International Journal of Engineering & Technology, 7 (4.36) (2018) 1181-1188

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper



Insights of Smart Community in Kemaman

Normalini Md Kassim[1], *Saravanan Nathan Lurudusamy[2], Jasmine Yeap Ai Leen[3], T. Ramayah[4] & Nor Hazlina Hashim[5]

[1,3,4,5] Universiti Sains Malaysia
[2] Telekom Malaysia
**Corresponding author E-mail: patricknathan78@gmail.com*

Abstract

A smart community is regarded as a community where various next-generation technologies and advance social systems are effectively integrated and utilized, including the efficient use of energy, utilization of resources, and improvement and transformation of the everyday lives of citizens. Since technology being a major element in smart community implementation, this research focused on the identification of those research streams which are adoption and continuance of usages. The investigation targets of this research are individuals from Kemaman in Terengganu, who are existing and potential adopters of the smart community facilities, ranging from different demographic background. Preliminary information has been gathered from the local authorities such as district officers, local agencies, community leaders and local institutions. Their responses are used together with the suggestions for the Smart Community process improvement which will also be part of this study. Survey is used as the research instrument and the units of analysis are households and stakeholders who are involved in these four districts in Malaysia. As this is a quantitative study using positive epistemology, data obtained from the survey are analyzed using Partial Least Square (PLS-SEM), to test the hypotheses that explain the relationship between the constructs in a wholesome perspective. This research will conclude by recommendations that hold some insights of the usage continuance of the smart community facilities in Kemaman household context.

Keywords: *smart community; Malaysian household; MCMC; UTAUT, quantitative*

1. Introduction

While Malaysia being a country blessed with pristine natural beauty, delicious local fare and delightful people, the year-end monsoon usually brings floods that damage homes and disrupt lives. With particular locus to these challenges and dilemmas, there emerged a great need to change and improve the community's lifestyle through the use of ICT applications. The astonishing diffusion of digital technologies due to the expansion of the Internet is the main basis of the rollout of smart community facilities in Malaysia; supported by the integration of planning, new media and technologies. Where the earlier days when access to Internet was so limited with very complicated information systems. This it has restricted the opportunity of exploring the potential use of new technologies and new media in giving shape to the new urban space. However, now with the inception of mobile phones and the transition to other "smart" devices is also opening new opportunities for creating a direct relationship between individuals and communities and between communities and decision-makers. Nonetheless, the digital revolution enabled cities and policymakers to realize the link between ICT and place in enhancing the local knowledge economy, where technology enables organizations to create responsible and sustainable solutions to problems faced by the community. The challenge is to provide the rural population of Malaysia with ICT services and applications at an affordable rate in order to boost penetration levels and bridge the digital divide between the rural and urban areas. This is being done incrementally and Malaysians will reap the benefits as well as to enhance their lifestyle in terms of both social and economy.

Another change linked to the spread of the Internet is the opportunity to collect information through sensors of different types, including individual cell phones, which used to be extremely expensive and difficult to gather in the past. Through the Internet, farmers who grow agricultural products on the urban fringe may be put in contact with customers, immigrants living in the urban region can maintain their community links, passionate skaters, cyclists or other sports can remain in regular contact, and students can create distance communities through social networks and provide alert during emergencies.

The idea of a smart community has been receiving increased attention worldwide in recent years. A smart community is regarded as a community where various next-generation technologies and advanced social systems are effectively integrated and utilized to improve and transform the everyday lives of the citizens in the designated area. The success of a smart community lies in how the technologies are adopted and used by the residents as well as how the lives of the residents are impacted as a result of the technology adoption particularly in smaller, less urban districts. For this reason, this study aims to examine the factors that drive the usage as well as community participation, satisfaction and continuance intention in MCMC's smart community initiatives as well as uncover the impact of smart initiatives by the stakeholders on the community itself. For the purpose of this article, the project site assessed is Kemaman, a pristine district in Terengganu.

The application of technology within communities is considered a key element to move forward into the future. In short, smart community initiatives are needed to drive technology adoption. In fostering technology adoption, initiatives to develop a Smart Community would involve several key components such as the

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use of devices and applications/apps, the availability of ICT infrastructure, the involvement of local champions, institutions and a target community. In line with this, the main objective if this research done in Kemaman is to develop an index that captures the essence of a Smart Community so that the involved stakeholders can be informed about the necessary criteria which enables citizens to be deemed as smart? This can then assist the stakeholders to create synergetic collaboration and partnerships that can further enhance the adoption and level of satisfaction of ICT technologies and ultimately form more smart communities among Malaysian citizens.

2. Literature Background

Gurstein (2014) argued that the current trend of developing more and more smart cities has deviated from its original objectives that attempt to improve the quality of live. As for now, many smart cities development planning are emphasizing on installing edge cutting technology rather than shifting its attention on educating innovative citizen and empowering in community development projects. Eger (2005) agreed that it should not just about technology and ICTs, it should be concerning jobs, dollars and quality of life. And emphasizing not just deploying technology as it is but to understand how the local citizens perceive the infrastructure and facilities to their daily life and works which it acts as one of the objectives of this study in measuring the impacts ICTs implementation initiatives. Besides, Gurstein (2014) criticized on current imbalance situation where politicians and major technology corporation utilize "smart city" as a PR tool and mainly focus in urban and desirable area and tend to ignore those rural and less attractive suburb particularly in less developed countries, where the living standard of the citizen were barely reach the basic requirement, and government initiative to develop towards "smart cities" is equal to transferring the resources from the poor to the rich as much resources is putting on installing high technology and expensive devices, whereas there are still people who has limited access to basic living facilities such as health care, environmental management and security.

2.1 Characteristic of Smart Community

In the last two decades, the concept of smart community has become more and more popular in scientific literature and even at international policies. The applications of technology within communities are considered key elements to move forward into the future. For change and advancement to happen, policy makers, the government, broadband Internet marketers, telecommunication firms and others who are involved in broadband need to be able to develop relevant policies and marketing strategies to maintain or to further improve the Smart Community concept among Malaysian citizens. Nevertheless, most (smart city) studies previously conducted concentrated on established metropolitan cities whereby their residents' use of ICT has already been high. On the other hand, not much has been documented on smart community projects in lesser developed districts, in both academic and non-academic literature.

Moreover, the development of an index to measure smart community is sorely needed given its current scarcity. An index would be able to ascertain the important criteria/elements that may go into establishing a smart community within the local residents. Moreover, the development of an index to measure smart community is sorely needed given its current scarcity. An index would be able to ascertain what are the important criteria/elements that go into establishing smart communities within the local residents are. From the index, certain changes within the community, in line with the smart community initiative objectives can be tracked, in particular the improvement of lifestyle/quality of life, the empowerment felt by the community in raising their competitiveness regionally and globally, the changes in productivity and the generation of a creative and innovative culture among the community as a result of using ICT.

2.1.1 Smart Citizen

Evidently, it shows the needs to shift to develop a smart community rather than smart city where social inclusion, enabling citizen, supporting community should be included in the city development agenda (Gurstein, 2014). Wongbumru and Dewancker (2014)'s study focusing on how next-generation technology could be utilise and integrated in community particularly through improving citizen innovation and participation in reaching the goal of improving quality of life demonstrating example from Japan that not only focusing on smart energy management, but going further to smart community by involving all the stakeholders and aims towards behavioural change through lifestyle innovation. Moreover, author pointed the challenges where there is situation although infrastructure on smart energy system is provided, citizen shows lack of participation and concluded that to bring up "smart citizen" should put as priority before succeeding a smart community (Wongbumru & Dewancker, 2014).

A smarter city should be treated as an organic system - as a network, as a linked system and smart citizen is part of it (Nam & Pardo, 2011). In order to enable this part of "smart citizen" to be fully integrated to the entire system, first the citizen should be educated in a way to "infuse" themselves in the smart system. As without the knowledge, it could not maintain the sustainable cycle of the system and it will become a huge hinder for long term sustainable development. If only with a smart and innovative citizen that act as motivator for the entire system to ensure the smooth network and linkage among the smart initiatives; they themselves could only be the beneficiary from the smart system.

2.1.2 Training

Stratigea (2012)'s work focusing on relating smart cities concept to community development adapting the concepts from Intelligent Community Forum (ICF) that demonstrated the critical success factors for cities "going smart" and presented in a pyramid structure. As Broadband infrastructure act as the first fundamental base, knowledge-based workforce is the second level from bottom proven that apart from infrastructure and facilities, it is important to educate skilled workforce to support the further development. As it is agreed by Eger (2005) as well that internet and broadband access is just the first step and an integrated intelligent community is a catalyst to economic growth (Hughes & Spray, 2002). Undoubtedly, the installation of internet and broadband could offer citizen the accessibility to be linked and connected with each other as well as with the government and businesses that stimulated the local growth in terms of both economy and socially (Nam & Pardo, 2011). Moreover, introducing innovation energy system, information and communication technology could encourage and support private companies, government and SMEs in providing various services to the community (Wongbumru & Dewancker, 2014).

2.1.3 Smart Governance

Apart from installing ICTs to the city, the citizens should introduce with a new decision-making mechanism which incorporate the community into the city planning (Eger, 2005). Hollands (2008) emphasise that the way citizen interacts and becoming a member to the society is the goal of succeeding a smart community and information technology is playing a role not just as a physical infrastructure that drive towards smart cities but offering opportunity to empower and educate "smart citizen". Frost and Sullivan (2014), a consulting and research firm identifies eight key aspects that define a smart city and smart citizen to be part of it

which acts as the main role in building the smart community (Singh, 2014).

Besides, argument exists as according to Gurstein (2014) that current situation was centralised and top down approach and the voices and opinion of the citizen were put as lowest priority when comes to city development. While in the process of development towards smarter community, all stakeholders from every segment in the society should be included and each party should assume the responsibility and attention as none of the segment should be neglected. Public private partnership to involve locals and realising a connected society is an example (Hughes & Spray, 2002). Smart community that should focus on cooperation, emphasise on shared governance and participation of the citizen is essential to include the voice and opinions of the community to local development. The role of government and policy in providing governance to the city is a strong support for smart city initiative (Nam & Pardo, 2011). Besides, in their study of conceptualising smart city with dimensions pointed the element in institutional factors which includes integrated and transparent governance, strategic and promotional activities, networking and partnership. Other than that, with the launches of e-government in many smart cities as one of the initiatives, it encourages the participation of citizen to more community development projects. In such way, government should be more transparent and accountable to share information to citizen, so they could voice their opinion and be part of decision making process which affect their daily lives. Smart governance it set to be the cornerstone for smart city, therefore, partnership and collaboration could prove as an effective approach to connect public, private and individual towards structuring an effective bottom-up mechanism where it is the key steps in transforming citizen towards a smarter way.

2.2.Comparative Analysis with Other Countries

2.2.1 China

Smart city development is favourable by governments and developers as to its benefits that been proven with the help of ICT it could improve the quality of life for the people. For instance, many smart cities projects have been carried out around the world while different developing models have been implemented and various initiatives were introduced to achieve respective targets. In China, smart community planning took place in Yishanwan, Jiangxia District, Wuhan. The community was developed alongside with a comprehensive framework to achieve the targets of construction of infrastructure, establish a sharing platform, develop and research of an application system and develop service portal (Anrong, Li, Li, & Kong, 2016). In the development plan, the synchronous development of informatization, new industrialisation, agricultural modernisation and new urbanisation act as the core of developing the smart community. The authority especially emphasis on agricultural modernisation as it plays as an important role in rural area and act as the fundamental for the suburban area to develop through urbanisation. Anrong et al. (2016) agreed that it is insufficient to improve only on infrastructure but also stress on the innovation ability of the society by integrating the concept of sustainable to city development (Chourabi et al., 2012).

2.2.2 Japan

While in Japan, Smart Community often define as taking full advantage of IT technology to effectively control power flow and provide new services for power supplies and demand side users (Gao, Fan, Ushifusa, Gu, & Ren, 2016). And it is different from the definition in other countries and the smart community model can be described in four parts which are new information network, new energy system, new transportation system and new urban development. Emphasis is putting on smart energy grid implementation as a way to change citizen towards smarted lifestyle in term of daily life, work or office and transportation. There are four large scale demonstration cities in Japan which implementing smart community concepts which are Kyoto Keihanna District, Yokohama City, Kitakyushu City and Toyota City. All the demonstration cities having the similar target which is reducing the emission of Greenhouse Gas (GHG) and with the assistant of IT technology smart-grid electricity management was introduced and most of the researches about smart community are about using of renewable resource. for instance, eco-town project was introduced for the aim to build a system by using all the waste products of an industry as raw materials for another industry and realising a zero-waste recycling-oriented society.

2.2.3 Malaysia

Medini Smart City in Iskandar Puteri, Malaysia was chosen to be the pilot for smart city projects which focuses on three areas, economy, environment and social and promotes six dimensions: smart economy, smart governance, smart environment, smart mobility, smart people and smart living (Ghazali et al., 2016). This is a project collaborating the university and regional development agency. The objective of this project was focus on infrastructure provision and change of quality of life and environment as long term target by developing smart living through engaging local citizen for sustainable development. However, Gil and Navarro (2013) argued that in terms of governance and policy context which were one of the factors in analysing smart city initiatives, the participation of local seems lacking from the technology partnership. While there was a noticeable effort from the aspect of education where there are few internationally well-known universities such as University of Newcastle plan to open up campus in Medini.

2.3. Smart City Threats and Issues

Incontestably, providing critical and basic infrastructure is essential while it could be said that smart city development plan should separate to several stages while the first priority is the provision of basic facilities including healthcare, education, transportations and security which particularly important for developing countries as in order to develop a smart city it should first fulfil the requirement to be a city and thereafter high technology infrastructure such as IoT, broadband and other ICT initiative could only take place on top of the fundamental and act as catalyst to drive smarter development (Nam & Pardo, 2011). Hence, there are opinions stating that the development direction should focus on producing smart community rather than smart city and the ultimate goals of a smart community should not just rely on high technologies and hardware while nurturing the smarter citizen that could ensure these infrastructure and facilities able to optimize their daily life and work and at the same time the community itself able to sustain by its own as they have acquired the knowledge and are well prepared to be part of the smart community (Eger, 2005).

2.4 Theory in Smart Community Adoption

While on the fundamental of Adoption Diffusion (Mahajan, Muller, & Bass, 1991) that focused on timing and rate of adoption, (C.-F. Shih & Venkatesh, 2004) pointed out the limitation of this model which it is not comprehensively enough to present the entire adoption process. C.-F. Shih and Venkatesh (2004) proposed an extension model of Use Diffusion (UD) model with the aim of understanding the nature of adoption. UD attention is putting on the rate of use and variety of use and it is proven that both of the criteria can be empirically correlated where variety of use act as the core determinant in influencing the rate of use as more time will be spend if users intended to perform more tasks. The man highlight of this study has concluded four typology of users which are intense, specialized, nonspecialized and limited according to the criteria of variety of use and rate of use. This research also

presented that higher UD levels are more satisfied with the technology that they are currently using and showing more potential and interest towards future innovations.

While E. Shih, Venkatesh, Chen, and Kruse (2013)'s further study proposed another model of dynamic use diffusion model to examine the post-adoption technology usage behavior. the study aimed to develop a model to measure the changes of the technology usage since the time of adoption as well as the impacts and consequences to their lives through satisfaction towards the technology. The study proposed four core determinants which are technology structure, household communications, external communications and use innovativeness influence the level of dynamic use diffusion which ultimately impacting the satisfaction. The results demonstrated that the higher frequency of the four determinants will result in higher dynamic use diffusion as well as leads to higher satisfaction. and the result of their previous study was supported that a positive effect on the relationship of the antecedents and dynamic use diffusion and consequently leading to higher satisfaction.

As for the purpose of this research which intended to investigate the factors that affecting user's satisfaction and ultimately how these relationships influence their intention to continue using ICT, UTAUT was used as the fundamental theory to carry out the investigation. In parallel with other technology acceptance model, Theotokis and Doukidis (2009) added several variables within the framework of use diffusion and the results proven that the hypotheses proposed were supported and possessing strong relationship with use diffusion. Based on Van der Heijden (2004), hedonic or enjoyment while using ICT was one of the prominent variables and it was agreed by other researchers where this variable was tested several times in their studies in different term such as enjoyment (Venkatesh, 2000) and perceived playfulness (Sledgianowski & Kulviwat, 2009).

Based on Venkatesh, Thong, and Xu (2012)'s study, price value and habit were added on top of four core UTAUT determinants and result proven to have direct effect on behavioural intention while these relationship was moderating by age and gender. Later, Escobar-Rodríguez and Carvajal-Trujillo (2014) proposed a study on investigating the determinants of purchasing flights from low-cost carrier website which built upon Venkatesh et al. (2012)'s work while the results presented to be paralleled that trust, habit, cost saving, ease of use, performance and expended effort, hedonic motivation and social factors to be key determinants.

Using UTAUT as the ground base to carry out this research, an extensive theoretical framework has developed incorporating variables from UTAUT2, use of diffusion, readiness, satisfaction and ultimately how these relationships influence the continuous using intention of user. Apart from the above variables that adopted from UTAUT, readiness received much attention too from researcher as a moderator in technology acceptance model. Tsourela and Roumeliotis (2015)'s study aimed to examine the moderating role of technology readiness in the relationship between UTAUT variables and behavioural intention and the findings proven that readiness, gender and age were the key determinants in user intention to use technology-based services. Besides, Acheampong et al. (2017) in their recent study as well investigating the adoption of e-payment services in Ghana by combining technology readiness index with technology acceptance model and results demonstrating a significant and positive relationship exist and influencing the adoption behaviour.

Besides investigating the adoption behaviour of consumer, researchers too concern on the post-adoption behaviour which was the intention of continuous using of technology and these seems to attract more attention from marketers in expanding their loyalty consumer markets. Son and Han (2011)'s works were focused on post- adoption behaviour and investigated how technology readiness affects the continued use intention of new technology and proven that usage patterns, particularly the use of innovative functions, have a significantly positive impact on consumer satisfaction and repurchase intention. This has provided a strong evidence and support on the linkages between different dimensions that proposed in the theoretical framework presented in Figure 1. As to the objective of this research, intention of continue using was not influencing by only one sided dimension but several of them, the complex relationship that underlying between each component need to be investigated hence to have a comprehensive understanding of consumer post-adoption behaviour. Koivisto, Makkonen, Frank, and Riekkinen (2016)'s study supported that the inclusion of both personal innovativeness in the domain of information technology and technology readiness index into basic technology acceptance model promotes the explanatory power of the model especially in terms of perceived ease of use but also in terms of perceived usefulness and use intention.

3. Research Methodology

The idea of a smart community has been receiving increased attention worldwide in recent years. A smart community is regarded as a community where various next-generation technologies and advanced social systems are effectively integrated and utilized to improve and transform the everyday lives of the citizens in the designated area. The success of a smart community lies in how the technologies are adopted and used by the residents as well as how the lives of the residents are impacted as a result of the technology adoption particularly in smaller, less urban districts. For this reason, this study aims to examine the factors that drive the usage/participation, satisfaction and continuance intention in MCMC's smart community initiatives as well as uncover the impact of MCMC's initiatives on the community itself. A combination of qualitative and quantitative research methods will be employed whereby the local residents in the four project sites will be the main targeted respondents for this study. This study is spread out across 18 months involving 5 main stages. In Phase 1 which aims to gather information including literature review, preliminary interview at four sites, build research framework, conduct focus group and lastly to deliver the preliminary interview report by end of this phase that aims to carry out in 4 months. Phase 2 is involving design and development of research framework and questionnaire within 3 months and to deliver the survey instrument by the end of this phase. In Phase 3, the survey instrument will go through pre-test and pilot test before finalizing the measurement by end of this phase which estimated to take up 3 months. Data collection will be carried out in Phase 4 follow by data analysis and interpretation which takes up 5 months to complete and lastly to deliver the analysis and data summary report by end of the phase. Lastly, in the last stages of Phase 5 where all the findings will be documented and final complete report will be delivered with presentation in a period of 3 months.

3.1 Research Design

For quantitative approach, primary data was gathered using a survey questionnaire which distributed to the community at the Smart Community project in Kemaman. The survey was aimed to fulfill the objectives of determining the items or factors that were affecting acceptance; and then in subsequent stages the important factors were modified to measure usage continuance behavior, usage satisfaction and its confirmation. A number of appropriate items were collected and modified to be in accordance to the need of this research context. This was done by reviewing some of the relevant questionnaire used in previous information science and technology continuance studies (Venkatesh et al., 2003).

3.2 Research Instrument

A self-administrated questionnaire was developed to gather information from the respondents which consisted of different sections with both open and close-ended questions. A screening question was included too as the first question to check if the respondent is staying and working in the selected smart community. The questions are asked in 3 sections namely Demographics Profile, Technological Profile and Evaluation on MCMC's Initiatives. The sections are such as Perceived Characteristic of Initiatives, Intention to use / continue using MCMC's Initiatives, Impact of MCMC's Initiatives and Opinion on technology.

In assessing the degree of measurement error present in any measure, both validity and reliability were addressed. A content validity questionnaire that comprised definitions of the constructs and associated items was generated and sent to academic experts, where they were requested to provide comments if the items in the questionnaire are not understandable, required re-wording or if new entries needed to be added.

Pre-test of the resulting instrument will be conducted with respondents from the Malaysian household residents who will be chosen using convenience sampling method. Prior to dissemination of the final questionnaire, a pilot study will be conducted to learn of any discrepancies within the questions, which included determining whether the format of the questionnaire and questions are suitable. Additionally, the duration that completion of the questionnaire would require is also established.
Purposive sampling method was used to distribute survey forms. Respondents were selected based on their living area which only within the project sites of Smart Community where MCMC's initiatives are implemented.

3.3. Data Analysis

3.3.1 Demographic

As for the main study, data on the household resident's information was obtained from respective district officers. Keeping the statistical analysis plan (i.e. factor analysis) in mind it is decided that the minimum sample size of 1500 was required to achieve 300 responses and which chosen randomly (Dwivedi et al. 2008). The collected data was analyzed using Statistical Package for Social Science (SPSS) and Partial Least Square Structural Equation Modeling (PLS-SEM).

Upon completion of data collection, data was entered to SPSS. Data was screened and cleaned to eliminate any errors and discard any incomplete survey. Later on, with the help of SPSS, information of demographic and respondent profile was analyses. The average points of different items and factors were calculated and presented according quartiles. While for PLS-SEM, assessments on both measurement and structural models were conducted to determine the reliability and validity of the measurement items and to ascertain the relationships between latent variables that were hypothesized in the research model (Hair et al. 2011).

3.3.2 Index Development

As mentioned earlier, four key components in IGC development index which are Humanware, Technoware, Infoware and Valueware were used as a reference point in developing the index. In contrast to most of the indices measuring digital divide or preparedness's method of developing indices using ratios and rates obtained from secondary data, SCI's approach is a more personal one, where a survey was conducted to obtain pertinent information about the community via the residents themselves in the Smart Community initiatives project sites. From the data gathered at these sites, certain portions were used in the development of the SCI. The portions chosen capture the four themes of Human, Technology, Information and Value. While the four themes may be adopted, nevertheless, the descriptions of those 4 themes vary slightly to fit the context of study for this research. Thus for this research, the descriptions of the four themes are listed in Table 1.

Table 1: The underlying foundations of the Smart Community Index

Theme/Component	Explanation and Importance	Sub-index	Indicator
Human	The extent to which individuals regard ICTs in a favorable or unfavorable way. This component is important because the attitude held by person can determine how ready he/she is in embracing innovative technology-enabled changes in their lives.	Access & ownership	1. No. of devices owned 2. Mobile data subscription 3. Home broadband subscription
Technology	The extent to which individuals have access to hardware/gadgets and also ICT facilities. This component is important because for ownership and access to such facilities and gadgets are tools for technology usage.	Use-diffusion	1. Infrastructure 2. Content training 3. Digital services
Information	The extent to which individuals use and apply the initiatives introduced MCMC. This component is important because it shows how engage individuals are with using technology usage.	Impact	1. Informational 2. Psychological 3. Social 4. Economic 5. Political 6. Cultural
Value	The extent to which individuals have used/participated in MCMC's Smart Community initiatives and have witness how the initiatives have helped them and improved their quality of life. This component is important because it shows the impact that technology has on the individuals' lives.	Attitude	1. Optimism 2. Innovativeness 3. Discomfort 4. Insecurity

With the four components being the foundation for this study, four sub-indexes were constructed to capture the essence of a Smart Community namely 'access and ownership', 'use-diffusion', 'impact' and 'attitude' as mentioned in Table 1 above that shows the sub-index and the indicators for this study. Each sub-index is reflected by its own indicator and measurement. Both indicators and measurement are drawn from the data obtained from the survey.

4.Quantitative Findings

4.1. Respondents' Profile in Kemaman

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In terms of respondents' selections, purposive sampling was used. Respondents were mostly members from Pusat Internet, except for Putrajaya whom the respondents were from the residents and/or employees in the area. As the respondents were limited to only 8-10 persons for each site, the purposive sampling was done and it was more objective in answering factors that drives the usage/participation, satisfaction and continuance intention from the community. Semi structured interviews were used where-by the same open-ended questions were distributed similarly across the four sites and in the case of
Kemaman, the semi structured questions were given via emails.

There is a higher proportion of female (57.4%) to male (42.6%) in this sample. Most of the respondents were from the 30-39-year-old group (42.4%) followed by 20-29 year old group (20.1%) and 40-49 year old group (20.9%) and given that these three age ranges had the majority number of persons. A large number of respondents were Malays (96.5%) followed by the Indian (2.1%) and Chinese (1.4%). Majority of the respondents had a modest to high education background, having SPM or equivalent level of educational qualification (41.7%) followed by Certificate or Diploma (24.5%) and Bachelor's Degree (22.3%). In term of employment, most of the respondents were either work as Professional or at managerial level (22.9%) or work as admin/clerical staff (22.1%). For most of them, their monthly income ranged between RM 1001 to RM 3000 (51.1%). Respondents who are married (72.9%) far outnumber the single (23.6%), divorced (1.4%) and widowed (2.1%). For those who are married, having two or three children seemed to be the norm (15.6%). A high percentage of the respondents surveyed did not have any children (39%) mainly due to the fact that they are still single/unmarried.

Almost all the respondents surveyed owned a smartphone (95.7%). The brand of smartphones owned were predominantly Samsung (39.6%). Besides smartphones, majority of the respondents also own a laptop (47.5%) and a desktop (17.7%). The average number of years of internet usage experience among the respondents was 12.8 years (std. dev.=5.61). The responses were varied with some being very new to the internet (1 to 5 years) to those who are experienced users (> 15 years). About 96.5% of the respondents subscribed to a mobile data plan with Celcom (37.5%) and Digi (22.1%) being the major service providers preferred by respondents. 67.2% of the mobile data plan subscribers were happy and rated the mobile data service quality as good. Those who were not satisfied with the quality of mobile data service (rated bad and terrible = 5.1%) mentioned reasons such as 'limited coverage' and 'internet speed not up to expectation'.

For the home broadband plan, a large percentage of the respondents (64.3%) did not subscribe to it. Among those who subscribed to the home broadband plan, TM was the preferred choice (81.6%). Majority were happy with quality of the home broadband service, with 59.6% respondents rating the service as good. For the few respondents who were not satisfied with the broadband service (rated bad = 7.7%), they cited reasons such as the 'speed not living up to expectations', limited coverage' and 'slow connection'.

4.2. Descriptive for MCMC's Initiatives in Kemaman

Based on the survey conducted it is found that as many as 94.3% of respondents surveyed were aware of Kemaman being a Smart Community project area. The various initiatives carried out by MCMC under the Smart Community project were grouped under three broad overarching themes namely Infrastructure, Content Training and Digital Services (See Table 1).

Awareness of two initiatives namely Pusat Internet 1 Malaysia (PI1M) and telecommunication (telco) data services such as Maxis/DiGi/Celcom/UMobile were the highest at 95% and 87.2% respectively; followed by flood management system and Entrepreneurship training workshops at 68.6% and 66.9% respectively. Usage of the initiatives were the highest for telco data services (90.8%), followed by PI1M (76.9%), ICT training workshops (45.7%), Dashboard (43.8%) and the entrepreneurship training workshops (38.0%).

Table 2: Respondents' Awareness and Usage of the Smart Community Initiatives

Initiatives	**Aware (%)**	Not aware (%)	**Use (%)**	Don't use (%)
Infrastructure				
1. Pusat Internet 1 Malaysia	**132(95.0)**	7(5.0)	**103(76.9)**	31(23.1)
2. Data Services	**116(87.2)**	17(12.8)	**119(90.8)**	12(9.2)
3. Dashboard	**81(60.9)**	52(39.1)	**57(43.8)**	73(56.2)
Content Training				
4. ICT Training	**88(64.7)**	48(35.3)	**59(45.7)**	70(54.3)
5. Entrepreneurship	**89(66.9)**	44(33.1)	**49(38.0)**	80(62.0)
Digital Services				
1. Flood Management	**94(68.6)**	43(31.4)	**47(37.3)**	79(62.7)
2. MyCrib Booking	**41(31.1)**	91(68.9)	**12(9.5)**	114(90.5)
3. E-Magazine	**60(45.5)**	72(54.5)	**27(21.6)**	98(78.4)

Note: n=141

In terms of the frequency of usage for infrastructure initiatives, data services, although the frequency of usage was varied among the respondents (mean=4.77, std. dev = 2.33), majority reported that they used data services to a large extent (mode=7) (See Table 2). On the other hand, MyCrib Booking (mode=1; mean=1.25, std. dev. = 0.92) were either not used much or not used at all by the respondents.

The rest of the initiatives namely PI1M, ICT training, entrepreneurship, flood management system, MyCrib and e-magazine did not gain much usage among the respondents (mean for the stated initiatives ranged from 1.44 to 3.37). In fact, majority responded that they do not use at all for these initiatives (mode=1). However, for those who did use PI1M (mean= 3.37, std. dev= 1.97), ICT training (mean=2.41, std. dev. =1.84) entrepreneurship training (mean=2.16, Std. Deviation =1.76), flood management system (mean=2.39, std. dev.= 2.00) and E-Magazine (mean=1.44, std. dev. = 1.08), their usage was somewhere between slight to moderate use.

Table 3: Descriptive for Usage Frequency of the Smart Community Initiatives

Initiatives	**Mode**	**Mean**	**Median**	**Std. Deviation**
Infrastructure				
1. Pusat Internet 1 Malaysia	1.00	3.37	3.00	1.97
2. Data Service	7.00	4.77	5.00	2.33
3. Dashboard	1.00	2.12	1.00	1.49
Content Training				
4. ICT Training	1.00	2.41	1.00	1.84
5. Entrepreneurship	1.00	2.16	1.00	1.76
Digital Services				
1. Flood Management	1.00	2.39	1.00	2.00
2. MyCrib Booking	1.00	1.25	1.00	0.92
3. E-Magazine	1.00	1.44	1.00	1.08

Note: N=141; Items were measured on a scale 1=not at all to 7=a large extent

For the respondents who use the initiatives, generally they felt satisfied with the initiatives, as seen from the mean scores of all the initiatives which ranged from 4.94 to 5.49 (See Table 3) except for MyCrib booking and e-magazine. Upon closer inspection, majority of the respondents were very satisfied with PI1M, data services, dashboard, entrepreneurship workshop training and flood management system (mode for the stated initiatives = 7). However, there is probably some room for improvement for initiatives like ICT training, MyCrib booking and e-magazine (mode for the stated initiatives = 4) as most of the respondents were only moderately satisfied with the initiatives as illustrated in Table 4.

Table 4: Descriptive for Satisfaction with Usage of the Smart Community Initiatives

Initiatives	Mode	Mean	Median	Std. Deviation
Infrastructure				
1. Pusat Internet 1 Malaysia	7.00	5.22	5.00	1.68
2. Data Services	7.00	5.21	5.00	1.71
3. Dashboard	7.00	4.98	5.00	1.77
Content Training				
4. ICT Training	4.00	4.94	5.00	1.55
5. Entrepreneurship	7.00	5.49	6.00	1.43
Digital Services				
6. Flood Management	7.00	5.26	5.50	1.62
7. MyCrib Booking	4.00	4.67	4.00	1.88
8. E-Magazine	4.00	4.53	4.00	1.73

Note: N=141; Items measured on a 1=very dissatisfied to 7=very satisfied. Scores were calculated for those who use the initiatives.

5.Conclusion

Despite having differences in the culture, values and lifestyle at these locations, however, when comes to smart community aspect, most of the community have some common requirements. As in the case of where access facilitating conditions are available, the adoption of the community to embrace which is quite subjective to factors such as package pricing, availability of it resources, lack of technology savviness plays very essential role. For instance, the elders in Kemaman are not in the know in using of mobile gadgets. There are also findings that in certain cases, the community application which is initially intended to be made available to the use of public are not made available to the community, but somehow it is justified that the information required by the community is being broadcasted to them via other means such as WhatsApp communication or SMS. This breach is to be overcame and based on our qualitative interview with stakeholders, the community here welcome the idea to able to self-service from the community applications, as the information-pull factor applies. Apart from that, locations of common facilities such as Pusat Internet need to be positioned at strategic locations to ensure public participation is appreciated.

Most of the respondents agree that the smart community programs should be continued with support from all – the government, private and the community itself. A few suggestions were given by the respondents towards the sustainable of 'smart community' initiatives. One of it is a proper guidance from the experts and sufficient funds allocation to implement smart community programs. With this, the communities are able to obtain IT knowledge, manage to solve their daily problems and improve quality of lives. The smart community initiatives would be able to bridge the digital gap between the urban and rural areas. Another suggestion is to implement programs, workshops or courses to ensure the community receive 100% communication by year 2020. These initiatives should come from MCMC, district officers, local champions and councils and other private sectors.

Some of the key recommendations include strengthening the infrastructure availability at the sites, extending IT resources to the rural in ensuring homogeneous adoption and placement of the resources at the strategic location in order to benefit the public at large. This is in line with MCMC's directive to empower Smart Communities to other states as well in order to make Malaysia to be a Smart Nation in coming years.

Acknowledgement

We would like to extend our deepest appreciation to Malaysian Communications and Multimedia Commission for the privilege to conduct this research, and also our heartfelt thanks to the stakeholders and respondents in Kemaman in facilitating for the survey and the researchers' logistics and other arrangements.

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