

A Conceptual Framework of Cloud-Based Mobile-Retail Application for Textile Cyberpreneurs

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Abstract— Cloud-based m-retail application is commonly used by internet retailers and cyberpreneurs for conducting online business operations. The emergence of third-party e-commerce platforms along with incentives from Malaysian government has easily enabled the utilization of mobile marketplace app among both Malaysian sellers and customers. As m-retail has just started to gain attention in Malaysia, more works must be done to overcome the academic research limitations in terms of technological and non-technological perspectives. Meanwhile, textile and apparel products are among the most popular to be sold via the internet in addition to the growing number of related businesses. The uses of latest technology such as cloud-based mobile-retail application may help business owners to sustain for business survival. In designing a mobile applications for specific users, a thorough investigation must be performed. A conceptual framework of the apps might be helpful in providing a general overview of required elements for developing a successful mobile-retail applications. Extensive literature reviews, qualitative analysis, interviews and questionnaires have been conducted in designing and validating the proposed framework. The analysis results shows mean values from the survey are > 3.5 for the core element variables in this research. Thus, the statistical analysis validation results indicates the importance of the element as the fundamental component for the proposed framework. Therefore, this paper intends to propose a conceptual framework of cloud-based mobile-retail application specifically to be used by textile cyberpreneurs which might be helpful for related key players.

Keywords— *mobile retail; mobile application; cloud-based mobile application; textile cyberpreneurship; conceptual framework.*

I. INTRODUCTION

Internet retailers are facing new challenges in conducting business nowadays. Apart from using common websites to sell their products, they are now given a few other choices of retail platforms to engage with potential customers. As mobile devices are greatly used nowadays for multiple purposes, the internet retailers must take advantages of this phenomenon to expand their business opportunities and engage in mobile retail (m-retail) activities. Textile and apparel products are among the most popular to be sold in Malaysia via the internet [1]. Some of the well-known textile brands have managed to create their own mobile applications for selling purpose while some others have utilized the existing mobile marketplace applications that are provided by third-party electronic commerce (e-commerce) merchants. The basic functionality of these applications or apps is to enable the sellers to promote and sell their products, while

the customer may use them to search and buy the required items from the seller.

In Malaysia, the e-commerce and mobile commerce (m-commerce) technologies have always been encouraged to be scrutinized and utilized by Malaysian entrepreneurs. Malaysian government has offered various incentives that are related to empower the usage of latest information and communication technologies (ICT) among businesses which include e-commerce and digital entrepreneurship industries [2]. The microentrepreneurs and small and medium enterprises (SME) are also invited to embark into the state-of-the-art technology utilization in targeting for business growth through several programmes such as eUsahawan [3], eRezeki [4] and SME Cloud Adoption [5]. Besides, the improvement of network infrastructure by telecommunication industries has enabled the internet retailing activities to flourish among Malaysians.

As the number of mobile devices users is increasing in Malaysia [6], the possibility for the users to shop or sell by using mobile devices is somewhat high. Moreover, the existence of social media has indirectly promulgated the chances to conduct internet retailing among individuals and businesses. Social media is a powerful marketing tool [7] and very common to be used by Malaysian retailers for online business purpose [8]. Whilst social media too have launched their own mobile apps, the m-retail activities might also escalate among mobile device users, be it customers or sellers. Along with the emergence of mobile marketplace apps and easy payment gateways, m-retail is a promising sector with a lot of opportunities for businesses.

Nonetheless, academic researches about m-retail or mobile shopping (m-shopping) are quite limited in Malaysia [9][10]. This may happen as a result from the e-commerce and m-commerce statuses which had only started to rise recently [11]. In order to accelerate the adoption of e-commerce among businesses, Malaysian government had introduced National eCommerce Strategic Roadmap [11] that emphasized the importance of technology utilization for economic growth. Generally, for a technology to be utilized by business owners or personnel, their needs must be identified and aligned with the business tasks that will be performed via the technology. If the technology or application is usable and helpful in fulfilling their needs, the chance to use it is higher. Hence, a thorough investigation must be conducted to understand the needs of business owners before developing a specific mobile app that can enable m-retail activities. For any information system (IS) or application to be practically implemented, a conceptual view or framework of the app shall be created as a reference to

smoothen the development process. Therefore, this paper intends to present a general conceptual framework of mobile retail application that employs cloud technology specifically for Malaysian textile e-commerce entrepreneurs or cyberpreneurs.

II. CLOUD-BASED M-RETAIL APPLICATION

A. Mobile Cloud Computing

Mobile cloud computing is a paradigm that combines both traits of mobile computing and cloud computing into its operations [12]. Mobile computing emerges to support the existence of mobile devices that can be used for communication purposes and information retrievals nowadays. The functionality of mobile devices has expanded aligned with the requirements of users who are always on-the-go and needs to be connected to the Internet. Several major changes have been done in mobile device designs to accommodate current user’s activities in terms of screen size, input mechanisms, quality of camera and other smartphone features. The device is becoming more sophisticated day by day to enhance the user’s experience while utilizing the technology. As mobile computing provides underlying technology for wireless data transmission by mobile device such as smartphones and tablets, the performance of mobile devices is still unquestionably deficient in terms of battery consumption, limited memory and storage capacity. If an application continuously runs on the mobile device, it is possible for the performance to drop significantly due to its limitations. Hence, to overcome this issue, cloud computing might be the proper solution in which the previous heavy loads that were encountered by mobile devices are now transferred to the cloud for processing. With this, the performance of mobile devices can be improved whilst the cloud takeovers the duties.

Cloud services are commonly offered via software as a service (SaaS), platform as a service (PaaS) and infrastructure as a service (IaaS). The business owners will be attracted to use cloud due to several reasons. First, by using cloud, they do not have to worry about storing a physical server since the cloud is managed by service providers. Second, the fees of cloud are charged according to pay-per-use basis [13], thus reducing the operational cost. Next, the cloud is scalable and flexible to expansion or reduction wherein is convenient for business owners who are likely to expand their businesses and need a bigger cloud size in the future. In all, coupled with traits of mobile computing, the benefits of mobile cloud computing will be advantageous to business owners and mobile device users as shown in Table 1.

B. Mobile-Retail Application

A mobile application or a mobile app is usually installed on a mobile device to operate with specific functionalities. It is normally built and classified as either native app or hybrid app based on the choice of development team.

For m-retail application, the basic role of the app is to enable mobile retail transactions to be performed by the user. The business owners may encounter several options to utilize m-retail app for their businesses. They may choose to develop their own m-retail app or simply use the existing mobile marketplace apps that are offered by third-party e-

commerce merchants such as Lazada, Zalora, Shopee, Carousell and eBay. Currently, these apps are normally operated by utilizing cloud-based services for better performance on service provider’s site. M-retail apps can be downloaded via Google PlayStore or Apple iOS for free and can also be used by both sellers and customers. Nevertheless the operational functionalities of apps for sellers are normally more complex than the apps for customers. This is because the sellers have to fulfill tasks such as managing customer orders, updating inventory and sometimes analyzing sales through the app. On the other hand, the customers may only place orders and view order status by using the app apart from updating user account information.

TABLE I. BENEFITS OF MOBILE CLOUD COMPUTING [14]

Benefits of Mobile Computing	Benefits of Cloud Computing
<u>Mobility</u> The user can perform tasks anywhere via the use of mobile device and network connection	<u>Accessibility</u> The data can be accessed by the user anytime and anywhere through network connection
<u>Time saving</u> Tasks can be conducted whenever the user is connected via network	<u>Storage capacity</u> The cloud can store huge data more than a personal computer
<u>Convenience</u> The mobile device user can perform various online activities regardless of time and location	<u>Data protection</u> The data is safely stored in cloud with disaster backup recovery services
	<u>Scalability</u> The cloud can be expanded according to the requirements of user
	<u>Eco-friendly</u> Only necessary resources are utilized for processing, thus saving the energy

III. TEXTILE CYBERPRENEURSHIP

In Malaysia, textile industry has been ranked as 10th major export contributors in 2015 [15], thus making it as one of the most profitable sectors for the country. Aligned with the growth of fashion or apparel sectors since Second Malaysia Plan (1971-1975), many entrepreneurs from small to big enterprises have taken opportunities in venturing into the industry whilst contributing for the country’s economy. Moreover, the advancements of technology nowadays have easily boosted the sales of apparels and garment products in Malaysia, especially via internet retailing. According to Euromonitor [16], the Malaysian clothing and footwear specialist retailers alone had gained RM 13,923 million of sales in 2012 with 20.69% contribution from overall non-grocery retailers. These impressive numbers have indicated the strong outlook of textile and fashion industry in retail sector. Nonetheless, competitions between fashion brands are very tough in this dynamic industry. Some have been very successful while some have not, thus quitting from the businesses. For the remaining survivors, it is essential to strategize the long-term plan by taking homage of trading opportunities via various state-of-the-art technologies such as e-commerce, m-commerce and cloud-based services. Nowadays, textile internet entrepreneurs or cyberpreneurs are using multiple selling channels for their online businesses. This includes social media platforms, websites, e-commerce merchants’ channels and m-retail apps.

IV. METHODOLOGY

In order to develop any IS or application, a proper plan with a thorough analysis must be conducted to ensure the usability and success of the application. The traits of every required element must be defined. For this study, the theoretical definition of IS is used as a major reference. One of the accepted definition of information system is "...a computer system that stores data and supplies information, usually within a business context. Information systems often rely on databases. A system of people, procedures, and equipment, for collecting, manipulating, retrieving, and reporting data". [17]. A mobile app can be considered as an IS but is supported by different technologies and environment unlike web or desktop applications. Still, the major components to make an app are similar to other systems which are people, technology and procedures. Based on these elements, the basis of conceptual framework is developed and then elaborated based on several related theories, models or concepts. Figure 1 illustrates an overview research methodology for this study.

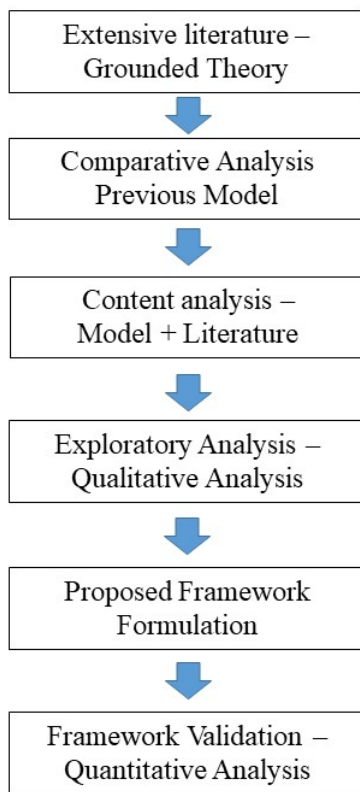


Fig. 1. Conceptual Framework of Cloud-Based M-Retail Application for Textile Cyberpreneurs

Extensive literature reviews were also performed to understand the background of study. By following methods suggested by Doherty and Ellis-Chadwick [18], a collection of related articles, documents from official websites of Malaysian government authorities and other reliable sources was collected and analyzed to suit with the study context. Previous works that are related to conceptual framework development for mobile application were also studied. Keywords like “mobile retail”, “mobile shopping”, “mobile application framework” and “textile industry” were used for

searching purpose. Content analysis was then conducted by using coding method in which the selected documents were segregated based on code. The unrelated articles or documents were put aside from further analysis.

In understanding the tasks that are normally performed by textile cyberpreneurs, interviews with three textile cyberpreneurs were conducted. Several questions that are related to activities of textile cyberpreneurs for managing their online businesses were asked. Their profiles and background were also inquired. The recorded data was then analyzed and six finalized characteristics of task have been identified as “ubiquitous sales order management, customer information management, product information management, payment information management, sales orders analysis and fashion trends forecasting” [19]. These activities are expected to be conducted by textile cyberpreneurs while using the m-retail application.

For deeper knowledge on technology elements, interviews with three experts or practitioners on mobile cloud technology have been performed and discussed. Based on the data analysis, it can be concluded that four major characteristics of cloud-based m-retail application are “ubiquitous services, reliable services, facilitating resources improvement and scalable services”. [19]

The results from review of literatures, exploratory and qualitative data analyses were merged for the purpose of developing a conceptual framework. For validating the proposed framework, quantitative method is used by distributing questionnaires to textile cyberpreneurs.

A unique data collection instrument were develop in order to validate the proposed framework. 600 set of questionnaires were distribute to various industries players, cyberpreneurs and online cyber communities to validate the component of the proposed framework.

V. PROPOSED CONCEPTUAL FRAMEWORK

The conceptual framework encompasses interrelated IS elements that could make a successful cloud-based mobile application, especially for textile cyberpreneurs in managing internet retail transactions. The retail management tasks which are going to be conducted by textile cyberpreneurs must be supported by several elements, particularly human elements, technology elements and application quality elements as illustrated in Fig. 2.

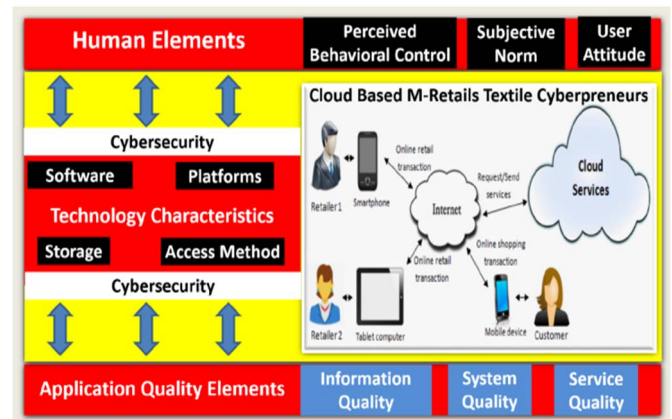


Fig. 2. Conceptual Framework of Cloud-Based M-Retail Application for Textile Cyberpreneurs

The human elements are derived from Theory of Planned Behavior (TPB) [20] that emphasizes human behavior as predictors for technology adoption. Thus, perceived behavioral control, subjective norms and user's attitude shall be examined. TPB has been widely used in many researches on studying the relationships between human beliefs, intention and action in various purposes. For an app to be successfully utilized, the role of people is very important. Hence, human traits must be analyzed and understood.

Meanwhile, the application quality elements are derived from Information System Success (ISS) model [21] that posits quality as essential to ensure technology utilization. DeLone and McLean [21] had suggested the quality dimensions to be investigated are system, information and service qualities. From the perspective of a system developer, quality shall be the upmost priority in delivering any system or application. By promoting quality traits and interesting up-to-date features like artificial intelligence (AI) mechanisms in an app, the user experience while using the app will be enhanced, thus gaining trusts from the user and potential users.

As intermediary between human and application quality elements, technology elements that consist of software, platforms, storages and access methods must be enabled for smooth transactions. The technology must then be supported by cybersecurity elements [22] to warrant secure data transactions which is very crucial for internet retail. Confidentiality, integrity and availability are among the vital elements of security that must be implemented. Since mobile cloud technology is relatively new, several issues regarding security [23] have always been discussed and raised up in many academic researches. Besides, the limitations of mobile devices such as restricted screen size, battery performance, storage capacity and limited memory shall be also taken into consideration.

In all, the conceptual framework is managed to illustrate a holistic view of important elements and required details for designing a cloud-based mobile application which is to be used by textile cyberpreneurs in managing their online business transactions. The framework may be used as a reference by major players of cloud-based m-retail application industry such as service providers, application developers and marketers for better comprehension of the app elements.

VI. FRAMEWORK VALIDATION

600 questionnaires were distributed via face-to-face and e-mail invitations to selected textile cyberpreneurs who have either participated at several online businesses festivals or have been listed in the directory of Perbadanan Usahawan Nasional Berhad (PUNB). 411 questionnaires were returned but only 348 were usable for data analysis after the process of removing outliers and missing data. Table II summarise the demographic descriptive analysis results for the validation of the framework through statistical empirical analysis.

TABLE II. DEMOGRAPHIC DESCRIPTIVE ANALYSIS RESULTS

Characteristics	Demographics Profiles	Percentage
Gender	Male	15.5 %
	Female	84.5 %
Ethnicity	Malay	84.5 %

Characteristics	Demographics Profiles	Percentage
	Chinese	6.9 %
	Indian	4.3 %
	Others	4.3%
Age	20 or less	12.9 %
	21 – 25	33.9 %
	26 – 30	21.0 %
	31 – 35	15.5 %
	36 – 40	11.2 %
	41 and above	5.5 %
Textile products	Clothes	89.7 %
	Carpets	4.9 %
	Curtains	5.2 %
	Bedclothes	4.9 %
	Table spreads	4.3 %
	Others	7.2 %
Mobile device type to conduct online business	Smartphone	90.2 %
	Tablet Computer	38.8 %
	Others	2.9 %
Website to conduct online business	Yes	56.6 %
	No	43.4 %
Social media channels to conduct online business	Facebook	87.1 %
	Twitter	14.4 %
	Instagram	71.0 %
	WhatsApp	61.2 %
	WeChat	33.9 %
	Others	1.1 %
Knowledge on cloud-based m-retail application	Not using any	3.7 %
	Heard about it	87.9 %
Possess own version of cloud-based m-retail application	Use it	47.1 %
	Yes	16.1 %
	No	83.9 %

The textile products that are mostly sold by respondents are clothes (89.7%), followed by other than listed textile products (7.2%), curtains (5.2%), bedclothes (4.9%), carpets (4.9%) and table spreads (4.3%). In terms of devices that are utilized for online retail, 314 respondents use smartphones (90.2%), 135 use tablet computers (38.8%) while the remaining 10 use other types of mobile device (2.9%). More than half (56.6%) of respondents possess their own websites for their business while the remaining (43.4%) do not. The finding also shows that social media has been used by respondents for their online retail where 87.1% use Facebook, 71% use Instagram, 61.2 % use WhatsApp, 33.9% use WeChat, 14.4% use Twitter and 1.1% use other platforms. Only 3.7% of respondents do not use any social media platforms for their businesses. The low adoption issue of cloud-based m-retail application among Malaysian textile cyberpreneurs has been acknowledged via the demographic data where only 47.1% has utilized the application and only 16.1% have their own version of mobile app.

From the developed framework, the tested variables were the elements of human, procedure and application quality that consist of user attitude, perceived behavioral control, subjective norm, task characteristics, technology characteristics, information quality, system quality and service quality. On the other hand, the elements of cybersecurity were not tested due to technical aspects of framework which are not suitable to be investigated from textile cyberpreneurs. It is assumed the security mechanisms are crucial to be implemented with no compromises.

In measuring the variables, five-point Likert scale was used where 1 = strongly disagree and 5 = strongly agree. Most of the questionnaire items were adapted from the previous relevant studies as shown in Table III. Only items for task characteristics and technology characteristics were

newly developed based on the earlier interview results with experts and real-life practitioners.

The reliability of items for each construct was measured by determining the value of Cronbach’s Alpha. All variables have been found to exceed 0.85, which are good enough based on the recommendation by Nunnally and Bernstein [28]. The specific reliability result for each variable is shown in Table IV.

In order to examine the agreements of respondents, the mean value for each variable is determined. It has been found that the mean value for the variables were ranging from 3.58 to 4.17 as presented in Table V. From the perspectives of textile cyberpreneurs, the user’s attitude and task characteristics are the most important elements from the framework. Both variables have shared the highest mean value of 4.17. Meanwhile, information quality has been ranked the lowest with mean value of 3.58. Nonetheless, all values have shown the inclination towards the agreement as they have approached the value of 4. In all, the elements from the proposed conceptual framework are proven to be essential from the perspective of textile cyberpreneurs.

TABLE III. QUESTIONNAIRE ITEMS AND CORRESPONDING REFERENCES

Variable	No. of items	References
Attitude	5	[24] [25]
Subjective norm	5	[25]
Perceived behavioral control	4	[26]
System quality	5	[27]
Information quality	5	[27]
Service quality	4	[27]
Task characteristics	6	Newly developed
Technology characteristics	4	Newly developed

TABLE IV. RELIABILITY TEST RESULT

Variable	No. of items	Cronbach’s Alpha
Attitude	5	0.950
Subjective norm	5	0.946
Perceived behavioral control	4	0.902
System quality	5	0.962
Information quality	6	0.979
Service quality	4	0.970
Task characteristics	6	0.940
Technology characteristics	4	0.862

TABLE V. MEAN VALUES AND RANK OF VARIABLE

Variable	No. of items	Mean	Rank
Attitude	5	4.17	1
Subjective norm	5	3.90	5
Perceived behavioral control	4	3.74	7
System quality	5	4.08	3
Information quality	5	3.58	8
Service quality	4	3.82	6
Task characteristics	6	4.17	2
Technology characteristics	4	3.97	4

VII. CONCLUSION

The proposed conceptual framework can be served as a guideline in understanding the requirements to develop a mobile cloud application specifically for textile cyberpreneurs. As retail transactions can be done via mobile devices nowadays, the essential elements that must be looked

upon are included in the framework to illustrate a holistic viewpoint which is required by service providers and application developers. However, the framework is still in preliminary stage. Therefore, more works must be conducted to assess the framework’s feasibility in the future especially in assessing the technical aspects of the application. Furthermore, a mobile app prototype shall be developed based on the proposed framework to examine and validate its usability among the textile cyberpreneurs through case study.

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REFERENCES

- [1] Goi C-H. M-Commerce: Perception of Consumers in Malaysia. *Journal of Internet Banking and Commerce*, 21:S5, pp. 1-11, 2016.
- [2] Malaysia Digital Economy Corporation. Building An Inclusive Digital Future. Available: <https://www.mdec.my/building-an-inclusive-digital-future> , 2017.
- [3] Malaysia Digital Economy Corporation. eUsahawan - Pemangkin Pendapatan Digital. Available: <https://eusahawan.mdec.my/eusahawan.html> , 2017.
- [4] Malaysia Digital Economy Corporation. eRezeki - Now everyone can benefit from the digital economy. Available: <https://erezeki.my/en/home/> , 2017.
- [5] Malaysia Digital Economy Corporation, Cloud Computing Adoption Programme. Available: http://www.mscomalaysia.my/cloud_sme , 2016.
- [6] Malaysian Communications and Multimedia Commission. Statistical Brief Number Seventeen Hand Phone Users Survey 2014, 2015.
- [7] Syed Ahmad S. F. and Murphy, J. Social Networking as a Marketing Tool: The Case of a Small Australian Company, *Journal of Hospitality Marketing & Management*, 19:7, pp. 700-716, 2010.
- [8] Hassan, S. Shiratuddin, N., Hashim, N. L., Ab Salam, S. N. and Sajat, M. S. Social Media as Persuasive Technology for Business: Trends, and Perceived Impact in Malaysia. Available: http://www.skmm.gov.my/skmmgovmy/media/General/pdf/SocialMedia_in_Biz_UUM_SKMM.pdf , 2016.
- [9] Wong, C. H., Lee, H. S., Lim, Y. H., Chua, B. H., Chai, B. H. and Tan, G. W-H. Predicting the consumers’ intention to adopt mobile shopping: an emerging market perspective, *International Journal of Network and Mobile Technologies*, Vol. 3 No. 4, pp. 24-39, 2012.
- [10] Wong, C. H., Tan, G. W-H., Ooi, K-B. and Lin, B. Mobile shopping: The next frontier of the shopping industry? An emerging market perspective, *International Journal of Mobile Communications*, Vol 13, Issue 1, pp. 92-112.
- [11] Ministry of International Trade and Industry. NATIONAL eCOMMERCE COUNCIL (NeCC). 2015. Available: <http://www.miti.gov.my/index.php/pages/view/3071?mid=409> , 2015.
- [12] Khan, A. U. R., Othman, M. and Madani, S. S. A Survey of Mobile Cloud Computing Application Models, *IEEE Communications Surveys & Tutorials*, Vol. 16, No. 1, pp. 393-413, 2014.
- [13] Prasad, M. R., Gyani, J. and Murti, P. R. K. Mobile Cloud Computing: Implications and Challenges, *Journal of Information Engineering and Applications*, Vol. 2, No. 7, pp. 7-15, 2012.
- [14] Ghani, W. S. D. W. A., Khidzir, N. Z., Guan, T. S. and Daud, K. A. M. Enterprise Mobile Cloud Application for Textile Cyberpreneurs : Big Data Issues , Challenges and Opportunities Enterprise Mobile Cloud Application for Textile Cyberpreneurs : Big Data Issues , Challenges and Opportunities, In *Proceeding of 9th International Conference on IT in Asia 2015 (CITA'15)*, pp. 38-41, 2015.
- [15] Malaysia External Trade Development Corporation. Textiles and Apparel. Available: <http://www.matrade.gov.my/en/foreign-buyers-section/69-industry-write-up--products/722-textiles-and-apparel> , 2016.

- [16] Euromonitor International. World Retail Data and Statistics 2014, 8th Edition, pp. 189-192, 2014.
- [17] Joshi, G. Information Technology for Retail, New Delhi, India: Oxford University Press, ch. 2, pp. 23-24, 2009.
- [18] Doherty, N. F. and Ellis-Chadwick, F. E. New perspectives in internet retailing: a review and strategic critique of the field, *International Journal of Retail & Distribution Management*, Vol. 34 Nos 4/5, pp. 411-428, 2006.
- [19] Khidzir, N. Z., Ghani, W. S. D. W. A. and Guan, T. T. Cloud-Based Mobile-Retail Application for Textile Cyberpreneurs : Task-Technology Fit Perspective Analysis, In *Proceedings of the International Conference on High Performance Compilation (HP3C-2017)*, Computing and Communications, pp. 65-70, 2017.
- [20] Ajzen, I. From intentions to actions: A theory of planned behaviour in J. K. (Eds.), & J. Beckman, *Action-control: From Cognition to Behavior*, Heidelberg: Springer, pp. 11-39, ch.2, 1985.
- [21] DeLone, W. H. and McLean, E. R. The DeLone and McLean model of information systems success: a ten-year update, *Journal of Management Information Systems*, Vol. 19, No. 4, pp. 90–30, 2003.
- [22] Khidzir, N. Z., Ismail, A. R., Daud, K. A. M., Ghani, M. S. A. A., Ismail, S. and Ibrahim, A. H. Human Factor of Online Social Media Cybersecurity Risk Impact on Critical National Information Infrastructure, Nicholson D. (eds) *Advances in Human Factors in Cybersecurity. Advances in Intelligent Systems and Computing*, vol 501. Springer, Cham, pp. 195-207, 2016.
- [23] Khan, A. N., Mat Kiah, M. L., Khan, S. U. and Madani, S. A. Towards secure mobile cloud computing: A survey, *Future Generation Computer Systems*, Vol. 29, Issue 5, pp. 1278-1299, 2014.
- [24] Al-Najjar, G. M. *Mobile Information Systems: An Empirical Analysis of the Determinants of Mobile Commerce Acceptance in Jordan*, Ph.D thesis, Universiti Utara Malaysia, 2012.
- [25] Md Nor, K. and Pearson, J. M. An Exploratory Study Into The Adoption of Internet Banking in a Developing Country: Malaysia. *Journal of Internet Commerce*; Vol. 7, No.1, pp. 29-73, DOI: 10.1080/15332860802004162 , 2008.
- [26] Shih, Y. Y and Fang, K. The use of a decomposed theory of planned behavior to study internet banking in Taiwan. *Int. Res.* Vol. 14, No. 3, pp. 213– 223, 2004.
- [27] Chen, L. Y. Determinants of m-shopping quality on customer satisfaction and purchase intentions: the IS success model perspective. *World Review of Entrepreneurship, Management and Sust. Development*, Vol. 9, No. 4, pp. 543 – 558, 2013.
- [28] Nunnally, J. C and Bernstein, I. H. *Psychometric Theory*. New York: McGraw Hill, 1994..