

e-Commerce versus m-Commerce: Where is the Dividing Line?

Priscilla Omonedo, Paul Bocij

Abstract—Since the emergence of e-Commerce, the world of business has witnessed a radical shift in the way business activities are conducted. However, the emergence of m-Commerce has further pushed the boundaries of virtual commerce revolution. As a result, there seems to be a growing blur in the distinction between e-Commerce and m-Commerce. In addition, existing definitions for both forms of commerce highlight characteristics (e.g. type of device and activity conducted) that may be applicable to both concepts. The aim of this paper is to identify the characteristics that help define and delineate between e- and m-Commerce. The paper concludes that characteristics of mobility, ubiquity and immediacy provide a clearer and simpler template to distinguish between e-Commerce and m-Commerce.

Keywords—e-Commerce, m-Commerce, mobility, ubiquity.

I. INTRODUCTION

THE concept of e-Commerce and m-Commerce has been widely discussed within different contexts in both academia and the business world. However, following advancement in technology, coupled with the development of new opportunities and platforms for conducting e- or m-Commerce, the unique and consistent boundaries that exist between both forms of virtual commerce is blurring [1]. As a result, the potential exists within this area of research for terms to become misconstrued, misrepresented or misused. This problem can be avoided if there is a shared consensus amongst experts within the field about the characteristics and boundaries that consistently define e- or m-Commerce. The purpose of this paper is to identify the characteristics that help define and delineate between both forms of virtual commerce and it is hoped that the outcome will encourage and drive further discussions about this subject area. The paper will explore various perspectives to e- and m-Commerce; highlight their comparative merits and demerits, as well as the relationship between both forms of virtual commerce. The paper will conclude by suggesting characteristics that define the boundaries for today's e-Commerce and m-Commerce.

II. PERSPECTIVES ON E-COMMERCE AND M-COMMERCE

A. Perspectives on e-Commerce

The term e-Commerce has been defined by several authors in slightly different ways. However, a generally accepted

P. Omonedo is with Aston Business School, Aston University, Aston Triangle, Birmingham, B4 7ET,UK (phone: +447721900468; e-mail: omonedpe@aston.ac.uk).

P. Bocij is with Aston Business School, Aston University, Aston Triangle, Birmingham, B4 7ET,UK (e-mail: p.bocij@aston.ac.uk).

definition focuses on the buying and selling of goods and services online. The International Business Machines Corporation (IBM) defined e-Commerce as a part of e-Business that includes the act of selling products and services on the internet [2]. A similar definition posit that e-Commerce is "...doing business over the Internet, selling goods and services which are delivered offline as well as products which can be 'digitised' [coded] and delivered online, such as computer software" [3]. Both definitions suggest an emphasis on characteristics of "commercial transactions" that is conducted over the "internet". A drawback of the definitions is that they do not capture non-commercial activities (e.g. information sharing and marketing) [4]. IBM's definition introduces e-Business as a separate entity that encapsulates e-Commerce, and other forms of virtual commerce (e.g. m-Commerce). However, the terms "e-Business" and "e-Commerce" have been used interchangeably overtime such that it poses a problem when attempting to differentiate e-Commerce from other subsets of e-Business. Clarity is important to provide distinct boundaries for each term.



Fig. 1 Relationship between e-Business and e-Commerce

Reference [4] clarified the difference between "business" and "commerce". According to their definition, business refers to activities involved in the production and sales of goods and services which may not necessarily be of "commercial" value (e.g. customer relationship management, procurement, human resources management). In contrast, they defined "commerce" as activities that involves buying and selling of goods and services such as marketing, after-sales services, etc. [4]. The classification recognises that certain aspects of e-Business do not fall under e-Commerce, and as a result, supports e-Commerce as an integral subset of e-Business. Further, all aspects of e-Commerce, irrespective of the value it adds (direct or indirect), can be placed under e-Business because some form of business activity is involved. In view of this, the paper suggests that e-Commerce can be defined as

"the conduct of activities that includes the transfer, exchange or sharing of information, goods and services over a network, particularly the internet, with the purpose of getting

some form of direct or indirect commercial benefit".

This definition emphasises that e-Commerce should not be primarily associated with the actual activity of buying and selling of goods and services online but should include activities such as pulling and pushing of information, e.g., content delivery on a website. Furthermore, the concept of direct or indirect commercial benefit was incorporated into the definition to buttress the aspect of commerce that involves actual exchange of goods and services. Therefore, while activities such as advertisements and information transfer may not provide direct monetary value, they can provide indirect commercial benefit such as potentially increasing sales or providing savings on operational costs.

B. Perspectives on m-Commerce

m-Commerce, like e-Commerce has been defined in slightly different ways. Reference [5], for instance, defined m-Commerce as "e-commerce activities carried out using a mobile device such as a phone or PDA". In another paper [6], m-Commerce was defined as "any direct or indirect transaction with a potential monetary value conducted via wireless telecommunication networks". However, [4] have argued that restricting the definition of m-Commerce to transactions that provides monetary value is problematic because it fails to differentiate m-Business from m-Commerce. They also argue that such definition suggests that transactions have to be exclusively completed via mobile telecommunication networks as a prerequisite; thus limiting m-Commerce products and services to immaterial items such as information [4]. They therefore define m-Commerce as "...any transaction, involving the transfer of ownership or rights to use goods and services, which is initiated and/or completed by using mobile access to computer-mediated networks with the help of an electronic device" [4]. This approach when defining m-Commerce is broader, flexible and more reflective of the range of opportunities and activities that are conducted within m-commerce. However, a drawback of this definition is its exclusion of activities that do not have a direct commercial value.

In order to provide a broader and more inclusive definition for m-Commerce, a modification to Leung & Antypas' [7] definition for m-Commerce will be adopted because of its broad coverage of m-Commerce activities. In their work [7], Leung & Antypas defined m-Commerce as "...content delivery (notification and reporting) and transactions (purchasing and data entry) on mobile devices such as Short Message Systems (SMS) devices, Wireless Application Protocol (WAP)-enabled devices, Personal Digital Assistants (PDA), etc." From this definition, Leung & Antypas are suggesting that m-Commerce involves business transactions that have direct and indirect monetary value. For instance, notification and reporting may not necessarily have a direct monetary value, but they can play an important role in building consumer trust which will in turn increase consumer loyalty and sales [8], [9]. Following on, Leung & Antypas [7] appear to suggest that m-Commerce activities include the use of SMS to deliver marketing and status messages (e.g.

Promotions and flight verifications, use of WAP for interactive processes such as purchasing or reservation applications, etc.) [7]. However, one of the problems of including specific technologies and platforms within a definition is that such definitions are not dynamic. In the case of [7], their definition does not take into account new technological developments, such as the emergence of Near Field Communications (NFC). Therefore, this paper suggests that m-Commerce can be defined as:

"the conduct of activities that involves content delivery (notification and reporting) and transactions (purchasing, transfers, data entry) on mobile devices capable of gaining access to a network, particularly the internet, which provides direct or indirect commercial benefit".

Although m-Business and m-Commerce share certain characteristics, it is important to emphasise that they are conceptually different and their unique characteristics will help to clarify the boundaries that defines m-Commerce. According to [10], m-Business is defined as "the ability to interact and transact with anything and anyone, anytime and anywhere". In contrast, they defined m-Commerce as the "buying and selling of products and services over the internet using mobile devices" [10]. The definitions suggest that m-Business involves a wider range of activities when compared to m-Commerce; thus implying that m-Commerce is an integral subset of m-Business. This is a view also shared by [4]. Reference [11] defines m-Business as the conduct of information inquiries and/or business transactions through the use of mobile devices via wireless communications. This definition of m-Business corroborates the breadth of activities captured in the definition by [10]. m-Commerce on the other hand has been defined as commercial transactions conducted through a variety of mobile equipment - such as wireless application protocol (WAP) equipped cellular phones and personal digital assistants (PDA) - over a wireless telecommunication network in a wireless environment [12]. Similar definitions for m-Commerce by [13] "the ability to conduct commerce using a mobile device, such as mobile phones, personal digital assistants (PDA) and smartphones" and [14] "the buying and selling of goods and services through wireless handheld devices" together, infer that m-Commerce involves a lower level of activities when compared to m-Business.



Fig. 2 Relationship between m-Business and m-Commerce

III. M-COMMERCE VS E-COMMERCE ADOPTION: MERITS AND DEMERITS

For every technology that exists, there is bound to be advantages as well as disadvantages inherent in their adoption. What makes the difference, however, is that some technologies present more advantages or fewer disadvantages than others. This can help to determine the extent of adoption of such technologies. Similarly, before making conclusions or suggestions about whether m-Commerce is better than e-Commerce or not, it is worth considering the comparative advantages and disadvantages of both technologies.

Quite obviously, a good number of people will agree that both m-Commerce and e-Commerce provide similar benefits, albeit to varying degrees. Interestingly, the variation in the degree of benefits can be seen as a merit for either of them which might result in increasing preference for one type of virtual Commerce over the other. For instance, the issue of convenience is a common benefit of e-Commerce and m-Commerce. However, it can be argued that in some regions of the world, particularly, in developing countries, m-Commerce provides more convenience to consumers than e-Commerce. This could be because the platforms required for the conduct of m-Commerce are more readily available in those regions than the platforms required for the conduct of traditional e-Commerce.

In business, the adoption of e-Commerce results in reduced transaction and production costs and potentially, increases sales [15]. This is because businesses can generate more revenues just by having an online presence [16]. Also, through the help of e-Commerce technology, physical boundaries and geographical barriers associated to traditional business transactions are lessened; thus increasing business market reach. For the consumer, they experience reduced cost of product search and have access to more varieties of product when they engage in e-Commerce [16]. Also, e-Commerce encourages an increase in competition which often results in increased product innovation and economies of scale [16].

Although e-Commerce provides such immense benefits, the introduction of m-Commerce pushes the boundary of innovation in the world of business even further. While e-Commerce provides the opportunity of conducting business transactions with little or no geographical barriers, a major advantage of using m-Commerce is that it provides the opportunity of conducting business transactions anywhere and anytime [6]. This makes it possible to conduct business transactions on the move. Also, the introduction of m-Commerce provides the benefits of localisation and instant connectivity [4]. With these features, businesses can send targeted information or advertisements to potential consumers based on their current location. The fact that mobile devices make it possible to remain connected to the internet means that such information is more likely to reach consumers in real time. This feature tends to be more effective with m-Commerce than with traditional e-Commerce because such location based information is likely to encourage more sales. For instance, a hungry consumer who receives a coupon on their mobile phone by walking past a fast food outlet is more

likely to visit that outlet than a hungry person receiving the coupon from their office computer.

Another advantage of m-Commerce is the concept of NFC (Near Field Communication). NFC refers to the integration of RFID (Rapid Frequency Identification) technology with mobile phones [17]. Through this technology, it is possible to make payments through mobile devices. Also, with the help of "smart poster", consumers can wave their phone close to a poster and get more information about the poster [17]. For some people this provides a faster and more convenient way of making payments and getting information than e-Commerce.

While it might seem, from the foregoing, that m-Commerce presents more advantages over e-Commerce; both m-Commerce and e-Commerce have their limitations. Interestingly, just as some of the limitations of e-Commerce can be overcome through the use of m-Commerce, some of the limitations of m-Commerce can also be overcome through the use of e-Commerce. For instance, an issue with m-Commerce is that of minimum screen size and display type found on most mobile devices [8]. With the use of mobile phones, there is usually a limit to how information can be displayed due to the size of the screen but on the other hand, laptops and computer screens can accommodate a larger amount of information due to its larger screen. By implication, the display and number of advertisements available to mobile users is limited compared to those available to computer users.

Clearly, just as e-Commerce and m-Commerce present some common advantages such as convenience, they also both present some common disadvantages. Several authors have identified security as a common concern that plagues e-Commerce [3], [18], [19] and m-Commerce [20]-[22].

Therefore, given the fact that e-Commerce as well as m-Commerce presents both advantages and disadvantages, the focus in comparing both technologies should not be on which form of technology is better. Rather, the focus should be: in a particular context, e.g., developing countries, which technological option is more favourable?

To provide some insight to answering this question, let's take developing countries as an example. Arguably, m-Commerce tends to be more accessible in developing countries than in developed countries because some of the barriers to e-Commerce (such as scarcity and high cost of computers [19]; poor electricity supply, [23], etc.) are overcome through the use of m-Commerce. For instance, the problem of infrastructure is minimal with m-Commerce because with a mobile phone, anyone can engage in m-Commerce. Interestingly, users do not need to have a smart phone before they can conduct m-Commerce transactions. In Africa, Paga [24] can be used to transfer money and pay bills using a phone that is SMS enabled. This is particularly useful in an environment like Nigeria where many people have more than one mobile phone or SIM card. It is however, interesting to note that banks in developed countries, such as Lloyds Bank [25] are also introducing this concept which will open up more services to more people.

Also, considering the issue of power supply, without mobile

devices, conducting commercial transactions online is quite heavily dependent on power supply. Whereas an e-Commerce user would need to be close to a power source to connect their computer or their router, an m-Commerce user can conduct business or commercial transactions online by simply using their mobile phones whose battery life could last for a comparatively longer time before needing power source to recharge the battery. Furthermore, while relaxing at the park or on the move, commercial transactions can still be conducted.

IV. RELATIONSHIP BETWEEN E-COMMERCE AND M-COMMERCE

In previous sections, perspectives on e-Commerce and m-Commerce were discussed. Based on preferences and interests, some authors define the concepts of e-Commerce and m-Commerce differently. As a result, there exist diverging views about the distinction between e-Commerce and m-Commerce - some schools of thought argue that they are separate concepts while others argue that m-Commerce is an extension of e-Commerce [4]. Although e-Commerce and m-Commerce have their individual strengths and unique characteristics, they still share some commonalities (Fig. 4). At a very basic, both e-Commerce and m-Commerce involve the conduct of certain aspects of business through a virtual market. In order to aid understanding of the inherent similarities and uniqueness of each concept, we shall turn the spotlight on their individual characteristics while paying particular attention to their spectrum of activities.

From the definitions of m-Commerce presented in this paper, it is generally accepted that m-Commerce involves business transactions conducted over mobile devices such as mobile phones, smartphones and other handheld devices. Although most authors agree with this definition, based on the engagement platform, there are divergent opinions about the specific kinds of activities that fall under m-Commerce. While some literature suggests that m-Commerce includes content delivery and information transfer, others suggest that m-Commerce goes beyond these activities and also includes transactions that offer some form of monetary gain. For instance, [8], [26], [27] suggest that m-Commerce activities involves business transactions conducted over mobile devices for the purpose of gaining monetary value e.g., product and service ordering, e-auctions. In contrast, [28], [6] posit that m-Commerce includes a wider range of activities such as sending and receiving emails, downloading music / graphics / animations, playing interactive games online, trading stocks, booking tickets, finding friends, and conducting financial and business transactions.

The range of e-Commerce activities can involve business transactions conducted over the internet and includes shopping, banking, investing and online electronic payment [29]. A table of e-Commerce activities compiled by [30] includes providing information, enabling communication, processing orders and other forms of exchange, both of goods and services, as well as information. It is obvious that some of these e-Commerce activities can also be achieved via internet-

enabled mobile devices. This buttresses the opinion that e- and m-Commerce share certain similarities. However, m-Commerce exhibit unique features that is different from e-Commerce. One of such example is Near Field Communication (NFC) where consumers can make use of their mobile device as a wallet [31]. Other examples include the use of mobile applications as a means of engaging in activities such as completing transactions, involving in mobile banking and mobile purchase, getting access to mobile vouchers and mobile games [13], [14].

Some authors posit that m-Commerce is an integral subset of e-Commerce [32] as shown in Fig. 3, this paper takes the stance that e-Commerce should be presented as a shared subset of m-Commerce as shown in Fig. 4. Although some mobile devices are designed to achieve functionalities such as is possible via standard computer systems, m-Commerce still possesses some unique qualities. Furthermore, supporting the stance for m-Commerce as an integral subset of e-Commerce adds to the blur between both forms of virtual commerce. In addition, some authors have suggested that unlike e-Commerce, m-Commerce presents opportunities for new business models due to their unique characteristics such as mobility and reachability [33]-[35]. This then means that classifying m-Commerce as an integral subset of e-Commerce is increasingly becoming less practical and a rather narrow perspective of the relationship between them.

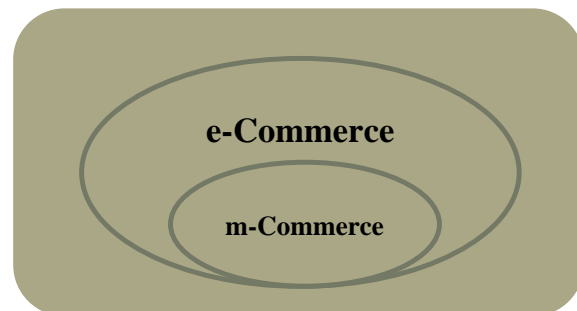


Fig. 3 m-Commerce as an integral subset of e-Commerce

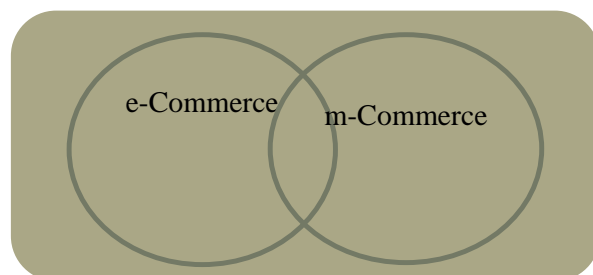


Fig. 4 m-Commerce as a shared subset of e-Commerce

Locating this relationship within the e-Business spectrum, Fig. 5 presents a diagrammatic representation of its position. From the diagram, m-Business is presented as an integral subset of e-Business because e-Business, by its definition is the broad concept that encapsulates every form of virtual business activity. This therefore captures m-Business.

However, in the case of e-Commerce and m-Commerce, this is different because they refer to distinct aspects (or subsets) of e-Business. Considering the radical shift that is heralding the conduct of m-Commerce, it might be worth placing e-Commerce as an integral subset of m-Commerce because most activities included in e-Commerce can be conducted in m-Commerce. However, considering the dynamic nature of technological advancements, it might be very myopic to have such representations because there might exist certain aspects of e-Commerce that are unique and may not fall within the scope of m-Commerce.

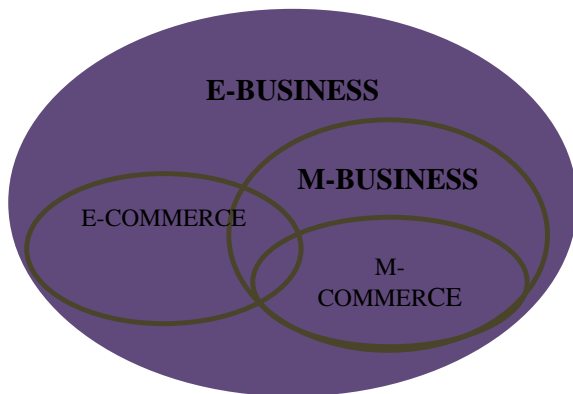


Fig. 5 Relationship of e-Commerce, m-Commerce, m-Business and e-Business

V. UNIQUE FEATURES OF M-COMMERCE: THE DIVIDING LINE

Having established that e-Commerce and m-Commerce share many similarities and also distinct characteristics, this section will focus on those unique features of m-Commerce in order to understand how these features can clarify the dichotomy – e-Commerce and m-Commerce. As highlighted in the discussion on the perspectives of m-Commerce, some authors draw the dividing line based on the mobility of the access platform; and others on access to internet connectivity. However, these two methods pose some classification issues which blur the distinction between e-Commerce and m-Commerce. For instance, if we are to restrict the definition of m-Commerce to the use of mobile handheld devices as suggested by [36], [37], it means we are excluding the use of devices such as tablets and laptops within the scope of m-Commerce. This then means that we become faced with the challenge of defining the scope of e-Commerce and how it differs from m-Commerce.

Reference [38] suggested key features of m-Commerce to be comfort, spontaneity and mobility. Other features of m-Commerce have also been suggested that includes ubiquity, immediacy, localisation, instant connectivity, pro-active functionality and simple authentication procedure [4], [39]. While these features have been attributed to m-Commerce, some of these features can also be attributed to e-Commerce, albeit to varying degrees. For instance, a consumer who is able to shop online through their personal computer will find that experience more comfortable than having to go to physical

stores. However, if the same consumer is able to conduct the shopping via their mobile device (m-Commerce) while in transit or relaxing at a park, this presents a better, more comfortable experience when compared to e-Commerce. Similarly, though, targeted advertisement or location based adverts could be deployed in both e-Commerce and m-Commerce, the range of proximity that m-Commerce offers between the target audience and businesses will result in a higher likelihood of sales as seen in the case of the fast-food example previously cited. However, these features or characteristics do not clearly delineate m-Commerce and e-Commerce so there is a merit to explore other features that will be truly unique to each form of virtual commerce.

Drawing from the literature, the unique features of m-Commerce appear to be mobility, ubiquity and immediacy. This implies that any device that is portable, mobile and is equipped with the ability of gaining access to a network, e.g., telecommunication network, wireless fidelity (Wi-Fi), intranet or internet, etc. can support m-Commerce. As such, whether it's a smartphone, a feature phone, tablet, fablet, laptop, etc., they can all be classified as platforms for m-Commerce transactions. Using this classification, business or commercial transactions stationary on technological platforms such as desktop pc will delineate e-Commerce. The classification helps to simplify and define boundaries for e-Commerce and m-Commerce. For instance, a feature phone may not have access to the internet, but it can still be used for mobile electronic transfers which fall under m-Commerce.

The factors of mobility, ubiquity and immediacy are particularly important for differentiating e-Commerce from m-Commerce because there is hardly any overlap of these features between the two concepts. Unlike comfort and localisation, which can be relative, mobility, ubiquity and immediacy are at the heart of m-Commerce. This is because the devices and technology that powers m-Commerce is readily available and accessible anywhere and anytime. For instance, with a personal computer, users tend to be in a fixed location before they can conduct e-Commerce activities whereas; users with mobile devices are able to gain access to m-Commerce without being restricted to particular locations. More so, because these mobile devices have the ability of connecting to a network from any location, users can conduct m-Commerce activities at any time which then means they can attend to e-mails, make bank transfer and even bid in an e-auction while on the go. Therefore, if we ever get confused about whether or not what we're doing is e-Commerce or m-Commerce, we just need to look out for the presence or absence of these three features – mobility, ubiquity and immediacy – at the very least.

VI. CONCLUSION

The presence of e-Commerce has revolutionised the way we conduct business. The introduction of m-Commerce has further pushed the boundaries of innovation. The dividing line between e-Commerce and m-Commerce is vague at present. This paper has considered where the dividing line should be and concludes that mobility, ubiquity and immediacy define

key characteristics that delineate both forms of virtual commerce. This classification offers a simpler and consistent approach to differentiate between e- and m- Commerce.

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