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DOMINANT ISSUES AND CONCEPTUAL APPROACHES IN MOBILE BUSINESS RESEARCH FROM 2005 – 2012

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Abstract

This paper undertakes a review and classification of the mobile business (m-business) theme of mobile computing research, with the intention of identifying the dominant issues and conceptual approaches to existing research. It consists of 100 articles published between 2005 and 2012 in a diverse journals focused on information systems, business, and development. The papers are reviewed under the subcategories of Mobile Business Applications/Services; Economics, Strategy and Business Models; and Consumer Acceptance/Adoption. In terms of issues, the review shows a concentration of research on firm-level adoption of mobile technology within first subcategory, whilst mobile business analysis, capturing customer value and responses to competition dominates the second subcategory. Determinants of consumer adoption of mobiles dominate the third subcategory. Similarly, technology adoption models like TAM and UTAUT dominate the conceptual approaches to m-business. There is much room for studies into the strategies adopted by firms to create value for consumers and to sustain the value creation process in response to consumer demands and advances in mobile technologies and applications. The review serves as a useful research synthesis and is excellent for future research on mobile business based on the gaps we have identified.

Keywords: mobile computing, mobile business, literature review

1 Introduction

The ever-increasing rate of adoption and use of mobiles and related services has numerous effects on individuals and businesses. These effects have fairly spurred a number of valuable studies seeking to study and understand the phenomenon and its interrelationships with business (see Schierholz et al., 2007; Lee & Park, 2008; Frempong, 2009; Gonçalves & Ballon, 2011; Ghezzi, 2012). This paper undertakes a review and classification of mobile business (m-business) research, to indicate the current state and direction of research topics in the field. Review articles are needed to facilitate the advancement of knowledge, theory development, to close saturated and uncover new research areas (Webster & Watson, 2002). General mobiles research is endowed with several such reviews (e.g. Fouskas, Giaglis, Kourouthanassis, Karnouskos, Pitsillides, & Stylianou, 2005; Scornavacca, Barnes, & Huff, 2006; Ngai & Gunasekaran, 2007; Ladd, Datta, Sarker, & Yu, 2010). Scornavacca et al. (2006) categorises and analyses 235 journal and conference articles between 2000 and 2004 to suggest future research areas (i) about business and organisational applications (ii) about empirical research, and (iii) towards theory development. Similarly, Fouskas et al. (2005) derives a research roadmap after an in-depth review of m-business dimensions. The roadmap proposes short-, medium-, and long-term research directions including but not limited to the study of organisational capacity to integrate mApplications and services within work culture and business processes, content pricing, and interoperability. In addition, a more recent review seems to have narrowed down on a specific mobile application area i.e. mobile commerce research and applications (Ngai & Gunasekaran, 2007). However, an overarching review of over 800 articles observes that within the broader mobile computing research area “the technology itself was initially of interest, followed by business applications, user concerns, and finally research related to commerce applications of the technology” (Ladd et al., 2010).

Despite these valuable reviews, none of them seems to satisfy the need to understand the theoretical and conceptual approaches to m-business research. Also, considering the very dynamic nature of the m-business area, there is room for papers that review the current state of the area. The purpose of this paper is thus to understand the dominant issues and conceptual approaches to m-business research from 2005 to 2012 to identify gaps and to suggest future research areas. This paper is structured into seven sections. The first section provides a background to, and the purpose of this paper; the second section discusses m-business definitions towards proposing a more comprehensive conceptualization; and the third section describes the methodology of the review. The fourth section presents the results of the review, based on m-business research themes. A discussion on the theoretical and conceptual frameworks of the previous research is presented in section five. The sixth section concludes with the gaps in the issues and conceptual approaches to provide some future research directions.

2 Framing Mobile Business Research

Balasubramanian et al. (2002) observes that the term m-business lacks a formal conceptualisation. This void has led to seemingly ad hoc definitions of the term in literature. For instance, Fouskas et al. (2005) defined it as “...communication, information exchange and transactions conducted over mobile or wireless networks”, whilst Giaglis (2006) defined it as “...the ways in which mobile communication technologies can be applied to address the requirements of mobile users that need to access a varied range of applications and services through wireless access devices”. These definitions conceptualise m-business as either a service (e.g. Muller-Veerse, 1999; Clarke, 2001 & Barnes, 2002 as cited in Woolfall, 2006), technology (e.g. Fouskas et al., 2005; Giaglis, 2006), or as a product (e.g. Lehner, 2003 & Zobel, 2001 as cited in Schierholz, Kolbe, & Brenner, 2007). Woolfall (2006) provides a definition that depicts an interaction of technology, product and service by defining m-business as “...the means by which multiple actors conduct discrete or relational exchanges of economic or social value via a wireless network”. Based on the foregoing definitions research (Woolfall, 2006; Schierholz, Kolbe, & Brenner, 2007; Fouskas et al., 2005; Giaglis, 2006) and aiming to advance and develop m-business theory, this paper conceptualizes m-business as *the application of mobile devices*

to execute a firm's functions internally and in dealing with its external stakeholders (i.e. partners, suppliers). This definition attempts to combine Giaglis' definition (using mobiles to address user requirements), Woolfall's (multiple actors conducting exchange), and Fouskas et al.'s (information exchange over mobile networks). Here the users or multiple actors could either be an individual or a firm, the exchange could be done amongst or between individuals and firms, all enabled by mobile or wireless technologies. This definition not only captures customer issues, but firm-level issues too, creating a broader basis m-business discussions.

3 Methodology for the Review

Only peer-reviewed journal articles are included in this review because they contain the core arguments raised in working papers and conference proceedings (Webster & Watson, 2002). Articles used were downloaded from Emerald FullText, JSTOR, Science Direct and Wiley Online Library. The search descriptors used in all four databases were "mobile", "mobile business", and "m-business". The results were sorted according to relevance, and the first 150 chosen from each database. The final 100 papers included in the review were those published between 2005 and 2012, and related to m-business subcategories by Ladd et al. (2010). Also, the co-authors adopted the following method to write the review; the first author identified, and downloaded all the papers used in this review. Based on the m-business themes discussed in Section 4, these papers were placed in respective folders. First author read and discussed the issues and conceptual approaches for the Business theme, whilst second author did same for the Service theme. The discussions under the conceptual approaches were then merged into a comprehensive piece.

4 Mobile Business Research: Issues and Evidence

There are several mobiles related themes themes posited in existing reviews shown in Table 1 below.

Review No.	Reference	Themes/ Categories from Review
R1	Fouskas et al. (2005)	Technology, Value, Service, Enablers
R2	Scornavacca, Barnes, & Huff (2006)	Consumer, Business, Technology, General, Industry
R3	Ngai & Gunasekaran (2007)	Cases & Applications, Wireless Network Infrastructure, Mobile Middleware, Wireless User Infrastructure, Mobile Commerce Theory and Research
R4	Ladd, Datta, Sarker, & Yu (2010)	Mobile Theory and Research, Mobile User, Mobile Business, Mobile Cases and Applications, Mobile Technology

Table 1. Themes from previous mobile-related reviews

Examining the four reviews listed in Table 1 suggests that the Ladd et al. (2010) review captures all the themes posited in the previous reviews. Hence, this paper adopts R4 i.e. Ladd et al. (2010) as the basis for categorising the papers discussed here in the ensuing subsections. The discussions border on the dominant issues in previous research. Owing to paper length constraints, authors focused on the Mobile Business category which explores the mobile computing phenomenon from *perspective of business or industry*. This category has seven subcategories including i) Mobile Business Applications/Services ii) Economics, Strategy, and Business Models iii) Consumer Acceptance/Adoption iv) Macroeconomic Cycles v) Government-Industry Interaction vi) Interorganisational Networks, and vii) Infrastructure. Specifically, the paper focuses only on subcategories i, ii and iii. The rest are not included because i) there is limited discussion about those topics, and ii) authors wanted to attain some fidelity in the discussion by examining the chosen subcategories (Ladd et al., 2010).

4.1 Mobile Business Applications/Services

This subcategory seems to be related to the specific mobile-related applications that firms adopt and use in their processes. Research under this subcategory has focused on firm-level adoption of m-business applications from two perspectives; mandatory adoption – where firms are required by some association or government regulation to use a mobile technology (see Lee & Park, 2008), and issues surrounding voluntary adoption (see Liang, Huang, Yeh, & Lin, 2007; Balocco, Mogre, & Toletti, 2009). Either form of adoption is expected to yield some benefits. The benefits include the reduction in transportation cost, flexibility, organisational efficiency, individual productivity and effectiveness, transparency within business processes (Schierholz et al., 2007); removal of overlapping functions, reduced document handling at the back-office, reduction in typing errors and amount of clerical work needed, single document flow (Rossi, Tuunainen, & Pesonen, 2007). On the other hand, some challenges faced are high subscription cost, customer insistence on face-to-face transactions, cost of on-net and off-net calls (Chiwere & Dick, 2008; Frempong, 2009). To go around these challenges, a framework has been proposed to serve as guidelines for the implementation of mobile initiatives by firms (see Sinisalo, Salo, Karjalainen, & Leppaniemi, 2007). The dominant applications discussed include mobile library services (Cummings et al., 2010; Canuel & Crichton, 2011; Johnstone, 2011) and mobile customer relationship management (Schierholz et al., 2007).

4.2 Economics, Strategy and Business Models

This subcategory seems to be related to the production and distribution of mobile-related products and services as well as firms' strategy and business models. There seems to be a fair distribution of research along all three dimensions of this subcategory. Some studies provide frameworks to obtain predictions for costs and benefits of a mobile solution (Gruhn, Kohler, & Klawes, 2007), whilst others dispute the economic impact of mobiles (Rohman, 2012). On the other hand, numerous studies show evidence of economic, social and developmental impacts of mobiles (Best et al., 2010; Cassidy, 2006; Dunn, 2009; Gani & Clemes, 2006; Horst, 2006; Hamade, 2012; Ilahiane & Sherry, 2012; Ishii, 2006; Mutula, 2008; Ndung'u & Waema, 2011). Au contraire, some negative outcomes like phone use by criminals, infringement of privacy rights, and the creation of a dishonest society (Cassidy, 2006; Ndung'u & Waema, 2011) have potential to affect the economics of adopting mobiles.

Further, some studies focus on the strategic implications of adopting mobiles e.g. to improve work processes, increase internal communication and knowledge sharing, and enhanced sales and marketing effectiveness (Sheng, Nah, & Siau, 2005). Other studies provide guidelines for firms within the mobile business ecosystem to overcome competition for instance by cooperating with network providers, releasing new products quickly (Chang, Wang, & Fu, 2009), and to have market-orientation and customer focus (Kristensson, et al., 2008; Bose & Chen, 2010; Rahman & Azhar, 2011; Isoherranen & Kess, 2011; Kuriyan, Nafus, & Mainwaring, 2012; Jeng & Bailey, 2012). Some also capture how firms interpret and react to changes in the technological landscape e.g. impact of W-LAN on the activities of mobile network operators (Madjdi & Husig, 2011). The issues to be addressed in designing new strategy in the mobile landscape are also delineated by Peppard & Rylander (2006).

Due to the potential for customers to affect firm strategy, some studies dedicate themselves to studying how firms can respond to customer needs (Aydin et al., 2005; Jayawardhena et al., 2009; Yeh & Li, 2009; Santouridis & Trivellas, 2010; Aleke et al., 2011; Srinuan et al., 2011; Zhou, 2011; Awwad, 2012; Hung et al., 2012; Tobbin, 2012; Wang & Lin, 2012). Concerning business models, issues discussed include the creation of customer value for mobile services (Methlie & Pederson, 2007); viability, reconfiguration and sustainability of business models (de Reuver & Haaker, 2009; Johansson et al., 2012; Ghezzi, 2012); search for additional revenue sources (Gonçalves & Ballon, 2011); and how to capture low-income customers (Anderson & Kupp, 2008).

4.3 Consumer Acceptance/Adoption

The importance of consumers reflects in arguments supporting the inclusion of clients in the delivery of mobile services (see Martin, Lopez-Catalan, and Ramon-Jeronimo, 2012). This argument

could thus explain the dominance of consumer research in m-business. Research in this subcategory primarily concern influencing factors of consumers' adoption of mobile services (e.g. Gomez-Barroso et al., 2012; Karim et al., 2010; Kumar & Lim, 2008; Laukkanen et al., 2007; Shim et al., 2006; Yang & Jolly, 2008; Bouwman et al., 2008; Deng et al., 2010; Riquelme & Rios, 2010; Wessels & Drennan, 2010; Mannukka, 2008; Tobbin, 2012; Laukkanen, 2007; Mokhlis & Yaakop, 2012; Petruzzellis, 2010; Salmi & Sharafutdinova, 2008). Whilst others provide customer categorisation schemes in terms of what influences their mobile adoption behaviour (Kimiloglu et al., 2010), others study the factors that inhibit customers' adoption (Dey et al., 2011; Dunn, 2009; Koenig-Lewis et al., 2010; Püschel, et al., 2010; Lu & Su, 2009). From the perspective of the actual consumers, others study actual consumer use of mobiles (Donner, 2008; Sey, 2009; de Angoitia & Ramirez, 2009), and switching behaviour (Shin & Kim, 2007; Lee et al., 2011; Srinuan, Annafari, & Bohlin, 2011; Nikbin et al., 2012).

5 M-Business Research: Conceptual Approaches

This section discusses theoretical- and framework-based approaches to m-business research to suggest conceptual gaps for future research. M-business research guided by theoretically-based approaches tend to be dominated by Consumer Acceptance/Adoption theme. The theories employed include the Technology Acceptance Model in either its original form (Amin, 2008; Yang & Jolly, 2008; Zhou, 2011; Tobbin, 2012) or extended form by adding on certain constructs (Akturan & Tezcan, 2012; Lule et al., 2012; Okazaki et al., 2008; Wessels & Drennan, 2010). TAM is sometimes combined with the Theory of Reasoned Action (e.g. Kim et al., 2009; Liu & Li, 2010; Lu & Su, 2009; Lee et al., 2007; Riquelme & Rios, 2010; Koenig-Lewis et al., 2010), and the Task Technology Fit model (Pagani, 2006) to form a theoretical basis. On the other hand, some studies simply modify original theories to explore the research objectives. For instance, because TAM is based on volition, it cannot measure mandatory technology adoption hence it is modified to create the Technology Satisfaction Model (Lee & Park, 2008). Other evident clear-cut theories include Unified Theory of Acceptance and Use of Technology (Yang, 2010); game theory (Woolfall, 2006); theory of disruptive competition and innovation (Gillwald & Mureithi, 2011); economic theory (Au & Kauffman, 2008); the Expectation-Confirmation Model (Hung et al., 2012); and Media richness theory (Lee et al., 2007).

Framework-based approaches include one providing directions for an organisation to choose a suitable mobile solution (Gruhn, Kohler, & Klawes, 2007), one for analysing the business side of mobile/wireless technologies (Kang, Lee, & Tsai, 2011), one for developing viable business models (de Reuver & Haaker, 2009), and one for ensuring collaboration amongst m-business ecosystem players (Jing & Xiong-Jian, 2011). Other (popular) frameworks employed include the Strategy orientation framework (Isoherranen & Kess, 2011), and the development of a Fit-viability model the the adoption of mobile technology in business (Liang, Huang, Yeh, & Lin, 2007).

6 Discussions

As observed by Scornavacca et al. (2006), and evidenced herein, m-business research is dominated by consumer issues. It is however encouraging that some research exist about the business side too. This review's contributions lie in the attempt to provide a holistic definition and to highlight the dominant themes and conceptual approaches to m-business research from 2005-2012. The evidence presented in this review imply that first, apart from gaps potentially overlooked in the 'Infrastructure', 'Macroeconomic Cycles', 'Government-Industry Interaction', and 'Interorganisational Networks' subcategories, there is the need for on-going research into the 'Economics, Strategy, and Business Models' subcategory because of high dynamics in the mobile industry (Ladd et al., 2010). Second, there is the room to contribute to the general 'Mobile Theory and Research' category by adapting and/or adapting more theoretically grounded approaches in m-business research to fill the paucity especially in the subcategories discussed under sections 4.1 and 4.2. In addition, the following sub-sections discuss the evidence and suggest further research areas.

6.1 Discussion of Issues and Evidence

First, concerning Mobile Business Applications/Services, firms face numerous uncertainties and challenges, in the adoption of mobile technology for business activities. To the extent that some firms overcome such challenges it would be helpful to understand and develop solutions to these challenges as a way of m-business transformation (Tsai & Gururajan, 2007). Detailed case studies documenting how firms overcome such challenges would provide useful insight and a roadmap for others seeking to implement mobile technologies. Another area that could be studied is the impact of mobile technology on a firm's managerial functions. Overall, these pointers and discussions in previous reviews suggest that on-going and future research still focuses on the adoption of mobile applications by firms which are non-core members of the m-business ecosystem (see Liang et al., 2007; Lee & Park, 2008; Chiware & Dick, 2008; Balocco, Mogre, & Toletti, 2009; Frempong, 2009). Such studies naturally study the related impact of mobiles adoption. Meanwhile Heeks (2006) suggests four levels stages of within the Informatics Lifecycle; Development, Adoption, Use, and Impact. With current research seemingly focused on adoption, use, and impact, there is room for research in to the development phase – how m-business applications are created.

Second, within Economics, Strategy and Business Models; previous studies focus on economic and non-economic impact of adoption, strategic implications of mobile adoption, overcoming competition, how to respond to technological changes, and responding to customer needs. However, within mobile business organisations (MBOs), there is the need to understand their ability to combine internal and external resources to create new resource combinations (Koruna, 2004). The seeming paucity of empirical studies about the how firms combine resources is evidenced in an m-business special issue by *The Journal of Policy, Regulation and Strategy for Telecommunications* (Ballon, 2007). There is the need to go beyond the current frontier to study managerial processes within MBOs, especially due to the many unresolved business challenges pertaining to the deployment and management of value-added services (Giaglis, 2006).

Third, research under the Consumer Acceptance/Adoption subcategory needs extension in the face of advocacy for the inclusion of customers in the delivery of mobile services (Martin et al., 2012). Further research could thus explore how MBOs harness customer perceptions as part of their value-creation process. Also, to attract low-income consumers, companies have been advised to reconfigure their value chain according to a strategic pattern depending on their business model type (Ghezzi, 2012). This raises the need for empirical research into how such reconfiguration is done, and what best practices could be followed. Such a study would help provide knowledge as to the existence or otherwise of any company that has succeeded or failed in a reconfiguration effort.

Generally, it seems that, firm-level m-business research is dominated by studies about mobile network operators (MNOs) (see Anderson & Kupp, 2008; Ballon, 2007; Chang, Wang, & Fu, 2009; Gonçalves & Ballon, 2011; Srinuan, Annafari, & Bohlin, 2011). To provide a holistic insight into m-business, other firms within the ecosystem needs studying. This need is supported by the observation of focus shifting to value addition and content creation, and hence from mobile network providers to other players in the mobile ecosystem (Peppard & Rylander, 2006). Further, since the usage of third party applications have a bright future (Verkasalo & Hämmäinen, 2007; Methlie & Pederson, 2007), firms like content providers are also important members of the mobile ecosystem that need to be studied. Other firms include service providers, service creators, mobile operators, handset and manufacturers (Smura, Kivi, & Töyli, 2009). Value creation in MBOs would be a promising area with for research into the effects of business model choices on performance, and the actual process of creating value.

6.2 Discussion of Conceptual Approaches

The focus of the issues as discussed in section 4 mirrors a concentration of conceptual approaches to studying consumer applications and user perceptions towards them. A good starting point is the creation of a framework that provides a holistic classification of m-business applications/services.

Further, as there are different levels of e-commerce capabilities, there is (Boateng, Molla & Heeks, 2008), a similar framework could be developed to understand the levels of m-business in firms

To add to the above, as pointed in the gaps in sub-section 6.1, there is the need to understand the development and deployment of firm resources to create products (m-business applications) and achieve benefits (for the firm). None of the conceptual approaches identified in this review provides the pathway to attaining this knowledge, hence the need to introduce one that captures this gap succinctly. A conceptual approach of this nature may not exist specifically for the m-business area. However, it could inform and provide guidelines in the creation of an m-business-specific framework. This review thus suggests the use of an established framework for studying how firms configure resources to create value and achieve firm benefits e.g. resource-based theory, and its later extension – the dynamic capability framework.

Similarly, while we have some evidence about companies involving customers creating value (Kristensson, Matthing, & Johansson, 2008), we should consider asking whether customers are (external) resources, and to what extent they influence the value-creation process. Obviously, customer feedback would have to be captured to inform the value-creation process, but from the m-business perspective, what are the mobile technologies specifically for this purpose – call it mobile knowledge management (KM). What KM frameworks can help understand this? Similarly, scientific research needs to evaluate the applicability and fit of value artifacts created with customer input. In this regard, design science theory provides some useful guidelines.

In addition, there is the need for frameworks that capture mobile use and benefits obtained by firms in various industries. So far, attempts have been made to understand this dimension from the perspective of individual users (e.g. Boateng, 2011). There is the need for similar extensions to understand firm-level impacts of mobile adoption. According to the evidence presented, research so far has borrowed from and extended the benefits of using ICTs in commerce or trade (Amit & Zott, 2001; Boateng et al., 2008) to its mobile equivalent. For instance, the mobile for development perspective posits three effects that mobiles have on adopters i.e. incremental, transformational, and production (Heeks & Jagun, 2007; Batchelor & Scott, 2004). Incremental effects are those benefits from using mobile phones to improve what a firm already does e.g. communicating with customers and partners. Transformational effects are benefits from using the mobile phone in creating new things or accessing new services e.g. mobile banking. Production effects are benefits from trading in or selling mobile phones and related services. Current benefits captured by research relate to incremental and transformational effects, hence there is room for research into the production effects of mobiles e.g. how mobile applications are created and sold to customers – both individual and corporate.

7 Conclusion and Future Research Directions

With a categorisation and discussion of salient existing mobile business (m-business) literature, this review attempted to provide a general picture of the characteristics of past and current research into the m-business subcategories of Mobile Business Applications/Services; Economics Strategy and Business Models; and Consumer Acceptance/Adoption. The main motivations for the review are that, first, m-business is a dynamic area that needs continuous on-going research (Ladd et al., 2010), thus review are important to show and close over-researched areas, whilst uncovering new areas. Second, even though past m-business research had been criticised to be more of intuition-based reasoning and conceptual analysis than empirical (Scornavacca, 2006), the past reviews did not analyse the conceptual approaches nor the methodological approaches used in those previous studies. This creates a gap in knowing which theories are replete, and which ones need attention. Third, this review explores the assertion that m-business research was focused on consumer applications (Anckar, Carlsson & Walden, 2003 as cited in Scornavacca et al., 2006).

The findings in this review provide evidence that initial perceptions are quite true. A transformation of the m-business research field as was predicted Scornavacca et al. (2006) can however not be guaranteed. Nonetheless, a clear focus for future researchers would help grow the area better. Especially, two main focal points informed by the issues, evidence and past theoretical approaches discussed here seem fertile for future m-business research. The first is *Research into business dimension of m-business*: Current research is skewed toward adoption issues – amongst both individual and corporate consumers. There is the need to understand, the process of developing firm resources to realise the consumer value (as proposed by the business model argument). The internal and external conditions and factors/resources that facilitate the process could also be explored to a

holistic understanding of the value-creation process. The second is *theory development*. Even though the IS discipline has key theories e.g. TAM, there is the need for the development of key theories specifically for mobile business in order to grow the area. This may be achieved by adapting and/or testing such IS theories with the m-business or m-computing sub-discipline.

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