Moderating Effect of Personal Characteristics on Telecentre Adoption for Value Creation in Malaysia

Zulkhairi Md Dahalin, Nor Iadah Yusop and Zahurin Mat Aji

Universiti Utara Malaysia, Malaysia, {zu, noriadah, zahurin}@uum.edu.my

ABSTRACT

This paper examines the influence of personal characteristics of community within the vicinity of rural telecentres on the relationship between adoption of ICT and value creation. The aim was to identify characteristics of members of the community that have positive or negative influence on the adoption of the telecentre in order to gain socio-economic impact. A survey was conducted among the community within the vicinity of the telecentres where data was gathered on respondents' demography, their perceptions on availability of ICT facilities at the telecentre, and the benefits gained from using the ICT facilities. The Diffusion of Innovation theory was used to guide the research and moderating analysis was used as data analysis. Results show that age, gender, marital status and PC ownership as significant moderators that affect the relationship between telecentre adoption and value creation.

Keywords: Bridging Digital Divide, socio-economic, Diffusion of Innovation.

I. INTRODUCTION

Telecentre project is one of the Information and Communication Technology (ICT) initiatives that has been proven to be successful in bridging digital divide (BDD) amongst the underserved community who mainly reside in rural areas (Nor Iadah et al., 2015; Zulkhairi et al., 2015). Bridging digital divide involves efforts in reducing the gap of disparities in adopting ICT among members of the community. It is seen as giving values towards the benefit of development generated through ICT rather than merely having physical access to ICT (EPU, 2007). The National Strategic Framework for Bridging Digital Divide (NSF-BDD) (Yogeesvaran, 2007) is a national policy established by the Malaysian government as a guide towards BDD. The framework sets socio-economic development as being the indicator to mark the success of ICT initiatives for the community which is termed as value-creation. This includes any action related to the use of telecentre that increases the worth of goods, services or even businesses (Zulkhairi et al., 2015). To achieve the value-creation state, the served community has to partake technology as part of their daily routines, and this is referred to as "adoption".

Telecentre is not just a public space where people can access ICTs facilities and services but also has become a gathering hub where local community can get together to access and produce relevant and useful information (Bailey, 2009; Gomez & Gould, 2010). Such centre can also be considered as a centre of developing human resource in IT as well as to the overall community development. This is evidenced by Zulkhairi et al. (2015) who indicated that the establishment of the centres have given opportunities for the rural communities to access information, obtain jobs, improve soft and technical skills, provide study opportunities, and generate income. These are among the values that the community attained by adopting telecentre.

Obtaining access to ICTs and using them actively has been linked to the advantages of demographic and socio-economic characteristics, namely; income, education, geographic location (urban-rural), skills, awareness, political and cultural perspectives. In this context, it is equally important to ensure that all clusters of society in Malaysia have equitable access to ICT and have the adequate capacity to improve their socio-economic status as a result of the digital access. The level of ICT uptake by the members of the community as part of their daily routine depends on who they are. Mohamad Amir et al. (2012), Johansson Hedberg (2011) and Mukerji (2009) indicated that the access and use of telecentre were related to the socio-economic status of the community, which includes age, gender, education, and occupation. The types of occupation provide indications of individuals' income status.

Many studies reported that youths tend to participate more actively compared to the older generations (Zahurin, 2014; Abu Samah et al., 2013; Attwood et al., 2013; Gomez & Camacho, 2013; Zulkhairi et al., 2012; Mohamad Amir et al., 2012; Mohammad Badsar et al., 2011; Bailey & Ngwenyama, 2010). The youngsters were frequent users of telecentre as they were recognized to be "naturally close" to technology (Gomez & Camacho, 2013). It was also found that they used telecentres mainly for entertainment and social networking (Zulkhairi et al., 2012). Apart from that, other purposes include to search for education-related information, do their school homework or college assignments (Gomez &

Camacho, 2013; Mbatha, 2015). On the other hand, most of the older adults use technology to update and obtain information, and to communicate with relatives and friends (Frias et al., 2011). Hence, economic benefits from such usage were not that obvious, but they did gained social-related benefits from its usages.

With regards to gender, some studies indicated that there are more males than females (Johansson Hedberg, 2011; Kumar & Best, 2006), some said that females dominate (Mohammad Badsar et al., 2011; Abu Samah et al., 2013) whilst others showed not much difference between the number of male and female users (Gomez & Camacho, 2013). Low education and literacy level were identified as barriers for women access to telecentre (Bailey & Ngwenyama, 2009; Mohammad Badsar et al., 2011; Terry & Gomez, 2011;). However, Lesame (2008) and Hansson et al. (2010) indicated that upon receiving appropriate ICT trainings, women can be empowered to maximize the use and benefits of technology, eventually enable them to compete successfully in the global information economy, with their male counterparts, and play a leadership role in its development. Ray and Prasad (2014) supported these by indicating that telecentre appears to be more women friendly as education-driven activities were found to be more attractive to women.

Pertaining to users' income status and education, Zulkhairi et al. (2009) study showed that majority of the telecentres' users were mainly those from low to middle income, and with a high school or college education. This was also supported by Mohammad Badsar et al. (2011), and Gomez and Camacho (2013). Among the reasons for such situation is that telecentres are mainly situated in the rural or suburban areas as they are established to serve those that could not afford to have ICT facilities at home (Gomez, (2014); Prado & Janbek, 2012; Kyobe, 2011; Walsham, 2010). It was also known that people in the rural areas are less educated as compared to their counterparts in the urban area (Gomez, (2014); Rajapakse, 2012; Johansson Hedberg, 2011).

Figure 1 depicts the potential effects of the various elements of personal characteristics of telecentre users on the relationship between adoption of ICT facilities at the telecentre and value that can be created from using the telecentre.
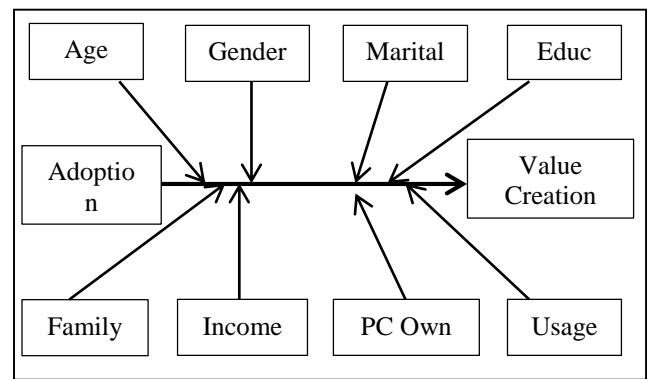

Figure 1. Conceptual model of Telecentre Value Creation with Personal Characteristics as moderators

Based on the literature review, these elements were formulated as eight hypotheses as potential moderators to study the effect of adoption on value creation.

II. METHODS

A survey was conducted among members of telecentre communities in the northern region of Peninsular Malaysia, covering the states of Perlis, Kedah and Penang. A total of 430 questionnaires were distributed to 19 telecentres with 392 returns. Eight questionnaires were discarded due to missing values leaving the remainder of 384 as useful data.

Reliability tests were calculated to check for internal consistency of responses. The results show that values of the Cronbach's alpha range from 0.892 to 0.953 which are above the minimum value of 0.60 as suggested by Hair et al. (2006). This indicates that the responses were reliable with acceptable internal consistency.

The sample used for data analysis was based on the 384 respondents from rural communities in the northern region. Following Rogers' Diffusion of Innovation Theory (Rogers, 2003), the sample data captured respondents' demography, their perception on the adoption of the telecentre in terms of relative advantage, compatibility, complexity, trialability and observation, and their perception on the adoption of ICT facilities at the telecentre. Table 1 depicts the summary of selected variables of interest in this study.

Table 1. Summary of selected variables

Variable	Scale	Value		%
Age Category	Dichotomous	0 (Young)	255	66.4
		1 (Old)	129	33.6
Gender	Dichotomous	0 (Female)	198	51.6
		1 (Male)	186	48.4
Marital Status	Dichotomous	0 (Not Married)	213	55.8
		1 (Married)	169	44.2
Educ	Dichotomous	0 (Not Educated)	303	78.9
		1 (Educated)	81	21.1
Family Size	Dichotomous	0 (Small-Medium)	190	50.9
		1 (Large)	183	49.1
Income	Dicho-	0 (Hardcore/Poor)	301	90.9

Level	tomous	1 (Medium-Rich)	30	9.1
PC Own	Dicho-tomous	0 (No)	213	56.2
		1 (Yes)	166	43.8
Usage Exp	Dicho-tomous	0 (Never/Seldom)	137	36.9
		1 (Frequent)	234	63.1
Adoption	Continuous	Min.	1.38	
		Mean	3.99	
		Max.	5.00	
Value Creation	Continuous	Min.	1.10	
		Mean	3.92	
		Max.	5.00	

A. Data Analysis

Data analysis was carried out to determine the moderating effect of variables representing personal characteristics of respondents and their influence on the relationship between adoption of the telecentre and value creation. According to Baron and Kenny (1986) a moderator variable is a qualitative or quantitative variable that affects the direction and/or strength of the relationship between an independent variable and a dependent variable. Hence, in this study the first hypothesis (H₁) is to determine whether the relationship between adoption and value creation is different for young and elderly people. Likewise, the second hypothesis (H₂) is to determine whether the relationship between adoption and value creation is different for male and female respondents. The third hypothesis (H₃) is to determine whether marital status affects the relationship between adoption and value creation. Whereas hypothesis 4 (H₄) is to examine whether the relationship between adoption and value creation is affected by whether a person is educated or not. It is also interesting to test for hypothesis 5 (H₅) to determine whether family size has an effect on the relationship between adoption and value creation. Equally interesting is to study the effect of household income and its influence on adoption and value creation as formulated in hypothesis 6 (H₆). The seventh hypothesis (H₇) is to determine whether the influence of adoption on value creation is different between owners of PC and non-owners. Lastly hypothesis 8 (H₈) is to determine whether there is a different effect in usage experience on adoption and value creation.

To test these hypotheses, moderated multiple regression was carried out with value creation as the dependent variable, adoption as independent variable, and variables representing the personal characteristics as the candidate moderator variables. However, before moderating analysis can be done, eight assumptions of multivariate analysis will have to be met. These assumptions are listed in Table 2 along with the corresponding evidence from performing the exploratory data analysis on the sample data.

Table 2. Assumptions for Moderated Multiple Regression

Assumptions	
Assumption 1	Dependent variable should be measured on a continuous scale.
Assumption 2	Independent variable should be continuous and moderator variables are dichotomous.
Assumption 3	Independence of observations (i.e., independence of residuals).
Assumption 4	There needs to be a linear relationship between the dependent variable and the independent variable for each group of the dichotomous moderator variable.
Assumption 5	Homoscedasticity or homogeneity of variance, which is when the error variances are the same for all combinations of dependent and moderator variables.
Assumption 6	No multicollinearity issue.
Assumption 7	No significant outliers.
Assumption 8	Residuals (errors) are approximately normally distributed.

Assumptions 1 and 2 were met as presented in Table 1. Independence of observations for Assumption 3 used the Durbin-Watson residuals computed as part of the linear regression analysis. The result shows a value of 1.90 which is well within the recommended range of 1.5 to 2.5. For Assumption 4, the strategy for determining whether or not a relationship is linear is based on significance tests for the Pearson r correlation coefficient. If the correlation coefficient between an independent variable and a dependent variable is statistically significant (its probability is less than or equal 0.05 level of significance), we will conclude that the relationship is linear. The data set was split into the different personal characteristics categories representing the two groups of the dichotomous variables. The Pearson Correlation for all groups is significant, therefore, the assumption of linearity is evidenced.

For Assumption 5, Levene statistic was used to test for homoscedasticity. Test of homogeneity of variances was carried out across the groups for combination of the moderating variables and the dependent variable. To carry out this procedure, homogeneity of variance test using the one-way ANOVA was carried out with the dependent variable ValueCreation fitted with the moderating variable as the factor variable. The null hypothesis for the test of homogeneity of variance states that the variance of the dependent variable is equal across groups defined by the independent (moderating) variable, i.e., the variance is homogeneous.

The results for age, gender, marital, and PC ownership categories, show that the probability

associated with Levene statistic is greater than the significant level (p > 0.05), hence fail to reject the null hypothesis and conclude that the variance is homogeneous. On the other hand, Education, Family, Income and Usage categories show that the probability of the Levene statistic is less than the significant level (p < 0.05), hence the null hypothesis was rejected and conclude that the variance is not homogeneous.

For Assumption 6, multicollinearity can be determined by performing linear regression on the independent variable Adoption and Value Creation for each group of the data set and check for collinearity diagnostic. A Variance Inflation Factor or VIF of greater than 5 is generally considered evidence of multicollinearity. The results show VIF of 1 across all the variables.

Assumption 7 deals with extreme outliers, which are data points that appear to be significantly different than the majority of the data. Outliers for the dependent variable were detected by taking the difference between the first and third quartiles and multiply by a multiplier factor (g) of 2.2, adding its product to the third quartile for the upper limit and subtracting from the first quartile for the lower limit of the data point (Hoaglin and Iglewicz, 1987). Data points exceeded the upper limit or less than the lower limit were considered extreme outliers. These were then replaced with the mean and the process was repeated until no extreme outliers detected in the data set. The extreme values were all within the upper and lower bounds which meet the condition set by Assumption 7.

Assumption 8 requires that the residuals are normally distributed. Residuals are gaps between actual dependent variable less its estimated values. The residuals should be normally distributed for regression to proceed. The Shapiro-Wilks test of normality was conducted on the standardized residuals with adoption predicting value creation. The result shows a p-value < 0.05 indicating the null hypothesis was rejected which indicates the residuals are not normally distributed. However, a visual inspection of the normality plot shows an indication of normality in the residual distribution. Figure 2 shows the histogram for the normality plot.
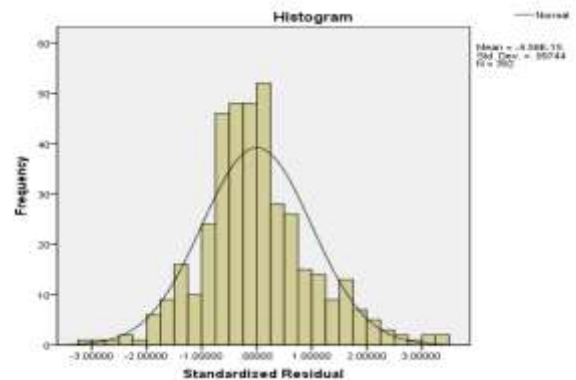

Figure 2. Normality Plot

Since four of the eight variables of personal characteristics were supported, moderation analysis was carried out on these four variables, namely Age, Gender, Marital Status and PC Ownership. With all the eight assumptions satisfied, it is now possible to carry out the moderated multiple regression.

III. FINDINGS

H₁: Age moderates the effect of adoption on Telecentre Value Creation.

The results show a significant model fit with R^2 = .794 and a significant interaction variable (p=0.000), hence hypothesis 1 is supported, that is, age moderates the effect of adoption of the telecentre on value creation. Since the coefficient of the interaction variable Product (-.074) is negative and the moderator variable AgeCat (-.044) is also negative, there is negative effect of adoption on value creation. The negative coefficient of the moderator variable suggests young people (the direction moving from old (1) to young (0)) tend to decrease value creation resulting from adoption of the telecentre.

H2: Gender moderates the effect of adoption on Telecentre Value Creation.

The results show a significant model fit with R^2 = .796 and a significant interaction variable (p=0.000), hence hypothesis 2 is supported, that is, gender moderates the effect of adoption of the telecentre on value creation. Since the coefficient of the interaction variable Product (-.074) is negative and the moderator variable GenderCat (.072) is positive, there is negative effect of adoption on value creation. The positive coefficient of the moderator variable suggests male gender (the direction moving from female (0) to male (1)) tend to decrease value creation resulting from adoption of the telecentre.

H3: Marital Status moderates the effect of adoption on Telecentre Value Creation.

The results show a significant model fit with R^2 = .794 and a significant interaction variable (p=0.000), hence

hypothesis 3 is supported, that is, marital status moderates the effect of adoption of the telecentre on value creation. Since the coefficient of the interaction variable Product (-.074) is negative and the moderator variable MaritalCat (.002) is positive, there is negative effect of adoption on value creation. The positive coefficient of the moderator variable suggests married people (the direction moving from single (0) to married (1)) tend to decrease value creation resulting from adoption of the telecentre.

H7: PC Ownership moderates the effect of adoption on Telecentre Value Creation.

The results show a significant model fit with R^2= .794 and a significant interaction variable (p=0.000), hence hypothesis 7 is supported, that is, PC ownership moderates the effect of adoption of the telecentre on value creation. Since the coefficient of the interaction variable Product (-.073) is negative and the moderator variable PCcat (-.015) is also negative, there is negative effect of adoption on value creation. The negative coefficient of the moderator variable suggests people with no PC (the direction moving from Yes (1) to No (0)) tend to decrease value creation resulting from adoption of the telecentre.

IV. CONCLUSION

The results of this study show certain aspects of personal characteristics have significant moderating role on the effect of adoption of a telecentre on a community socio-economic value creation. In particular age, gender, marital status and PC ownership tend to moderate the relationship between adoption of the telecentre and value creation. Examining the age category, this study found young people tend to have negative effect on value creation when adopting the telecentre. In the gender category, finding of this study indicates males tend to decrease value that can be created when adopting telecentre.

This study also found marital status to be a significant moderator, in which married people tend to contribute less when adopting the telecentre. In terms of PC ownership, this study found people with no PC tend to contribute less to the value that can be created when using the telecentre. Other personal characteristics such as education level, family size, income and frequency of use were found not to have significant moderating effect on the relationship between adoption and value creation.

Overall, results of this study may throw some light on sustainability of the telecentre in terms of socio-economic value creation with certain personal characteristics of the community. Past studies have

shown positive significant relationship between adoption and value creation. This trend is expected to continue to grow in the future.

With additional hindsight from this study, telecentre managers and stakeholders can make necessary adjustments in formulating programs for telecentres based on personal demography as suggested by Hansson et al. (2010), Ray and Prasad (2014) and Zulkhairi et al. (2015). This will further enhance the national policy on bridging the digital divide that specifies adoption of the telecentre as having higher socio-economic impact as described in the National Strategic Framework for Bridging the Digital Divide.

Future work can extend this study by examining the other personal characteristics not found to be significant moderators by transforming the variables in satisfying the multivariate assumption of homoscedasticity that was not supported in this study.

VI ACKNOWLEDGMENT

REFERENCES

Abu Samah, B., Badsar, M., Abu Hassan, M., Osman, N., Shaffril, M., & Azril, H. (2013). Youth and telecentres in community building in rural Peninsular Malaysia. Pertanika Journal of Social Sciences & Humanities, 21(spec. July), 67-78.

Attwood, H., Diga, K., Braathen, E., & May, J. (2013). Telecentre functionality in South Africa: Re-enabling the community ICT access environment. The Journal of Community Informatics, 9(4).

Bailey, A. (2009). Issues Affecting the Social Sustainability of Telecentres in Developing Contexts: A Field Study of Sixteen Telecentres in Jamaica. The Electronic Journal on Information Systems in Developing Countries (EJISDC), 36 (4), 1-18.

Bailey, A. and Ngwenyama, O. (2009). Social Ties, Literacy, Location and Perception of Economic Opportunity: Factors Influencing Telecentre Success in a Development Context. 42nd Hawaii International Conference on System Sciences, HICSS 42, Hawaii.

Bailey, A. and Ngwenyama, O. (2010). Bridging the generation gap in ICT use: Interrogating identity, technology and interactions in community telecenters. Information Technology for Development, 16 (1), 62-82.

Baron, R. M., and Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. Journal of Personality and Social Psychology, 51, 1173-1182.

Economic Planning Unit (EPU) (2007). Rangka Kerja Strategik Kebangsaan bagi Merapatkan Jurang Digital (NSF-BDD), presented at Bengkel Pusat Perkhidmatan dan Ilmu Komuniti Peringkat Negeri Pulau Pinang, 13 Jun 2007.

Frias, M.A.E, Peres, H.H.C., Paranhos, W.Y., Leite, M.M.J., Prado, C., Kurcgant, P., Tronchin, D.M.R. and Melleiro, M.M. (2011). The use of computer tools by the elderly of a Center of Reference and Citizenship for the Elderly, Rev Esc Enferm USP, 2011; 45(Esp):1606-12, retrieved October 1, 2012 from http://www.scielo.br/pdf/reeusp/v45nspe/en_v45nspea11.pdf.

Gomez, R. (2014). When you do not have a computer: Public-access computing in developing countries. Information Technology for Development, 20(3), 274-291.

Gomez, R. and Camacho, K. (2013). Users of ICT at Public Access Centers: Age, Education, Gender, and Income Differences. In Chhabra, S. (ed), ICT Influences on Human Development, Interaction, and Collaboration (1-21). IGI Global.

Gomez, R. and Gould, E. (2010). The "cool factor" of Public Access to ICT Users' Perceptions of Trust in Libraries, Telecentres and Cybercafe´s in Developing Countries, Information Technology & People, 23 (3), 247-264.

Hair, J.F., Black, W., Babin, B., Anderson, R. and Tatham, R. (2006). Multivariate Data Analysis. Prentice Hall, Inc.: Upper Saddle River, NJ, USA.

Hansson, H., Mozelius, P., Gaiani, S. and Meegammana, N. (2010). Women Empowerment in Rural Areas through the Usage of Telecentres - A Sri Lankan Case Study. 2010 International Conference on Advances in ICT for Emerging Regions (lCTer), IEEE, 5-10.

Hoaglin, D.C. & Iglewicz, B. (1987). Fine tuning some resistant rules for outlier labelling, Journal of American Statistical Association, 82, 1147-1149.

Johansson Hedberg, L. (2011). Telecentre For Community Development: Evaluation of the Tunjang telecentre, Malaysia. The Journal of Community Informatics, 6(2).

Kumar, R. and Best, M. (2006). "Social Impact and Diffusion of Telecenter Use: A Study from the Sustainable Access in Rural India Project", Journal of Community Informatics, 2(3).

Kyobe, M. (2011). Investigating the key factors influencing ICT adoption in South Africa. Journal of systems and information technology, 13(3), 255-267.

Lesame, N.C. (2008). The Impact of Information and Communication Technologies (ICTs) on Development: A Case Study of the Influence of Telecentres on The Education of Users, PhD Thesis, University of South Africa.

Mbatha, B. (2015). Pushing the agenda of the information society ICT diffusion in selected multipurpose community telecentres in South Africa.Information Development, Doi:10.1177/0266666915575544.

Mohamad Amir Abu Seman, Huda Ibrahim, Mohd Khairudin Kasiran, Nor Iadah Yusop, Zahurin Mat Aji, Zulkhairi Md. Dahalin and Azman Yasin. (2012). Community Characteristics for Self-Funding and Self-Sustainable Telecenter,AWERProcedia Information Technology & Computer Science . [Online]. 2013, 3, 1666-1671. Available from: http://www.world-education-center.org/index.php/P-ITCSProceedings of 3 rd World Conference on Information Technology (WCIT-2012), 14-16 November 2012, University of Barcelon, Barcelona, Spain.

Mohammad Badsar, Bahaman Abu Samah, Musa Abu Hassan, Nizam Bin Osman and Hayrol Azril Mohd Shaffri (2011). Social Sustainability of Information and Communication Technology (ICT) Telecentres in Rural Communities in Malaysia Australian, Journal of Basic and Applied Sciences, 5(12): 2929-2938.

Mukerji, M. (2009). ICTs and development: A study of telecenters in rural India. Doctorial Colloqium. 10th International Conference on Social Implications of Computers in Developing Countries, Dubai, United Arab Emirates.

Nor Iadah Yusop, Faudziah Ahmad, Zahurin Mat Aji and Azizi Ab Aziz (February 2015). A Computational Model for Dynamics in Effective Usage of ICT Public Access Centre. ARPN Journal of Engineering and Applied Sciences, 10 (3), 1494-1498.

Prado, P., & Janbek, D. M. (2012). Telecenter Web Portals in Latin American and Arab Nations: A Comparative Analysis. The Journal of Community Informatics, 9(1).

Rajapakse, J. (2012, August). Impact of telecentres on Sri Lankan society. Paper presented in 8th International Conference on Computing and Networking Technology (ICCNT), 2012, pp. 281-286, IEEE.

Ray, R.S. and Prasad, R. (2014). Telecentres Go Where Mobile Phones Fear to Tread Evidence from India. Review of Market Integration, 6(1), 62-95.

Rogers, E.M.(2003). Diffusion of Innovations (5th Edition), New York Free Press.

Terry, A., & Gomez, R. (2011, January). Gender and public access computing: An international perspective. In System Sciences (HICSS), 2011 44th Hawaii International Conference on (pp. 1-11). IEEE.

Walsham, G. (2010). ICTs for the Broader Development of India: An Analysis of the Literature, European Journal of Information Systems in Developing Countries (EJISDC) 41(4), 1-20.

Yogeesvaran, K. (2007). National Strategic Framework for Bridging the Digital Divide and the Need for Upgrading and Expanding ICT Infrastructure. MyBroadband 2007 Conference and Exhibition 10-12 Sept 2007, MATRADE Exhibition & Convention Centre, Kuala Lumpur.

Zahurin Mat Aji (2014). An Investigation on Individual Empowerment of Telecentres Users: A Case Study of Three Pusat Internet Desa (PIDs) in Northern States of Malaysia. Universiti Utara Malaysia.

Zulkhairi Md Dahalin, Huda Ibrahim, Md Zahir Mat Cha, Nor Iadah Yusop, Nafishah Othman, Zahurin Mat Aji, Mohamad Amir Abu Seman, Mohd Khairudin Kasiran, Abdul Jaleel Kehinde Shittu and Azman Yasin (2012). A Model of Institution of Higher Learning and Community Collaboration for the Development of eCommunity. Proceedings of the 19th International Business Information Management Association (IBIMA) Conference, 12-13 November, Barcelona, Spain.

Zulkhairi Md. Dahalin, Huda Hj. Ibrahim, Nor Iadah Yusop, Mohd Khairudin Kasiran, Zahurin Mat Aji, and Nafishah Othman (2012). A Telecentre Ecosystem for Diffusion and Adoption. Proceedings of 3rd International Soft Science Conference (ISSC) 2012, 6-8 November, Phnom Penh City, Cambodia, 99-103.

Zulkhairi Md. Dahalin, Nor Iadah Yusop, Huda, Ibrahim, Mohd. Khairudin, Kasiran, & Zahurin, Mat Aji (2009). Socio-economic Benefits of Telecentre Implementation in Peninsular Malaysia. Proceedings of the International Conference of Computing and Informatics 2009 (ICOCI09), Legend Hotel, Kuala Lumpur, 24 – 25 June.

Zulkhairi Md Dahalin, Nor Iadah Yusop, Huda Ibrahim, Zahurin Mat Aji, Nafishah Othman, Rosmadi Bakar, Yussalita Md Yussop and Mohd Khairudin Kasiran (2015). A Test Model for Telecentre Value Creation, Proceedings of the 5th International Conference on Computing and Informatics, ICOCI 2015, 11-12 August, 2015 Istanbul, Turkey, 551-556.