Task-Technology Fit for Textile Cyberpreneur's Intention to Adopt Cloud-Based M-Retail Application

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***Abstract*— Task-Technology Fit (TTF) model has been widely used in many researches for understanding the compatibility of task characteristics and technology characteristics. Applying TTF in mobile retail (m-retail) context from the perspectives of retailers might give the insights of their intention to adopt mobile cloud application technology for online business operations. Since it is currently common for retailers such as textile cyberpreneurs to conduct m-retail via the uses of certain mobile applications and devices, it is essential to investigate the usage intention based on task-related factors. Therefore, the objective of this study is to examine the compatibility of textile cyberpreneurs' tasks and characteristics of cloud-based m-retail application (CBMA) along with their usage intention to adopt the technology for their online business transactions. This research model surveyed 348 Malaysian textile cyberpreneurs. The results show that both task characteristics and technology characteristics have positive significant effects on task-technology fit. Further analysis also suggests the fitness between task and technology has positively influenced textile cyberpreneurs' intention to adopt cloud-based m-retail application. The findings contributed in acknowledging the usage intention among textile cyberpreneurs based on task-related factors which might be useful for service providers in delivering the right services for end-users. The directions for future research are also discussed.**

Keywords—Mobile retail; behavioral intention;cloud-based mobile application; cyberpreneurship; task-technology fit

I. INTRODUCTION

Nowadays, internet retailers have several options in conducting their businesses through various platforms. As the business grows, the needs for efficient business management increase along with the uses of specific technologies. In this era of smartphone utilization, the way businesses are conducted have also transformed which then allow m-commerce transactions to be performed at anytime and anywhere. Mobile retail or m-retail is one of m-commerce subdivisions that are now possible to be done by internet retailers via mobile devices with supporting network technology. Internet retailers or cyberpreneurs [1][2] are facing challenges in expanding their business due to factors such as the rising numbers of competitors and current economic downturn. This situation is exclusively valid in fashion and textile industries that are always dynamic and vulnerable to current trends. Thus, textile cyberpreneurs must now find ways to be creative in promoting their products and engaging with the potential customers. Utilizing latest advancements of technology is always encouraged by Malaysian government in both textile industry and e-commerce context. It is believed the latest technology could help to ensure business growth especially among cyberpreneurs who are mostly young and new to digital entrepreneurship [3]. Nonetheless, the adoption of state-of-the-art technologies to be applied for business operations such as cloud and e-commerce services is still slowly emerging among Malaysian enterprises and entrepreneurs unlike other countries like Hong Kong and South Korea [4]. Issues such as low adoption and awareness, lack of offerings, poor fulfilment experience and lack of supporting ecosystem [4][5] have been identified as the hindrances for e-commerce growth in Malaysia. There are several initiatives that have been introduced by Malaysia Digital Economy Corporation (MDEC) to empower the uses of digital platforms and cloud computing services among small and medium businesses through eUsahawan and SME Cloud Adoption Programme. These programmes are helpful as stepping stones for cyberpreneurs to look for new business prospects. Since cloud and m-commerce services are still lowly adopted by entrepreneurs in Malaysia, it can be concluded that the uses of related technology like cloud-based m-retail applications (CBMA) is also low. Previous meta-analyses of literatures [6][7] have shown that the least explored in m-retail adoption context is to gain information from the retailers' perspective as many researches focused more on customers' point of view. Researches about m-retail in Malaysia are still limited [8][9] and little is known about the usage intention of m-retail application especially among specific audience like textile cyberpreneurs based on task-related factors. It is important to acknowledge the compatibility between textile

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cyberpreneurs' tasks and characteristics of CBMA to gain in-depth knowledge on the acceptance of this new technology. Therefore, this study aims to investigate the textile cyberpreneurs' intention to adopt CBMA by using task-technology fit (TTF) model as a major reference.

II. Literature Review

A. Cloud-Based M-Retail Application (CBMA) and Textile Cyberpreneurship in Malaysia

The emergence of mobile cloud computing has facilitated the development of various cloud-based mobile applications for multiple purposes. In business context, one of the rising needs for mobile applications or mobile apps is to conduct m-shopping or m-retail transactions that are deemed useful for both retailers and customers. Practically, CBMAs can be obtained by retailers in two ways which are through downloading existing apps from third-party e-commerce marketplaces or producing own version of mobile apps specifically to conduct m-retail. As the uses of cloud services are increasing among business owners [10], many e-commerce and mobile cloud service providers offer attractive packages that may include the production of specific business mobile apps. Nonetheless, business owners should consider several reasons before deciding to have their own m-retail apps as it will involve cost for implementation and future apps maintenance. High investment cost is often associated to new technology implementation [11]. On the other hand, business owners may also utilize the existing mobile marketplace applications that are provided by third-party e-commerce and m-commerce platforms such as Lazada, Amazon and eBay. As these apps are already well-known among mobile device users, retailers will gain benefits in engaging with the potential customers without too much effort for promotion. Meanwhile, as fashion products are among the most popular items which are being sold on the internet [12][13], many textile cyberpreneurs from various business sizes have ventured into using multiple e-commerce platforms like websites, social media and online marketplaces for retailing activities. Since one of the cyberpreneur's common traits is willingness to take risks [1][2], it is not surprising that they are keen to utilize the latest technology for business expansion. Furthermore, in Malaysia's textile industry environment, the key players are encouraged by the government to apply contemporary technologies into operational activities and manufacturing processes. Generally for a technology to be utilized, the reasons are closely related to the tasks that must be fulfilled by using the technology.

B. Task-Technology Fit

Goodhue and Thompson [14] had introduced a model to measure the fitness between characteristics of tasks and characteristics of technology in which can further lead to technology utilization by a user and also individual performance impacts. The model is named as Task-Technology Fit (TTF) that consists of five major constructs; task characteristics, technology characteristics, task-technology fit, performance impacts and utilization. The visual illustration of TTF is shown in the following Fig. 1. TTF theorizes that the traits of technology must match with the user's tasks for obtaining compatibility which will enable technology utilization by the user and also gain performance impacts. The higher the compatibility level, the higher chance of technology utilization is predicted to occur. On the other hand, if the compatibility level is low, then the chances of technology utilization are also low or may not occur at all. TTF have been used in many adoption intention and usage researches by Zhou et al. [15], Lin & Huang [16], Junglas et al. [17], Lu & Yang [18] and Yen et al. [19]. Results from these researches have shown the validity of TTF as an influential model to determine the user's level of intention or utilization for specific technology.

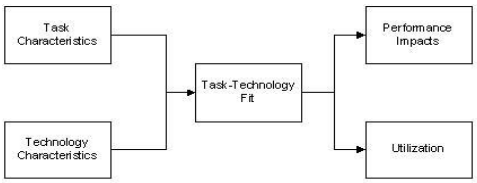

Fig. 1. Task-technology fit model [14]

III. Research Model and Hypotheses

The conceptual framework of this study is rooted from TTF model in which to investigate the factors affecting the intention to adopt CBMA among textile cyberpreneurs. This can be done by examining relationships between textile cyberpreneurs' task characteristics, CBMA characteristics, task-technology fit and intention to adopt. Figure 2 shows the research model for this study.

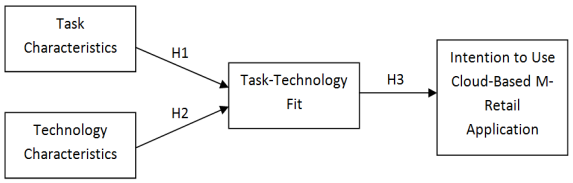

Fig. 2. Research model

As TTF emphasizes the compatibility between task and technology to ensure technology utilization, hence task characteristics and technology characteristics are chosen as the constructs to be examined. For this research context, task characteristics construct refers to textile cyberpreneur's tasks in managing her online business regardless of time and location. Business owners are sometimes required to make quick decision while on-the-go by using mobile devices. On the other hand, technology characteristics construct refers to the major traits of CBMA. CBMA differs from a typical mobile application in terms of its operational environment which relies on cloud technology for data loading processes and major data storage placement [20][21]. Both of these constructs are expected to influence the task-technology fit construct that measures the compatibility of textile cyberpreneur's tasks with CBMA's characteristics. Previous works such as by Lu & Yang [18], Yen et al. [19], Shih & Chen [22] and Schrier et al. [23] have shown the capabilities of task and technology characteristics in affecting task-technology fit.

Furthermore, as compatibility rises, the task-technology fit construct is expected to affect the intention of textile cyberpreneur to use CBMA in conducting retail operations. Since adoption intention is closely related to actual adoption of certain technology, task-technology fit has proved to affect adoption intention in previous studies [18][19][22]. Therefore, the hypotheses can be generated as follows:

H1: Task characteristics positively affects task-technology fit
H2: Technology characteristics positively affects task-technology fit
H3: Task-technology fit positively affects intention to use cloud-based m-retail application

IV. Research Methodology

A. Instruments

Each construct from the research model is measured by multiple items, ranging from four to eight items per construct. Most of the items are adapted from the relevant previous literatures that are related to m-commerce and technology adoption. Since task characteristics and technology characteristics are new constructs that involve textile cyberpreneur's tasks and CBMA's traits respectively, hence new items were developed based on the study by Churchill [24].

For task characteristics, in order to develop preliminary items, we firstly performed in-depth reviews of relevant literatures. Then, semi-structured interviews with three textile cyberpreneurs were conducted to reassure the validity of items that could represent the tasks of textile cyberpreneurs in m-commerce context. After that, the items were reviewed by five experts from both academia and industry for content validity. The items were finalized into six items to represent task characteristics construct which are ubiquitous sales order management, customer information management, product information management, payment information management, sales orders analysis and fashion trends forecasting. Explanatory factor analysis (EFA) was then performed after data collection for validation.

Similar to task characteristics, preliminary items for technology characteristics were developed via extensive reviews of literatures and semi-structured interviews with three mobile cloud computing experts. Expert review was also conducted for content validation and while to purify the items, EFA was performed after data collection. The four finalized items to represent CBMA's characteristics are ubiquitous services, reliable services, facilitating resources improvement and scalable services. These items were chosen based on the general traits of mobile application in mobile cloud environment that differs from other computing paradigms. The items that measure task-technology fit construct were adapted from Lin & Huang [16] which involve eight dimensions of fitness between textile cyberpreneur's tasks in managing online business and CBMA's traits. They are measured by adequateness, appropriateness, usefulness, tasks compatibility, helpfulness, sufficiency, tasks easiness and needs fulfillment.

Finally for intention to use construct, the measuring items were adapted from Khalil & Pearson [25]. Five related items to measure textile cyberpreneur's intention to use CBMA are reflected via planning to use, willingness to use, predicting to use if given the chance, likeliness to use and expectation to use. All items were prepared in dual-languages which are in English and Malay. Back-to-back translation has been applied to ensure meaning consistency. Five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree was used for item measurement. Reliability test for all the items were conducted before proceeding to further analysis by using Statistical Package for the Social Sciences (SPSS) software.

B. Procedures

Data were collected through self-administered questionnaires that were distributed via face-to-face and e-mail invitations. Purposive sampling was used in which the questionnaires were handed individually at several carnivals that involved the participation of textile cyberpreneurs. As the carnivals were usually held with minimum of two days duration, the questionnaires were given on the first day and then collected on the second or third day of events. As for the online questionnaires, e-mail invitations were sent to the respondents based on the list provided by Perbadanan Usahawan Nasional Berhad (PUNB). Overall, 600 questionnaires were distributed and 411 were returned. For analysis, only 348 responses were usable after dropping 63 cases of outliers. Hence, the calculated response rate is 58.0%.

V. Results and Findings

A. Sample Profile

Table I illustrates the demographic information of the respondents. In terms of gender, 294 are females (84.5%) and 54 are males (15.5%). 84.5% of them are Malays, 6.9% are Chinese, 4.3% are Indians and another 4.3% are from other races that consists of Kadazan-Dusun, Murut, Bajau, Malay- Indian, Kedayan, Iban and Bidayuh. Majority of the respondents are between 21 to 25 years old (33.9%).

TABLE I. Demographic Information of Respondents

Characteristics		Frequency	Percentage
Gender	Male	54	15.5
	Female	294	84.5
Ethnicity	Malay	294	84.5
	Chinese	24	6.9
	Indian	15	4.3
	Others	15	4.3
Age	20 or less	45	12.9
	21 – 25	118	33.9
	26 – 30	73	21.0
	31 – 35	54	15.5
	36 – 40	39	11.2
	41 and above	19	5.5
Textile products	Clothes	312	89.7
	Carpets	17	4.9
	Curtains	18	5.2
	Bedclothes	17	4.9
	Table spreads	15	4.3
	Others	25	7.2
Mobile device type to conduct online business	Smartphone	314	90.2
	Tablet Computer	135	38.8
	Others	10	2.9
Website to conduct online business	Yes	197	56.6
	No	151	43.4
Social media channels to conduct online business	Facebook	303	87.1
	Twitter	50	14.4
	Instagram	247	71.0
	WhatsApp	213	61.2
	WeChat	118	33.9
	Others	4	1.1
	Not using any	13	3.7
Knowledge on cloud-based m-retail application	Heard about it	306	87.9
	Use it	164	47.1
Possess own version of cloud-based m-retail application	Yes	56	16.1
	No	292	83.9

In terms of textile products, most of the respondents sell clothes (89.7%), 4.9% sell carpets, 5.2% sell curtains, 4.9% sell bedclothes, 4.3% sell table spreads and 7.2% sell other products. For conducting online business, 314 use smartphones (90.2%), 135 use tablet computers (38.8%) while 10 use other types of mobile device (2.9%). 56.6% of respondents have their own business websites while the remaining (43.4%) do not. Since social media platforms are popular to conduct online business nowadays, the data shows that 87.1% use Facebook, followed by Instagram (71%), WhatsApp (61.2%), WeChat (33.9%), Twitter (14.4%) and others (1.1%). Only 3.7% of respondents do not use any social media platforms for their businesses. In determining textile cyberpreneurs' knowledge on CBMA, 87.9% of respondents have heard about it but only 47.1% have used it for business purposes. This shows the adoption of the technology is still low among the respondents. Moreover, only 16.1% of respondents have their own CBMA, while the others (83.9%) do not.

B. Factor Analysis and Reliability Test

Exploratory Factor Analysis (EFA) with principal component analysis and varimax rotation technique was performed on TTF factors and intention to use CBMA. A total of five factors were found, which is aligned with the context of this study. All five factors have eigenvalue more than 1, explaining 77.22% of variance. The factor loadings for all items are between 0.739 and 0.885. In measuring the reliability of items, reliability test was conducted by calculating values of Cronbach's alpha coefficient. The items are considered as reliable if the value is between 0.7 and 1.0 [26]. The results for both factor analysis and reliability test are displayed in Table II.

TABLE II. FACTOR ANALYSIS AND RELIABILITY TEST RESULT

Variable	Items	Factor Loadings	Cronbach's Alpha
Task Characteristics (TAC)	TAC1: Manage sales orders anytime anywhere	0.885	0.939
	TAC2: Manage customer information anytime anywhere	0.876	
	TAC3: Manage product information anytime anywhere	0.885	
	TAC4: Manage payment information anytime anywhere	0.864	
	TAC5: Analyze sales orders anytime anywhere	0.813	
	TAC6: Forecast fashion trends anytime anywhere	0.739	
Technology Characteristics (TEC)	TEC1: Provides ubiquitous services	0.833	0.860
	TEC2: Provides reliable services	0.806	
	TEC3: Improves facilitating resources	0.861	
	TEC4: Provides scalable services	0.815	
Task-Technology Fit (TTF)	TTF1: Manage functions of CBMA are adequate	0.789	0.952
	TTF2: Manage functions of CBMA are appropriate	0.807	
	TTF3: Manage functions of CBMA are useful	0.829	
	TTF4: Manage functions of CBMA are compatible with the task	0.819	
	TTF5: Manage functions of CBMA are helpful	0.785	
	TTF6: Manage functions of CBMA would be sufficient	0.756	
	TTF7: Manage functions of CBMA would make the task very easy	0.798	
	TTF8: Functionalities of CBMA fully meet my online business needs.	0.758	
Intention to Adopt (INT)	INT1: Use CBMA in the future	0.835	0.956
	INT2: Use CBMA in the future	0.827	
	INT3: Use CBMA in the future, if given the chance	0.840	
	INT4: It is likely I will use CBMA in the future	0.827	
	INT5: I expect to use CBMA in the future	0.843	

C. Hypothesis Testing

In order to test the hypotheses, multiple regressions analysis (MRA) was used. Based on the results in Table III and Table IV, the TTF has shown the ability to explain the fitness between task characteristics and technology characteristics which further leads to examining textile cyberpreneur's intention to adopt CBMA for their business. The findings show a significant positive relationship between TAC and TTF ($\beta = 0.460$, $p < 0.001$, $t = 10.048$) and TEC and TTF ($\beta = 0.229$, $p < 0.001$, $t = 5.008$). In other words, TAC is the better predictor of TTF and has the stronger positive relationship with TTF as compared to TEC with TTF. In this case, both Hypotheses 1 and 2 are supported. The overall coefficient of multiple determination for Hypothesis 1 and 2 are found as $R^2 = 0.284$, Adj-$R^2 = 0.280$, $F = 68.322$, $p = 0.000$, D-W = 1.204. In other words, two independent variables, specifically TAC and TEC explain 28.4% of the variance of TTF, that is significant based on the F-value of 68.322 in a sample of 348 respondents. In examining the relationship between TTF and INT, the results in Table 4 show a significant positive relationship between TTF and INT ($\beta = 0.670$, $p < 0.001$, $t = 16.807$). Hence, Hypothesis 3 is supported. The overall coefficient of multiple determination for Hypothesis 3 is $R^2 = 0.449$, Adj-$R^2 = 0.448$, $F = 282.446$, $p = 0.000$, D-W = 1.589. Therefore, it can be concluded that TTF explains 44.9% of the variance of INT which is highly significant based on the F-value of 282.469 in a sample of 348 respondents.

TABLE III. REGRESSION RESULT : TASK-TECHNOLOGY FIT

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.689	.212		7.949	.000	1.271	2.107		
	TAC	.406	.040	.460	10.048	.000	.326	.485	.991	1.009
	TEC	.181	.036	.229	5.008	.000	.110	.252	.991	1.009
Notes: $R^2 = 0.284$, Adj-$R^2 = 0.280$, $F = 68.322$, $p = 0.000$, D-W = 1.204										

TABLE IV. REGRESSION RESULT : INTENTION TO USE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.123	.184		6.112	.000	.761	1.484		
	TTF	.745	.044	.670	16.807	.000	.658	.832	1.000	1.000
Notes: $R^2 = 0.449$, Adj-$R^2 = 0.448$, $F = 282.469$, $p = 0.000$, D-W = 1.589										

VI. Discussion

Examining the intention to use a certain technology is important for researchers and practitioners to ensure the success of the technology. CBMA is a relatively new technology that is getting recognized by Malaysian consumers and retailers. Hence, examining the factors that could lead to its usage among textile cyberpreneurs based on task-related factors may be useful for associated parties. Based on the findings of this study, TTF has proved its capabilities in predicting intention to use CBMA besides acknowledging the effects of both task and technology characteristics towards TTF. The findings have shown a consistent result with previous studies by investigating the direct relationship between task-technology fit and behavioral intention [18][19][22]. The significant positive relationship between task-technology fit with intention to use CBMA indicates that both tasks and technology play important roles towards textile cyberpreneurs' behavioral intention for technology utilization. It also indicates that the greater the compatibility between task and technology, the stronger their behavioral intention to adopt. Recent studies by Lu & Yang [18], Yen et al. [19], Shih & Chen [22] and Schrier et al. [23] also proved that task characteristics have a direct positive relationship with task-technology fit. Similarly, this findings had also shown that task characteristics have stronger effect with task-technology fit than technology characteristics. CBMA is a compatible tool for textile cyberpreneur to conduct her online business based on the major tasks that are required to be performed. Other than using their usual retail platforms, CBMA might be helpful in managing textile cyberpreneurs' required retail transactions. On the other hand, the low loadings for technology characteristics' relationship with task-technology fit may be due to the condition of CBMA as somewhat new and haven't been fully explored by the respondents. Besides, based on the findings from Table I previously, only 47.1% of respondents have utilized the technology for their business operations. From the study, it can be concluded that the fitness between textile cyberpreneur's task and CBMA's traits can be enhanced by improving the capabilities of the technology to fit with the required tasks to be performed by textile cyberpreneurs. The service providers must also create a strategy to ensure the technology is well-suited and well-accepted among textile cyberpreneurs.

VII. Conclusion and Future Recommendation

The purpose of this investigation was to examine the intention of textile cyberpreneurs to adopt CBMA by using task-technology fit (TTF) model as a major reference. Based on the findings, task-technology fit plays a significant role in influencing textile cyberpreneur's intention to adopt CBMA for their business operations. The two former constructs specifically task characteristics and technology characteristics have also shown positive direct relationships towards the fitness between tasks and technology which signified their importance for potential technology utilization. Fulfilling the tasks that are required to be performed at anytime and anywhere by using a certain technology such as CBMA can be convenient for textile cybrepreneurs in their dynamic business environments. For researchers, understanding the compatibility between textile cyberpreneurs' tasks and traits of CBMA might be very useful in acknowledging the successfulness of the technology. Whilst for the service providers, the technology can be further refined in order to suit with the needs of textile cyberpreneurs. In all, the study has managed to explain the factors that influence intention of textile cyberpreneurs to adopt CBMA via TTF model. Nevertheless, this study has several limitations which can be overcome in future works. First, the data collections via face-to-face method at selected carnivals were only conducted at three states, specifically in eastern region of Peninsular Malaysia. Next, the sample of study consists majorly of textile cyberpreneurs who sell clothes rather than other textile products, in which may not represent the whole population. Thus, the sample size shall be increased to include the respective diversified groups. Finally, since the study was only targeted for Malaysian textile cyberpreneurs, future studies can be conducted in other countries that have different cultures and business environments.

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