

Mobile Commerce in Developing Countries: An Evaluation of Selected Articles Published between 2009 and 2015

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Abstract This study is an evaluation of mobile commerce in developing countries (DCs). The aim is to trace the progress of m-commerce research and unearth conditions that have contributed to this state. The result is a summary of facts derived from an amalgamation of various studies. Reviews are integral components of academic writing that improve knowledge creation. This assessment involved article detection, election and examination to build up literature. A total of eighty articles published in fifty-two journals during 2009 and 2015 were selected from four electronic databases (Association for Information Systems, Google Scholar, Palgrave MacMillan and Science Direct). Study results are presented in a discursive manner. Perspectives of works on DC were noted. Four main thematic patterns were revealed. Conceptual, theoretical and methodological issues and gaps were uncovered. The definition of m-commerce in literature is sometimes unclear while some studies fail to establish clear scholarly or practical indications. Gaps and issues provide justifications for further mobile commerce research and an awakening to find solution to concerns. Findings were compared to similar studies on developed countries to detect conformity and variation. The study contributes to extant literature on mobile commerce by suggesting areas that require further research. Revelations from this study may be shared by scholarship and embraced by service providers during marketing research, customer targeting, business plan alignment and strategy formulation activities within DC contexts.

Keywords Developing countries, Mobile commerce, State, Literature- review

1. Introduction

This paper is an enquiry on the evolution of scholarly works on mobile commerce (m-commerce) in developing countries (DCs). The purpose is to add-up to existing studies on information systems (IS) in general and m-commerce in particular. IS studies are gradually becoming interdisciplinary (as exists in the domain of m-commerce) and synthesis results may be shared across different disciplines. Variations exist in regularity regarding primary research findings. Literature reviews provide an effective means to expose a range of merits and demerits in extant works [1]. This study seeks to provide a summary of how studies on the concept are conducted in DCs. Again, problems identified can be addressed to help improve impending works [2].

M-commerce is an addition to the existing commercial

transactions (marketing) that take place electronically. It denotes any intended or unintended profitable activity that takes place in different types of hand held devices supported by wireless communication technologies [3]. It represents the fusion of two distinct technical areas: the Web and cable-free technologies. Whereas the Web significantly altered the manner in which business is conducted, wireless technology has added a portable aspect to electronic commerce (E-commerce), which prior, involved a stationary user with an Internet-enabled personal computer. As a moderately new concept, m-commerce shows a potential to proliferate the exchange of goods and services. In developed countries, it is a thriving channel for business but in DCs, it has not yet attained a highly attractive status.

Globally m-commerce participation grew by 13.7 per cent in the year 2013 [4], an indication of increasing acceptance. Japan and Korea are Asian countries popular for m-commerce adoption. China and India are also embracing the concept, a sign that, m-commerce may be gaining widespread acceptance. In Africa, Kenya is noted as a leader in mobile services acceptance and use. However, there is no empirical evidence on the acceptance rate or continuous adoption levels in DCs as compared to

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developed countries. In Ghana for example, mobile-payment activities have become popular through massive promotions on transaction benefits. Conversely, the same cannot be said about mobile purchases though a few mobile commerce channels have recently sprang up [5]. It appears that an enabling environment necessary for m- commerce has not yet been developed. As such predictions on the acceptance levels and adoption states have not been met.

This study seeks to uncover the prevailing conditions of the m- commerce environment in DCs. The structure of this paper is as follows: a given definition and overview of m-commerce precedes a discussion on the evolution of mobile technology. This is followed by a brief account on mobile devices and applications. The article continues with the procedure for literature evaluation. Next a disclosure of findings starts with a display of yearly distributions of articles, an assessment of extant literature synthesis and some perspectives of adoption studies. A discussion of issues and comparative studies ensues after which gaps are addressed. An account of the potential contributions to IS research and practice is indicated. The paper ends with acknowledged limitations.

1.1. M- commerce- an overview

M- commerce is defined as the provision of goods and services via cable- free equipment that enable electronic business transactions without time and place limitations [6]. It refers to the capacity to purchase goods through wireless-enabled Internet devices. The m- commerce environment often involves a detached campaign and a display of products, services or ideas by a promoter. The setting is often simple, in order to make navigation and selection easy for patrons. Attraction is a force used to draw potential customers.

In its early days, m- commerce was regarded as a branch of E- commerce. However, [7] recognized that technological distinctions exist in the nature of devices, rules, standards and communication methods employed in cabled and wireless environments. They highlighted advantages of m- commerce (over E- commerce) as identification, instantaneity, localization, personalization and ubiquity. From the perspective of a consumer, the ability to participate in commercial transactions without restrictions of time or place (ubiquity) is highly essential. This places m- commerce as a separate channel because it offers distinct worth to consumers.

M- commerce promises good prospects for business. Some activities include mobile banking, mobile marketing, mobile payment, mobile ticketing and other location-centered activities. A study on China for example shows that satisfaction is a driver for sustained m- commerce participation [8]. In Sub- Saharan Africa, Kenya first introduced an SMS based M- banking service in 1997, known as the M- Pesa. Within five years, the service had over seven million registered users [9, 10]. M-commerce constantly paves new opportunities for service- rendering

firms to communicate effectively with likely clients. The interactive nature of mobile communication provides an amicable atmosphere for sales promotion which helps to create good relationships between m- commerce providers and customers.

Commercial entities persistently find means to exploit communication technologies to their benefit. Mobile technologies have improved the availability, rate and promptness of communication [11]. This has widened the communication net for users who could not gain access till the advent of mobile technologies. [12] recognized the potential of mobile technologies to transform the setting of traditional commercial activities. Currently, commercial service providers are equipped with a broad range of avenues through which customers are captured in an effective and personalized manner.

1.2. Evolution of Mobile Technology

Mobile communication technology has undergone steady improvement from the advent of the first cell phones which heralded a series of mobile generations. [13] acknowledge five generations of mobile communication technologies. A generation refers to the period in which standards of a particular wireless technology emerged and was used. First generation (1G), emerged in the 1980s, and comprised cell phones that used analog radio signals and could convert and improve signal strength during transmission. 1G standards were not uniform and varied across countries. It was replaced by 2G technology that began in the early 1990s, based on digital transmission.

The first universal standard for mobile communication, *Global System for Mobile Communication* (GSM) is 2G technology. It is a voice transmission technology that erased time and place boundaries, enabling exchanges between multi- national telephone companies and the emergence of world- wide roving voice-exchanges [13]. Functions provided by this technology were quite limited. Though it was mainly used for conversations, data transmission was possible, often minimal and slow and required computer mediation. The functionality of GSM technology improved with integration of data services into its architecture [14]. Some of these data services are *Short Message Services* (SMS) for transmission of tiny message signals in a channel and *Wireless Application Protocol* (WAP) that provides linkage to internet information. Another is *High Speed Circuit Switched Data* (HSCSD) that offers data conversion between different channels through a bundling functionality and *General Packet Radio Service* (GPRS), which adds collections of services with GSM. It permits cellular receptors (nodes) to stay on without blocking other connections to a main station. To support data carriage, *Enhanced Data rates for GSM Evolution* (EDGE) was developed (Cox, 2012). The next generation began after this development.

The *Universal Mobile Telecommunication System* (UMTS) or 3G was initiated by an ITU- led program called

the International Mobile Telecommunication (IMT- 2000). With an additional radio network for deciphering codes, it added multi- media to voice transmission [15]. The affordability of 3G technology made it popular. Its data transmission speeds were comparatively higher than 2G. Services such as *Global Positioning System* (GPS), *Mobile Television* and *Video Conferencing* functionalities were introduced [16]. M- commerce originated with 3G technology together with the World Wide Web. Continual technological enhancements in 3G resulted in some modifications such as *High Speed Downlink Packet Access*, *High- Speed Uplink Packet Access* and *Worldwide Interoperability for Microwave Access* (WIMAX, for data transfer across microwave links) [13]. Again, mobile network congestion as a result of increasing data transmission led to the development of *Long Term Evolution* (LTE), to support data transmission capacities of mobile communication systems. Modifications to a main generation have a decimal extension for differentiation. For example LTE is 3.75G and LTE Advanced is 3.9G [15].

A decade later, improvements in 3G technologies by the Third Generation Partnership Project resulted in the fourth generation termed *Ultra Mobile Broadband* (UMB). 4G is generally an expansion of 3G technologies which significantly increased quality and speed of multimedia transfer [17]. A popular jargon for 4G is MAGIC, derived from the expression: *Mobile multimedia, Anywhere, Global mobility solutions over Integrated wireless and Customized Services* [13].

Another generation, 5G has been introduced and is undergoing trial use and modification [18]. Its standardization is forecasted to take place around the year 2020 [19]. It is expected to achieve a thousand times more of the capacity of 4G, precisely, offer ten times more data transfer speeds and improve energy and spectral control rates [20]. It appears that the purpose of 5G is to annul the limitations of 4G technology, and to provide communication services unsupported by existing technologies.

An interesting wireless technology, Bluetooth developed by the Bluetooth Interest Group has its own set of protocols and is not limited by Internet Protocol [21]. It aids transmission between personal devices (and peripherals) separated by short distances. Through current mobile and Web technologies, m- commerce provides a means of reaching out effectively to target customers, affording customers simplified adverts, messages and choices that reduces the burden of moving physically to search for products and services [22]. The in- built traits of mobility differentiates m- commerce from other retail modes, an indication of its offerings for profitable exchanges [23].

1.3. Mobile Devices and Applications

About two decades ago, possession and use of mobile devices was viewed as a sign of affluence. The most

popular hand- held devices are cellular (mobile) phones. Currently a sizable portion of m- commerce is conducted via mobile phones. A [24] report estimates that more than five billion people the world over use mobile phones, for which it is attributed as the most speedily embraced communication device in history. Mobiles are the preferred choice by many users over computers. [25] report that more than two thirds of the over five billion global mobile phone users live in DCs. The mobile phone was the preferred device for initial m- commerce adopters and mobile services providers [26]. However with the introduction of smart phones and tablets, wider arrays of marketing techniques are made available to customers.

Both traditional businesses (e.g. Commercial banks, Insurance brokers, Retail outlets, etc.) and on- line service providers (e.g. Amazon, Yahoo, etc.) have augmented m- commerce with their methods of operation. Currently, a high amount of m- commerce involves not only physical goods and services but the purchase of digital content. The decrease in transaction charges and the proliferation of mobile gadgets has turned these handy devices as ideal commercial implements.

Mobile resources and services continue to expand [27]. The ubiquitous nature of mobile applications has carved a niche of importance to consumers. Mobile applications offer the functions and services that a device and promoter provide respectively. Though the sizes of mobile devices constrain speedy improvement of mobile applications [28], it appears not to affect mobile Internet usage. [29] predict that within the next five years internet access globally will be through mobile devices and not desk top- computers.

Smartphone applications have a capacity to alter the experience and value that customers place on shopping [30]. For instance, applications such as Google shopper or Amazon Price Check enable customers in a physical merchandise shop to take product pictures, capture bar code numbers and immediately receive price comparisons, voucher reductions, customer reviews and other relevant product information. On the other hand, the technique can get invasive and irritating due to difficulties that result from making choices as a result of information overload. Evidence suggests that individual perceptions on m- commerce applications influence acceptance [31]. Hence, the extent of adoption of m- commerce applications and services may differ amongst demographic groups and regions.

2. Review Methodology

In order to advance scholarly works on m- commerce in DCs, a review of studies covering a seven- year period was conducted using journal articles. This investigation began with an identification of works based on distinctly planned measures and was followed by an assessment and presentation of results [32].

2.1. Article Characteristics

Searches based on the concept of m- commerce within the DC setting were made. Initial search expressions used were *m- commerce*, *adoption determinants*, and *impact*. To improve the inclusion principle, the supporting *technology*, *applications* and *devices* were added. To further broaden the selection criteria, other words used were *benefits*, *challenges* and *issues of m- commerce*. Due to the under-representation of current literature on the Sub Saharan Africa in leading IS journals, a purposeful search was made to include some studies from this region. Articles were downloaded from Online databases namely the AIS, Google Scholar, Palgrave Macmillan and Science Direct.

2.2. Sampling Procedure and Size

A total of eighty articles on studies conducted during 2009 and 2015 were selected for this review. The entire compilation was arranged in alphabetical order based on topics in a single folder. Sorting was performed by a thematic inspection of research aims and perspectives. Literature was then separated into four folders. Articles were further divided based on the focus of each theme (sub themes). Categorization was effected by yearly representations and an examination of studies issues and gaps. Findings were arrived at by a scrutiny of the entire body of literature. A qualitative account was used to present findings.

3. Results- classification of m- commerce Research in DCs

3.1. General Perspectives of m- commerce Research on DCs

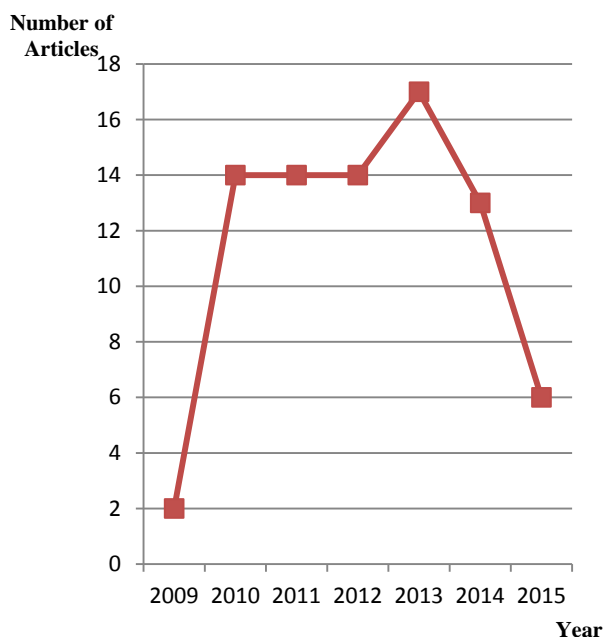


Figure 1. Displays the Yearly Distribution of Articles

Earlier studies on m- commerce which begun in developing countries considered the classical mobile phone for studies. The traditional portable phone was the technology of the time and research findings were solely based on it though it had limited functionalities. A merit that can be attributed to selected literature is that research on DCs is growing. Some studies have examined m-commerce activities such as mobile banking [33, 34], mobile financial services [35], mobile purchases [8] mobile payment [36, 37] and ubiquitous commerce [38]. The two main perspectives of studies are users (consumers) and businesses (m- commerce service providers).

Fig. 1 displays the yearly distribution of articles within the study time period. The lowest record of two was realized in 2009. This figure increased significantly to fourteen within a year and this appeared unchanged for two consecutive years. The figure peaked to seventeen in 2013, gradually declining to six articles in 2015.

3.2. Identified Themes

Analysis revealed four main thematic patterns: consumer adoption, mobile business, mobile technology systems development and literature reviews. Themes are displayed in Figure 2. Consumer- centred studies on adoption dominate with a high figure of fifty- seven. The theme that follows is studies on the appraisal of the concept with a total number of twelve. The representation of evaluation studies may be accounted for by the young state of m-commerce in DCs. The mobile technology and systems theme follows with a total of eight articles. As a researched theme, mobile businesses are least represented, with an article number of three, probably because the goal of commerce is to target and win customers. A graphical illustration is provided in Figure 2.

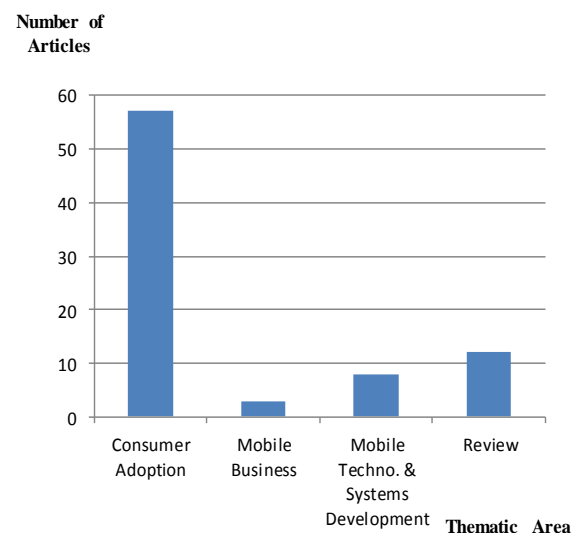


Figure 2. Displays the Distribution of Articles by major Themes

An appraisal of the selected review studies was conducted to reveal the foci of findings derived from

synthesized literature. Table 1 displays some selected studies with recommended research directions.

Table 1. Some Review Studies on m- commerce in DCs

Authors	Study Focus	Recommendations
[7]	A meta- analytic review on the influential factors of m- commerce adoption in eastern and western cultures	A consideration of the moderating effect of culture in the development of m- commerce adoption strategies
[34]	Mobile phones and financial services in DCs	Further studies in the area of mobile financial services for development and poverty alleviation
[39]	Mobile technology adoption	Attention should be placed on behavioural effects of adoption and improved qualitative methodologies
[40]	The changing trends in mobile financial payment systems	Collaboration among policy makers and industry experts to protect local and international payment systems
[46]	A classification and assessment of literature on mobile marketing	A standardized framework for m- commerce classification and further investigation into the role of user perceptions and experiences
[47]	The use of mobile telephony in micro and small enterprises in DCs	Further assessment of the impact of mobile technology on other areas of business
[48]	An examination of the state of m- commerce research	Further research on middleware and m- commerce issues as well as other mobile technology related phenomena to improve knowledge

Review studies on m- commerce in DCs encountered were relatively few. For example, [7] examined m-commerce between diverse socio- cultural terrains and urged researchers to consider culture in strategy development. The study by [46] provided a classification scheme, proposing the development of standardized classification frameworks. Whiles [39] focused on technology adoption, [47] focused their study on micro-enterprises recommending evaluation studies on other business areas. Whiles [40] suggested the formulation of policies to protect the mobile financial industry, [48] recommended further research into issues affecting m-commerce.

A further illustration of findings on the distribution of adoption sub- themes is displayed in a diagram Figure 3. Customer perceptions and attitudes recorded the highest representation with nineteen articles. Adoption determinants and moderators followed with ten articles each. This was trailed closely by satisfaction and loyalty with eight articles in number. Six studies on value and trust were noted with impact being the least exemplified sub- theme with a total of four articles.

Number of Articles

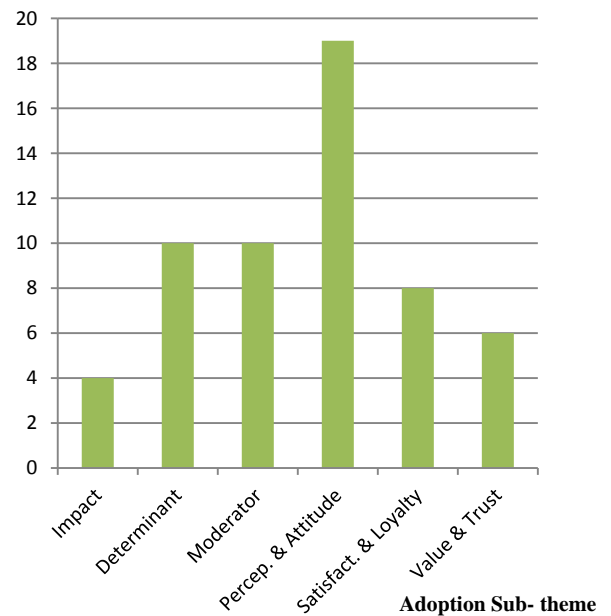


Figure 3. Displays the Distribution of Adoption Sub- Themes

Based on the perspective examination and thematic identification, an illustration of the m- commerce domain as pertains in DCs is represented as a Spider diagram.

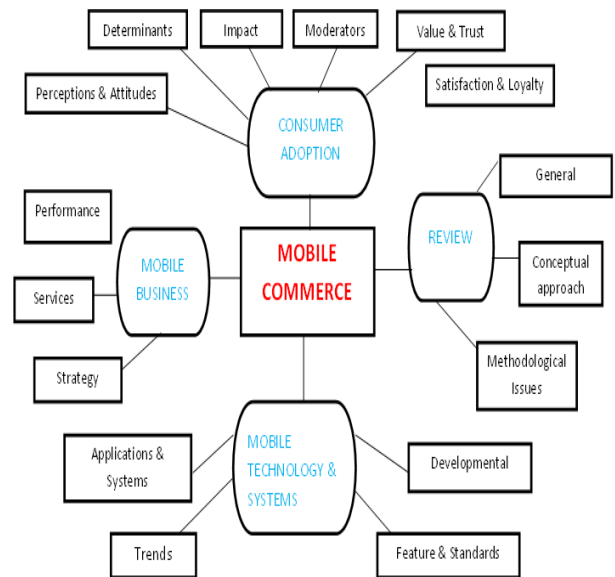


Figure 4. Spider Diagram of m- commerce domain in DCs

The Spider diagram is the result of the thematic analysis of literature on m- commerce in DCs. It provides a graphical reduction of facts in an encompassing way. The concept under study is at the center of the diagram, surrounded by the main themes. Sub- themes in turn are linked to their main themes, providing an all- inclusive outlook of study foci of the m- commerce environment in DCs. The diagram can be likened to a mind- map that depicts an overall picture of the state of m- commerce research on DCs.

3.3. Selected Studies on m- commerce Adoption

To further appraise studies on m- commerce adoption, a gathering of works from various DC regions was made. IS theories on technology adoption were found to be dominant. The moderating effects of various variables such as culture [6], gender [42] and age [43] have been researched. Methodologies used are often quantitative, due to hypothesis testing to determine influential factors [37] and [45]. Findings illustrate that the extent of m- commerce acceptance and participation varies amongst countries. Acceptance in China and Korea appear to be high [9] and [49] whiles in South America, hindrances to mobile technology in business has been reported [45]. Studies recommend research into other themes and further investigation of existing theory variables in DCs to expand knowledge and fill unknown voids. A summary is provided in the ensuing display, Table 2.

Table 2. Selected Studies n m- commerce adoption in DCs

Authors	Study Focus	Recommendations
[38]	Effect of decreased mobile money transaction cost on risk sharing	Further evaluation of opposing reasons on causal risk
[42]	M- commerce adoption	Improved studies on adoption
[43]	Assessment of the moderating effect of gender and individualism	Test of theory in DC context to check its authenticity
[44]	Determinants of acceptance factors among the youth	Incorporation of gender and profession factors in future studies
[45]	Role of trust in early adoption	Application of model to late adopters using a randomized sample
[46]	Mobile banking inhibitors	Existence of perceived obstacles to adoption

4. Discussion

4.1. Identified Issues

The analytical study revealed some shortfalls in extant literature that require consideration in future studies. Though the number of articles selected is not exhaustive, it is a fraction of extant literature and findings are indicative of the present situation. The identified issues and comparative studies are hereby discussed.

4.1.1. Conceptual Issues

Literature reveals that some researchers classify a number of distinct mobile services as m- commerce. In addressing this set- back [46] report that m- commerce studies are inconsistent and disjointed. The concept is yet to mature and this may be the cause of the anomaly. The apparent lack of standards as well as an established framework seems to be the reason. In like manner, [49] state that unless a shared meaning is applied to m-

commerce, its performance and benefits will always be vague. A consensus is needed to endorse a collective meaning of the term. Secondly, a definite meaning is necessary for m- commerce because it is technology dependent. As such, it is important to separate the concept from its rapidly changing technology to aid and direct research. Vague concepts tend to impede research progress, particularly in situations in which a concept is mistaken for a technology. Though four main themes emerged, consumer studies seem dominant showing a lack of research variety. Almost all adoption studies are centered on similar sub-themes, giving a reader the chance to infer before discussions and conclusions are drawn. Emerging issues in current contexts require consideration to introduce novel revelations in literature.

M- commerce offerings to consumers are broad. The determinants of adoption are a collection of factors, often intertwined, posing difficulty in the categorization of subthemes. Some identified adoption determinants include service provider image, value, privacy, risk, security, etc. These factors sometimes pose comprehension difficulties. For example, some studies identify trust as a perception that influences adoption. The same variable in other studies may be identified as influencing other factors. A holistic framework for m- commerce research that will help standardize the ad hoc classification of adoption determinants as well as influential factors is needed to clarify current vague meanings of concepts.

4.1.2. Theoretical Issues

Most studies are guided by IS adoption theories which are sometimes restrictive because of the limiting variables accounted for. Prevalent is the TAM that considers only two constructs: Perceived ease of use and Perceived usefulness [42, 50] and [51]. It fails to address the influences of other determinants. With m- commerce adoption in particular, the dominant theories are constantly undergoing modification because they do not account for the diverse variables associated with adoption influence [52]. This could probably account for the failure of technologies such as m- commerce to attain projected adoption levels. Another debate is that the TAM is often applied to optional contexts, with no provision for compulsory situations [53]. With this short fall certain contexts are not well understood. Another limitation is the low- level of practical direction it offers practitioners on offering suitable solutions to motivate user adoption. Theory development that accounts for the vast array of adoption determinants will improve precision in study findings and improved understanding.

Again, the application of theories from related disciplines sometimes stirs controversies in explanation of results. One pertinent example is the culture variant which has been a research issue in adoption studies. Hofstede's theory that addresses cultural concerns at a collective (national) level is often used. Some studies indicate that cultural values at an individual and national level differ [54]. Societies are made up of groups of diverse individuals, each with unique traits.

Individual opinions can influence actions. Some researchers advocate that behavioral studies on consumer adoption requires individual level of analysis [55] and [56] but this has generated controversy because Hofstede's theory has a nation- wide focus. However, a meta- analytic review by [57] confirmed that Hofstede's theory is applicable at a personal level. In relation to this revelation, some researchers continue to use it at a subjective point of analysis [58]. Due to the absence of other cultural theories, Hofstede's theory is still applied in m- commerce adoption studies at an individual level.

In an earlier study, [59] however argued that Human Computer Interaction (HCI) studies require context- precise theories. They disclosed that sometimes researchers are often inclined to find pivotal details at relatively unimportant levels of a study, a practice referred to as explanatory reductionism [60]. A researcher may lose focus and report results that may not improve knowledge. Alteration of research objectives as a result of deviation affects findings. Such inconsistencies can be mitigated by robust attitudes and measures and the development of theories and standards for emerging concepts and phenomena.

4.1.3. Methodological Issues

A level of ambiguity surrounds m- commerce adoption methodology. Earlier reports by [61] cautioned against the use of instruments and constructs for Web studies for measuring mobile applications usability. They reasoned that inaccuracies may result because Web instruments are designed for fixed settings and may fail to capture some aspects of mobility. In a controlled setting, [62] tested the usability of a mobile application using a general IS assessment method. There appears not to be specific measuring instruments for mobile application usability. Similarly, [63] report that application functions influence usage and are necessary in the design of usability measuring instruments. Whiles the user- interface of a Website is manipulated by a mouse or cursor that of a mobile device is manipulated by fingertips and touch sensitivity. An assessment of existing measurement techniques is required to enhance usability research. The development of instruments for mobile applications usability measurement will instill accuracy in reported results.

Another observation made is the manner in which conclusions are drawn. For example, culture is reported to influence adoption [6, 64]. A study identifies an adoption issue in a particular context. Another adoption study in different settings employs the same approach to arrive at the same conclusion. This is sometimes misleading, especially the use of reliability statistics to prove the uniform influence of controlling factors. In view, [65] caution researchers to desist from the practice, especially the manner in which the effect of culture is handled. Culture differs from one country to another and in like manner its moderating role on adoption may differ among groups of

people.

[66] also report that brand image influences satisfaction and creates customer loyalty which is important in marketing research. The aim of marketers is to make profit. Branding techniques (technical or non- technical) are the measures put in place to distinguish a marketer. To understand brand loyalty, researchers often assume a customer or product centered approach, avoiding other aspects of a business that promote brand loyalty which is evident of methodological biases. The error can be attributed to the low presence of mobile business studies in existing works on DCs.

4.2. Identified Comparative Studies

A few comparative studies between DCs and developed countries were encountered. For example in a cross cultural adoption study between China and the USA, [67] detected important dissimilarities and advised vendors to consider separate details when dealing with diverse communities. Like- wise another study detected that adoption decisions are influenced by three factors in China and by five in Malaysia and suggest that sellers consider the factors when planning tactics [16]. Again, a study between Kazakhstan, Morocco and Singapore discovered that all five determinants of Innovation Diffusion were found to influence youth adoption of m- commerce in all three countries but culture played a moderating role on adoption in Kazakhstan and Morocco, but not in Singapore [68]. In another meta- analysis study, [7] realized that opinions of usefulness are more important to westerners whiles opinions of ease of use are important to people in the far- east. A review by [69] identified that m- commerce adoption in developed countries was supported by constant innovation whiles in DCs adoption is symbolic of an unsettling innovation. This demonstrates that perceptions on innovation adoption differ between DCs and developed countries. [52] recommend comparisons between similar studies based on theory to help ascertain variations and similarity. Some IS theories that address the use of technology have been used in studies and the variations in results among cultures have been revealed. Theories from other disciplines like the Social Sciences can be applied in future studies to provide revelations on this multidisciplinary concept.

4.3. Identified Gaps

Research on m- commerce is thriving, yet the representation on DCs is low. Conspicuously few are studies on South American countries. Though a few studies on m- banking [45] and mobile payments were encountered, studies on m- commerce in particular are scarce, probably due to perceptions about m- commerce or the unavailability of service- providers in this zone.

Comparatively, a gap exists in the state of studies between developed countries and DCs. The gap has been blamed on unstable prevailing conditions in DCs. The

reasons for this instability may be cultural, economic, political or the lack of a technologically enabled environment [70]. Unstable conditions impede the rate of m-commerce adoption in DCs [71]. The development and maintenance of stable prevailing conditions and improved living standards may alter this under-representation. Comparative studies on device and application usage in DCs are non-existent. In relation, [63] bemoan the absence of studies that compare application usage on different devices from different manufacturers or on different devices from the same manufacturer. If device and application usability are compared, findings will improve usability understanding, an improvement in the development of usable tools and subsequent customer acceptance and involvement in m-commerce.

5. Contribution to Information Systems Research and Practice

This paper examined m-commerce research development in DCs. The appraisal exposed some limitations in topics, strategies, theory and methods. Issues regarding various stages of the IS cycle are addressed to advance knowledge on the discipline. To increase content and guide prospective studies, frequent evaluations are necessary. Probes provide directions for future research that foster valid results and conclusions. Findings can also have implications on the design, development, and usability measurement of mobile applications because problems in available literature are addressed. Improvement in application and device design may have a positive impact on diffusion and subsequent acceptance.

For practitioners the role that mobile technology plays in the transformation of established business practices is re-enforced. M-commerce provides a supplementary path for the distribution of products and services. With the right infrastructure in place, mobile customer intentions can be stirred; intents can change behavior which can trigger acceptance and subsequent adoption. Cross-disciplinary research teams can be set up to assess the state of m-commerce from both social and technical perspectives. Results can better help practitioners understand and create a facilitating environment to induce adoption and sustain engagement.

6. Conclusions

This paper examined the state of m-commerce literature in DCs. The concept adds up to existing modes of commerce. The review disclosed that mobile payment services appear to have more patronage than retail activities. Mobile transfers have broadened modes of financial payments and the efficiency has the won trust of users. However mobile purchases are not as popular. With the availability and growing popularity of mobile technology and devices in DCs,

businesses can improve variety in retail offerings through the m-commerce channel. This study recommends the support of policy makers and industry experts in the creation of an enabling environment that can stimulate interest and patronage for m-commerce to thrive. User patronage may follow and experiences, challenges and successes can stir paths for further research to improve processes.

Limitations

The study incorporated some methodological biases. Only journal articles were selected for analysis. An indication of the convenient sample chosen may not be an exact reflection of all literature. Future studies may increase the number and types of publications to provide a better representation of the DC environment.

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