

# Enterprise Mobile Cloud Application for Textile Cyberpreneurs: Big Data Issues, Challenges and Opportunities

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**Abstract**—Mobile cloud computing (MCC) paradigm is relatively new and still being studied by researchers in academic and industry. MCC has embarked the development of various mobile cloud applications in many sectors including mobile commerce. In Malaysia, the online business entrepreneurs in the textile industry or textile cyberpreneurs are searching for new opportunities to expand their business, thus enterprise mobile cloud application may perhaps be suitable to be utilized. At the same time, cloud computing is often being related to Big Data issues which are still under scrutiny by researchers. The main purpose of this paper is to highlight the needs to conduct comprehensive studies in tailoring the enterprise mobile cloud application specifically for textile cyberpreneurs in Malaysia. Related issues and challenges regarding the cyberpreneurship in Malaysia are still debated among researchers and practitioners especially in managing and organizing big data in order to become more competitive and reliable in business. Therefore, the preliminary study through several literatures in big data, textile industry and enterprise mobile cloud applications are also presented in this paper along with the proposed research methodology of the study.

**Keywords**—Mobile cloud computing; mobile cloud application; cyberpreneurs; big data, mobile commerce; online business; textile industry

## I. INTRODUCTION

Mobile cloud computing (MCC) is one of the initiatives in realizing the vision of Mark Weiser's concept of ubiquitous computing [1]. It combines the characteristics of mobile computing and cloud computing along with the benefits of both paradigms as shown in Table I. While mobile computing allows the users to access information via mobile devices and the underlying network technology, cloud computing on the other hand provides reliable services to the customers through Internet.

Cloud computing encompasses multiple companies, multiple servers, and multiple networks, providing cloud services and storage to be accessible from anywhere in the world over an Internet connection [2]. Business owners will be attracted to the concept of cloud computing because its utilization will enable them to provide reliable services to the

customers over the Internet. Concurrently, the needs for useful information in order to improve business agility can be achieved through the analysis of big data either from the clouds or the servers.

TABLE I. BENEFITS OF MOBILE COMPUTING AND CLOUD COMPUTING

Benefits of Mobile Computing	Benefits of Cloud Computing
<b>Mobility</b> <ul style="list-style-type: none"> <li>The user can perform tasks anywhere via the use of mobile device and network connection</li> </ul>	<b>Accessibility</b> <ul style="list-style-type: none"> <li>The data can be accessed by the user anytime and anywhere through network connection</li> </ul>
<b>Time saving</b> <ul style="list-style-type: none"> <li>Tasks can be conducted whenever the user is connected via network</li> </ul>	<b>Storage capacity</b> <ul style="list-style-type: none"> <li>The cloud can store huge data more than a personal computer</li> </ul>
<b>Convenience</b> <ul style="list-style-type: none"> <li>The mobile device user can perform various online activities regardless of time and location</li> </ul>	<b>Data protection</b> <ul style="list-style-type: none"> <li>The data is safely stored in cloud with disaster backup recovery services</li> </ul>
	<b>Scalability</b> <ul style="list-style-type: none"> <li>The cloud can be expanded according to the requirements of user</li> </ul>
	<b>Eco-friendly</b> <ul style="list-style-type: none"> <li>Only necessary resources are utilized for processing, thus saving the energy</li> </ul>

The emergence of Mobile Cloud Computing (MCC) has triggered the development of mobile cloud applications in various sectors. The success of these technology implementation was catalyzed by the computer networking technology, telecommunication infrastructure and the ease of use of mobile application. Due to this trend and high demands, research and development of mobile cloud application are continuously being conducted. The architecture of the Mobile Cloud Computing (MCC) is shown in Fig. 1.

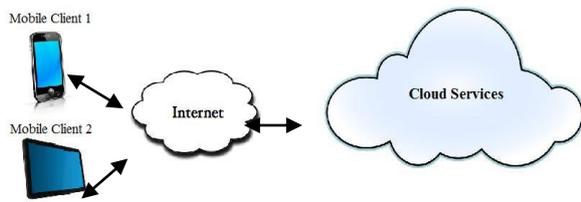


Figure 1: Mobile cloud computing architecture

Meanwhile in Malaysia, many cyberpreneurs who are mostly from small and medium businesses are using social media as a platform to run their online businesses [3] especially for marketing purposes [4]. Whilst on the move, they might be using mobile applications such as Facebook Mobile, Twitter Mobile and Instagram to keep track on their businesses via the Internet. Through social media, the textile cyberpreneurs can conduct marketing and advertising of products such as apparels, carpets, bedclothes and curtains to the potential customers. However, the functions of social media applications are quite limited for business purpose, especially in managing the business transactions. To overcome this, a specific mobile application may be required.

Currently there is no specific research done in finding the suitability of enterprise mobile cloud application specifically for textile cyberpreneurs in Malaysia. Benefits might be gained by the textile cyberpreneurs if the Mobile Cloud Computing (MCC) technology is being applied into their business functions. Therefore, comprehensive studies are required to determine the suitability of enterprise mobile cloud application for textile cyberpreneurs in order to expand the textile industry in Malaysia.

## II. CYBERPRENEUR, BIG DATA AND CLOUD APPLICATIONS

Nowadays, Internet has been used as a platform to conduct e-commerce activities, thus emerging the concept of cyberpreneurship or cyberentrepreneurship [5]. Cyberpreneur can be defined as “one who creates a firm that is founded upon electronic commerce” [5] [6], and also “someone who is not only creative and innovative, but he or she is someone with a vision and a high desire to succeed, and not forgetting strong determination in consistently spotting and exploiting new opportunities” [7]. Whilst the cyberpreneurs are determined to explore new opportunities, they are encouraged to take advantage of the new technologies such as cloud applications for their business purposes.

Cloud application is the implementation of cloud computing paradigm. It is an application that combines the certain features of a desktop application and web application, where its major operation is in the cloud. The uses of cloud applications will transfer the load of the user’s tasks to the cloud, thus reducing the computational workload on the user’s device. This trait of cloud application could be beneficial to the cyberpreneurs who are seeking new opportunities in deploying cloud computing paradigm into their business operations. A cyberpreneur could also make use of the benefits that are being offered by cloud computing as it provides efficient management of data processing and scalable storage. Hence,

the business operations are expected to run better with cloud adoption.

As the cloud services are constantly growing, more data too are likely to grow and more complex data needs to be processed. This will lead to a new term called “Big Data”. For example, a cyberpreneur who is expanding his or her business will concurrently deal with big data such as increasing customer and transaction records, thus requires certain techniques and mechanisms to manage them. These large amounts of data should be managed and analyzed efficiently in order to provide meaningful information to the cyberpreneurs and organization for their business purposes. The process of mining the data is still being debated and under scrutiny by researchers in academic and industry.

The uses of big data might be helpful for the cyberpreneurs to improve their business operations and discover new opportunities based on the information resulted from data mining process. The data mining mechanisms such as pattern recognition, data analytics and business intelligence will surely add the value to the specific information required by the cyberpreneurs.

## III. CYBERPRENEURSHIP AND MOBILE COMMERCE IN MALAYSIA

Besides websites, many cyberpreneurs in Malaysia are using social media applications such as Facebook, Twitter and Instagram as a platform to run their online businesses. These applications help them to interact with their potential customers and are being used to promote their products and services effectively. However, these applications have several limitations in terms of business and operational management, for example the statistical analysis of revenues, stock management and others.

Nowadays with the booming of mobile technology, the cyberpreneurs might be using the mobile devices to perform online business via mobile applications like Facebook Mobile. Still, the efficiency of these mobile applications in conducting the business is quite limited and disorganized because the primary function of these applications are for socializing, not for business purpose. Hence, the mobile commerce activities between the cyberpreneurs and their customers are not fully executed. According to [8], mobile commerce applications might consist of mobile financial, mobile advertising, mobile inventory management and proactive service management. Some of these components are missing in the social media applications that are currently being used by cyberpreneurs in Malaysia. Therefore with the current computing technology, it is unfortunate if the cyberpreneurs are not taking initiative in integrating MCC into their online business operation.

## IV. RESEARCH METHODOLOGY

In determining the relationship between enterprise mobile cloud application, Big Data and textile cyberpreneurs, basic content analysis [9] and relational analysis [10] methods were used for proper findings. By combining these two approaches, several inclusive steps have been conducted for this study as shown in Fig. 2.

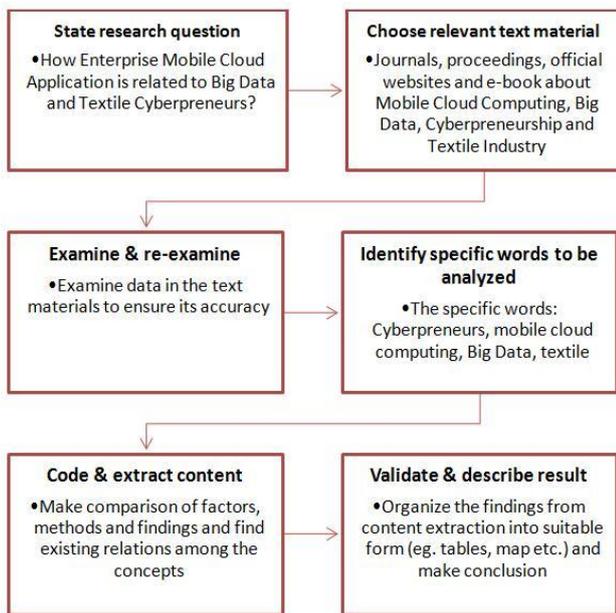


Figure 2: Research Methodology

## V. CHALLENGES IN TEXTILE INDUSTRY

Malaysia has been actively involved in textile industry since the industrialization era backdated in 1970's during the Second Malaysia Plan [11] where the country was focusing on exporting manufacturing goods as source of incomes. According to Malaysia External Trade Development Corporation (MATRADE) [12], the textile industry is ranked 9th largest export earner and accounted for 2.3 per cent share of Malaysia's exports of total manufactured goods. In order to sustain the growth of textile industry in Malaysia, the key players must take initiative in utilizing the new ICT technologies, as suggested by Ministry of International Trade and Industry (MITI) in the Third Industrial Master Plan (IMP3) [13].

Besides producing the Islamic apparels, Malaysia is also a well-known country in producing heritage textiles such as batik and songket, which represent the richness of Malaysian culture. Many textile entrepreneurs including small and medium enterprises (SMEs) have taken the opportunities to sell textile products via offline and online businesses. In textile design industry, the retailers or selectors play a major role to set a trend in fashion for the market [14]. They are the experts in dealing with customers, designers and manufacturers. However, some of these retailers use inappropriate medium such as social media applications to perform business transactions that include receiving customer orders, managing payments and others.

Another challenge in textile industry is related to forecasting fashion trends [14]. Designers require information from various sources like sales figures, media and new technology to develop their products. These information might be obtained from the uses of big data and mobile cloud application.

## VI. ENTERPRISE MOBILE CLOUD APPLICATION ISSUES

The enterprise mobile applications have gained attentions by many companies for delivering values into their businesses. The developers are facing challenges to develop the suitable mobile applications for the enterprises based on the business needs and requests. Major big companies such as IBM, Oracle and Hewlett-Packard are involved in providing services and platforms for the application development. However, some companies especially the SMEs might not afford the implementation costs presented by these major application providers. In Malaysia, although there is an attempt by Multimedia Development Corporation (MDeC) to facilitate the use of cloud computing solutions among the SMEs that is called as SME Cloud Computing Adoption Programme [15], only 49% of Malaysians are completely familiar with cloud computing services [16]. Hence, this may interrupt the process of cloud services adoption among the Malaysian enterprises. In addition, there are still many issues that have not been fully resolved about Mobile Cloud Computing (MCC) such as performance, security and privacy, control, bandwidth costs and reliability [17]. Therefore, further investigations must be conducted to acknowledge the full benefits for the mobile users, especially those who are involved in mobile commerce activities.

## VII. ORGANIZING BIG DATA USING CLOUD APPLICATION

Big data applications and environment need a lot of resources for data analysis [18] and require clusters of servers to support the tools that process the large volumes, high velocity, and varied formats of big data [19]. On the other hand, cloud computing enables business organization to improve business agility and efficiency through the cloud services. It offers variety of services that provide new opportunities for e-commerce activities and transactions. While clouds are already deployed on pools of server, storage, networking resources and can scale up or down as needed, therefore cloud computing offers a cost-effective way to support big data technologies and the advanced analytics applications that can drive business value [19].

### A. Characteristics of Big Data

According to [20], big data can be defined by "5V" properties which are volume, verocity, variety, value and veracity.

Volume refers to the size of the data that determines its classification as big data or not. As the volume increases, it has bigger potential to be classified as big data. Velocity of data means the speed that is involved in data generation and data processing. Increasing speed means more challenges for the data to be processed. Variety refers to the wide-ranging types or formats of data which are useful for data analysis. It includes structured, semistructured and unstructured data [19]. Value of data is referring to the significance of data to the organization. The data can be processed to become important information for the business owner. Veracity refers to the accuracy of data. Accurate data will enable the precision of big data analysis, thus providing excellent results and information.

## B. Big Data Analytics and Cloud Computing

In order to analyze petabytes and exabytes of heterogeneous data, a proper platform is needed to accommodate them. Apache Software Foundation has introduced Hadoop [21] framework as a platform to process massive amounts of real-time data and it is inexpensive, scalable and flexible, offers faster processing and built-in data security. Meanwhile, Intel has also introduced cloud-based Analytics as a Service (AaaS) framework that can be installed on various cloud services types, be it Infrastructure as a Service (IaaS), Platform as a Service (PaaS) or Software as a Service (SaaS) [19]. The deployment of AaaS will be based on requirements and budgets of the organization.

The uses of big data analytics will enable the efficient decision making by the business owners since it provides mechanisms that can perform various data mining functions such as pattern recognition, predictive analytics and business intelligence. This will lead to discovery of new opportunities in determining market trends, customer behaviour and preferences, unseen valuable patterns and other essential information. Moreover, with the maturity of cloud computing, the adoption of big data analytics into the cloud is possible. According to [19], analyzing big data by using cloud infrastructure is possible because clouds can provide the storage space and computing power for the analysis, only selective data from trusted sources are analyzed for the requirements of organization and cloud environment allows data services to extract value from big data.

If the big data analytics are being implemented into Mobile Cloud Computing (MCC) environment, the mobile device users will be able to perform the analysis regardless of location and time. Besides, instead of using the processing power of mobile device, the workload can be delegated to the cloud services for the purpose of big data analysis. Hence, the useful information can be retrieved by the mobile device user efficiently without much hurdles.

## VIII. CONCLUSION

This paper has presented the interrelated concepts, issues, challenges and opportunities within enterprise mobile cloud application and big data, specifically for textile cyberpreneurs in Malaysia. Reviews have been done on several literatures that are related to these concepts along with the proposed research methodology of the study. The purpose of this paper is to highlight the needs to conduct comprehensive studies in tailoring the enterprise mobile cloud application to the needs of textile cyberpreneurs in Malaysia. Since the concepts of Mobile Cloud Computing (MCC) and big data are relatively new in Malaysia, it is believed to bring many new opportunities especially for textile cyberpreneurs who are conducting their businesses via online.

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