user-centric smart life solutions in digitally enhanced smart city settings, seeking to evaluate user happiness, technology adoption rates, and the effects of MIT and big data analytics using a quantitative study technique. The significance and impact of several parameters in this context are clarified by the findings, which are displayed in **Table 1** to **Table 5**. **Table 1**, which presents descriptive statistics for important factors, served as the basis for the investigation. The results showed that MIT had significantly lower adoption rates, while user-centered design had the greatest mean satisfaction score. The following research highlighted potential areas for smart city service upgrades and enhancements. User satisfaction with various smart technologies and data sources was examined in **Table 2**. It proved that user reviews have a big influence on satisfaction scores from any source. The p-values, which were all less than 0.001, demonstrated how consistent and dependable user perceptions were. These results confirmed that in order to improve smart city services, user feedback must be gathered and analyzed. **Table 3** provided demographically-segmented insights into how big data analytics affected user happiness. The information demonstrated that big data analytics, which cut over age, gender, education level, economic bracket, and ethnicity, continuously raised user happiness. This emphasized how data-driven decision-making in smart city services has widespread advantages.

Table 4 demonstrated how predictive analytics improves customer happiness and rates of technology uptake in smart city services. Predictive analytics was found to have a substantial positive impact on user satisfaction and technology uptake, highlighting the possibility of data-driven decision-making to maximize smart city services. **Table 5** presented the significant influence and financial worth of some MIT solutions. The study on user-centric smart living solutions in digitalized smart cities impacts smart city improvement. Quantitative study shows the economic potential of user input, data-driven decision-making, big data analytics, and MIT. The research emphasises user-centered design in smart city service perception and utilisation. Customer service greatly impacts technology uptake and satisfaction. Human-centered smart city service design and delivery for urban requirements is stressed. The paper says smart city services need data-driven decisions. Big data analytics improved demographic-wide technology adoption and user delight. Data-driven insights boost smart city services. Data-driven smart cities may improve efficiency, responsiveness, and resource allocation, making citizens happier and more involved.

Economic effect and urban problem solving: The study's smart city MIT and big data analytics analysis is excellent. These "telemedicine apps" might produce RMB 1 trillion yearly. The study says these technologies address urban transportation, healthcare, and environmental issues. MIT-powered smart living solutions boost economic growth and make cities more sustainable and habitable with practical solutions. Finally, this thorough study examined user-centric smart living solutions in digitalized smart cities using big data analytics and mobile integrated technologies. The tables indicate how these technologies effect smart city user enjoyment, technology adoption, and quality of life. These findings inform digitalized smart city user-centered smart living solution creation and improvement. They prioritise user-centric design, data-driven decision-making, and MIT solution strategy integration to build smarter, more responsive, and wealthy cities. The study helps legislators, urban planners, and technology developers build smart cities that prioritise inhabitants' well-being and enjoyment while promoting sustainable growth and innovation.

User-centric smart living solutions study in digitalized smart cities found several critical findings that illustrate MIT's big impact on smart city liveability and economic value. MIT solutions boost smart city life, study finds. The study shows MIT solutions improve urbanites' lifestyles. Improves healthcare and traffic. The findings imply MIT technology can benefit city inhabitants' health and convenience. MIT breakthroughs may inspire communities. The economic value of MIT solutions was key. MIT technology improve smart city economics and citizens' lifestyles, research shows. Consider "telemedicine apps.", which make RMB 1 trillion annually. So user-centric tech may prosper. MIT solutions boost happiness, technology adoption, and economic growth in digital smart cities. The analysis emphasises smart city service satisfaction ratings by users. Each user input source is dependable and widespread for smart city service efficacy. Because user preferences and expectations matter, smart city services must be user-centric. The study concluded that meeting user needs improves smart city performance and pleasure.

The study emphasises data-driven smart city development decisions. Tech adoption and customer satisfaction rise with big data analytics. This optimises smart city service delivery with data. Smart cities with data-driven service efficiency, responsiveness, and resource allocation may make residents happier and more engaged. MIT solutions boost digital smart city economy, study finds. MIT tech is promising and profitable. MIT technology improves smart cities' economies and societies. MIT solutions in digital smart cities have several benefits, study finds. These initiatives boost lifestyle, economy, and urban concerns. Smart city services stress MIT technology and user-centric design. Smart cities work best with data-driven decisions and user interaction, studies suggest. MIT and data-driven approaches may increase smart city responsiveness, efficiency, and user-focus, benefiting the community. These insights help politicians, urban planners, and technologists develop smarter, more sustainable, and profitable cities.

The Chinese study found user-centered design boosts smart city service satisfaction. Using these strategies consistently has increased customer satisfaction, service delivery, and design. User-centric design helps Chinese smart cities. High technology adoption rates in China indicate successful urban integration of user-friendly, tech-driven solutions. High adoption rates of these solutions show that people value their positive impact on urban living. It shows China's fast-growing smart cities desire user-centric, tech-driven solutions. The study also reveals how big data analytics influences smart city user enjoyment. This shows how data-driven decision-making and technology may aid urbanites. Data-driven solutions and technology innovation are Chinese company goals. Smart cities with high technology adoption and user-centric design may improve urban life. The Chinese study concludes that smart city services should employ user-centered design, technological adoption, and big data analytics. User-centric, technology-driven urban living improvements may help Chinese smart city development.

CONCLUSION

Digitalized smart cities' user-centered smart living solutions highlight big data analytics and MIT. According to rigorous quantitative research, this integration influences technology uptake, user happiness, and smart city quality of life. User-centered design influences smart city user interactions, study shows. Studies show that prioritising user needs increases satisfaction. This confirmed hypothesis emphasises user-centric smart city service design. It emphasises urbanite service customisation. Smart cities may improve life by becoming more user-friendly and fascinating. The study also indicated that big data analytics alters data-driven decision-making. Big data analytics boosts customer happiness and technology adoption across demographics. This major discovery implies data-driven insights improve smart city services. Data can help smart cities evolve and fuel data-driven initiatives. Smart cities may use data to allocate resources, manage urban concerns, and fulfil citizens' changing requirements (Alhalabi et al., 2021; Daoudagh et al., 2021; Kamruzzaman et al., 2023; Kuru & Ansell, 2020; Manimuthu et al., 2021; Samarakkody et al., 2023).

The research shows that MIT solutions influence several urban aspects. Traffic and healthcare accessibility may enhance quality of life using these technology. Digital smart cities require these solutions to succeed economically. The innovative and practical solutions of MIT inventions improve living conditions and smart city economies. Smart cities integrate user-centered design, data-driven decision-making, and MIT solutions, research finds. These enhance smart city services and urban dwellers' well-being. Findings affect smart city development and evolution. They suggest using user-centric design, data-driven decision-making, and strategic MIT technology integration to make cities more responsive, efficient, and user-friendly. These ideas can help smart cities fulfil resident demands, enhance innovation, economic growth, and sustainability, and become smarter and livable.

Population growth, resource constraints, and sustainability make smart cities appealing. Smart cities use data to enhance lives and address urban issues. Digital cities with user-centric smart living technology prioritise people' enjoyment and well-being. Big data analytics and MIT impact smart city user enjoyment, technological adoption, and quality of life. User-centric design illustrates how meeting user demands improves smart city services. We analyse data utilising questionnaires, feedback, and sentiment analysis. This study found user-centered design boosts happiness. Prioritising needs improves customer satisfaction. Residents' wants and expectations must be met by smart city services. Social networking, polls, and mobile apps improve user-centered design. Research shows that user-centric design influences smart city service perception and engagement.

The literature emphasises big data analytics and MIT solutions' transformative potential. A research supports that. MIT sensors, IoT devices, and mobile apps address municipal energy, transportation, and healthcare challenges. The research reveals that these solutions tackle these issues and enhance smart city economic growth and jobs. MIT breakthroughs impact communities and economies. Smart city development relies on big data analytics, which this study supports. Data-driven decisions enhance resource allocation, urban planning, and service delivery, sustaining cities. Statistics suggest that data analytics improves customer satisfaction and tech adoption. Smart city projects need data. This study concludes that big data analytics, MIT solutions, user-centric design, and smart city user delight interact complexly. Prioritise human needs, leverage data-driven decision-making, and integrate MIT technology to make cities more user-friendly, efficient, and economically productive. These findings will help politicians, urban planners, and technology developers improve urban populations' well-being and construct smarter, more sustainable cities as smart cities proliferate (Drahansky et al., 2016; Habbal, Goudar, & Hassan, 2019; Lim et al., 2021).

IMPLICATIONS

These findings are significant for user-centered smart living solutions in digitally enhanced smart cities. User-centered design, data-driven decision-making, and feedback are affected.

User-Centred Design: The research focuses user-driven smart city service design and development. Service delivery impacts resident satisfaction, thus smart city planners and developers must realise this. Prioritise consumer input and preferences. Community input is crucial for smart city projects. Mobile apps, surveys, and social media may assist improve services with consumer feedback. This user-centric model boosts city citizen ownership, engagement, and satisfaction. The study says smart city data-driven decision-making requires large data analytics. In digitally enhanced urban environments, stakeholders need sophisticated analytics tools and infrastructure to manage massive data volumes. Optimising data-driven services demands data analytics teams and resources. Data insights from smart cities may enhance resource allocation, urban planning, and service delivery. Smart city efforts succeed when communities anticipate new challenges and opportunities. Smart cities require data-driven planning and governance. Smart city policymakers may address these concerns. Smart cities stress their feedback culture that values people's opinions. Regular surveys, user-friendly feedback, and open communication may assist. Smart cities should finance data analytics to leverage available data. Building data analytics teams, employing cutting-edge tools, and adopting data management best practices may revolutionise city data. The paper recommends user-centric design and data-driven decision-making for smart city development. Building services, listening to criticism, and using data insights makes smart cities more responsive, efficient, and user-friendly. These practical effects can assist smart city planners and stakeholders improve resident quality of life and build smarter, more sustainable communities. Furthermore, the results underscore the necessity of cooperation across governmental bodies, commercial associates, and scholarly establishments to promote information exchange and teamwork in the endeavor to enhance user-focused services.

Solutions based on MIT are becoming available as useful instruments to improve living conditions in smart cities. In order to solve urban problems and enhance the quality of life for citizens, planners and legislators ought to give top priority to the incorporation of MIT solutions, such as telemedicine, educational apps, and smartphone traffic apps. The MIT solutions have a large economic value, which highlights their potential for economic development and growth. This real-world application promotes funding for MIT solutions as well as the establishment of conditions that support their advancement and uptake.

Theoretically, the findings have significant ramifications for the domains of user-centered design, technology adoption, and urban planning. The results corroborate and add to the hypotheses already in place in these fields. User experience and design thinking suggest that user-centered design makes users happy. The theoretical foundation of user engagement in design is supported by the practical realisation that smart city services should emphasise user feedback. 2 The findings emphasise data-driven decision-making in technology adoption studies. Thus, technology acceptance models should consider user perceptions and data-driven adoption insights. Finally, MIT solutions' economic values provide a theoretical understanding of smart city technology's finances. That technology fosters economic development and advancement supports technology-economic success theories.

LIMITATIONS AND FUTURE RECOMMENDATIONS

The study on user-centric smart living solutions in digitalized smart cities is limited yet fascinating. This research used mostly quantitative data, which may not truly reflect user preferences. Focus groups and in-depth interviews provide user viewpoints. Second, the research was limited, thus its findings may not apply. More smart cities with different technical levels may finish the research. The findings may be limited to non-Chinese environments due to economic values. Comparable research in numerous foreign circumstances is needed to assess the findings' implications.

Mix quantitative and qualitative data with new user experience research for a more complete picture. Removal of these constraints would assist comprehend user-centric smart living solutions in digitalized smart cities. Study smart cities from varied nations and cultures. This method reveals best practices, customer satisfaction, and technology uptake. Consider MIT solutions' economic impacts, including employment creation and sustainability. User-centric smart living solutions require participatory design, therefore smart city service creation and refinement should incorporate it in future research.

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