Global Review of Islamic Economics and Business, Vol. 11, No. 2 (2023) 073-088
Published by Faculty of Islamic Economics and Business, State Islamic University Sunan Kalijaga Yogyakarta
e-ISSN: 2338-7920, p-ISSN: 2338-2619

The Behavioral Intention of Citizens to Finance Smart City Development in Indonesia through Civic Crowdfunding

Mohamed Asmy Bin Mohd Thas Thaker[a, *]

[a]*Associate Professor, Department of Economics, International Islamic University Malaysia*

Keywords:
Civic Crowdfunding,
Smart City,
Financing,
and Technology Acceptance Model

JEL Classification:
R0, O0, and G0

Article History:
Received: 25 October 2023
Revised: 8 December 2023
Accepted: 18 December 2023
Published: 27 December 2023

Citation:
Thaker, M. A. B. M. T. (2023). The behavioral intention of citizens to finance smart city development in indonesia through civic crowdfunding. *Global Review of Islamic Economics and Business, 11*(2), 73-88. https://doi.org/10.14421/grieb.2023.112-06

Abstract: In order to foster the creation of sustainable and habitable urban areas that cater to the needs of all residents, it is imperative to construct new infrastructure and concurrently ensure the upkeep and modernization of existing ones. This is where the concept of smart cities becomes instrumental, exerting a profound impact on the broader urban landscape. However, a significant challenge lies in securing the financial resources required for the development of smart cities, particularly in the midst of the current economic downturn. As a solution to this challenge, the present study proposes the implementation of an Integrated Civic Crowdfunding Model (ICCM) to finance the development of smart cities in East Java, Indonesia. Based on this proposed model, the study delves into the willingness of citizens to adopt ICCM. To achieve this, an analysis is performed utilizing Partial Least Squares on primary data collected through a survey administered to residents of East Java, specifically in Surabaya (SmartPLS). Additionally, the study assesses the model's adoption in practice by incorporating an extended Technology Acceptance Model (TAM). The study's results reveal that factors such as the perceived usefulness, perceived ease of use, and perceived benefits positively influence residents' intentions to use ICCM, thereby contributing to the advancement of smart cities in Indonesia. Furthermore, there is a favorable correlation and direct impact of perceived ease of use on the perceived utility of ICCM among citizens. These findings can serve as a foundation for the development of a specialized framework for examining other aspects of the ICCM model and devising relevant intervention strategies for the enhancement of smart cities in East Java.

Originality/Value: The originality of this study lies in its introduction and application of the Integrated Civic Crowdfunding Model (ICCM) to finance the development of smart cities in East Java, Indonesia.

Introduction

The world is becoming increasingly urbanized for the past few decades. Sustainable cities and communities constitute one of the goals of the United Nation sustainable goals because of the significant roles of cities as the powerhouse of economic growth in any country. According to the UN Sustainable

*Corresponding author.
asmy@iium.edu.my (M. A. B. M. T. Thaker)
https://doi.org/10.14421/grieb.2023.112-06

Development Goals framework for Covid-19 recovery (2021), more than half of the world population lives in cities and it is expected to rise to 60 percent by 2030.

The smart cities concept has recently gained popularity due to its potential as a catalyst to economic growth by proffering solutions to social, economic and environmental challenges faced by urban dwellers. A smart city is a city that combines ICT, technology, and innovation to address urban issues in order to improve the quality of life, promote economic growth, establish a sustainable and safe environment, and support efficient urban management methods. The conventional methods of urban management are viewed as antiquated and necessitate a more inventive approach to attain effectiveness, as highlighted by Ngah (2009). In order to ensure the creation of sustainable and habitable cities that cater to the needs of all citizens, it is imperative to establish new infrastructure while simultaneously ensuring the upkeep and modernization of existing structures. This is where the concept of smart cities assumes a prominent role and exerts significant influence. Smart cities make substantial contributions to social stability and economic growth by fostering an environment that encourages enterprises to invest their resources and expertise in the city. Additionally, they enhance the well-being and contentment of their residents, thereby contributing to prosperity and happiness.

Smart city services provide citizens with an improved living environment and increase their overall quality of life. Indeed, the development of appropriate smart city technologies can provide access to development and economic opportunities. Furthermore, the need of smart cities emerges due to (i) rapid urbanisation is placing increased pressure on limited resources and infrastructure, while climate change and cyber threats add new risks and uncertainties; (ii) to address the former challenges and provide ever deeper public services, governments and cities are constrained by limited fiscal resources and influence; and (iii) a number of breakthroughs have delivered powerful technologies that are redefining the ways in which cities operate, and people live, work and socialise

Inspired by the importance of smart cities, the Indonesian government has launched Smart City Master Plan Preparation Guidance Book prepared by Ministry of Communication and Information Technology of the Republic of Indonesia. It is to harness and enhance the role of cities as the growth engines of the national economy and help to transform Indonesia from a low-income country into a high-income country. The plan will form guidance for Indonesia's pilot cities across states and regions, formulated to address urban challenges arising from rapid urbanisation, meet national and global agendas, adopt new global development trends, promote digital economy and position Indonesian cities to be at par with other cities globally.

Furthermore, in 2019, Indonesia embarked on a journey toward establishing 100 Smart Cities, showcasing its commitment to leveraging technology to enhance urban development and achieve more efficient, transparent, and dependable governance. Noteworthy urban centers in Indonesia, such as Bandung and Bogor, have already embraced and implemented innovative Smart City concepts. In East Java, a number of cities, including Surabaya City, Malang City, and Banyuwangi Regency, have also adopted the Smart City model, furthering the integration of technology and innovation in their urban development initiatives.

As contained in the plan too, local authorities are encouraged to generate new ideas and a new mode of promoting smart planning, smart city management services and smart city administration. The continuing growing expenditures to maintain the cities in the face of limited resources and exposure of cities to decay especially the inner-city areas. Recent government efforts to reduce the continuous budget deficit have constraint Indonesian government ability to allocate enough funds for development expenditure (Yong, 2017). The traditional means of urban management is considered outdated and required some innovative approach to achieve effectiveness (Ngah, 2009). In order to provide sustainable and liveable cities for all the citizens, new infrastructures must be provided while the existing built infrastructures must be maintained and modernized.

Meeting the financial requirement especially in this difficult economic period remains a challenge. Achieving a sustainable smart city requires inclusive citizen participation and financial stability. Given the existing situation, innovative finance approaches like civic crowdfunding are needed to mitigate this challenge. Civic crowdfunding has emerged as a viable participatory tool in current urban development processes. The concept of civic crowdfunding stem from the notion that citizens generally care for their communities and may be passionate to pay for certain services or provide funding for some projects. Civic crowdfunding can thus be defined as an innovative alternative revenue collection instrument in the city governance (Gierczak et al., 2015). In light of the rapid adoption of civic crowdfunding as a

complementary financial instrument rather than a replacement, a series of platforms have been established to realize the purpose. Examples of such platforms are i.e. spacehive and citizen Investors.

Although participatory and collaborative planning methods have gained recognition as effective approaches for enhancing direct citizen engagement in the formal planning procedures of smart cities, limited research has explored the capacity of civic crowdfunding to foster participatory mechanisms and enable citizens to actively contribute to and influence the development of the urban landscape in a grassroots and innovative fashion.

In line with this perspective, the current study introduces the Integrated Civic Crowdfunding Model (ICCM) as a proposed approach to fund the development of smart cities in East Java, Indonesia. The ICCM is anticipated to serve as an effective solution to bridge the financial gap in this context. Given that smart city initiatives are inherently citizen-centered, this study employs the Technology Acceptance Model (TAM) theory to elucidate the behavioral intentions of the East Java community regarding the adoption of the proposed model. Smart city services are designed to enhance the living environment and overall quality of life for citizens. Since citizens are the primary users of these services, it is of paramount importance to consider their ideas and perspectives during the planning and management of such services. To the best of the researcher's knowledge, there has been no empirical investigation into the optimization of civic crowdfunding as a source of financing for smart cities using the TAM framework.

In light of the aforementioned considerations, this paper primarily aims to introduce the Integrated Civic Crowdfunding Model (ICCM) and examine the behavioral intentions of the public regarding the utilization of ICCM as a funding source for the development of smart cities. The structure of this paper is organized as follows: the second section delves into the literature review, while the third section outlines the methodology employed in this study. The fifth section presents the principal findings of the study and provides a discussion of these results. Finally, the sixth section offers the conclusion and policy recommendations.

Literature Review

Smart City (SC)

The term "smart city" is often used interchangeably, but it broadly refers to the incorporation and utilization of information and communication technology (ICT) infrastructures to advance social and urban development by improving the economy, public involvement, and government efficiency. Cities that are constructed with this new digital layer of smart city services not only become more intelligent but also better cater to the needs of their mobile citizens. As Neirotti et al. (2014) noted, cities employing ICT solutions may not always be labeled as superior cities, but these implementations can yield intermediate outcomes that exemplify their smart city initiatives by offering their residents an enhanced and more sophisticated way of life. In order to be more specific, smart cities aim to establish a foundation for human-centered and sustainable socioeconomic well-being and quality of life, as mentioned by Kulkki (2014). This includes the use of ICT applications for managing intelligent transportation systems, monitoring natural resources, overseeing energy and water usage, managing buildings, addressing urban development and sprawl, facilitating online education, and employing ICT in healthcare, city safety, e-service delivery, e-democracy, and government participation. Therefore, the successful implementation of urban management should prioritize meeting contemporary needs and demands of citizens while promoting active and seamless interaction among residents to enhance their quality of life through ICT-based smart city services.

Smart City in Surabaya, East Java

Urbanization offers economic benefits, but it brings forth a set of distinctive challenges. As East Java experiences a swift increase in its population, it must enhance its ability to provide public services, address issues related to traffic congestion, handle waste and pollution, and guarantee the well-being and safety of its citizens. All of this must be done while striving to foster a united and engaged community.

In Indonesia, the Ministry of Communication and Information Technology introduced a pilot project for the Smart City Initiative in 2017. The objective was to achieve the establishment of 100 Smart Cities by 2020, each tailored to the diverse community and urban characteristics they encompass. However, the realization of the Smart City concept in each city is contingent upon the extent to which the local government adapts the concept to the unique local attributes, including those of Surabaya. Surabaya stands as Indonesia's second-largest city and serves as the capital of the East Java province. Positioned along the northern coast of East Java, the city is administratively divided into 163 districts and 31 sub-districts. Surabaya ranks as the second most populous city in Indonesia, following Jakarta, and its population is expanding at an annual rate of 1.2%. In 2015, the total working-age population in Surabaya was approximately 2,909,257 people, which accounts for roughly 48 percent of its total population.

The city of Surabaya represents one of the Indonesian cities actively progressing towards smart city development, particularly in the realm of urban settlement. Within the city, numerous urban villages persist in their efforts to preserve their identity and significance in the face of Surabaya's transformation into a metropolitan area. These urban villages should be leveraged to become distinguishing features or exemplary models of urban development, while still respecting the historical roots from which Surabaya emerged. Urban villages are Surabaya City characteristics that must be preserved by capitalising on the city's rapid development toward smart city status. Surabaya is well-known for its potential development of world-class urban settlements. This is an opportunity to accelerate Surabaya's transition to a smart city by focusing on the settlement sector. Surabaya urban village is the primary attraction, however as the city develops toward metropolitan status, the Surabaya City Government and community participation do not preclude the presence of urban kampung. The city of Surabaya's distinctiveness in urban development, particularly in the domain of settlements, lies in its utilization of local capabilities to establish inclusive, secure, and robust urban villages. This approach aligns with the findings of convergence, contributing to the realization of sustainable urban communities. Surabaya is home to thematic villages, where communities have been cultivated and designated as pilot villages, allowing them to evolve and grow autonomously under the oversight of the municipal government.

Smart City Financing Challenges

Challenges related to financing smart city projects, as highlighted by Breuer et al. (2014), include a scarcity of available funds, disparities in financing structures, a lack of well-defined business models, and substantial initial investment costs. These factors collectively hinder the progress of local collaborative and innovative platforms, as noted by Breuer et al. (2014).

In a study by Pierce and Anderson (2017), the predominant obstacles in smart city initiatives stemming from municipal decisions within the European Union were examined. Their findings revealed that there are limitations in funding for smart city initiatives and difficulties in realizing returns on investments made in smart city projects.

As noted by Carvalho (2015), the challenges related to smart city initiatives are amplified by the restricted availability of public funding and the need for substantial private investment. Meanwhile, Manville et al. (2014) underscore the risks linked to reallocating fixed capital towards local experimental infrastructure projects and the complexities involved in generating returns on investments in smart city ventures due to the extended timeframe required to realize the benefits of these "smart" capabilities.

Alongside the insights from Manville et al. (2014), Costa et al. (2013) provided a summary of the financial challenges facing smart cities. They emphasized the substantial investment risks linked to innovations and the extended timeframe necessary for investments to become profitable or yield anticipated returns. In conclusion, it is evident from the literature that there is a consistent consensus on the critical role of finance in the advancement of smart cities.

According to Silva et al. (2018), a major obstacle in establishing a feasible Smart City program is the expense associated with deployment. The more cost-effective the deployment, the greater the likelihood of its practical implementation. Furthermore, the affordability of maintenance plays a crucial role in the sustainability of such initiatives; the lower the maintenance costs, the higher the probability of long-term viability.

Technology Acceptance Model (TAM) and Smart City

The Technology Acceptance Model (TAM), initially developed by Davis (1989), has garnered substantial empirical support for its effectiveness in predicting the adoption of technology across various technological contexts, as demonstrated by McKinnon and Igonor (2008). TAM stands out as one of the most reliable models and has served as the foundational framework for numerous other empirical studies focused on forecasting technological adoption and changes in user behavior, as discussed by Kabbiri et al. (2018). This model posits that an individual's intention to adopt a technological system or innovation is influenced by two key beliefs: perceived usefulness and perceived ease of use. It's important to note that the application of TAM assumes that individuals have a degree of control over whether they choose to use the system, as indicated by Pearlson and Saunders (2006).

Perceived usefulness (PU) is described as "the extent to which an individual believes that utilizing a specific system would improve their productivity," as defined by Davis (1989). In contrast, perceived ease of use (PEOU) is defined as "the extent to which an individual believes that using a particular system would require minimal effort," also articulated by Davis in the same year.

In recent decades, robust theoretical models for technology acceptance have been developed. However, adapting these models to the context of smart cities is challenging due to the limited availability of empirical studies in emerging smart city environments that can help predict their success, as observed by Praharaj et al. (2018). A study conducted by Shareef et al. (2009), focusing on Bangladesh, explored users' perceptions and determined that security, ease of use, and relative advantage are the top three factors influencing users' perceptions. This research underscores the distinct values held by urban residents in emerging urban economies and illustrates the potential for the model to tailor urban service technology to various cultural contexts.

Setiajadi et al. (2019) carried out a study in Sampang district and Pamekasan to assess the readiness for implementing smart cities. The findings of the study indicated a significant relationship and relevance between the variables in the Technology Acceptance Model (TAM), with a particular focus on perceived usefulness and perceived ease of use.

Prior empirical studies have applied the Technology Acceptance Model (TAM) across various industries, including the educational sector, small and medium-sized enterprises (SMEs), the general public, and the manufacturing environment. For example, Ndubisi et al. (2001) examined the applicability of TAM in predicting technology usage among entrepreneurs and found it to be a valid model. Ramayah et al. (2002) further validated the TAM in predicting Internet shopping behavior. Ramayah et al. (2002) tested the applicability of TAM for both Internet banking users and non-users. In the education sector, Ramayah et al. (2003a) employed TAM along with motivational variables to explain Internet usage among students in institutions of higher learning. Ramayah and Aafaqi (2004) extended the use of TAM to predict e-library usage by incorporating self-efficacy into the model. Meanwhile, Ramayah et al. (2003) applied the TAM to elucidate Internet shopping behavior among the Malaysian public. These studies demonstrate the versatility of TAM as a framework for understanding technology adoption and usage in diverse contexts.

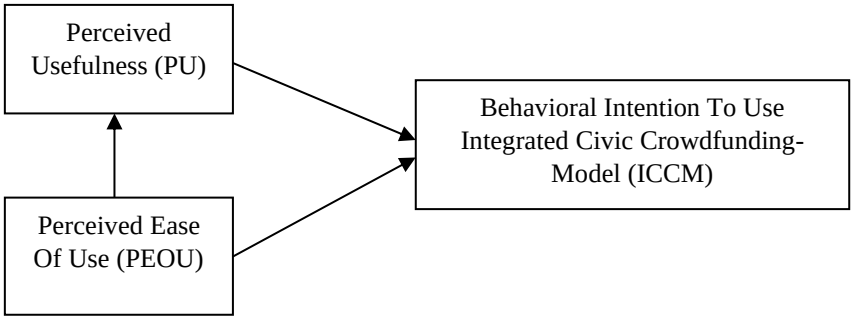

Figure 1. Technology Acceptance Model (TAM)

In this study, the Technology Acceptance Model (TAM) is employed due to its predictive capacity when examining citizens' engagement in technology adoption. The TAM is utilized to establish causal

relationships between perceived usefulness (PU), perceived ease of use (PEOU), and the behavioral intention to use (BIU) the Integrated Civic Crowdfunding Model (ICCM). This adaptation of the TAM is intended to reflect the unique context of the proposed model in the study (see Figure 1).

Based on TAM framework, the present study comes out with three main hypotheses, which are:
(i) Hypothesis 1
Ho: There is no significant (positive) influence of perceived usefulness on the intention to engage in ICCM among citizens in Surabaya, East Java.

Ha: There is a significant (positive) influence of perceived usefulness on the intention to engage in ICCM among citizens in Surabaya, East Java.

(ii) Hypothesis 2
Ho: There is no significant (positive) influence of perceived ease of use on the intention to engage in ICCM among citizens in Surabaya, East Java.
Ha: There is a significant (positive) influence of perceived ease of use on the intention to engage in ICCM among citizens in Surabaya, East Java.

(iii) Hypothesis 3
Ho: There is no significant (positive) influence of perceived ease of use on perceived usefulness of ICCM among citizens in Surabaya, East Java.
Ha: There is a significant (positive) influence of perceived ease of use on perceived usefulness of ICCM among citizens in Surabaya, East Java.

Civic Crowdfunding

Civic crowdfunding has recently gained popularity as a means of finance. This success is attributable in part to its inclusive nature. For the first time, civic crowdfunding enables ordinary citizens to "go online and invest in causes they believe in."

Civic crowdfunding is a specialized form of crowdfunding that has gained increasing attention in academic research and practitioner discussions. The concept of 'civic crowdfunding' involves the funding of projects with a distinct 'civic' or community-oriented purpose. These initiatives are typically initiated by 'civic' organizations, supported by individuals and groups with a strong civic-minded intent, and facilitated through online platforms dedicated to advancing civic goals and engaging relevant stakeholders. The term 'civic' encompasses actions and efforts within cities or municipalities, as well as actions undertaken by citizens in pursuit of a shared community objective, as described by Wenzlaff (2020).

The financing of various public initiatives, such as bridges, streets, beaches, gardens, playgrounds, theaters, museums, festivals, events, as well as science and health institutions, political campaigns, and monuments, has found a place on crowdfunding platforms specifically dedicated to civic causes. These projects are often featured within the 'Community' categories on platforms that serve broader purposes, reflecting the diverse range of civic endeavors that benefit from crowdfunding support.

A significant proportion of civic crowdfunding campaigns are typically featured on donation-based crowdfunding platforms. For instance, the public's collective effort to acquire New Zealand's Tasman Beach was conducted on the donation-based platform GiveALittle, as documented by Boyle (2016) and Doan and Toledano (2018). Civic crowdfunding initiatives can also be found on reward-based crowdfunding platforms, providing backers with tangible and intangible incentives. An example is the campaign aimed at providing relief to the Greek population during the financial crisis, which was hosted on Indiegogo in 2015.

Spacehive, a UK-based crowdfunding platform, was established in 2011 and officially launched in 2012. According to its website, the platform's core mission is to simplify the process for as many individuals as possible to transform their civic environment. Despite being relatively new, Spacehive has witnessed rapid user growth, making it an insightful case for examining how Social Mission Platforms (SMPs) can handle and surmount the early challenges of maintaining their social missions while fostering diverse cross-sector user expansion. By the end of 2018, Spacehive had successfully raised over £10.5 million in funding for civic projects spanning 349 cities, towns, and villages

throughout the UK. Among the projects initiated on the platform, 51 percent were categorized as "successfully supported." It's worth noting that Spacehive employs an all-or-nothing funding model, meaning that if a project fails to secure its full funding goal, the pledged funds are returned to the backers. Spacehive also applies a 5 percent fee to the funds collected by projects that achieve their funding goals.

Civic crowdfunding has been extensively utilized in numerous other nations to finance various public initiatives, particularly for the development of smart cities. Applying this concept to Surabaya's Smart City development could play a pivotal role in advancing socio-economic progress. Therefore, this research aims to raise awareness about civic crowdfunding among citizens interested in participating in the Integrated Civic Crowdfunding Model (ICCM). Such efforts may pave the way for an additional avenue of generating sustainable funds for smart city projects.

Developing Integrated Civic Crowdfunding Model (ICCM)

The model we have created, referred to as the Integrated Civic Crowdfunding Model (ICCM), comprises two distinct groups: citizens and government institutions. This study primarily centers on civic crowdfunding, which, in this context, takes the form of donation-based civic crowdfunding and reward-based civic crowdfunding. The structure of the proposed model is visually represented in Figure 2.

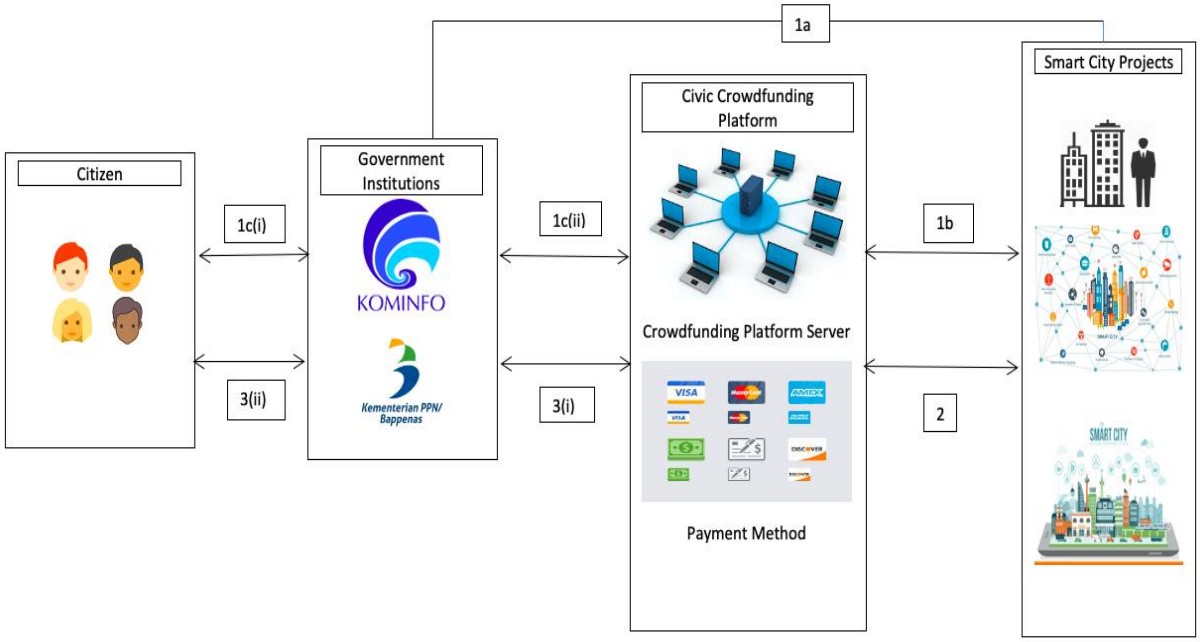

Figure 2: Proposed Integrated Civic Crowdfunding Model (ICCM)
Source: Author's own illustration.

The current research proposed Integrated Civic Crowdfunding Model (ICCM) platform for effective financing of smart city initiatives and projects in East Java, Indonesia. It involves citizens, government institutions, civic crowdfunding platform and the smart city projects. The proposed model platform could be illustrated by Figure 2. The following are the detailed explanation of proposed ICCM for smart city financing:

a) Government institutions intend to initiate a crowdfunding campaign for smart city projects through crowdfunding platforms (1a and 1b). This fundraising initiative encompasses various aspects of the smart city projects. All campaign-related information, including visual content such as photographs or videos, is presented in electronic format and subsequently submitted to the civic crowdfunding platform (1b).

b) Government institutions have the responsibility of overseeing and operating the envisioned civic crowdfunding platform. They will also handle the collection of contributions on behalf of smart city development. Upon receiving a crowdfunding campaign from citizens, government institutions will conduct a thorough screening and evaluation of the campaign before posting it on the platform. Additionally, they will assign a suitable campaign name and upload it to the proposed platform to attract potential funders.
c) After the campaign is successfully uploaded into the system, the smart city projects and associated campaigns must secure funding within a predetermined timeframe, with the possibility of extensions. What sets civic crowdfunding apart is the collaborative effort between government institutions and citizens to finance the smart city projects (1c(ii)). The platform will draw in a diverse range of participants, including the general public, businesses, and organizations, to engage in these campaigns (1c(i)).
d) Both the funders, which include both citizens and government institutions, have the flexibility to opt for either donation-based civic crowdfunding or reward-based civic crowdfunding. They explore online platforms to discover project requests and ultimately make selections based on the smart city projects they wish to support. Funds are then transferred or sent through payment gateways for contribution.
e) When the designated funding goal from the funders is achieved, the system will promptly update the project status and maintain a record of the received funds until they are prepared for distribution. The system proceeds to disburse the funds to the smart city project developers through government collaboration, and subsequently, they are notified to prepare for the disbursement of funds to the specific campaign (2).
f) Civic crowdfunding platform provider will release the fund to particular projects. Government institutions will manage and supervise their identified smart city campaigns (2).
g) It is imperative for them to continually monitor the progress and input these updates into the system until the specific campaign reaches its conclusion. This ongoing process guarantees transparency between the stakeholders and the citizens. Additionally, the system facilitates communication with citizens for control and audit purposes using a straightforward medium like short message services (SMS) (3(i) and 3(ii)).

Methods

This study centers on the residents of Surabaya, located in the East Java region of Indonesia. Surabaya is among the Indonesian cities actively progressing towards smart city development, particularly in the realm of urban settlements. The survey questionnaires were distributed randomly to Surabaya's adult population, aged eighteen and above.

We employed a self-administered survey to gather data, receiving a total of 200 completed questionnaires from micro-enterprises. However, only 134 of these questionnaires were utilized for subsequent data analysis. The collected data was then subjected to analysis using SmartPLS version 3.3.9. Our choice of SmartPLS was based on its capability to simultaneously measure causal relationships among all latent constructs, while effectively addressing measurement errors within the structural model (Farooq & Markovic, 2016; Hair et al., 2017). The advantages of employing PLS include its flexibility with regard to measurement scales, sample size, and residual distributions, as highlighted by Chin et al. (2003).

Research Findings and Discussion

Descriptive Analysis- Demography Information

As illustrated in Table 1, 40.5 percent of the respondents are male, while 59.5 percent are female. The predominance of female respondents is evident and highlights the significant role of women in driving smart city development in the context of East Java, Indonesia.

A significant majority (84.2 percent) of the respondents fall within the age group of 20-40, with a smaller proportion (15.9 percent) being over 40 years of age. Consequently, the survey responses largely represent the attitudes and viewpoints of middle-aged and younger individuals, considering those above 40 as the older segment of respondents. Consequently, it appears that the survey findings would be considerably shaped by the perspectives of married middle-aged participants. The results also reveal that the majority of the participants are single, followed by the married segment.

Furthermore, with regard to educational attainment, a significant majority of respondents have completed tertiary education (50 percent), followed by those who have completed primary and secondary schooling (33.3 percent). In contrast, 15.9 percent of respondents hold postgraduate or professional degrees. This data underscores the inclination of an educated demographic to actively participate in smart city development initiatives.

Table 1. Distribution of Respondents by Demography Information

Items	Categories	Percent
Gender	Male	40.5
	Female	59.5
Age	20-30	55.6
	31-40	28.6
	41-50	10.3
	>50	5.6
Marital Status	Single	50.8
	Married	48.4
	Divorced	0.8
Education Level	No Education	0.8
	Primary	23.8
	Secondary	9.5
	Tertiary	50
	Postgraduate/Professional	15.9
Occupation	Government	21.4
	Private	34.9
	Self-business	24.6
	Others	19
Awareness Of Civic Crowdfunding	Yes	10.3
	No	89.7
Willingness To Use Civic Crowdfunding	Yes	79.4
	No	20.6

Assessment of Measurement Model

In the initial stage, we conducted a test for convergent validity, which considered indicators or item loadings, average variance extracted (AVE), and composite reliability (CR). As shown in Table 2, the item loadings exceeded 0.6 for all items, meeting the recommended threshold suggested by Hair et al. (2013). Regarding AVE, Hair et al. (2006) propose that it should be higher than 0.5. In our study, AVEs ranged from 0.588 to 0.867, comfortably meeting this threshold. The CR values ranged from 0.908 to 0.927, aligning with the recommended value of 0.7 as suggested by Hair et al. (2006). The results of the measurement model are presented in Table 2 and Figure 3.

Following the earlier test for convergent validity, the next step involves examining discriminant validity. Traditionally, the Fornell-Larcker (1981) criterion has been used for this purpose. However,

this criterion has faced criticism for not always reliably detecting the lack of discriminant validity in common research scenarios (Henseler et al., 2015). As an alternative approach, Henseler et al. (2015) have proposed using the heterotrait-monotrait ratio of correlations to assess discriminant validity. They have also demonstrated the superior performance of this method through a Monte Carlo simulation study. In line with this, we conducted the test for discriminant validity using this newly suggested method, and the results are presented in Table 3. If the HTMT (heterotrait-monotrait) value exceeds the threshold value of 0.85 (Kline, 2011) or 0.90 (Gold et al., 2001), it indicates a potential issue with discriminant validity.

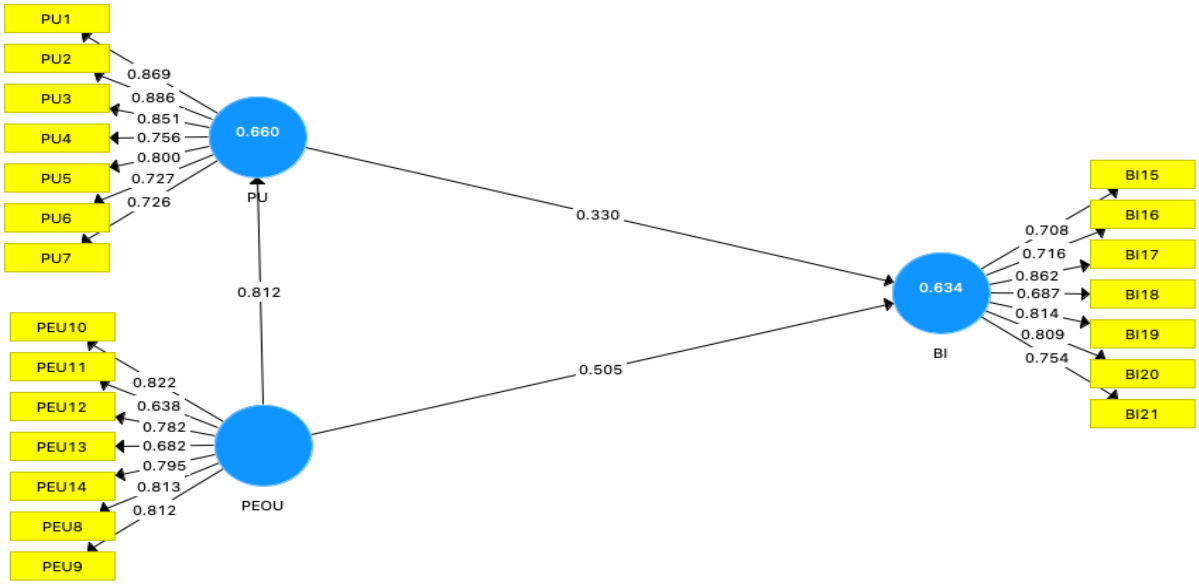

Figure 3. Measurement Model

Table 2. Results of Measurement Model

Construct	Items	Loadings	AVE	CR
Perceived Usefulness (PU)	PU1	0.869	0.812	0.927
	PU2	0.886		
	PU3	0.851		
	PU4	0.756		
	PU5	0.800		
	PU6	0.727		
	PU7	0.726		
Perceived Ease of Use (PEOU)	PEU8	0.813	0.867	0.908
	PEU9	0.812		
	PEU10	0.822		
	PEU11	0.638		
	PEU12	0.782		
	PEU13	0.682		
	PEU14	0.795		
Behavioral Intention (F)	BI15	0.708	0.588	0.908
	BI16	0.716		
	BI17	0.862		
	BI18	0.687		
	BI19	0.814		
	BI20	0.809		
	BI21	0.754		

While the present findings indicate that all values are above the threshold of $HTMT_{0.90}$ (Gold et al., 2001) and also exceed $HTMT_{0.85}$ (Kline, 2011), as presented in Table 3, the results signify that discriminant validity has been successfully established through HTMT inference. The HTMT inference approach, which involves the use of bootstrapping techniques as suggested by Henseler et al. (2015), further supports the discriminant validity. Using this method, if the confidence interval for any of the constructs does not encompass the value of 1, it confirms that discriminant validity is in place. Based on these outcomes, it can be concluded that the measurement model demonstrates both adequate convergent and discriminant validity.

Table 3. HTMT Criterion

	BI	PEOU	PU
BI			
PEOU	0.867 CI.90 (0.887, 0.944)		
PU	0.812 CI.90 (0.798, 0.941)	0.904 CI.90 (0.862, 0.966)	

Assessment of Structural Model

In accordance with the study by Ramayah et al. (2016), the use of R-squared (R^2) is advocated as a means to evaluate the quality of the structural model. As elucidated by Hair et al. (2011), R^2 offers valuable insights into the coefficient of determination, shedding light on the significance of the path coefficients (beta values). In the specific context of the current research, the R^2 value stands at 0.62, denoting that approximately 62 percent of the variability in the behavioral intention to utilize Integrated Care Case Management (ICCM) can be ascribed to the combined influence of perceived ease of use and perceived usefulness.

Subsequently, to evaluate the statistical significance of the path coefficients in the study, the research employed bootstrap analysis with 500 resampling iterations, as presented in Table 4. The results of this analysis indicate that perceived usefulness and perceived ease of use both exhibit a positive relationship with behavioral intention to use ICCM, with path coefficients b= of 0.812 ($p < 0.10$) and 0.505 ($p < 0.10$), respectively. Additionally, it was found that perceived ease of use has a positive relationship and a direct effect on perceived usefulness, with a path coefficient of 0.330, which is statistically significant at $p < 0.05$. These outcomes provide support for Hypotheses 1, 2, and 3. The detailed results of the structural model can be found in Table 4 and Figure 4.

Table 4. The Results of Structural Model

Hypothesis	R/ship	Std. Beta	Std. error	t-value	Decision
H1	PEOU-> BI	0.505	0.126	3.99	Supported
H2	PU -> BI	0.812	0.032	25.5	Supported
H3	PEOU -> PU	0.330	0.122	2.7	Supported

*Significance at 10%, one-tailed test.

Importance-Performance Map Analysis (IPMA)

According to Ringle and Sarstedt (2016), the Importance-Performance Matrix Analysis (IPMA) serves the purpose of identifying antecedent factors that exhibit relatively low performance but possess a high degree of importance with regard to the target constructs. In the context of Partial Least Squares Structural Equation Modeling (PLS-SEM), IPMA emerges as a valuable analytical tool. It graphically enhances the conventional path coefficient estimates, rendering them in a more practical and insightful format (Ringle and Sarstedt, 2016).

Within the scope of this study, the focal construct of interest is the behavioral intention to adopt ICCM, as illustrated in Figure 2. This behavioral intention is predicted by two antecedent constructs:

perceived ease of use (PEOU) and perceived usefulness (PU). The study has leveraged Importance-Performance Matrix Analysis (IPMA), and the results are presented in Figure 5 and Table 5.

The results of the Importance-Performance Matrix Analysis (IPMA) shed light on the dynamics of the two antecedent constructs, perceived ease of use (PEOU) and perceived usefulness (PU), in relation to the prediction of the behavioral intention to adopt ICCM. The IPMA findings underscore that PEOU stands out with both high performance and substantial importance as a contributing factor to the behavioral intention of ICCM adoption. In contrast, while PU exhibits high performance, it appears to carry relatively less importance in comparison to PEOU concerning its impact on shaping the behavioral intention to adopt ICCM. This underscores the pivotal role of PEOU as a primary determinant in influencing and shaping individuals' behavioral intentions towards the adoption of ICCM, a conclusion that finds strong support within the IPMA results.

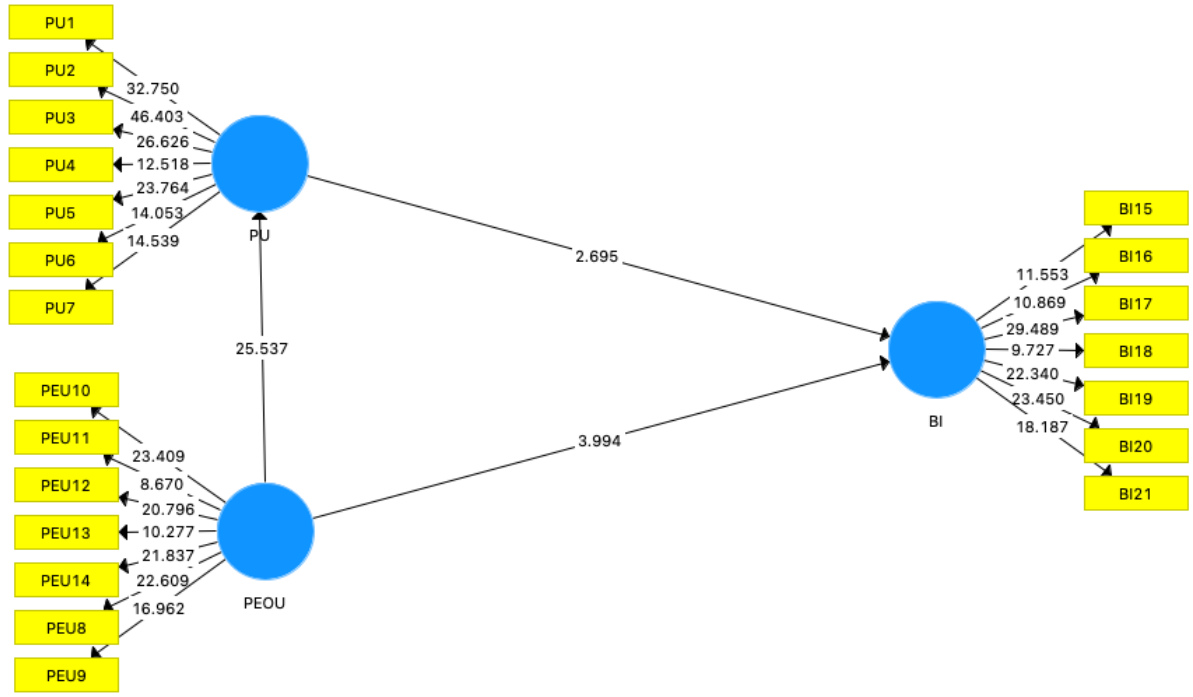

Figure 4. Structural Model

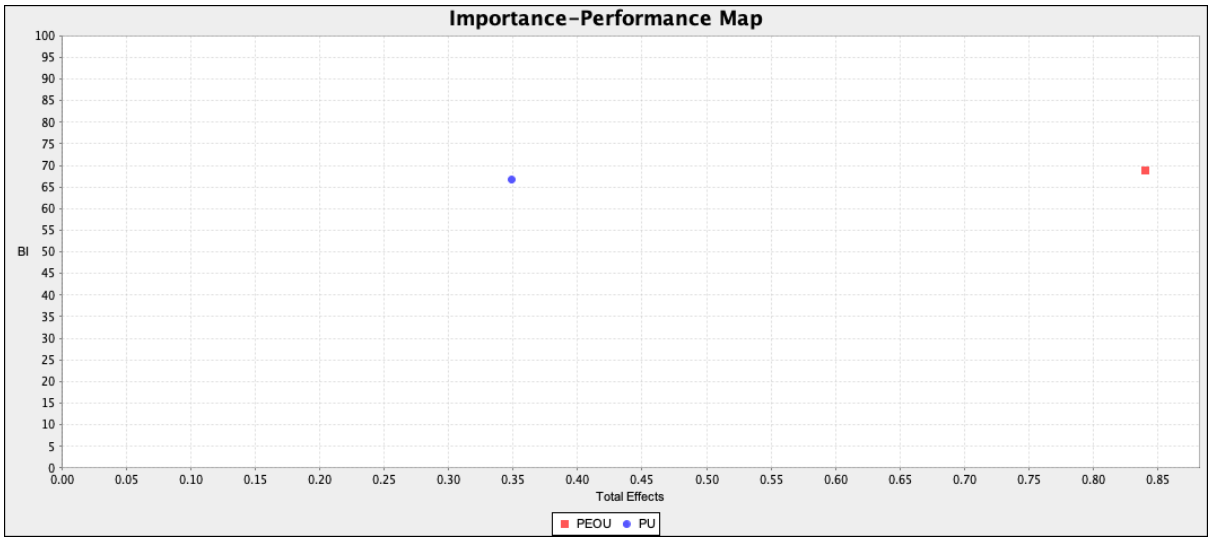

Figure 5. Importance-Performance Map

Table 5. Importance-Performance Map Analysis Statistics

Construct	Importance (Total Effect)	Performance (Index Values)
PEOU	0.840	68.9
PU	0.349	66.7

Discussion of Results

In this study, the research focused on assessing the behavioral intention of citizens residing in East Java, particularly in Surabaya, to adopt and utilize the Integrated Civic Crowdfunding Model (ICCM). The findings of the study indicate that this behavioral intention is primarily influenced by two key factors: perceived usefulness and perceived ease of use. These two factors play a pivotal role in shaping the citizens' intentions to engage with the ICCM platform in Surabaya and East Java as a whole.

Perceived usefulness in the context of this study refers to the citizens' belief that an online-based system, such as Integrated Civic Crowdfunding Model (ICCM), will assist them in achieving their work-related goals. In the context of smart city initiatives or projects, there is a clear need for a mechanism that can facilitate the raising of financing to support and expand these activities. ICCM, as an online platform, serves as a means for citizens to contribute to and participate in smart city projects by donating funds to further their development in East Java, Indonesia. The study's findings indicate that citizens are motivated to engage with this proposed model because they perceive ICCM as beneficial and valuable. They believe that ICCM enables them to participate in smart city projects and initiatives, fostering a sense of active involvement in their community's development. This positive perception encourages citizens to utilize this technology for their purposes. Furthermore, given that ICCM involves a platform for capital raising, citizens are more likely to engage with this model if they consider it a useful and interactive platform. This aligns with previous research by Venkatesh et al. (2000), Abassi et al. (2011), and Cheng et al. (2007), which emphasized the importance of perceived usefulness in technology adoption. As a result, this model is expected to generate a positive perception among citizens who are eager to contribute to the advancement of smart city development in Indonesia.

Perceived ease of use, as defined by Davis (1989), refers to an individual's belief that technology is user-friendly and easy to operate. In the context of the Integrated Civic Crowdfunding Model (ICCM), this means that the more straightforward and accessible the platform is, the more likely citizens are to participate and contribute funds using it. In essence, citizens are more inclined to adopt ICCM when they find it easy to use, which results in a positive attitude towards the platform.

Furthermore, this ease of use is associated with several elements, such as efficient information retrieval, minimal risk, accessibility to smart city projects, available rewards, and security features. These attributes contribute to the perceived ease of use, making ICCM an attractive option for citizens. This observation is in line with research by Davis (1989), Gefen & Straub (2004), and Yi et al. (2005), which highlight the importance of ease of use in technology adoption.

Moreover, the study suggests that perceived ease of use is positively linked with perceived usefulness. In other words, the easier the system is to use, the more valuable it is perceived to be. For ICCM, this implies that the platform should incorporate features that are not only user-friendly but also serve the needs of citizens who seek to participate and contribute funds for smart city initiatives. These features can enhance the platform's overall utility and appeal.

Conclusion

This article aimed to develop a citizen-centric strategy for financing smart cities by examining local technological acceptance factors. The study underlines the potential of technology acceptance tools in the advancement of smart cities. By conducting surveys, analysis, and gaining insights into technological acceptance, it provides both theoretical and empirical support for the implementation of smart cities in less affluent countries. Currently, the proposed model stands as the most comprehensive and accessible means to assess the acceptability of urban technology services in the context of developing nations. The research findings hold significant relevance for technology managers, smart city administrators, and urban service providers. They contribute to streamlining the smart city transformation process by clarifying the essential elements that determine behavioral intention,

ultimately influencing the pace of smart city development. These critical variables are instrumental in enhancing our understanding of residents' attitudes toward the adoption of information- and communication-based urban technology services.

This paper has introduced the Integrated Civic Crowdfunding Model (ICCM) with the aim of financing the development of smart cities in East Java, Indonesia. Subsequently, the study empirically tested the behavioral intention of citizens to adopt this model by applying the Technology Acceptance Model (TAM). In doing so, the author extended the application of TAM within the context of civic crowdfunding and smart cities. The study has effectively demonstrated that both perceived usefulness and perceived ease of use play direct and significant roles in influencing citizens' intentions to use ICCM. These findings hold great potential for the development of a specific framework for examining other facets of ICCM usage behavior and for devising appropriate intervention strategies to enhance its capacity in furthering the development of smart cities in Indonesia. In essence, this research serves as a valuable foundation for advancing the understanding and implementation of civic crowdfunding within the smart city context.

There are some potential limitations of the study. First, the study focuses on the context of East Java, Indonesia, which may limit the generalizability of the findings to other regions with different cultural, economic, and technological backgrounds. The effectiveness of the Integrated Civic Crowdfunding Model (ICCM) may vary in diverse contexts. Second, although TAM is a well-established framework, it has its limitations in explaining the complexities of technology adoption. Other factors, such as social influence, trust, and perceived risk, could be relevant but are not extensively addressed. Third, the study relies on survey data, which may be subject to response bias and may not capture the full spectrum of citizen perspectives and behaviors regarding ICCM.

Acknowledgement

This research is partially funded by FRGS, MOHE (Grant ID: FRGS/1/2023/SS01/UIAM/02/1).

References

Abbasi, A., Hossain, L., Uddin, S., & Rasmussen, K. J. R. (2011). Evolutionary dynamics of scientific collaboration networks: Multi-levels and cross-time analysis. *Scientometrics, 89*(2), 687-710.

Boyle, T. M. (2016). *The city and the crowd: An exploration of civic crowdfunding disruption to local government led city planning and the quest to co-create liveability* [Master Thesis, University of New England].

Breuer, J., Walravens, N., & Ballon, P. (2014). Beyond defining the smart city: Meeting top-down and bottom-up approaches in the middle. *TeMA: Journal of Land Use, Mobility and Environment*. http://doi.org/10.6092/1970-9870/2475

Carvalho, L. (2015). Smart cities from scratch? A socio-technical perspective. *Cambridge Journal of Regions Economy and Society, 8*(1), 43-60. https://www.doi.org/10.1093/cjres/rsu010

Cheng, E. W., Li, H., & Fox, P. (2007). Job performance dimensions for improving final project outcomes. *Journal of Construction Engineering and Management, 133*(8), 592-599.

Costa, S., Chira, C., Deambrogio, E., Horatz, M., Lindholm, P., Nielsen, D., Pasic, E., & Bhana, R. (2013). Using EU funding mechanisms for smart cities. In J. N. Ferrer (Ed.), *Smart Cities Stakeholder Platform.* Smart Cities and Communities.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*, 983-1003.

Doan, M. A., & Toledano, M. (2018). Beyond organization-centred public relations: Collective action through a civic crowdfunding campaign. *Public Relations Review, 44*(1), 37–46.

Farooq, M. S., & Radovic-Markovic, M. (2016). *Modeling entrepreneurial education and entrepreneurial skills as antecedents of intention towards entrepreneurial behaviour in single mothers: A PLS-SEM approach*. Entrepreneurship: Types, Current Trends and Future Perspectives, 198, 216.

Fornell, C., & Larcker, D. F., (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50.

Gefen, D., & Straub, D. W. (2004). Consumer trust in B2C e-Commerce and the importance of social presence: Experiments in e-Products and e-Services. *Omega, 32*(6), 407-424.

Gierczak, M. M., Bretschneider, U., Haas, P., Blohm, I. and Leimeister, J. M. (2015). Crowdfunding: Outlining the new era of fundraising. In O. Gajda, & Brüntje, D. (Eds.) *Crowdfunding in Europe: State of the art in theory and practice*. Springer.

Gkypali, A., Arvanitis, S., Tsekouras, K. (2018). Absorptive capacity, exporting activities, innovation openness and innovation performance: A SEM approach towards a unifying framework. *Technological Forecasting and Social Change, 132*(C), 143–155.

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems, 18*(1), 185-214.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2013). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage.

Hair, J., Blake, W., Babin, B., & Tatham, R. (2006). *Multivariate data analysis*. Prentice Hall.

Hair Jr, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: Updated guidelines on which method to use. *International Journal of Multivariate Data Analysis, 1*(2), 107-123.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice, 19*(2), 139-152.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science, 43*(1), 115-135.

Indiegogo. (2015). *Greek bailout fund*. Indiegogo.

Kabbiri, R., Dora, M., Kumar, V., Elepu, G., & Gellynck, X. (2018). Mobile phone adoption in agri-food sector: Are farmers in Sub-Saharan Africa connected? *Technological Forecasting and Social Change, 131*, 253–261.

Kline, R. B. (2011). *Convergence of structural equation modeling and multilevel modeling*. The SAGE Handbook of Innovation in Social Research Methods, 562-589.

Kulkki, S. (2014). Cities for solving societal challenges towards human-centric socio-economic development? *Interdisciplinary Studies Journal, 3*(4), 8–14.

Manville, C., Cochrane, G., Cave, J., Millard, J., Pederson, J. K., Thaarup, R. K., Liebe, A., Wissner, M., Massink, R., & Kotterink, B. (2014). *Mapping smart cities in the EU*. European Parliament.

McKinnon, K., & Igonor, A. (2008, November). Explaining eLearning perceptions using the technology acceptance model and the theory of planned behavior. *E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education*, 2994-2999. Association for the Advancement of Computing in Education (AACE).

Ndubisi, N. O., Jantan, M., & Richardson, S. (2001). Is the technology acceptance model valid for entrepreneurs? Model testing and examining usage determinants. *Asian Academy of Management Journal, 6*(2), 31-54.

Ngah, K. (2009). *The future challenges of local authorities in Malaysia*. Centre for Policy Research & International Studies, Universiti Sains Malaysia.

Neirotti, P., Marco, A. D., Cagliano, A. C., Mangano, G., & Scorrano, F. (2014). Current trends in smart city initiatives: Some stylised facts. *Cities, 38*, 25–36.

Praharaj, S., Han, J. H., & Hawken, S. (2018). Towards the right model of smart city governance in India. *International Journal of Sustainable Development and Planning, 13*(2), 171–186. http://doi.org/10.2495/SDP-V13-N2-171-186

Pearlson, K. E., & Saunders, C. S. (2006). *Managing & using information systems: A strategic approach*. John Wiley & Sons.

Pierce, P., & Andersson, B. (2017). Challenges with smart cities initiatives: A municipal decision makers perspective. *Proceedings of the Hawaii International Conference on System Sciences*, 2804–2813. Institute of Electrical and Electronics Engineers.

Ramayah, T., Ma'ruf, J. J., Jantan, M., & Osman, M. (2002*)*. Technology acceptance model: Is it applicable to users and non-users of internet banking. *Proceedings of the International Seminar, Indonesia-Malaysia, the Role of Harmonization of Economics and Business Discipline in Global Competitiveness, Banda Aceh, Indonesia*, 14-15.

Ramayah, T., Jantan, M., Noor, M. N. M., Razak, R. C., & Koay, P. L. (2003). Receptiveness of internet banking by Malaysian consumers: The case of Penang. *Asian Academy of Management Journal, 8*(2), 1-29.

Ramayah, T., & Aafaqi, B. (2004). Role of self-efficacy in e-library usage among students of a public university in Malaysia. *Malaysian Journal of Library & Information Science, 9*(1), 39-57.

Ramayah, T., Ling, N. S., Taghizadeh, S. K., & Rahman, S. A. (2016). Factors influencing SMEs website continuance intention in Malaysia. *Telematics and Informatics, 33*(1), 150-164.

Ringle, C. M., & Sarstedt, M. (2016). Gain more insight from your PLS-SEM results: The importance-performance map analysis. *Industrial Management & Data Systems, 116*(9), 1865-1886.

Setijadi, E., Darmawan, A. K., Mardiyanto, R., Santosa, I., Hoiriyah, & Kristanto, T. (2019). a model for evaluation smart city readiness using structural equation modelling: A citizen's perspective. *Fourth International Conference on Informatics and Computing (ICIC)*, 1-7. http://doi.org/10.1109/ICIC47613.2019.8985969

Shareef, M. A., Kumar, U., Kumar, V., Dwivedi, Y. K. (2009). Identifying critical factors for adoption of E-government. *Electronic Government an International Journal, 6*(1), 70–96. http://doi.org/10.1504/EG.2009.022594

Silva, B. N., Khan, M., & Han, K. (2018). Towards sustainable smart cities: A review of trends, architectures, components, and open challenges in smart cities. *Sustainable Cities and Society, 38*, 697–713. https://doi.org/10.1016/j.scs.2018.01.053

Venkatesh, V., Morris, M. G., & Ackerman, P. L. (2000). A longitudinal field investigation of gender differences in individual technology adoption decision-making processes. *Organizational Behavior and Human Decision Processes, 83*(1), 33-60.

Verma, P., & Sinha, N. (2018). Integrating perceived economic wellbeing to technology acceptance model: The case of mobile based agricultural extension service. *Technological Forecasting and Social Change, 126*, 207–216.

Vilajosana, I., Llosa, J., Martinez, B., Prieto, M. D., Angles, A., & Vilajosana, X. (2013). Bootstrapping Smart Cities through a Self-Sustainable Model Based on Big Data Flows. IEEE Communications Magazine, 51(6), 128-134. http://dx.doi.org/10.1109/MCOM.2013.6525605

Wenzlaff, K., Hoffmann, A., & Pachali, D. (2012). Freiwillig bezahlen? Crowdfunding und social payment im journalismus. In D. Pachali (Ed.), *Öffentlichkeit Im Wandel: Medien, Internet, Journalismus* (pp. 82–87). Heinrich-Böll-Stiftung.

Wenzlaff, K. (2020). Civic crowdfunding: Four perspectives on the definition of civic crowdfunding. In R. Shneor, L. Zhao, & B. T. Flåten (Eds), *Advances in crowdfunding: Research and practice*. Palgrave Macmillan.

Yi, Y., Wu, Z., & Tung, L. L. (2005). How individual differences influence technology usage behavior? Toward an integrated framework. *Journal of Computer Information Systems, 46*(2), 52-63.

Yong, H. K. (2017). Infrastructure financing in Malaysia. *Nomura Journal of Asian Capital Markets, 1*(2), 26-30.

Zanella, A., Bui, N., Castellani, A., Vangelista, L., & Zorzi, M. (2014). Internet of things for smart cities, IEEE Internet of Things Journal, 1(1), 22-32. https://www.doi.org/10.1109/JIOT.2014.2306328