Apps in the U-space
From mobile to ubiquitous marketing

JOHN MARTIN JAMES BREDICAN
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JOHN BREDICAN

Supervisors:
Dr. Esmail Salehi-Sangari
Dr. Leyland Pitt

Doctoral Thesis No: 2016:06
KTH Royal Institute of Technology
Division of Industrial Marketing, INDEK
Stockholm, Sweden
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Abstract

Smart mobile devices are becoming increasingly essential daily companions. Applications (apps) are the interface through which the consumer can leverage unique capabilities of smart mobile devices to interact with people, other devices and firms via the supporting mobile ecosystem.

Smart mobile devices and apps are influencing how competition is defined and changing how firms do business by improving internal processes and increasing flexibility and convenience for customers. Mobile apps and devices enable users to move from a portable and mobile communication and computing environment to that of a ubiquitous communication and computing environment [u-space]. Discussion in terms of ‘mobile marketing’ is therefore too limiting, our understanding should be ‘ubiquitous marketing’. Six papers explore ubiquitous marketing further.

The retail sector provides a contextual setting for paper one and finds that mobile marketing increases value for retailers and consumers. Integration of all retailer / consumer interfaces with mobile marketing to maximise exposure and connectivity between both parties is recommended.

Paper two investigates the sources for mobile app ideas in companies and finds that apps developed externally or within the firm with some outside help, were perceived to be more effective. Apps that leverage the mobile devices unique features is central to the methodology proposed for developing an app in paper three.

The next three papers examine the impact that mobile apps and devices have on business activities and customer relationships. Paper four finds increased operational efficiency in a Dental
Practice, while paper five identified the opportunity for increased firm-customer interaction in a medical context. Paper six determines that rather than five dimensions of SERVQUAL, financial service quality of apps consists of three dimensions: Reliability, personal and visibles; and that service success can be derived from providing less service.

This thesis contributes to a fuller understanding of U-commerce theory. It advances understanding in how apps are making significant changes in how information technology is managed and controlled from an organisational perspective, and how these technology advances can influence consumer interaction.

**Keywords:** Mobile applications, smart mobile devices, U-commerce, mobile value creation.
Dedication

For my sister Colleen.
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Acknowledgements

This thesis has required a huge investment of time, effort and sacrifice that could not have been possible without the expertise, and support of the KTH faculty and staff, colleagues and my family.

I would like to thank Dr. Esmail Salehi-Sangari for his guiding hand and encouragement throughout the PhD. It is a program of outstanding teachers and researchers that not educate and inspire!

An integral part of the program has been the ubiquitous input and support of Dr. Leyland Pitt, to whom I extend my heart-felt gratitude. A mentor and friend, without whose encouragement I would not have started the doctorate. His expertise, relentless support and generosity have impacted my thinking by nourishing my intellectual curiosity and developing my skills.

For insight and guidance in refining key aspects of my thesis, Dr. Jan Kietzmann deserves a special shout-out. I would also like to thank my co-authors: Dr. Kirk Plangger, Dr. Debbie Vigar-Ellis, Dr. Martin Vendel, Adam Mills, Roger Strom, Jim Armstrong and Emily Treen. I have learned a great deal from you all. I am indebted to them for their debate, time, energy, patience and insight.

I was lucky enough to have had the privilege to of studying with two cohorts of students on the PhD program. Thank you all for making the experience special, and memorable. It was hard work but fun.

Finally, to Tanja my ever-supportive wife, big thanks for giving me the time and space when I needed it. Your love and support are in every word on every page. To my son Kian, thank you for the hugs and understanding Dad needed while doing his ‘Dr PhD’.
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CHAPTER ONE:

Overview of the research
1.1 Introduction

On July 15th, 2014, Apple and IBM announced an exclusive partnership to ‘transform enterprise mobility through a new class of business apps (applications) – bringing IBM’s market-leading big data and analytics to iPhone and iPad’ (Apple, 2014). Global smartphone penetration is 16.7% by the end of 2012, and Strategy Analytics estimates there are over 1.1 billion smartphones in use (Mobiforge, 2014). Use of smartphones has led to the creation of an applications market. Mobile applications (or “apps”) are made available online and can be downloaded directly onto a smartphone or tablet device and run on an operating system. The advanced computing ability and Internet connectivity, combined with GPS navigation make these devices a powerful tool that marketers can leverage to entice, engage, and empower customers. Moreover, a firm can also shift functions such as scheduling, billing, information seeking, records management and communications from the business to the customer or consumer.

Evidence of the above has already presented across a range of industries. Customers use mobile apps to book flights, book hotels, execute banking transactions, and manage online profiles and business records. Mobile devices and applications are already influencing marketing outcomes in various contexts making them highly relevant in today’s marketing landscape. In the marketing war, speed and strength may be no match for the firm with the best app. The mobile device coupled with the mobile app and the mobile ecosystem is still a relatively new phenomenon, a disruptive innovation that is quite literally in the hands of the customer.
A number of industries have undergone a fundamental shift in how competition is defined where the business models of incumbents are being challenged (Figure 1.1). Competition between products has traditionally been defined by what the customer will buy; for example ‘selling a newspaper’, the competition would be between two newspaper titles, or in ‘selling a phone service’, between two phone service providers. So by looking at the product benefits for the customer, in relation to the customers’ goals, the understanding of competition has moved from the product or service level to industry level. An example here is ‘killing 10 minutes of time’, when the choice can be between reading a newspaper and playing a game app.

Figure 1.1: Fundamental shift in how competition is defined (Vision Mobile, 2014)

Mobility has become core to a great number of industries and is transforming business-to-consumer (B2C) relationships resulting in new services, and improved customer retention and loyalty. The Apple IBM partnership announcement confirms that mobile applications are being widely adopted in business-to-business (B2B); and there is increasing adoption of business-to-employee
(B2E) apps that drive workforce productivity and customer service, and emerging adoption of machine-to-machine (M2M) technology.

The Mobile Marketing Association defines mobile marketing as “a set of practices that enables organisations to communicate and engage with their audience in an interactive and relevant manner through any mobile device or network” (Mobile Marketing Association, 2009). An adequate definition, though this is quite device centred, therefore a broader and deeper understanding of what a mobile device is (particularly a ‘smart device’ e.g. smartphones, tablets, smart watches) and how this can affect marketing outcomes is necessary to understand the importance of this channel.

To appreciate the significance of a ‘smart’ mobile device, one needs to consider the broader context within which the device operates – the mobile ecosystem. The device itself is not the dominant player as it is merely the instrument, the mobile application (app) is the interface, and the mobile telecoms network is the conduit. The dominant player that presents the most value is the operating system (OS) because it is the key enabler. The ecosystem provides the user ubiquity, which Watson et al. (2002) defines as supporting accessibility, reach-ability and portability. Internet access is unconfined as devices provide time and location convenience.

With the advent of the mobile ecosystem what we now understand mobility to mean has changed. The progression started initially where portability had value but location mattered because users had to move to the data (go online at an Internet café or plug into a LAN cable to get connected). Mobility meant location no longer mattered; data came to users through their Internet enabled
smartphones. The mobile ecosystem has enabled smart device users to move from a portable and mobile communication and computing environment to that of a ubiquitous communication and computing environment [the u-space]. Smart devices now talk to each other and to their environment (with or without people’s involvement and often consent) through ubiquitous networks (smartphones, tablets, smartwatches, mobile telecoms network etc).

The world has moved on, rather than thinking and talking in terms of ‘mobile marketing’, our understanding should be ‘ubiquitous marketing’. Managers who don’t understand ubiquitous marketing may waste marketing resources by focusing on a technology and marketing strategy that is of little relevance. In order for researchers and academics to improve understanding of the phenomenon, this research aims to answer: “In a constantly connected environment, how do apps change marketing (and vice versa) to create ‘ubiquitous’ marketing?”

Six papers will investigate and conceptualize the ubiquitous marketing phenomenon further and argue that Ultimate Commerce or simply U-commerce theory provides the most exhaustive method for examining the symbiotic value of mobile devices, applications and networked mobile ecosystem. “U-commerce implies ubiquity, universality, uniqueness and unison. It is not a replacement of other types of commerce, but an extension of them” (Galaxhi-Janaqi and Nah, 2004, p.744).

This chapter will provide an overview of mobile devices, applications and the mobile ecosystem. The supporting theory is explored and gaps in the marketing literature concerning mobile marketing are identified. Next, the overall methodology is detailed
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and is followed by in depth discussion of each of the six papers that cover the overarching research problem.
1.2 Mobile devices, applications, and ecosystem

In this section, a description of ‘smart’ mobile devices and apps is detailed and an examination of the network mobile ecosystem is discussed. The origins of smartphones and tablet computers and their development are briefly described followed by a concise definition of a smartphone and tablet device, and of mobile applications. Devices and applications can be viewed as key parts of a network - the ‘mobile ecosystem’, which is also described and illustrated in this section followed by a discussion of the definition of mobile marketing.

1.2.1 Origin and development of ‘smart’ mobile devices and applications

A mobile device is basically any handheld computer and is designed to be extremely portable, often fitting into the hand or pocket. Smartphones came first, followed a few years later by the tablet. Early generations of feature phones (i.e. ‘dumb’ phones) were generally only able to make and receive telephone calls and SMS text messages. Many mobile phone users in the late 1990’s also carried separate dedicated personal digital assistant (PDA) devices. In early 2000, Ericsson Mobile Communications released the Ericsson R380, which was marketed as the first ‘smartphone’ (Conabree, 2001). The Ericsson R380 combined the functions of a mobile phone and a PDA, and had limited web browsing and a touch-screen that utilised a stylus (PCMagazine, n.d.).
Smartphones

Modern cellular telephones, commonly referred to as ‘smartphones’, can be thought of as a combination of a mobile phone, PDA and mobile computer (Nolan, 2011). The devices use and combine the power of cellular technology with computing technology to offer a very small, very portable computing device with capabilities such as Internet browsing, email, audio/video playback, hard drive storage, as well as having full keyboard functionality, whether through physical buttons (like the BlackBerry) or touch-screen digital input (like the iPhone). Similar to a computer, they run on an operating system, such as Apple iOS, Microsoft’s Windows Mobile, or Google’s Android.

Smartphones have four defining characteristics: (i) to make and receive telephone calls and text messages, (ii) to access the Internet via cellular and/or Wi-Fi networking, (iii) to run software applications of the user’s choice at the user’s discretion, and (iv) internal data storage. Individually, these functions can be managed by legacy mobile phones, laptop or tablet computers, but only in smartphones are all four functions integrated into a single device (Bredican, Mills and Plangger, 2013). Additional common features of smartphones include camera functionality, Global Positioning System (GPS), multimedia playback and supplementary networking abilities such as Bluetooth, infrared, or near-field communication.

Origin and development of apps

The Oxford Dictionary defines an app as “an application, especially as downloaded by a user to a mobile device” (oxforddictionaries, n.d.).
At the turn of the 21st Century, growth of smartphones was spread across different markets: NTT Docomo in Japan, Microsoft Windows Mobile and Blackberry in the US, and Symbian in Europe. The launch of the Apple iPhone changed everything. Apple was hardly a pioneering smartphone company, but the iPhone device had mass appeal largely due to the multi-touch screen (also not the first with this feature) combined with a simple and easy to use interface (without the need for a stylus) that was custom built for a touch-screen, this was combined with other features such as a music player. The iPhone became more than just a way to communicate with other people; it was literally a mobile media centre and miniature computer.

January 9, 2007, Apple introduced the iphone (Apple, 2007), but it was not until a year later, with the release of the iPhone OS 2.0, that apple launched its App Store (part of the iTunes Store – a software based online digital media store operated by Apple). At the initial launch in 2007, Apple had envisioned that web apps (applications that run in a web browser) would provide the functionality that would satisfy most users. However, the development of specific device apps was the result of developers hacking (or “jailbreaking”) the iPhone and coding third-party apps for the device. Apples response to this development was to embrace and work with developers and use the new App Store platform as the distribution channel. Not only is the App Store hugely profitable for developers and Apple alike, it was another significant breakthrough and market innovation. PCs are based on a hierarchical, folder-based file system, while the mobile device has developed fast and efficient apps to manage its own data.
Tablets

The design ethos, technology (touch-screen, iOS, App Store) and master class marketing combined again with the launch in 2010 of the iPad – the first and still the most dominant tablet computer. Like laptops, tablets, as the name suggests, are designed to be highly portable. The Oxford Dictionary (oxforddictionaries, n.d.) defines a tablet computer as: “A small portable computer that accepts input directly on to its screen rather than via a keyboard or mouse”.

However, like smartphones, tablets are usually owned and used by one individual (Pitt et al. 2011), the variety and availability of thousands of different apps, and the wide variety of settings for the software make the devices very personal. They are ‘always on, instant on’ with no ‘boot-up’ time and instant off without having a shutdown process. Many devices come with an accelerometer and gyroscope. Having apps that manage its own data greatly simplified software acquisitions and updates, while also reducing the amount of storage space for iPad software. State of the art ‘flash drives’ (more durable than disk drives) could be used instead of bulkier hard drives saving weight and space and the flash drives allow the computer to boot up and open programs more quickly. Tablets however, provide a different computing experience. The most obvious difference is that they don't have keyboards and allow users to be very productive without having to enter data. The entire tablet screen is touch-sensitive, allowing users to type on a virtual keyboard and using a finger as a mouse pointer.

Tablet computers are mostly designed for consuming media, and they are optimized for tasks like web browsing, watching videos, reading e-books, and playing games. The accelerometer and
gyroscope (also found on smartphones) also give the tablet a strong functional difference (position and motion) from PCs or laptops. As tablets are optimized for Internet use, they have built-in Wi-Fi. Purchase of a 3G or 4G data plan allows users to access the Internet from almost anywhere.

1.2.2 Mobile devices and applications sit within a mobile ecosystem

Using the concept of food webs from ecology, where in a natural ecosystem, the eating relationships among different animals and plants construct food webs, the OS industry can be seen as an ecosystem in which profits are generated and consumed among different participants, just as energies are generated and consumed among different species in a real ecosystem (Lin and Ye, 2009).

The term “business ecosystem” first used by Moore (1998) to describe and extended system of mutually supportive organisations, while Gossain and Kandiah (1998, p.29) further defined the concept by recognising the importance of “creating value for customers through the provision of additional information, goods, and services and the use of the Internet and other enabling technologies”. The conceptualisation of the mobile business market as a linear, one dimensional supply chain process is therefore inadequate and has led to the study of these contexts as value networks [i.e. ecosystems] (Li and Whalley, 2002, p462; Peppard and Rylander, 2006, p14; Basole and Karla, 2011, p5).

The mobile ecosystem is rapidly transforming and new relations and affiliations are continuously formed (Basole, 2009, p147). Strategic and economic implications for players in this space are huge, and the relentless furious pace of transformation and
consumer demands has led to close collaboration of key complementary players, for example, Apple and third party developers.

The success of smart mobile devices has in turn led to an intense battle between mobile OS platform providers, each looking for ways to become the system of choice for mobile device manufacturers, mobile network operators, and mobile application developers and customers (Calem, 2010, p.18). New leaders have emerged as the result of a convergence of telecommunications, computing, and mobile computing which has led to a clash of business models. This battle of the network mobile platform has resulted in the emergence of two dominant players, Apple iOS and Google Android; other players are working hard to catch up.

Basole and Karla (2011) identify four key players in the ecosystem, namely:

1) Mobile device manufacturers; e.g. Samsung, Apple, HTC
2) Mobile network operators, e.g. Vodafone, EE, Orange
3) Mobile application developers, e.g. Compsort, Apptology, The App Business
4) Mobile platform providers, e.g. Apple, Android, Windows

Additional players that are also important components of the ecosystem:

5) Mobile infrastructure components, e.g. App store, Intel chips
6) Mobile application services, e.g. Calendar, email, maps, Internet browser
7) Mobile Content Providers, e.g. Penguin Books, Atlantic Records, MGM
CHAPTER ONE: OVERVIEW OF THE RESEARCH

All seven are involved in the building, design, and distribution of handsets, software, hardware, mobile networks and content associated with mobile devices [Appendix One illustrates the players in the Apple ecosystem].

The app stores, tied to their respective platforms, have been a key driver to the rapid transformation of value creation and delivery in the mobile ecosystem. App stores tend to be the primary gateway for end-users to mobile applications and content. The apps store can be viewed as an enabler for ecosystem participants to collaborate and offer their services for a particular platform. Consequently, platform app stores will play a critical role in the future development of business strategy and mobile marketing.

1.2.3 Defining mobile marketing

Understanding of what is meant by the term mobile marketing remains largely device centric. This is clearly observed in the Mobile Marketing Association (2009) definition of mobile marketing is “a set of practices that enables organisations to communicate and engage with their audience in an interactive and relevant manner through any mobile device or network”. This definition implies a ‘one way’ communication from the organisation to the audience and fails to encapsulate the other key aspects of what marketing on smart mobile devices represents today:

1) Ubiquity – adoption and number of smart mobile devices is dominant
2) Multi-way communication. (Firm to device, device to firm, device to device),
3) Constant connectivity – ‘always on’. (Acknowledges the mobile ecosystem, the u-space and the always on nature of a mobile device),

4) Marketing activity. (A general term that remains ‘open’ and therefore more embracing of on-going developments in marketing)

5) Personal mobile device. (Acknowledges the very uniquely personal software design and settings of a user’s mobile device).

Shankar and Balasubramanian (2009, p. 118), define mobile marketing as “the two-way or multi-way communication and promotion of an offer between a firm and its customers using a mobile medium, device, or technology. Because it involves two-way or multi-way communication, mobile marketing is primarily interactive in nature, and could include mobile advertising, promotion, customer support, and other relationship-building activities”.

Defining mobile marketing as “any marketing activity conducted through a ubiquitous network to which consumers are constantly connected using a personal mobile device” Kaplan (2012, p. 130) addresses this aspect of ubiquity. This definition succinctly describes the key aspects of what mobile marketing now represents with the advent of a smart mobile device.

1.2.4 Relevance for researchers

Marketing professionals continuously adjust their strategy and tactics to efficiently match their consumers’ evolving behaviour and habits (Lamarre, Galarneau and Boeck, 2012). Smart mobile devices present significant advantages over other marketing
channels such as TV, radio, print and the Internet. The devices are highly interactive providing multi-way communication, are always-on affording continuous access to the customer regardless of temporal and spatial constraints. These distinctive and powerful advantages make it one of the most dynamic, effective and personal mediums for marketing (Yaniv, 2008).

The relevance of mobile apps for researchers, beyond the significance for companies and players in the mobile ecosystem can be explained from a number of significant perspectives. Due to the nature of mobile apps and the ecosystem they inhabit, disciplines such as business, management, marketing, information technology and information systems have been drawn on.

**Studying business models and strategy**

More than just another marketing channel, the mobile channel has morphed into the ultimate marketing vehicle, which enables business entities to establish a pervasive two-way [multi-way] electronic presence alongside their customers anytime, anywhere (Varnali and Toker, 2010). “As the mobile environment continues to grow it is crucial for researchers and practitioners to better understand how mobile business can create value for organisations” (Picto, Belanger, and Palma-dos-Reis, 2014). Understanding of business models enables firms to drive innovation and develop relationships with customers that are more profitable, and as a result allow them to survive in the continuously evolving global economy (Afuah and Tucci, 2003; Amit and Zott, 2001).

Kourouthanassis and Grorgiadis (2014) identify that because of factors such as location, time, task and service are inherently
coexistent, the mobile user exhibits more complex behaviour than the typical Internet user. Users have access to a plethora of applications that integrate various functions in various ways to offer a uniquely customizable services experience.

Osterwalder and Pigneur (2002) note that as new business models are emerging, the importance of business models for managers also makes it essential for researchers to study and define them, since an understanding of business models forms the foundation of many management tools that are developed by researchers to help managers react to changing business dynamics. “With a better understanding of the drivers of mobile device and service adoption, and the role of mobile marketing in customer decision making, marketers can develop a more effective mobile marketing strategy” (Shankar and Balasubramanian, 2009, p.124).

**Ubiquity**

Smartphones have surpassed feature phones sales (Gartner, 2014); ‘in the UK (and US, and other countries), smartphones are approaching "saturation" - the point where there are no new users to be converted to using them’ (Arthur, 2014), and tablets are forecast to outsell desktop PC’s and laptops by the end of 2015 (IDC, 2013). The take-up of apps has exploded. In June 2014, Apple announced that the iOS App Store had reached more than 1.2 million applications (Apple, 2014). Appbrain.com states that in August 2014, rival Google has 1,334,178 Android apps in the market, while CNET.com reports that as of August 2014, Windows phone store hits more than 300,000 apps (CNET, 2014).

The number of apps and categories used in the App stores indicates and confirms a huge scale of innovation has occurred in
various mobile service sectors, such as content services (e.g. e-book, news) and traditional offline services (e.g. banking, healthcare) (Murray et al. 2010, Kim et al. 2014). Companies now deliver via mobile apps a wide range of services and business activities that include: e-mail, social networking, video streaming, and location based services in order to secure a competitive edge in the mobile service marketplace (Wang, Lin and Luarn, 2006; Murray et al. 2010). Support for these types of app services requires support from the mobile ecosystem particularly, 3G/4G and Wi-Fi access. Perpetual access to information, wherever an individual might be, is a central component of U-commerce [described in detail in the next section], so ubiquity not only includes the proliferation of devices and apps but also the pervasive ability to access and augment information in the u-space.

The role of mobile marketing in customer decision-making is becoming more pronounced. The proliferation of devices and opportunities presented by apps give marketers new ways to deliver messages that are less one-to-many, but more strongly one-to-one marketing, which can present challenges for marketers and the firm. The value of smartphones and mobile apps to the future growth and profits of all players in the mobile ecosystem is significant (Kim et al. 2013).

**Impact of smart mobile devices and apps on society**

Smart mobile devices and applications are changing the way consumers behave and firms operate. These devices have made communication routine and convenient whether business related or personal in nature. Files can be sent across the globe virtually instantaneously, or approvals for vital decision can be made
ensuring that business is addressed when it is critical. Collaboration with colleagues can happen in real-time virtually anywhere in the world.

Smart mobile technology has given voice to those previously cut off from the world. Voice, text, images and the ability to share these instantaneously, has bought real change politically, socially, and commercially.

The full extent of the impact that mobile apps (and smart mobile devices) have on society may be too soon to fully comprehend. The explosive growth of smart mobile devices and apps has exposed firms and users to significant risks. Studying mobile apps can provide implications for mobile ecosystem participants such as service providers, app developers, mobile network operators, device manufacturers, marketers and policy makers (Kim et al. 2014).

Company risk associated with smart mobile device and apps can centre on security and privacy threats to company information. While increased connectivity can deliver business benefits, roughly one in five cell [mobile device] owners say that their phone has made it at least somewhat harder to forget about work at home or on the weekends (Smith, 2012); which could potentially hinder performance and morale in the longer term.

Due to multi-way communication, firms can engage the consumer at every stage of the purchase process by delivering the right message to the right person at the right time. Among the required elements in creating targeted and personalized experiences is consumer data, especially the type associated with the prospect’s use of mobile devices — such as location, identity and social network. The collection and use of this data creates marketing risks. Firms are always just one poorly timed message
away from damaging whatever brand equity they have earned (Gartner, 2013). The intimacy of mobile provides firms access to a wealth of information about how customers or prospects view a brand or product, and what their past behaviour has been. However, such a personal form of media can result in unwanted messaging being interpreted as an invasion of privacy.

Mobile technologies give consumers a powerful amplifier to share their individual views. When mobile combines with social dialogues, added layers of immediacy and convenience are added to the interaction, which can present significant risk. Interaction can be for good views and news or bad news and views (Gartner, 2013). The sheer pervasiveness of smart mobile devices among consumers combined with their communication capability means that marketers must be careful to exercise mobile marketing techniques with care, sensitivity and responsibility.

Aside from behaviour impacts of mobile phones, such as addictive and stress related behaviours in children and safety issues (e.g. use of mobile devices in cars, for example), the risk for consumers can be equally great. The specific benefits inherent in mobile devices and apps also pose risks with regards to privacy and security of personal information. Mobile marketing is device/technology dependent that allows identification of individual users and it has high penetration rates, especially among minors (Varnali and Toker, 2010). Development of regulations for mobile consumer policy lags behind the pace of technological development in mobile context.

Not everyone regards privacy in the same way (Malhotra, Kim and Agarwal, 2004). The concerns about privacy are virtually irrelevant for today’s teenagers (Stuart, 2012), who trade utility
(value) for privacy. Despite the unique benefits of mobile services, overcoming trust issues with regards to security is a major obstacle in the adoption of mobile services and development of m-loyalty. Many consumers feel uncomfortable with the idea of conducting commerce and sharing personal information over wireless, handheld devices (Vanali and Toker, 2010).

1.2.5 Past Research on Mobile Marketing

Classification

The mobile marketing channel involving mobile devices and applications is growing rapidly in the multichannel environment (Neslin and Shankar, 2009; Shankar and Balasubramanian, 2009). Various authors have examined the subject and defined categories of enquiry. However, since their launch in July 2008, apps have become highly integrated with mobile marketing, they have significantly changed many aspects of the topic, therefore the main focus of this thesis stems predominantly from 2008. Before this significant turning point, Ngai and Gunasekaran (2007) considered the relevance of the mobile commerce in the literature, the 136 articles are categorized into five key areas:

1) Mobile commerce applications (not software apps) and cases.
   (location-based services, advertising, entertainment, financial applications, product location and search, wireless engineering and m-commerce in individual companies or industries or countries)
2) Wireless user infrastructure.
   (mobile interfaces, and handheld devices)
3) Mobile middleware.
   (Agent technologies, database management, security issues, wireless and mobile communications systems, wireless and mobile protocols).

4) Wireless network infrastructure.
   (Networking requirements, wireless and mobile network)

5) Mobile commerce theory and research.
   (Development of m-commerce applications and guidelines, behavioural issues, economics, strategy and business models. Legal and Ethical issues, overview, context and usage).

The subject area was further refined and considered by Shankar and Balasubramanian (2009) by looking at mobile marketing and summarising the key issues as:

1) Customer adoption of mobile devices and services
2) The impact of mobile marketing on customer preferences and decision-making
3) Mobile marketing strategy formulation and choice of mobile marketing methods
4) Mobile marketing in the global context.

Varnali and Tokers’ (2010) classification framework for mobile marketing research encapsulates all of the key issues proposed by Ngai and Gunasekaran (2007), and presents them in a clearer format (Figure 1.2).

Varnali and Toker (2010) classify 255 articles, and under the category of strategy (73 articles) as those that focus on ‘design issues in mobile business models, identification of the extended structure of the mobile value chain, revenue increasing models for mobile marketing, firm-level adoption of mobile technologies,
effectiveness of cross-media integration, and critical success factors and effectiveness of mobile marketing campaigns in stimulating consumer response and as a brand vehicle’.

**Figure 1.2:** Classification framework for mobile marketing research. Adapted from Varnali and Toker (2010)

Mobile marketing is further refined in a literature review authored by Strom, Vendel and Bredican (2014), that looks at the value of mobile marketing for consumers and retailers. The paper is the first paper presented in chapter two of this thesis, and gives a detailed analysis of the retail industry and covering 64 empirical studies that are categorised in the following research themes:

1) Mobile device shoppers
2) Consumer perceived value benefits
3) Improved value of mobile marketing
4) Realising potential value in mobile.
Mobile Marketing Theory

There are a number of well-established and recognised theoretical contributions that co-exist in the innovation acceptance and adoption literature. One avenue of research focuses on acceptance and adoption of innovation at an individual and societal level (Compeau and Higgins; Davis et al. 1989), other streams focus on implementation success at an organisation level (Leonard-Barton and Deschamps, 1988). Behavioural theories are referred to in the first paper presented in this thesis.

The models relate to consumer mobile marketing adoption and include the Technology Acceptance Model (TAM) (Davis, 1989), a widely acknowledged theory that models how users come to accept and use a technology. Ease of use and usefulness are key dimensions of TAM, a model that originates from the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980). The Theory of Planned behaviour (TRB) extends TRA by adding a third construct; Perceived Behavioural Control. This construct is a combination of perceived self-efficacy (i.e. people’s belief about their capabilities to exercise control over their lives) and controllability (i.e. situational factors that allow or restrict individuals from performing certain behaviour (Ajzen, 1991). The task-technology fit model (Goodhue and Thompson, 1995) advocates that only a sufficient match between the technology utilized and the tasks it supports will positively impact performance. [Appendix Two has a more detailed discussion].

However, theory development is now investigating networked systems, and U-commerce theory best explains the combined influence and impact of mobile devices, applications, networked mobile ecosystems and their effect on society and business. U-
commerce theory is detailed below as it is used extensively for papers three, four and five, as it is more broad in its scope and provides the major theoretical lens for this thesis.

**U-commerce Theory: The u-space construct**

Noting the increased prevalence of networks of all kinds, and in all aspects of personal and business life, Watson et al. (2002), coined the term “U-commerce” (or Über-Commerce, can be referred to as ultimate commerce, or the u-space) to provide a theoretical framework for understanding the effects of networks on society and business. However, it has been noted that several authors also (inaccurately) refer to U-commerce as ubiquitous commerce, and this is probably a result of identifying the most influential element in the theory namely ubiquity.

The theory suggests that while “e-commerce” (or, electronic commerce) describes an incremental shift in consumption and distribution methods, it does not capture the essence of our networked environments. Rather, e-commerce simply categorizes a form of traditional economic exchange that occurs over the Internet; it is not a new form of exchange in and of itself, but rather a new platform for exchange. e-commerce is centred on the replacement or enhancement of brick-and-mortar retail stores with web-based or web-assisted stores where consumers pay for goods online and then retailers ship goods to a delivery location (home, office, local office, etc).

In contrast, however, the U-commerce theory expands the boundaries of economic exchange to include all forms of value exchange between organization, the customer, consumer and other stakeholders in addition to exchanging money for goods or services
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for example, the exchange of documents and processes to coordinate activities. The network-driven firm understands that networks are both a means of increasing efficiency (e.g. lowering transaction costs) and effectiveness (e.g. adding value to customers) and that the firm’s future is shaped symbiotically by the interplay of strategic thinking and network technology advances (Watson et al. 2002). It also takes into account “every conceivable form of computer- or network-driven technology” (Watson et al. 2004, p.40). The theory strongly supports a practitioner view of “mobile ecosystem”.

There are two specific points of differentiation between U-commerce and e-commerce. Firstly, within U-commerce, time, data and information factor in as central currencies of value and exchange. Secondly, such exchanges exist continuously. Where e-commerce is based on discrete transactions between (generally) two parties, U-commerce is based on the perpetual ebb and flow of information and resources between and through the networked ecosystem, along all possible connections of consumers, firms and information sources. U-commerce as defined by Watson, et al (2002, p.336) as “the use of ubiquitous networks to support personalized and uninterrupted communications and transactions between a firm and its various stakeholders to provide a level of value over, above and beyond traditional commerce”.

U-commerce has four defining characteristics, referred to as the “4 Us”: ubiquity, uniqueness, unison and universality. It is important to note is that, given the level of integration of technology used in U-commerce, the dimensions of the 4 Us are not necessarily mutually exclusive. In most cases there will be
considerable overlap among dimensions, and the distinctions between dimensions are theoretical.

**Ubiquity**

The first U, Ubiquity, incorporates the idea of accessibility, reachability and portability into one construct. Ubiquity is the drive to have access to information unconstrained by time and space” (Junglas and Watson, 2006, p.578). Perpetual access to information, wherever an individual might be, is a central component of U-commerce. Telecommunications infrastructures that support the networked smartphone – GSM, 3G, 4G LTE, Wi-Fi – are virtually pervasive in most developed nations, if globally.

**Uniqueness**

Uniqueness is “the drive to know precisely the characteristics and location of a person or entity” (Junglas and Watson, 2006, p.579). The delivery or distribution of customized, individualized information to or from the individual allows the user to access and generate much more meaningful information than a static, generic interface would allow.

**Universality**

The goal of universality is “the drive to overcome the friction of market with a limited information systems’ incompatibilities” (Junglas and Watson, 2006, p.580). In the name of efficiency and ease, users generally want fewer devices with more functionality. A single device such as a smartphone has a high level of integrated functionality such that it may serve as a phone, web browser, music player, PDA, camera, Global Positioning System (GPS), and so forth.
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*Unison*

Unison, “the drive for information consistency” independent of access point or time (Junglas and Watson, 2006, p.580). Compounding the first principle of Ubiquity, consumers here want synchronicity between their smartphone, personal computer, tablet computer, and web-based access points across relevant sources of information such as calendars, documents, lists of contacts or emails, rather than uncoordinated, conflicting or out-of-date information from multiple points of access. Unison refers to consistently synchronized access to the user’s data in an interactive way (i.e., the ability to both pull data from the server to the device and push data to the server), where information gathering is often coupled with a sense of timeliness and conflicting information is generally seen as inefficiency.

According to Zang and Liu (2011) U-commerce theory is still regarded as an emerging research area but has attracted some criticism. McGuigan and Manzerolle (2014 p.6) identify assumptions and biases that underpin U-commerce theory. “Assumptions underpinning Universality depend on the dubious assumptions that (1) capitalist modes of consumption jibe with conceptual systems, or routes of culture, globally and (2) historical and power-laden institutions allow equal marketplace freedoms. Universality imagines away the role of the state”. However, tax policy, labour laws, and environmental protection vary regionally, and thus encourage unequal concentrations of wealth, waste, and exploitation (Maxwell and Miller, 2012).

U-commerce theory tends to promote an idealised state that is seamless and natural. However, McGuigan and Manzerolle (2014), note that while aspects of this idealised state or prospective reality
are, to a certain extent being realised, the path is mediated by laws and contracts, international trade agreements, and formal and informal regulatory bodies such as the International Monetary Fund, the World Bank, the International Telecommunication Union, the Internet Corporation for Assigned Names and Numbers, the Internet Engineering Task Force, GS1 (responsible for barcode and supply chain standards), and the Industrial Internet Consortium (see DeNardis, 2012: p.723; Mansell, 2012: p.158). The prospective reality depicted in U-commerce literature depends on complex technical and administrative infrastructures (DeNardis, 2012). Technical infrastructures refer to the capacities of hardware and software systems; while administrative infrastructures describes networks of personal, corporate, state, and supranational relations and information flows that coordinate commerce as a social process.

Similarly, note McGuigan and Manzerolle, the expansion of networked computing technology for facilitating ubiquitous commercial exchange at once arises from the particular concerns of market-oriented societies and influences political–economic organization. As noted above, development and deployment of technology is approaching conditions in which digital capital can be transferred universally, ubiquitously, and immediately. Exploiting optimum, “frictionless” routes for financial efficiency directs investment unevenly around the globe; yet fulfilment of this marketing logic still requires physical transportation of goods. Unlike digital flows, manufacturing of ideas and devices is not borderless: it entails bodies in space conforming to local laws and cultural standards of production and consumption. Ever more complicated routing requires tools and techniques of logistical
control and human labour to build material infrastructures. With sectors concentrated differentially by region, value is realized unequally across places, and imbalances are exacerbated (McGuigan and Manzerolle, 2011).

U-commerce has gained traction in the management; marketing and information systems literature and the avenues that are being explored include further refinement of the constructs (Junglas and Watson, 2006), innovation and business opportunities (Wu and Hisa, 2008), business leadership and entrepreneur challenges (Galanxhi and Nah, 2004; Leong, 2005).

The application of U-commerce in tourism (Watson et al. 2004) and retail (Keegan, O’Hare and O’Grady, 2008) are a more specialised focus, and the paper “iMedical: Integrating smartphones into medical practice design” and “Smart Dental Practice: Capitalising on Smart Mobile Technology” that are a component of this thesis are a further contribution.

**Mobile marketing: user perspective research**

In many cases, apps provide opportunities for the user to synchronize (upload and/or download) their own data with other users, with centralized databases or with other personal devices such as Tablets or personal computers. This phenomenon of the user-generated information system (UGIS) is nascent, enabled by inexpensive, powerful, and ubiquitous devices connected to each other via global networks (DesAutels, 2011).

What’s more, recent advances in mobile search, personalization, recommendation and Artificial Intelligence (AI) make it possible and plausible for people to think of their mobile devices as smart personal assistants. The device is equipped with an app that has the
capability to converse with the user (the software understands natural language, not key words) and an inbuilt ability to know what each of us will appreciate (because they infer from digital clues such as our browsing patterns and past purchases). The highly personalised and interactive ability of smart mobile device applications can be seen as an extension of our selves. “Value lies in the ability of the product to connect us to others” (Hearn and Pace, 2006 p.60).

Value, from a user perspective, can be defined as the benefits offered by the product or service compared to customer sacrifices for acquisition and use of the product and service relative to the competition (de Chernatony, Harris and Dall’Olmo Riley, 2000; Ulaga, 2003; Walter, Ritter and Gemunden, 2001; Zeithaml, 1988), and differs based on consumer product experiences (Parasuraman, 1997). Perceived value affects acceptance and use of mobile technology, services and marketing and loyalty to mobile services and marketing. In several studies related to mobile marketing value for consumers, perceived value was not explicitly measured. But the majority of the studies measured components of benefits and sacrifices.

Benefits such as utilitarian, emotional, hedonic, social and monetary value have been confirmed by several studies (Bruner and Kumar, 2005; Nysveen, Pedersen and Berthon, 2005). For mobile services perceived values varied based on situational value and novelty value. Situational value affected utilitarian, emotional, social and monetary value, while novelty value only affected emotional and social value for both information and entertainment services, and monetary value for information services (Pilström and Brusch, 2008).
In this early stage of mobile marketing implementation, the perceived values and benefits of mobile marketing may affect brand positioning according to the results of Okazaki, Katsukura and Nishiyama (2007). While Yen (2012) found that perceived values, including utilitarian value, social value and hedonic value, positively influence customer loyalty and the mediation of customer satisfaction is also significant.

In comparing mobile devices to a PC, mobile devices users acknowledge the primary benefits of convenience (time and location flexibility) companionship, and efficiency compared to a PC. Mobile Internet functions as a complementary media to fixed Internet in high involvement situations, while mobile Internet functioned as a substitute in lower involvement situations (Strom, Vendel, and Bredican, 2014).

**Mobile marketing: The firm and marketing perspective**

The development of the app and app store has been a significant catalyst to the ‘morphing’ of mobile marketing into a very powerful ubiquitous vehicle, as the app combined with the mobile ecosystem has provided unprecedented opportunities in building and fostering customer relationships, and has accelerated mobile advertising. Mobile marketing is a technological frontier and is an attractive area for research because of its rapid growth and potential applications (Ngai and Gunasekaran, 2007; Sadeh, 2002).

The literature points to a shift from value chain to value network. Hearn and Pace (2006 p.59), state that the model ‘is a dynamic and multi-directional cluster of networks’. Activities are improved as mobile networks cut across institutional boundaries and thus facilitate the rapid transfer of information putting people in direct
contact with each other. Networks can create, manipulate and synthesise information, and as the cost of information production is independent of its scale of use, this suggests increasing returns to the use of information.

The mobile industry has consequently been described as a complex system with numerous inter-firm relationships across multiple segments (Basole, 2009; Rosenkopf and Padula, 2008). Within this system, mobile marketing has been indicated to improve consumer communications, service interactions resulting in improved output value via transaction-based results (foot traffic to firms and sales), and brand relationship results in brand awareness, associations, attitudes, purchase intentions and loyalty and potentially higher margins (Strom, Vendel and Bredican, 2014).

Studies based on a firm perspective were focusing on mobile marketing as an advertising tool except for Lee, Cheng and Cheng (2007), who regarded mobile marketing as a tool for front-line staff improving person-to-person interactions between insurance agents and consumers, defined as internal mobile marketing. Another exception was Nysveen, Pedersen and Berthon (2005) focusing on the mobile channel as a tool to improve consumer relationships to brands.

If consumers’ post purchase interactions with purchased brands are a contact point of increasing importance this can strengthen the consumer and brand relationship, thus mobile marketing may become an important tool for consumers supporting such interactions. Additionally should loyalty spur consumers to participate in viral mobile marketing; the viral effects may serve as one out of several indicators of consumer loyalty. The viral effects
may also result in increased branding and sales, both decreasing contact costs, while the willingness of receivers to access viral content is higher than for firms’ mobile push advertising (Strom, Vendel and Bredican, 2014)

There is a knowledge gap covering firms’ adoption, implementation of best-demonstrated practice and effects of in-store and post-purchase mobile marketing. A firms adoption and use of mobile advertising services differed by how they perceived benefits and value, and differences in user’s participation in value co-creation: the more the users participated the more value they seemed to perceive (Komulainen et al. 2007). Multinational companies using mobile advertising produced similar results (Okazaki, 2005). Firms’ perceptions of how improved outcome value could be achieved by mobile advertising came from the use of location-based marketing supporting the branding strategy. This is dependent on facilitating conditions and is restrained by security or privacy issues and costs (Okazaki, 2005, Okazaki and Taylor, 2008). Studies of acceptance and use of mobile marketing from an organizational perspective were based on the organisational adoption model (Rogers, 1995) perceived value models for B2B services (Lapierre, 1997), and task-technology fit models for frontline personal use (Goodhue and Thompson, 1995). The analysis of consumer perceived value confirm that mobile marketing supports consumer processes as pre-purchase, service interactions and sales in mobile channels.

Lee et al. (2007) found mobile devices to be a suitable tool for insurance staff, providing a good fit for the insurance tasks involving customer/consumer interactions. Mobile devices provided high level of assistance to post-contract customer
services, followed by recruiting new insurance contracts and tax and legal information services. The insurance agents could access timely information and locate the needed data to perform their tasks. Based on these results the potential values of mobile marketing for retail front-line staff are related to their increasing efficiency and effectiveness in service interactions, increasing work capacity and quality, by increasing capacity to match consumer needs and providing information services about products and product use. With the same logic in-store mobile marketing to self-service consumers may increase effectiveness and efficiency of service interactions, limiting the need for staff interactions while still completing transactions of high-perceived value.

Several studies covered mobile advertising effectiveness, the outcome value of marketing activities in the value chain, mobile push advertising (Kondo and Nakahara, 2007; Merisavo et al. 2006; Nysveen, Pedersen and Berthon, 2005; Rettie, Grandcolas and Deakins, 2005; Yeh and Lin, 2010), mobile pull advertising (Bellman et al. 2011; Kim and Jun, 2008; Li and Stoller, 2007), and cross-media effects of mobile push and Internet pull advertising (Wang, 2007). Results indicated improved outcome value, requirements (consumer characteristics, choice of communication appeal and endorser, choice of mobile application design style) for realizing these values and a few indications of relative improved outcome value of mobile advertising. By adding mobile marketing, firms may increase loyalty, as the higher interactivity and media richness were more effective in creating category and branding effects.
1.3 Development of research questions

The academic papers that make up the core of this thesis were developed through the realisation that smart mobile devices, apps and the associated mobile ecosystems are a developing phenomenon, having only existed since 2008. The academic literature spans various journals in a number of disciplines including: marketing, management, information systems and technology, business, engineering, finance, operations and healthcare.

Development of knowledge.

Reviewing existing literature can bring together seemingly fragmented research to synthesise the existing findings into a coherent picture. A lack of published reviews in a field can impede the progress, so review papers are critical to pushing a field of study forward (Zhang and Liu, 2011).

Thought leaders in the literature have acknowledged that the ubiquitous nature of mobile services may change the paradigm of marketing, especially in retailing (Shankar and Balasubramanian 2009; Shankar et al. 2010; Okazaki and Mendez (2013). Mobile marketing has the potential to change the paradigm of retailing from one based on consumers entering the retailing environment to retailers entering the consumer’s environment through anytime, anywhere mobile devices (Shankar et al. 2010).

Although the literature on mobile marketing and mobile apps is accumulating, the stream of research is still in the development stage (Varnali and Toker, 2010). A number of classification and reviews in the wider topic area have been published including:
Zhan and Liu on U-commerce (2011), Shankar and Balsubramanian (2009), Varnali and Toker, (2010) have presented reviews on mobile marketing, and Kourouthanassis and Georgiadis (2014) on m-commerce, while Shankar et al. (2010) considered the retail environment. The issues and the research questions discussed in classification and review articles can help identify some of the challenges that are becoming pertinent to both academics and managers (Bolton and Saxena-Iyer, 2009). Given the explosion of mobile apps and their impact on retail marketing review articles can help develop and complement related research.

**Applications of U-commerce**

Research on U-commerce is still an emerging research area and has attracted the attention of both practitioners and academics (Zhang and Liu, 2011). Zhang and Liu acknowledge that more attention needs to be paid to U-commerce economics, strategies and business models, and the business mode is a very important research issue. Osterwalder and Pigneur (2002) note that as new business models are emerging, the importance of business models for managers also makes it essential for researchers to study and define them, since an understanding of business models forms the foundation of many management tools that are developed by researchers to help managers react to changing business dynamics.

In the area of industry applications of U-commerce, Zhang and Liu (2011) found that academic research mainly concentrates on tourism and health, however, developing an understanding of how U-commerce can be used to examine mobile apps from an application perspective remains largely unexplored. Understanding value added uses and success factors to increase consumer
acceptance of them are the kinds of publications that “not only contribute to the development of a richer knowledge base but they also expand the horizon for the mobile marketing research stream by offering innovative consumer-centric solutions packages as mobile marketing tools”. (Varnali and Toker, 2010. P.147). “It is urgent to provide better services to users and develop technologies integration, which is based on good business mode” (Zhang and Liu, 2011 p.53).

Organisational Perspective

In a time of a rapidly expanding mobile environment, it is crucial for researchers and practitioners to better understand how mobile business can create value for organisations. However, it is not yet clear how mobility can affect firms, or what are the implications of mobile technology at the organisational level (Picto, Belanger and Palma-dos-Reis, 2014). Firms making mobile business investment decisions need to consider the value creation of m-business (Basole, 2005; Peltomaki, Hallikainen and Tuunainen, 2009).

Furthermore, there is presently no unified view of how companies can leverage the potential value of m-business and no empirical research regarding the development of successful m-business strategies (Barnes and Scornavacca, 2006; Ngai and Gunsekaran; 2007, Wen-Jang, 2007). On a smart mobile device, in the networked mobile ecosystem, apps are the interface and as such are a key source of value creation.

Mobile users obtain “mobile value” created through the use of mobile services containing Internet content and services (Anckar and D’Incau 2002; Hur, Yoo and Chung, 2012). Mobile services differ from traditional services and e-commerce in their ability to
provide access to information, communication, and services independent of time and place (Mallat et al. (2009). Several studies have identified mobile service values such as ubiquity, time-criticality, spontaneity or immediacy, accessibility, convenience, localisation and personalisation (Ankar and D’Incau 2002; Clarke, 2001; Vanali and Toker, 2010) which are focussed on the unique features of mobile technology.

However, mobile service value can be understood in terms of the offering consumed and experienced by users in the context of the motivations for, or purpose of, consumption (Park and SuJin, 2006). Understanding a goods or services value from the perspective of users has long been recognized as a primary element of a customer-oriented strategy (Desarbo et al. 2001).

Differentiation of smart mobile devices is increasing but how user’s perceptions of these devices differ according to size and convenience is virtually unknown. This type of differentiation among portable devices is expected to be of emergent importance (Okazaki and Mendez, 2013). Advances in the design and usability of smart mobile devices, proliferation of different sizes together with increasingly competitive pricing can all be expected to create greater business needs and opportunities. Therefore developing an understanding of the drivers of mobile device and service adoption, and the role of mobile marketing in customer decision-making, allows marketers to develop a more effective mobile marketing strategy (Shankar and Balasubramanian, 2009, p.124).

Smart mobile devices and applications are changing the way consumers behave and firms operate. What we think and talk about as ‘mobile marketing’ reflects an old paradigm, it will become redundant, as it will be the default communication tool. Unlike a
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TV or computer that you switch on and off when you want to use it, or a book that you can open to read and then close, the smartphone is always on, within close proximity with the user (Stuart, 2012) and smart mobile devices have a high degree of personalisation that makes the product unique to the user (Thorsteinsson and Page, 2014).

Marketers should be thinking about ‘ubiquitous marketing’. A failure to fully understand ubiquitous marketing and how best to develop and deploy a mobile app that fully leverages the specific benefits of mobile devices and applications limits marketing opportunities. To improve our understanding of the phenomenon, the central research problem has been formulated as follows:

Research Problem: In a constantly connected environment, how do apps change marketing (and vice versa) to create ‘ubiquitous’ marketing?

The research problem is used to develop six research questions that are explored through four discrete published peer-reviewed academic journal articles. U-commerce theory provides the theoretical lens to conceptualise the ubiquitous marketing phenomenon.
1.3.1 Formulation of research paper one

Title: Mobile Marketing: The value for consumers and retailers; a literature review.


According to Mobiforge.com (2012), four out of five US smartphone owners, use their phone to help with shopping, with 70% using the phone in store. Clearly, value is created for both the consumer and the retailer in this interaction. Understanding the customer is critical to marketing strategy. “The marketing concept is the philosophy that for firms to achieve organizational goals it must be more effective than competitors in creating, delivering, and communicating superior customer value to target markets”. However the holistic marketing concept is based on the development, design, and implementation of marketing programs, processes, and activities that recognize their breadth and interdependencies. Holistic marketing acknowledges that everything matters in marketing—and that a broad, integrated perspective is often necessary (Kotler and Keller, 2012, p.18).

Therefore, the initial paper for this research looks to take an integrated approach to mobile marketing by using a contextual setting (retail) and looking at both consumers, “who are mobile device shoppers?” and the firm, “what is the value of mobile marketing for retailers?”

Research Question One:
“What is the value of mobile marketing for retail consumers and retailers?”
The purpose of this study is to describe existing knowledge on how mobile marketing can increase value for consumers and retailers. Value for consumers is assumed to drive adoption, use and loyalty to retailers’ mobile marketing applications and recruitment and loyalty to the firm. These factors create the foundation of competitiveness for retailers (Porter, 1985).

From this analysis as a secondary question is addressed - how can the potential of mobile marketing be realised by retailers? The article enables more precise research and development of managerial concepts and tools while providing both managers and academics with increased understanding of mobile marketing and its value outcomes for retailers. This paper provided the focus of areas for follow-up papers.
1.3.2 Formulation of research paper two

Title: Applications - Idea sourcing, and app development: Implications for firms.


The available knowledge on how and where mobile device applications are being developed within a business is scant; no papers have been found in this area.

Kangas and Kinnunen (2005), state that opportunities for app development are increasing. The Internet abounds with advice on developing mobile apps and the tightening economic climate encourages entrepreneurs to develop mobile apps (Kirk and Rouge, 2011). Thus there are many firms offering app development services. Bernoff and Schadler (2010) encourage firms to empower employees to provide the solutions to customer problems using the technologies used by these customers. As referenced previously, Shankar and Balasubramanian (2009), identify that there is a strong avenue for enquiry regarding how a firm’s mobile strategy meshes with the firm’s overall marketing strategy. Mobile apps are a popular and powerful marketing method but how are they being developed in firms? – particularly concerning the formulation of a mobile marketing strategy and choice of mobile marketing methods. U-commerce theory is used as the theoretical framework for insight into development of apps at firm-level.

Consumer behaviour and strategy are succinctly covered in the first research question that examines value creation for the firm and the consumer. The first paper provides a development perspective of mobile marketing in the retail sector, and as a second
step a source perspective is developed to determine how a mobile application is developed and perceived from an organisational perspective by asking:

**Research Question Two:**

“How do firms source their ideas for mobile apps?”

Mobile phones and applications have strong implications for marketing, this exploratory research has focussed on the sources of app ideas with firms, locations for app development and perceptions of app development.
1.3.3 Formulation of research paper three

Title: Tablet computing and apps: a methodology for improved business productivity.

- submitted, under review

It was determined earlier that ubiquitous marketing is a key component of this thesis. With a better understanding of the role of mobile marketing and the influence of apps in customer decision-making, firms are better positioned to develop a more effective ‘ubiquitous’ mobile marketing strategy. Research on what methodology a firm should adopt is still relatively unexplored.

Shankar, O’Driscoll, and Reibstein (2003), proposed a framework for understanding m-business strategies and how to approach investments in new technologies. Shanker and Balsubramanian (2009), note that while a sound mobile marketing strategy pursued with appropriate methods can be effective, they expect that few firms will rely solely on mobile marketing. Rather, mobile marketing may be powerful compliment to other marketing activities.

After a broad scope of mobile marketing has been established, followed by examining firm level operations and the impact of apps, the focus moves to determine what process a firm should take to develop a mobile application. Therefore research question four is formulated as follows:

**Research Question Three:**

“What methodology should a firm adopt for developing apps for a mobile device?”
1.3.4 Formulation of research paper four

Title: Smart Dental Practice: Capitalising on smart mobile technology.


Research question one looked at the value of mobile marketing, while research question two explored where in the firm ideas are sourced for apps, and research question three examined a methodology for developing apps. Combined, these studies give us a good understanding of the value smart mobile devices and apps and how a firm might leverage and maximise their value.

In this study, the focus moves from one of primarily a management and operations perspective to the operationalization of customer management and service. By examining how smart mobile devices and apps are being used within a context deepens the analysis of the subject area from an impact perspective and can develop insight valuable for managers and researchers. Several researchers have suggested that understanding value added uses and success factors increase consumer acceptance of them (Varnali and Toker, 2010).

**Research Question Four:**

“How are smart mobile devices and apps being leveraged to improve customer service, increase operational efficiency and save financial and other resources?”
1.3.5 Formulation of research paper five

Title: **iMedical: Integrating smartphones into medical practice design.**


This study looks more specifically at smartphone devices and apps. The paper examines in more detail firm-customer (in this case, patient) interactions and how they benefit from smart mobile devices and apps.

**Research Question Five:**

“How are smartphones and apps impacting firm operations and firm-customer interactions in a specific field? - a Medical Practice”.

Technological evolution in the customer-facing arena of the medical practice is emerging. Researchers have considered the impact of ‘interactivity’ in the electronic environment as being key to successful on-line marketing (Bezjian-Avery et al. 1998; Deighton, 1996; Hoffman and Novak, 1996; Peppers and Rogers, 1997). Discussion of ‘interactivity’ in mobile has built on electronic commerce (Lee, 2005). However, these studies are primarily centred on users perception and / experience and are device or interface centred.

Technological innovations have impacted the practitioner-patient relationship as patients have easier access to some of the technical medical knowledge (either via PC’s or smart mobile devices) formerly “owned” solely by the practitioner. While one perspective may see the position of the practitioner as authority
figure diminishing as a result, a counter-perspective sees the education of patients as an opportunity to allow practitioners to focus more time and attention on relationship-centred care and experience-based healthcare than simply educating.

The new paradigm of relationship-centred care, where practitioners and patient work together to pursue shared goals with attention to both illness and personal experiences (Makoul, 2001), allows practitioners to realise potential increases in productivity, profitability and efficacy.

This article aims to offer the reader with a number of perspectives on and ways in which smartphones are beginning to make significant changes to how information technology is managed and controlled in medical practice, and how these technological advances can influence the ways medical teams interact with patients.
1.3.6 Formulation of research paper six

Title: App Service: How do consumers perceive the quality of financial service apps on smart devices?


To paraphrase Ted Levitt (1976) – less is more, success derived from providing less service. Research shows that customers involved in and given responsibility for some aspects of the operational processes of a service encounter are actually more satisfied with their experiences, as they feel more ownership of and control over their interactions (for example, Bendapudi and Leone, 2003).

Financial services have shifted over time from physical environments such as bank branches, to automated banking machines at bank branches, to personal computers and laptops, to apps on smart devices that can be used wherever there is a wireless signal. Presumably, the greater control and convenience this progression of technology has occasioned has led to greater customer satisfaction.

Yet there is very little evidence to suggest that customers perceive the quality of service delivered by the apps on their smart devices as better, or even just different, than the quality of service they receive when physically going into a branch of their financial services provider, or when banking online at a computer. The purpose of this paper is to gain preliminary insight into consumer
perceptions of the quality of service delivered by these apps, therefore the research question is defined as follows:

**Research Question Six:**

“How do customers perceive the quality of service they receive on their smartphone or tablet?”
1.3.7 Summary

The research problem is formulated as follows:

**Research Problem:**
In a constantly connected environment, how do apps change marketing (and vice versa) to create ‘ubiquitous’ marketing?

The individual research questions were formulated as follows:

Research question one:
*What is the value of mobile marketing for retail consumers and retailers?*

Research question two:
*How do firms source their ideas for mobile apps?*

Research question three:
*What methodology should a firm adopt for developing apps for a mobile device?*

Research question four:
*How are smart mobile devices and apps being leveraged to improve customer service, increase operational efficiency and save financial and other resources?*

Research question five:
*How are mobile apps impacting firm operations and firm-customer relationships in a specific field? Medical Practice, Healthcare.*

Research question six:
*How do customers perceive the quality of service they receive on their smartphone or tablet?*
The first paper is a literature review and forms the foundation for further papers (see Figure 1.3). This investigation looks at the value of mobile marketing then proceeds to an organisational perspective by examining the genesis of mobile app development in the firm in the second paper.

The third paper continues the contribution from an organisational perspective and looks at how firms can use smart mobile devices by examining tablets in particular. The next two papers study how smart mobile devices and apps are being used by the healthcare sector, and how this impacts firms, managerially, operationally and in terms of customer relationships. The dental and medical practice is examined. Finally, this sixth paper looks at the quality of customer service received on smart devices in the finance sector.

**Figure 1.3: Thesis paper overview**

![Diagram showing the overview of thesis papers]

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1.4 Methodology

1.4.1 Research Philosophy

The position adopted for answering the research question is that of the pragmatist. The research question is investigated using a set of sub-questions and given the complexity and different natures of these questions a multi-method research design has been adopted.

1.4.2 Research Design

Saunders, Lewis and Thornhill (2009) suggest that the classification of research purpose in the research methods’ literature is threefold: exploratory, descriptive and explanatory.

Exploratory study is constructive for finding out ‘what is happening: to seek new insights; to ask questions and to assess phenomena in a new light’ (Robson, 2002 p.59). It is useful if the researcher wishes to clarify understanding of a problem by looking for patterns, ideas or themes. The key advantage of this type of research is that it is flexible and adaptable to change. The objective of descriptive research is to provide accurate profiles of characteristics of certain topics by using measures, and/or determine which proportion of populations, events or situations has these characteristics (Hair et al. 2007). Thirdly, explanatory studies establish causal relationships between variables (Saunders, Lewis and Thornhill, 2009).

To bring together the research on such a broad subject as mobile devices and apps, the research design is exploratory and descriptive. Mobile apps are still a relatively new innovation, and knowledge on the subject is nascent.


1.4.3 Research Method

More than one data collection technique and analysis procedure is used to answer the primary research problem, thus a multiple methods approach is used rather than a mono method such as a qualitative or quantitative research method. A multiple-method approach involves collecting and analysing both forms of data in a single study (Creswell, 2003) and can be further categorised into:

(1) multi-method which involve multiple types of qualitative inquiry (e.g. case study and ethnography) or multiple types of quantitative inquiry (surveys and experiments); and

(2) mixed methods which involve the mixing of the two types of data (qualitative and quantitative), either at the same time (parallel) or sequentially, but does not combine them (Tashakkori and Teddlie, 2002; Saunders, Lewis and Thornhill, 2009; Harrison and Reilly, 2011).

Mixed-method is increasingly advocated within business and management research (Curran and Blackburn, 2001), while Creswell (2003) notes that for the mixed methods researcher, pragmatism opens the door to multiple methods, different worldviews, and different assumptions, as well as to different forms of data collection and analysis. Six, rather varied, research questions that require different techniques and analysis procedures are used to address the primary research problem of this study.

1.4.4 Research Strategy

The pragmatist argument states that the most important determinant of the epistemology, ontology and axiology that is adopted is the research question. Mixed methods, both qualitative
and quantitative, are possible and probably highly appropriate within one study (Saunders, Lewis and Thornhill, 2009).


The paper describes the existing knowledge on how mobile marketing can increase value for consumers and retailers. The a literature review is used to gain a rich understanding of the context of the research in the mobile m-commerce space and enables more precise research and development of managerial concepts and tools.

Paper Two: ‘Smartphone Applications – Idea sourcing and app development: Implications for firms’

The objective of paper two was to analyse the sources of app ideas within firms, locations for app development and perceptions of app development success. A quantitative research because it deploys quantitative measurement and the use of statistical analysis. The exploratory method is mainly focused on finding out ‘what is happening, to seek new insights, to ask questions and to assess phenomena in a new light (Robson, 2002, p.59). Due to its utilisation of single questionnaire and single quantitative data analysis procedure, the method of this research is mono-method (Saunders, Lewis and Thornhill, 2008). This research also describe a particular phenomenon (the location and perception of app development) in a particular short period of time and hence, this is a cross-sectional study that utilises survey strategy (Saunders, Lewis and Thornhill, 2008).

Paper Three: Tablet computing and apps: A methodology for improved business productivity
The paper investigates the unique capabilities of the tablet device and how tablet applications leverage the unique capabilities of these devices. A case study method is used as an approach to tablet application development for firms where the context of how the device and applications are used is proposed and supported by frameworks that are grounded in the marketing literature.

Paper Four: ‘Smart Dental Practice: Capitalising on smart mobile technology’

Paper Five: ‘iMedical: Integrating smartphones into medical practice design’

The case study method is used to develop these papers in order to investigate what makes smartphones (and smart mobile devices) different from other more common Internet applications (via personal computer), and how these enhance the interactions the dental and medical practice has with its patients while also increasing efficiency.


Quantitative research using descriptive statistical analysis was conducted using an online survey where MTurk, a web-based platform that recruits respondents. There is widespread acceptance and support for the use of MTurk to conduct social science experiments and surveys (Minton et al. 2013; Goodman, Cryder and Chema, 2013; Paolacci, Chandler and Ipeirotis, 2010; Buhrmester et al. 2011). Like paper two, the method used is mono-method (Saunders, Lewis and Thornhill, 2008).
1.4.5 Quality Criteria

This section looks at reducing the possibility of getting the answer wrong, meaning that attention has to be paid to two particular emphases on research design: reliability and validity (Saunders, Lewis and Thornhill, 2009). Four of the six papers use secondary data, and reliability and validity are functions of the method by which the data were collected and sourced. Looking at the source of the data can make a quick assessment of reliability and validity. Dochartaigh (2002), and Saunders, Lewis and Thornhill (2009) point to assessing the reputation or authority of the source. In all papers, the academic journals, well-known organisations and web-based platforms of reliable and trustworthy reputations have been used. Those who were responsible for collecting and recording the information and an examination of the context in which the data were collected were carried out followed the guidelines adapted from Miles and Huberman (1994). The design tests of confirmability, credibility, transferability and dependability were applied to these qualitative studies.

Reliability

Reliability can be defined as ‘a measure of consistency over time and over similar samples, the extent to which a procedure produces similar results under constant conditions on all occasions with the same person or across interviewers (Cohen et al. 2000). ‘For qualitative studies reliability is often more difficult to control and measure, since they rely heavily on interpretation, which makes them susceptible to researcher bias’ (Blumberg et al. 2014). The reliability of qualitative data therefore ‘depends on the likely
Due care and attention was given in all papers to clearly communicate the choices made in all stages of data collection and analysis, ensuring readers had clarity on any biases that may have occurred. Other measures were taken with all papers to reduce research bias, Qualitative study of paper one: ‘Mobile Marketing: The value for consumers and retailers: a literature review’, were completed independently by multiple analysts, and then either were verified by a third or through cross checks to ensure dependability (analogous to the notion of reliability in quantitative research) (Reige, 2003). To ensure confirmability, the study’s general methods and procedures are described explicitly, and the sequence of how data was collected, processed and transformed and displayed for specific conclusion drawing is articulated.

**Validity**

Validity refers to the ‘extent to which data collection method or methods accurately measure what they were intended to measure’ (Saunders, Lewis and Thornhill, 2009). The validity that has been ascribed ‘to secondary data are functions of the method by which the data were collected and the source’ (Saunders, Lewis and Thornhill, 2009). Therefore as stated above the case study papers exercised great caution in the choice of materials and used mainly peer-reviewed academic journals, literature and data from official sources, to ensure that the material was valid, of high quality and suitable for the investigated research issues.

Miles and Huberman (1994) design test for credibility is the equivalent construct to internal validity. Descriptions given in the
case studies are context rich, the findings are internally coherent, and the data presented are linked to the categories of prior emerging theory.

**Generalisability**

Generalisability can be discussed in two different contexts, ‘theoretical’ and ‘empirical’ (Hammersley, 1992; Ritchie and Lewis, 2003). Generalisation can be discussed with regard to theory building, but the purpose of this thesis is not to produce a theory, as a case study approach was selected because this can be ‘a very worthwhile way of exploring existing theory’ (Saunders, Lewis and Thornhill, 2009, p.147). The second context, ‘empirical’, sometimes referred to as external validity, refers to whether the findings may be equally applicable to populations or settings beyond the sample of the study (Saunders, Lewis and Thornhill, 2009). Miles and Huberman (1994) use the equivalent construct of transferability.

The findings of papers one and two and their use for making inferences about the mobile ecosystem are questionable. Paper one, a literature review is a concern with regard to generalisability as the analysis is on a specific population, however stability and consistency in the process of the enquiry serves to negate some of the concern as the use of specific procedures for coding and analysis during the data analysis phase helps to ensure transferability (Yin, 1994; Riege, 2003). The quantitative analysis of paper two and six may be generalizable to an extent (beyond the sample of the study) it does not provide much depth, richness or context with regard to specific respondents.

Concerns for generalisability can be raised for papers three, four and five, as the findings of these studies are based on mini case
studies. A key difference between case studies and quantitative methods is that case studies seek to investigate phenomena in their contexts, rather than independent of context (Gibbert, Ruigrok, and Wicki, 2008; Tsang, 2014). By trying to understand empirical events in their rich context, case studies also throw light on the specific contingent conditions under which the postulated mechanisms operate (Tsoukas, 1989; Tsang 2014). Tsang (2014, p.379) argues “case studies have merits over quantitative methods in terms of generalizing to theory, identifying disconfirming cases, and providing useful information for assessing the empirical generalizability of results”.

1.5 Layout of Individual Papers

To examine the research problem, six research questions were developed resulting in six research papers. Different perspectives were used which together offer insight into mobile apps and marketing [Figure 1.4].

As stated previously, the approach to the research problem is pragmatic, primarily because it has been established that smart mobile devices, mobile applications and the formation of a mobile ecosystem are all relatively new innovations, and research in the subject area is developing.

Figure 1.4: Different perspectives of the thesis paper layout

The first paper 'Mobile Marketing: The value for consumers and retailers; a literature review', is exploratory and looks at patterns and themes in the literature concerning the value of mobile
marketing in retail. Paper two: ‘Smartphone Applications – Idea sourcing and app development: Implications for firms’, is both descriptive and exploratory in its purpose. This paper investigates the sources of app ideas within firms and explains where apps are developed. Papers three, ‘Improving business productivity and service: The power of tablet computing’, papers four and five: ‘Smart Dental Practice: Capitalising on smart mobile technology’, ‘iMedical: Integrating smartphones into medical practice design’, and are largely descriptive, determining what characteristics make smartphones and tablets different from other computer devices and describing the impacts on firms. Paper six, an exploratory analysis answers research question six: How do consumers perceive the quality of financial service apps on smart devices?’ The paper looks at the financial services sector where delivery has moved from people- and location based to mobile devices and apps.
1.5.1 Paper One

Title: Mobile Marketing: The value for consumers and retailers; a literature review.

Research Question One:

What is the value of mobile marketing for retail consumers and retailers and how can the potential of mobile marketing be realised by retailers?

The purpose of this study is to explore existing knowledge on how mobile marketing can increase value for consumers and retailers. A literature review is used to gain a rich understanding of the context of the research in the mobile m-commerce space and enables more precise research and development of managerial concepts and tools.

Methodology

As the paper is a literature review (content analysis), the preliminary literature search was conducted during April 2010, using the ISI Web of Knowledge database.

A content analysis is used to develop objective inferences about a subject of interest in any type of communication. The process of content analysis consists of coding raw messages (i.e. textual material, visual images, illustrations) according to a classification scheme. The coding process is essentially one of organising communication content in a manner that allows for easy identification, indexing, or retrieval of content relevant to research questions (Shepherd and Achterberg, 1992). Content analysis is still “in part an art” and that ‘there is no right way to do content analysis (Weber, 1990), however this study has used the “content analysis’ method recommended by Krippendorf (2004).
The basic unit of study is the academic research articles submitted to journals. The data is classified according to subject theme as identified by the title and keywords determined by contributing authors and/or editors. Editorial articles, replies, book reviews and comments are excluded from the analysis. In order to comply with the definition subscribed to this content analysis with regards to value, the information was further framed around 1) Consumers, 1a) Mobile device shoppers, 1a) consumer perceived value benefits; 2) Retailers, 2a) Improved value of mobile marketing, and 2b) Realising potential value in mobile.

Data Collection
The literature search was limited to peer-reviewed journals and was based on keywords such as: “mobile marketing”, “m-marketing”, “mobile commerce”, “m-commerce”, “mobile advertising”, “m-advertising”, “mobile loyalty” and “m-loyalty”. The 50 most cited articles were selected (cited five times or more). Several conceptual studies and some best demonstrated practice/output value studies covered topics as mobile value creation and mobile value chains, while a limited number of studies were related to consumer perceived value in mobile contexts.

An additional literature search was conducted during September and October 2011, using the ISI Web of Knowledge database with the above search words in combination with “value”, “value chain”, “strategy” and “perceived value”. A search was also conducted in International Journal of Mobile Marketing and International Journal of Mobile Communications, as the majority of articles covering mobile marketing were published in these journals (Varnali and Toker, 2010). Assuming differences in consumer
behaviour on a more general technology level (devices and services) compared to the specific mobile marketing level, the search was expanded due to the low number of studies. Search words of closely related constructs to perceived value such as “attitude”, “perceptions”, “satisfaction” and “trust” were used in combination with the search words from the 2010 search. A total of 64 empirical studies were selected for a qualitative content analysis, categorized based on research themes, and then discussed within and between categories.

Data analysis
The coders imported the articles into a computer program separately. Due to the coding protocol detailed above differences in coding were virtually non-existent, where misunderstanding did occur regarding data input, they were resolved by the coding supervisor to ensure 100% integrity of the data.

To reflect the topic characteristics for the period, the content of these articles was analysed to identify the most prevalent themes and concepts. The articles were categorized according to the title of the article and keywords applied to the article by the author and/or editor. Not all articles could comfortably sit in one category and where this was the case the article was evenly divided between two categories and half a point allocated to each category accordingly.
1.5.2. **Paper Two**

**Title:** Smartphone Applications - Idea sourcing, and app development: Implications for firms.

**Research Question two:**
How do firms source their ideas for mobile apps?

Smart mobile devices and applications have strong implications for marketing; this research has focussed on the sources of app ideas with firms, locations for app development and perceptions of app development. A quantitative methodology is applied in this paper.

**Methodology**

Using the client database of a large international IS consulting firm, by means of an email questionnaire, 970 IS executives in various parts of the world were questioned in order to assess the extent of smartphone app use, the sources of app ideas, the location of app development and managers’ perceptions of the effectiveness of these processes.

The survey questionnaire utilised various categorical responses to group respondents as well as Likert-type scales to assess various aspects of perceived app performance. Statistical analysis using SPSS was employed and a series of simple one-way analysis of variance (ANOVA) procedures was run in order to explore these relationships.

**Data Collection**

By contractual obligation, all 970 IS executives are required to respond to surveys conducted by the consultancy, which effectively results in a 100 per cent response rate. Respondents were filtered to include only those utilising smartphone apps. The resulting 239
firms equated to an effective response rate of 24.6 per cent. Respondents came from varying company and IS department size and with varying degrees of financial resources. The spread of countries includes the USA, Canada, Australia, New Zealand, United Kingdom, Ireland, France, Germany, Sweden, Spain, and South Africa.

**Data Analysis**

Analysis was performed to determine the impact of the idea source on four outcome variables: satisfaction with the app development process, perception of app effectiveness, satisfaction with cost effectiveness of the app, and the perceived innovativeness of the app itself. To further investigate these differences, the Tukey-Kramer procedure was applied to determine which means were significantly different (Levine, 2004).
1.5.3 Paper Three

Title: Tablet computing and apps: A methodology for improved business productivity.

Research Question Three:
What methodology should a firm adopt for developing apps for a mobile device?

This paper details the unique capabilities of the tablet device, more particularly the iPad, and examines the human-machine interaction capabilities with a focus on B2B business applications. Research in the area of methodology for developing apps is still very fresh. At the time of the paper, tablet devices were still a relatively new phenomenon, and the benefit of this study is to obtain deeper insight into the capability of tablets as a mobile device and to expose implications for managers by proposing a methodology of how to create and deploy applications that can shorten, shift or reshapese business processes.

Methodology
The U-commerce theory was used to develop this paper and business apps that best reflect or demonstrate the key characteristics of the theory. The characteristics of U-commerce are: ubiquity, uniqueness, unison and universality.

Data Collection
Mobile apps used in the paper were taken from the Apple App store. At the time of the study there were over 500 existing applications for business use, some of which are enormously popular.
Data Analysis

Examining the detailed descriptions of various mobile applications formed the analysis for this paper. The descriptions given on the App Store website were used in the initial selection process, then this was cross-referenced with the mobile applications own website (or authors website). For applications to be accepted and used as an example to develop, or highlight points in the paper the app descriptions needed to be very specific.
1.5.4 Paper Four

Title: Smart Dental Practice: Capitalising on Smart Mobile Technology.

Research Question Four:
How are smart mobile devices and apps being leveraged to improve customer service, increase operational efficiency and save financial and other resources?

Methodology
A case study research design is employed that examines dental Practice. U-commerce theory provides the theoretical foundation that best explains the uniqueness of smart mobile device apps. Research is conducted to identify business integrated mobile applications and how they improve customer service, increase operational efficiency and save financial and other resources. A micro case approach is used to illustrate current apps used in dental and are aligned to the four defining characteristics of U-commerce theory.

Data Collection
Mobile apps used in the paper were taken from the Apple App store. At the time of the study there were over 500 existing applications for business use, some of which are enormously popular.

Data Analysis
The App Store website provides descriptions for apps and these were used in the initial selection process. This description was then cross-referenced with the mobile applications own website (or authors website). Examining the detailed descriptions of various
mobile applications formed the analysis for this paper. For applications to be accepted and used as an example to develop, or highlight points in the paper, the app descriptions needed to be very specific.
1.5.5 Paper Five

Title: iMedical: Integrating smartphones into medical practice design.

Research Question Five:

How are smartphones and apps impacting firm operations and firm-customer interactions in a specific field? - a Medical Practice.

Methodology

This is a case study research design that uses U-commerce theory to best explain the uniqueness of smartphone apps. The study group selected is the medical practice, which provides some interesting uses for mobile apps specific to the market. Research is conducted to identify business integrated mobile applications and how they have enhanced customer relationships. Analysis of mobile apps for medical practice is completed and specific apps are identified to use as a micro case approach to illustrate current applications of this technology.

Data Collection

Mobile apps used in the paper were taken from the Apple App store. At the time of the study there were over 500 existing applications for business use, some of which are enormously popular.

Data Analysis

Examining the detailed descriptions of various mobile applications formed the analysis for this paper. The descriptions given on the App Store website were used in the initial selection process, this was then cross-referenced with the mobile applications own website (or authors website). For applications to
be accepted and used as an example to develop, or highlight points in the paper, the app descriptions needed to be very specific.
1.5.6 Paper Six

Title: App Service: How do consumers perceive the quality of financial service apps on smart devices?

Research Question Six:

How do customers perceive the quality of service they receive on their smartphone or tablet?

There is very little evidence to suggest that customers perceive the quality of service delivered by the apps on their smart devices as better, or even just different, than the quality of service they receive when physically going into a branch of their financial services provider, or when banking online at a computer. This quantitative analysis explores service quality of smart mobile devices and apps in financial services.

Methodology

A database of 194 respondents, taken from the MTurk web-based platform was used. The main part of the questionnaire is adapted from original SERQUAL scale Parasuraman, Zeithaml and Berry (PZB) (1985; 1988) and consists of 18 items selected to reflect the nature of apps on smart mobile devices. SERVQUAL items that referred to the appearances of buildings and people, as well as employee courtesy were eliminated.

Of these 18 items, 17 were then subject to a principal components factor analysis with varimax rotation. Using the eigenvalues greater than 1 rule, three cleaner factors emerged: reliability, personal, and visibles. A multiple regression with these dimensions as predictors and overall satisfaction with the financial services app as the dependent variable were conducted providing some support for the convergent validity of the 12-item scale.
Data Collection

Survey respondents in the US were recruited using MTurk, a web-based platform. Researchers can use the platform to recruit individuals to complete certain tasks in return for a nominal cash reward ($1 for participation). Filters can be used to define demographics and other respondent requirements. Qualified respondents in this survey had to be older than 21 years, and a user of a smart mobile device app that accesses a financial service. The maximum number of respondents was set at 250, however a number of checks were used to enhance data quality resulting in 194 respondents.

Data Analysis

The data set was transferred into SPSS for analysis. Initial analysis indicated internal consistency. At this stage, item 11 was eliminated from further analysis, as its exclusion resulted in a large increase in the alpha coefficient.

The 17 remaining items were then subjected to a principal components factor analysis with varimax rotation. This analysis resulted in the exclusion of items 4, 7, 8, 13, and 14. The remaining 12 items were then subjected to a further factor analysis resulting in three cleaner factors: reliability, personal, and visibles.

A multiple regression with the dimensions of reliability, personal and visibles as predictors, and overall satisfaction with the financial services app as the dependent variable was conducted.
1.5.7 Summary

The ubiquity of smart mobile devices and the massive proliferation and variety of mobile apps present new opportunities for marketers to get their messages to customers. The network mobile ecosystem that supports smart mobile devices and their apps provide the opportunity for marketers to create relationships that are more one-to-one (if the customer wants it), and is thus a very powerful channel. The mobile phone is always on, provides multi-way communication, localisation, and accessibility and is uniquely personal to the user.

The distinctive and powerful features of smart mobile devices and apps make it one of the most dynamic, and highly personal channels for marketing and are a very significant area of academic enquiry for researchers. The basis of management tools that academic researchers develop for practitioners are often developed from gaining a deep understanding of new marketing channels and business models. With smartphones virtually reaching saturation point, mobile apps and devices are changing the nature of how we communicate, access information, and connect with firms and each other. Apps are taking advantage of new interface technologies like accelerometers and multi-touch screens, making access to information easier, more personalised and relevant which presents opportunities to collapse time in relation to the price, product, promotion and place. Therefore mobile apps present challenges for marketers and firms. Finally, knowledge of the societal impacts of mobile apps – particularly in the areas of privacy and security can assist academic researchers to provide insight that aids policy makers.
The main overall problem for this thesis is:

*In a constantly connected environment, how do apps change marketing (and vice versa) to create ‘ubiquitous’ marketing?*

Six individual research questions were formulated to develop insight into the problem. The questions were developed by identifying gaps in the literature concerning the development of knowledge.

The first research questions sets the foundation for the following questions. The paper is a literature review that brings together disciplines such as business, management, marketing, information technology and information systems that have published knowledge on the subject area of mobile devices, apps, m-commerce, m-business or mobile marketing. Reviews can help identify the challenges relevant to academics and managers, particularly as mobile apps are rapidly developing phenomena. Developing a customer-orientated strategy comes from understanding value from a user perspective. This exploratory perspective of the subject area is industry focussed on the retail sector and looks at the value of mobile marketing.

Research question one:

*What is the value of mobile marketing for retail consumers and retailers?*

Papers two, three, four and five, develop the organisational standpoint of mobile apps and leverage U-commerce theory, an emerging research area. U-commerce provides the theoretical lens through which these four papers conceptualise the ubiquitous marketing phenomena.
Research question two:

*How do firms source their ideas for mobile apps?*

The second paper addresses the research problem from a source perspective. There is little understanding of how mobile apps are affecting organisations, and this paper addresses this gap in the knowledge.

Research question three:

*What methodology should a firm adopt for developing apps for a mobile device?*

Paper three approaches the research problem from a development perspective. Okazaki and Mendez (2013) identified that differentiation among devices is expected to be of emergent importance, while Osterwalder and Pigneur (2002) identify the need for academics to develop management tools to help managers. This third question addresses this concern in literature, by looking at a particular device and the development of apps (a methodology) that specifically leverage a particular device.

Research question four:

*How are smart mobile devices and apps being leveraged to improve customer service, increase operational efficiency and save financial and other resources?*

An impact perspective is used to answer research questions four and five. In these papers the implications of mobile technology at an organisational level are considered. Research question five also looks at the impact of smartphones and apps on firm-customer interactions.
Research question five:
*How are smartphones and apps impacting firm operations and firm-customer interactions in a specific field? - a Medical Practice.*

Finally, research questions six takes deeper and more quantitative look at firm-customer interactions in the financial sector.

Research question six:
*How do customers perceive the quality of service they receive on their smartphone or tablet?*
CHAPTER TWO:

The Individual papers
List of Papers

Paper 1: Mobile Marketing: The value for consumers and retailers; a literature review
Published in the Journal of Retailing and Consumer Services, 2012.
   Co-authors: Roger Strom and Martin Vendel.

Paper 2: Smartphone Applications – Idea sourcing and app development: Implications for firms
   Co-authors: Debbie Vigar-Ellis.

Paper 3: Tablet computing and apps: A methodology for improved business productivity
   Solo Paper.
CHAPTER TWO: THE INDIVIDUAL PAPERS

Paper 4: **Smart Dental Practice: Capitalising on smart mobile technology**

Published in the British Dental Journal, 2015.

Co-authors: Kirk Plangger, Adam Mills, and Jim Armstrong.


Paper 5: **iMedical: Integrating smartphones into medical practice design**

Published in the Journal of Medical Marketing, 2013.

Co-authors: Adam Mills and Kirk Plangger.


Paper 6: **App Service: How do consumers perceive the quality of financial service apps on smart devices?**

Accepted by the Journal of Financial Services Marketing, 2016.

  Accepted. Yet to be published.

Co-authors: Emily Treen and Leyland Pitt.


  [publication issue yet to be confirmed].
CHAPTER THREE:

Summary, contribution and conclusion
APPS IN THE U-SPACE
CHAPTER THREE: SUMMARY CONTRIBUTION AND CONCLUSION

3.1 Introduction

On April 21st, 2015, Google changed their Search Engine Optimisation (SEO) policy, as the algorithms now rank the mobile-responsiveness of websites. Those who have not developed apps or have websites that cannot be accessed by will be penalised (Murphy, 2015). Following this development, Adwords (2015), Google’s official blog announced that “more Google searches take place on mobile devices than on computers in 10 countries including the US and Japan”. According to comscore.com (2014), in May 2014, mobile device apps now drive half of all time spent on digital and the trend is likely to continue.

Figure 3.1: Share of U.S. Digital media time spent by platform

![Graph: Share of U.S. Digital media time spent by platform]


In early 2015, Apple Inc launched the iWatch, another mobile device that is designed to work with a smartphone. The launch of the iWatch follows similar launches from Apple’s competitors (Samsung and Motorola have launched similar products), and like
other smart watches, a large proportion of the functionality leverages the users smartphone device. As the limitations of this new mobile device are overcome (short battery life, and dependence on a smartphone for full functionality), and they become more common, the impact of this device will grow.

Although still relatively new, smart mobile devices have quickly become firmly established, with new devices and accessories on the horizon and the increasing share of time spent on apps, it is necessary for practitioners and academics to have a better understanding of these devices, their applications and network systems. Marketers will continue to leverage the power of these devices, apps and network systems to deepen relationships with customers, and as these devices continue to be integrated into people’s lives and the firm’s IS systems, operations and strategy, they need to be understood by researchers to help managers predict, plan and react to the rapidly changing business dynamics.

This thesis has described and analysed the breath of research into this subject area. The focus of this thesis has been predominantly from an operational standpoint. As established earlier in the thesis, research in the area of adoption of mobile practices, technologies and business models for customer value at the firm-level is still relatively underdeveloped. The research problem for this thesis explores is how apps change marketing to create ‘ubiquitous’ marketing.

In order to investigate this research problem, six separate studies were developed to answer specific research questions that explore key aspects of the main research problem. The first paper brings together published knowledge from various disciplines to develop
an exploratory perspective of the subject area focussed on the retail sector and the value of mobile marketing. From the first paper the investigation broadens to consider specific organisational perspectives using U-commerce as the theoretical lens. It is crucial for researchers and practitioners to better understand how mobile business can create value for organisations. However, it is not yet clear how mobility can affect firms, or what are the implications of mobile technology at the organisational level (Picto, Belanger and Palma-dos-Reis, 2014). The next four of the thesis papers consider the source of app ideas in firms, app development methodology for a specific device, and the impacts of apps on firms. The final paper give a preliminary insight into consumer perceptions of app service quality.
3.2 Conclusions to the research questions

The research problem has been formulated as follows:

*Research problem:* In a constantly connected environment, how do apps change marketing (and vice versa) to create ‘ubiquitous’ marketing?

The research problem has been explored via six research questions that have been developed into six academic papers published in academic peer-reviewed journals. The findings of these papers are discussed in the following sections.

3.2.1 Research paper one: Findings

The question that paper one was formulated to answer is as follows:

*Research question one:* What is the value of mobile marketing for retail consumers and retailers? How can the potential of mobile marketing be realised by retailers?

The research question was selected in order to explore existing knowledge on how mobile marketing can increase value for consumers and retailers, and to provide understanding of the scope and power of smart mobile devices and apps. The literature review unites the research on mobile devices and apps from various disciplines to synthesise key themes and challenges. Thus the paper offers a foundation for developing the operational perspective of how mobile devices, apps and mobile ecosystem improve marketing effectiveness.
The question was answered through a literature review (content analysis) of peer review journals based on a search of keywords. The top 50 most cited articles were selected. The papers covered conceptual studies and best demonstrated practice/output value, and also covered topics such as mobile value creation, mobile value chains, and a limited number of consumer perceived value on a general technology level were also selected. A total of 64 empirical studies were selected for a qualitative content analysis.

Once the data was assembled, the studies were grouped and discussed from both a consumers’ and retailers’ perspective. The consumers’ perspective was grouped as mobile device shoppers, and perceived value benefits and sacrifices of mobile marketing. The retailers’ perspective was divided into two further categories: improved value of mobile marketing and realising the potential value in mobile marketing.

The findings support the proposition that mobile marketing increases perceived value for consumers and outcomes for retailers. However, a limited number of studies supported mobile marketing’s effectiveness over other marketing alternatives. While mobile transactions were perceived as risky, mobile marketing supports pre-purchase, in-store, and post-purchases.

Knowledge of mobile shopping behaviours remains limited, and consumer segmentation remain relatively limited to traditional approaches. Mobile shopping as an extension to PC Internet shopping is acknowledged, though significant new behaviours have been identified such as augmented reality based content, location specific content, barcode scanning and Near Field Communications (NFC) mobile device payment.
From an organisational perspective, integration of all retailer consumer interfaces with mobile marketing to maximise exposure and connectivity between retailer and consumer is recommended. Management of consumers' cross media and channel use, support self-segmentation of consumers, and to increase perceived value to consumers and outcome value for retailers is supported.

The research suggested that the implementation of mobile marketing forms part of the foundation for sustainable competitive advantage. From a branding perspective mobile marketing was indicated to offer several advantages for retailers: First, as a more effective channel than traditional media for direct marketing, and for brand and sales driven communication. Second, by offering opportunities to streamline, customize and enhance shopping experiences in-store, product use and other post purchase interactions, the service experience may reach new levels of perceived values and satisfaction. These new levels of “customer delight” may add to the brand image fostering loyalty and increasing recruitment of consumers.

Third, mobile marketing was found to increase the value of existing marketing investments. By channel addition, mobile marketing increased connectivity to retailers and was indicated to increase loyalty to the store network. By adding interactivity to existing brand contact points, consumers’ information processing is indicated to be improved, resulting in improved branding effects.

Finally, as these potential advantages are backed up by development of a partner network and assumed structural bonds within partner networks and structural changes of IT-structure and organization, the potential for these advantages to be more lasting are increasing. Increased consumer co-creation activities by using
mobile marketing also increase perceived value for some consumers and outcome value for firms, potentially creating higher brand involvement, loyalty and structural bonds to retailers’ and more lasting competitiveness.

Research from this paper suggests that case studies or particular context settings may increase the in-depth knowledge about mobile marketing implications and the effects on activities and processes of the firm, and also identify drivers and barriers for mobile marketing implementation. These aspects are developed more specifically in papers two, three, four and five. The analysis also revealed there has been far more attention on consumer studies than from an organisational perspective. Papers two, three, four and five of this thesis are focussed on the organisational perspective, while paper six looks at service quality of smart mobile devices and apps.

3.2.2 Research paper two: Findings

The question that paper four and five was formulated to answer is as follows:

Research question two:

*How do firms source their ideas for mobile apps?*

Very little research has focussed on the sources of app ideas within firms. This gap in the literature forms the basis of this paper’s research question – where do firms source ideas for apps? Following from this central question, the paper also seeks to answer: Should apps be developed internal or external to the firm? And what effects do the sources of app ideas and the development
locations have on the firm’s satisfaction with the effectiveness and efficiency of apps?

This research question posed by Shanker and Balsubramanian (2009) concerning how a mobile application is formulated and meshed with the overall firm strategy is addressed in this paper, additionally and the research findings are useful for practitioners and researchers.

The research question was answered through exploratory research conducted in the form of a survey of a large sample of IS executives. The analysis was performed on 239 firms from a full spectrum of company and IS department sizes that use smartphone apps in some way.

The following are the primary findings of the study described by paper four:

• All firms use apps, to some extent, both internally and externally, with potential for expanded use in the future.
• The main purpose of apps were for external use, with the majority of apps developed to provide customers with a mix of information and real-time service (40.5% of apps).
• The ideas for apps came mainly from the IT department (41% of cases) followed by the Marketing department (20.1% of cases). Ideas from customers (18% of cases).
• Only a few of the survey respondents relied on outside suppliers, so the majority of development was done in-house or with some degree of outside help (refer to table 3.1). Until 2008, (when the Apple App Store was established) this task simply didn’t exist in the IS
department or anywhere else (Pitt, Berthon and Plangger, 2012).

Table 3.1  Location of App Development

<table>
<thead>
<tr>
<th>Location of App Development</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completely within the organisation</td>
<td>36.4%</td>
</tr>
<tr>
<td>Within the organisation but with some outside help</td>
<td>36.0%</td>
</tr>
<tr>
<td>A 50-50 mix of the organisation and outside help</td>
<td>10.0%</td>
</tr>
<tr>
<td>Mostly with outside help</td>
<td>13.4%</td>
</tr>
<tr>
<td>Completely by a supplier outside of the organization</td>
<td>4.2%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
</tr>
</tbody>
</table>

The impact of the idea source and Location on four outcome variables was determined (see table 3.2).

Table 3.2  Idea sources

<table>
<thead>
<tr>
<th>Idea sources</th>
<th>Location of development</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS department</td>
<td>Completely by a supplier outside of the firm</td>
</tr>
<tr>
<td>Marketing department</td>
<td>Mostly with outside help</td>
</tr>
<tr>
<td>Other departments</td>
<td>A 50-50 mix of the firm and outside help</td>
</tr>
<tr>
<td>Customers</td>
<td>Within the firm, but with some outside help</td>
</tr>
<tr>
<td>Other firms</td>
<td>Completely within the firm</td>
</tr>
</tbody>
</table>
Outcome variables:

1) Satisfaction with the app development process
2) Perception of app effectiveness
3) Satisfaction with app cost effectiveness
4) Perceived innovativeness of the app

Idea sources results:

It was found that the idea source does significantly affect all outcome variables. Satisfaction with app development process was significantly higher when the source of the app idea was other departments in the firm. The perception of app effectiveness was significantly higher when the source of the app idea was other departments in the firm. There are significantly higher levels of satisfaction with app cost effectiveness when the source of app ideas are internal sources, particularly the IS, and other departments. There are significantly higher levels of perceived app innovativeness when the source of app ideas are other departments, the IS department or customers. App ideas from other companies and the marketing department were perceived to be significantly less innovative.

Location results:

The results satisfaction with app development process also showed that an ‘all or nothing’ approach or a 50-50 cooperation approach works best. Apps developed by 50-50 mix, within the firm but with some outside help, or completely by a supplier were perceived to be more effective. While satisfaction with the app cost effectiveness is highest when the app is developed within the firm but with some outside supplier help.
Perhaps the most significant conclusion is that Marketing departments seem not to be a good source of app ideas for any of the measures chosen, but other departments were a good source of ideas. Although only a small number of firms in the sample actually used external suppliers completely or to a large extent, and yet outside suppliers were perceived to provide significantly higher levels of app development satisfaction and app innovativeness.

3.2.3 Research paper three: Findings

The question that paper three was formulated to answer is as follows:

Research question three:

*What methodology should a firm adopt for developing apps for a mobile device?*

The answer to this question focuses primarily on the other major mobile device, the tablet, and looks more at business applications. The answer to this question looks at firm-level strategy while also considering the integration of the unique features of the device, business applications and types of applications. In answering this question a deeper insight into the capability of Tablets is obtained whilst the implications for managers is exposed by proposing a methodology for how to create and deploy applications that can shorten, shift or reshape business processes.

To answer the question, the features that make the Tablet unique are first explored. Apps that demonstrate the key aspects of U-commerce theory were used to a develop technology integration discussion, then a five-step framework for identifying and developing tablet applications in business is proposed.
The five-step process uses models established in academic literature including:

1) The 4 I’s Framework (Gebauer, Shaw, and Gribbons, 2010), further developed by Pitt, Berthon and Robson (2011) looks at inscriptive, interactive, isolative and informative, which further the discussion of information interaction.

2) Comprehend Context. This step considers information about the context, for the context and can be very useful for generating ideas for mobile apps. The integration of a smart mobile device and applications allows can enhance the user experience by adapting automatically to the changing environment as the user moves about.

3) The three C-Abilities (Configure-ability, Consume-ability, and Context-ability) is a decision criterion that considers and evaluates the key dimensions that differentiate laptops, smartphones and tablets and help to evaluate the usefulness of the device by first determining the right priority for a business application. For example, if the priority is being able to consume and interact with information, the consumer-ability should inform the decision with regard to the choice of hardware.

4) Vicarious Learning. Identifying, collecting and studying good case study examples of how other organisations in similar or different industries have used tablet or smartphone apps in innovative ways can inform the development of tablet apps for the business.

5) IS strategy; selection of a business model: In addition to the above steps the employment of a business process model can also stimulate thinking about how the tablet might be used for the analysis and improvement of a process or application within the

The paper establishes the power of the integrated smart mobile device and the app, and their strategic adoption at firm-level. The devices unique features and types of applications are considered for the development of the app.

3.2.4 Research paper four: Findings

The question that paper four was formulated to answer is as follows:

Research question four:
*How are smart mobile devices and apps being leveraged to improve customer service, increase operational efficiency and save financial and other resources?*

This research question was chosen to explore a context setting in order to examine how smart mobile devices and apps are impacting activities and processes of the firm. As Varnali and Toker (2010) pointed out that several researchers have suggested that understanding value added uses and success factors increase consumer acceptance of them. The paper also supports the assertion that as mobile devices have become ‘smart’ the integration of the device and apps is now far more unified and this should be reflected in the academic enquiry.

To answer this question a Dental practice context is used, and the research design uses U-commerce theory to best explain the uniqueness of dental smartphone apps and the impacts of networks on society and business. Several mini-cases of dental apps were
analysed to demonstrate the four defining characteristics of U-commerce theory.

The key findings from this paper show that with the likelihood of patients owning or having easy access to smart mobile devices allows the responsibility for functions such as scheduling, information seeking, and communications can be shifted from the practice to the patient.

The potential to see strong competitive benefits in terms of both practice operations (cutting costs) and customer service (increasing revenues) are available for dental practices that incorporate advances in information technology. The networked ecosystem that supports smart mobile devices offers dentistry many benefits such as eliminating the need for costly local servers and reductions in capital software acquisition expenses, while enabling collegial collaboration and access to electronic health records, securely, from any device with a browser. The paper outlines how smart mobile technology, quite literally in the patients’ hands, can be leveraged in the dental practice context to improve patient service, increase operational efficiency, and save financial and other resources, thus improving and the practice’s bottom line and sustainability.

3.2.5 Research paper five: Findings

The question that paper five was formulated to answer is as follows:

Research question five:

*How are smartphones and apps impacting firm operations and firm-customer interactions in a specific field? - a medical practice*".
CHAPTER THREE: SUMMARY CONTRIBUTION AND CONCLUSION

Answering this question is important as it provides more examples of the application of U-commerce theory. The paper uses medical practice to explore the what and where phenomenological context and content of the research problem. Mini-case medical app examples are used to validate the four defining characteristics of U-commerce theory. This article aims to offer the reader with a number of perspectives on and ways in which smartphones are beginning to make significant changes to how information technology is managed and controlled in medical practice, and how these technological advances can influence the ways medical teams interact with patients.

Patients are more empowered and informed thanks to the accessibility provided by technology such as a smartphone. This in-turn has impacted the practitioner-patient relationship as patients have easier access to some of the technical medical knowledge formerly ‘owned’ by the practitioner. This presents the opportunity for physicians to focus more time and attention on relationship-centred care and experience-based healthcare rather than simply educating.

A process for practitioners to identify and develop proprietary smart mobile device applications specifically aligned to the practice to enhance productivity, profitability and patient engagement is proposed as a means of integrating and exploiting emerging technologies (device, apps, networks) with the practice’s current strategies.

By providing details of the functionality and unique characteristics of networked mobile technology, and then by exploring the U-commerce framework using specific micro-case examples, the paper hopes to provide an enriched understanding
and appreciation of the potential impacts of mobile technologies in practice.

3.2.6 Research paper six: Findings

The question that paper six was formulated to answer is as follows:

Research question six:

*How do customers perceive the quality of service they receive on their smartphone or tablet?*

In answering this question, the aim of this study is to gain some initial understanding into customer perception of the quality of service delivered by apps in the financial services sector, as little evidence exists in the literature.

The SERVQUAL scale developed by Parasuraman, Zeithaml and Berry (PZB) (1985; 1988) was adapted to measure consumer perceptions of the financial service quality delivered by apps on smart devices.

The primary findings described by paper six are the following:

- Rather than the five dimensions of SERVQUAL, financial service quality on apps seems to consist of three dimensions: reliability, or the ability of the app to deliver service when it is promised and always being available; personal, or serving the individual needs of the consumer; and visibles, or the observable aspects of the app.

- The exploratory scale developed to measure financial service quality on apps shows good convergent validity, as the three dimensions of app service quality correlate well and significantly with an overall indication of consumer satisfaction with the service delivered by the app.
• The majority of respondents felt that the quality of service provided by the financial app on their smart device was at least as good, or better than using a PC or laptop.

• Both online financial service and that provided by an app are perceived as being better than the service provided in a physical location.

   It appears that success can be derived from providing less service. Financial services apps have certainly shifted much of the work previously done by the firm onto the customer. Judging by the responses of the consumers in the study reported here, consumers prefer this to dealing with financial services providers in a physical presence.
3.3 Academic Contribution of the Study

This thesis supports the Kaplan (2012) definition of mobile marketing as “any marketing activity conducted through a ubiquitous network to which consumers are constantly connected using a personal mobile device”. This definition succinctly describes the key aspects of what mobile marketing now represents with the advent of a smart mobile device and apps: ubiquity of the devices, apps and the mobile ecosystem that supports multi-way communication, always on – always connected, and personal. This thesis has sort to introduce and develop a deeper understanding of ubiquitous marketing.

Development of Knowledge

To push the field of study forward, the review of paper one focussed on the retail sector with an emphasis on the value of mobile marketing (then and now). As Shankar et al (2010) noted, mobile marketing has the potential to change the paradigm of retailing from one based on consumers entering the retailing environment to the retailer entering the consumer’s environment through anytime, anywhere mobile devices. Ubiquitous marketing has the potential to collapse the timing of the four P’s: Product, place, price and promotion. Given the explosion of mobile apps and their impact on marketing, review articles help to develop and complement related research.

Picto, Belanger and Palma-dos-Reis (2014), acknowledged that there is a gap in the literature regarding the implications of mobile technology from an organisational perspective. The examination of mobile marketing from an organisational perspective is set by
CHAPTER THREE: SUMMARY CONTRIBUTION AND CONCLUSION

looking at a broader view of the subject in Paper One. This paper looks at how personal mobile devices influence us as consumers, and how firms think about them with a focus on the retail sector. The literature review investigates the body of mobile marketing literature before and after the advent of device specific apps in order to describe the existing knowledge on how mobile marketing can increase value for consumers and retailers and identifies areas of further research. Support for mobile marketing increasing perceived value for consumers and outcome value for retailers is evident. Whether mobile marketing is more effective than other more established marketing investments receives limited support, however, research in this area is still nascent.

The literature is showing growing support for the integration of all retailer consumer interfaces with mobile marketing, maximizing exposure and connectivity between retailer and consumer. Indications were found of mobile marketing implementation functioning as part of the foundation for sustainable competitive advantage. Development of a partner network and structural bonds within partner networks and structural changes of IT-structure and the organization were found to be required.

Applications of U-commerce

This thesis introduced ubiquitous marketing and has taken a lead in understanding it better. In section 1.3 U-commerce theory is proposed as a lens through which mobile apps, devices and ubiquitous marketing and its impact on society and business can be better understood. However, is it noted that the application of this theory in the literature is scant. Papers three, four and five contribute to the literature through the application of U-commerce
theory to the mobile device and apps. These papers have tested and advanced the u-space construct contributing to the body of marketing knowledge by exploring the what and the where phenomenological context and content of the research problem (Berthon et al. 2002).

Paper Three’s focus is on the tablet mobile device, and provides a deep and rich proposed methodology for developing an app. Osterwalder and Pigneur (2002) note that as new business models are emerging, the importance of business models for managers also makes it essential for researchers to study and define them, since an understanding of business models forms the foundation of many management tools that are developed by researchers to help managers react to changing business dynamics. By analysing the functionality of the device, how apps are being used through the application of U-commerce theory is insightful in improving marketing effectiveness. The proposed process provides a useful model to the marketing literature as to how to integrate this technology into the firms’ strategy.

Papers four and five examine the healthcare sector, (a sector with huge potential for value for mobile devices particularly in the area of body monitoring and diagnostics) and apply U-commerce theory to provide insight into how smart mobile device apps are being used and their impact on how firms operate and on consumer relationships. Micro cases of particular apps that leverage specific features of the mobile device and / or mobile ecosystem are detailed and confirm a robust application of U-commerce theory delivers added value to the design of apps.

The paper offers perspectives on ways in which apps are beginning to make significant changes in how information
technology is managed and controlled from an organisational perspective, and how these technology advances can influence consumer interaction.

**Organisational perspective**

There is presently no unified view of how companies can leverage the potential value of m-business and no empirical research regarding the development of successful m-business strategies (Barnes and Scornavacca, 2006, Ngai and Gunsekaran, 2007, Wen-Jang, 2007). The thesis contributes to the body of knowledge from an organisational perspective in a number of key areas: idea sourcing for mobile apps, a methodology for the development of apps and their impact on the organisation.

Paper two investigates the sources of ideas regarding the development of apps in firms and raises some questions about the role of marketing in the development of apps. Mobile devices, apps and the mobile ecosystem have profound implications for marketing particularly concerning consumer engagement, retention and conversion. Yet the results of this paper indicate that while most ideas for apps come from the IS and marketing departments within the organisation, and development of the apps is done mainly within the organisation, these development strategies are not necessarily the most effective. In this paper, marketing departments did not seem to be good sources of app ideas for any of the measures chosen. The research suggests that by utilising the collective knowledge throughout the firm and customers (ranked third for good ideas for innovative apps) is best for generating innovative ideas for apps. This information is valuable in mobile apps as a business model and developing a
methodology for the creation of an app. A methodology is detailed in paper three.

Paper six acknowledges the industrialisation of service (Levitt, 1976), and focuses on the financial services sector where service has become increasingly operationalized by putting control into the hands of customers. Effectively offering less service. The greater control and convenience this progression of technology has occasioned (ATM, online banking to mobile banking for example) has led to greater customer satisfaction. Yet there is very little evidence to suggest that customers perceive the quality of service delivered by the apps on their smart devices as better, or even just different, than the quality of service they receive when physically going into a branch of their financial services provider, or when banking online at a computer. This paper contributes to the body of knowledge by adapting SERVQUAL scales for use as a starting point for the development of an instrument to measure perceptions of the financial service quality delivered by apps on smart mobile devices. An exploratory scale is developed consisting of three dimensions, namely reliability, personal, and visible. The scales possess good convergent validity, as the three dimensions of app service quality correlate well and significantly with an overall indication of consumer satisfaction with the service delivered by the app. The paper achieves its purpose of providing a preliminary insight into consumer perceptions of the quality of service delivered by these apps.

Apps are changing the organisation and marketing by demanding a continued and more integrated understanding of the consumer across the organisation. Apps are pushing marketers to be more aligned with the IS department in terms of developing
innovative apps ideas. Additionally, the multi-way communication supported by apps and smart mobile devices produces a great deal of data that marketers must analyse to create more detailed insights.

This thesis, comprised of six papers contributes to the body of knowledge by bringing together fragmented research from across disciplines to synthesise existing findings into a coherent picture, and providing insights into further areas of research via a literature review. This review provides a basis for the investigation mobile apps and devices from an organisational perspective. Application of U-commerce theory is scant in the literature, but has been successfully applied to both devices and apps and found to be a robust and an insightful tool in developing innovative apps that present significant value. While mobile apps present significant change for marketing and the wider organisation, it is clear that further research is required and this thesis has taken some steps in developing a more robust understanding.
3.4 Managerial Implications

The concept of mobile has changed. Smart mobile devices, apps and the mobile ecosystem morphed information from one-way (consumers accessing data via an Internet enabled device) to multi-way communication with devices talking to other devices, and the environment via ubiquitous networks (smart mobile devices, mobile telecoms, remote sensors).

This section discusses what the key implications for managers concerning the improvement of marketing effectiveness for customers, and the integration of mobile marketing (by understanding ubiquity) into the overall strategy of the firm.

Ubiquity

The potential of mobile marketing is realised in the integration with other marketing interfaces. Google’s decision (as of April 21st, 2015), to include mobile friendliness as part of its search ranking, further supports a ubiquitous marketing mind-set required of managers. Ubiquity is more than just the proliferation of smart devices and apps, but also considers the ability to connect virtually anywhere at any time. This study shows that managers need to consider all avenues through which they and their customers might connect. Firms can engage the consumer at every stage of the purchase process by delivering the right message at the right time to the right person. Apps are pushing firms and marketers to revamp their concept of mobile so that content is responsive and adaptive across a number of mobile platforms – less PC versus mobile, and more about how and when consumers might connect and where they might connect along the customer lifecycle. Rather
than repurposing content from online into an app, marketing is changing apps, increase value by considering how apps can leverage the unique capabilities of mobile devices.

In Paper One, the research suggests that mobile shoppers are valuable segments for retailers, and by opting into a firms' mobile marketing, mobile customers may present even more value. Firm's can deliver higher perceived value to consumers, which can positively affect recruitment, loyalty, and ultimately sales.

**Developing mobile strategy with the overall strategy**

U-commerce theory is proposed to help frame the value exchange between the firm and the user, particularly in the development of apps for mobile devices. The examination of particular devices and context in papers four and five expose the necessity for understanding the unique features of the mobile device and how users interact with the information and that the context in which they do is crucial.

The empirical exploratory research in paper two suggested that although a small number of firms surveyed used external suppliers completely or to a large extent to engineer the apps, it seems that a 50-50 mix of internal external suppliers of apps, the use of outside suppliers could considerably increase effectiveness measures of satisfaction with app development and cost effectiveness, and perceived app effectiveness and innovation.

Paper Three provides managers with a practical methodology to developing an app tailored to the unique functions of the mobile device. Developing apps can be a step-wise process, where firms can move to more demanding application areas while learning the new technology and consumer behaviours. Ideas for apps
predominantly come from the IS department, and to a lesser extent, marketing departments. Garnering ideas for innovative apps should include all departments from across the organisation.

Managers in financial services institutions should be able to use the 12-item scale in Table 3 of paper six as a convenient means of gauging the quality of service delivered by their firm’s app(s). They will want to pay particular attention to the things that consumers in our survey valued most, such as delivering when promised, and always being available.

**App features**

Consumers are looking for actionable information about their location, what they are currently doing (context) or what they might do next (purpose). The content that engages them will be the content that solves their problem in real time. What Junglas and Watson (2006) term uniqueness. Paper six suggests that managers might find it useful to explore ways of customizing apps so that they fit more closely with the specific individual needs of customers, an area in which apps seem to be falling down at present (see item 15 in table 3 of paper six). Increasingly consumers will expect marketers to use the data they know is being collected to personalize their marketing communication. So by tracking the way a user organically interacts with an app can inform the strategy of future campaigns.

Seamless information across different devices is an app feature that managers must be mindful of when developing high quality engaging apps. What Junglas and Watson (2006) term unison. Consumers will not expect to restart a process just because they have shifted to another device. Making a purchase, signing up for a
service or program may start on a PC and finish on a tablet, but the expectation will be that all devices will be in sync.

The mini cases used in papers four and five also highlighted the importance of ensuring apps were contextually relevant. For users in transit, this will often mean that the information should be location-specific by leveraging the geo-specific (GPS) capability of the smart mobile device. Additionally, with all the multi-way information that is being exchanged, the marketers will need to ensure that the communication is relevant and personal. Advertising a mobility scooter to a teenager is best avoided!

Managers might also wish to explore whether perceptions of app service quality vary among different customer groups, depending on such variables as demographics and client value to the firm. Measures of app service quality can also be compared with those of competitors and shortcomings addressed where these are evident. Furthermore a longitudinal tracking of perceptions of app service quality might give insight into how these change over time, particularly when apps have been updated and new features offered, or design has been changed.

The data contained on a smart mobile device is very personal to the user and marketers need to be vigilant about privacy. Although privacy can mean different things to different people (as pointed out in section 1.2.4), users are generally willing to share data with firms, but increasingly they want to know what firms are doing with that data. A data policy that is transparent and easy to understand and easy to find will ensure trust.
3.5 Future Research

The symbiosis of smart mobile devices and wireless networks, and the convergence of mobility, computing and information management, organization and exchange is an emerging subject area of great interest to researchers and fertile ground for future research. The following list details some of the possible avenues of further discovery:

**Mobile Device Behaviours**
- What kinds of mobile device behaviours consumers use in different contexts
- What devices (with what functionality) consumers use
- The level of use of devices, and functionality in particular contexts
- Profiling of mobile device consumers
- What combination of mobile devices are being used and in what contexts

The data can be used to estimate diffusion patterns of behaviours to identify new and increase usage of existing mobile marketing consumers.

**Role of Trust in mobile marketing**
- Trust as it relates to Privacy
- The utility vs privacy trade off
- The role of trust in the adoption / use of mobile applications

**Mobile satisfaction and mobile loyalty**
- Level of consumer mobile marketing engagement and the influence on brand loyalty

320
Attitudes towards M-Marketing
- In different cultural contexts

Perceived Value, Value Creation and relative outcome
- Measurement of the relative outcome value of mobile marketing
- Aligning consumer perceived value with outcome value of mobile marketing
- Comparative studies measuring the effects of mobile marketing compared to other investment opportunities
- The role of mobile partner networks and the wider mobile ecosystem

M-Marketing Tools and Applications
- Application areas of interest for B2C firms, and B2B firms other than advertising or information channels

Mobile Marketing Strategy
- The role of marketing in development and implementation of apps
- Integration of mobile marketing strategy with other elements of the marketing mix
- The barriers and blockers implementing mobile strategy
- What elements of the on-line and off-line marketing initiatives translate to mobile strategy. What elements will be replaced by mobile strategy
- Capturing and leveraging data received from the consumer
Quality of service

- Development of a dedicated, psychometrically sound scale to measure consumers’ perceptions of the quality of service delivered by their apps.

In order to evaluate the effectiveness and efficiency of mobile marketing practices, align it with overall results, and determine the most effective ways of mobile marketing, more empirically oriented research is needed.


APPS IN THE U-SPACE


McGuigan, L. and Manzerolle, V. (2014). All the world’s a shopping cart: Theorizing the political economy of ubiquitous media and markets. *New Media and Society*, 18, pp. 464- 478.


Appendix

Appendix One: Mobile Ecosystem

Figure A1.1: Apple Ecosystem. (Adapted from Judith Vargas, 2012)

The platform for the apple ecosystem is the iOS software (figure A1.1), but the most notable differentiator of the apple ecosystem from the Android ecosystem is that the devices within the apple ecosystem seek to have seamless integration with other apple devices, (this include devices other than Tablets and phones, and apple devices can also integrate with non-apple devices). In the Android (Figure A1.2), ecosystem, however, mobile devices are more open and used by other Original Equipment Manufacturers (OEM’s).
The figures above do not give a full picture of the entire smart mobile device industry, but is a visual tool to describe the major components of the ecosystems of the two major platform players.
Appendix Two: Behavioural theories underlying mobile device usage

Introducing Behavioural Theories.

*Theory of reasoned action*

A general theory that has been applied to explain behaviour beyond adoption of technology, the Theory of Reasoned Action (TRA) is still accepted as a robust model for consumer behaviour (Fishbein and Ajzen, 2011; Madden, Ellen and Ajzen, 1992), and is the most systematic and extensively applied approach to attitude and behaviour research (Rao and Troshani, 2007).

Developed in the 1970’s by Fishbein and Ajzen (1975), the model proposes that a person’s behaviour is determined by the person’s intention to perform the behaviour. This intention is a measure of how much effort the individual is willing to exert into performing the behaviour (Ajzen, 1991), and this intention is influenced jointly by the individual’s attitude (the attitude of individual toward the behaviour or behavioural beliefs), and subjective norms (defined as the person’s perception that most people who are important to them think that they should or should not perform the behaviour in question (Dillon and Morris, 1996). Figure A2.1 below, depicts the model.
The Theory of Planned behaviour (Figure A2.2) extends TRA by adding a third construct: Perceived behavioural control. This construct is a combination of perceived self-efficacy (i.e. people’s belief about their capabilities to exercise control over their lives) and controllability (i.e. situational factors that allow or restrict individuals from performing certain behaviour (Ajzen, 1991)). Developed by Ajzen (1991; 2011) to improve the predictive power of TRA, the reasoning behind the extension was that an individual’s perceived ease or difficulty of performing the particular behaviour is determined by the total set of accessible control beliefs. These control beliefs are about the presence of factors that may facilitate or impede performance of the individuals’ behaviour and stem from self-efficacy theory proposed by Bandura (1977). A decomposed TPB includes constructs such as relative advantage, compatibility, influence of significant others, and risk, which are derived from the innovation diffusion literature, and decomposing the three perceptions in TPB into a variety of specific belief
dimensions. This model offers several advantages over TPB and is considered more complete and management-relevant by focussing on specific factors that may influence adoption and usage (Teo and Pok, 2003).

**Figure A2.2 The Theory of Planned Behaviour (TPB) (Ajzen, 1991)**

Technology Acceptance Model (TAM)

TAM can also be viewed as an extension of the theory of reasoned action (TRA).

According to an authoritative study proposed by Venkatesh et al. (2003), it is possible to distinguish eight theoretical approaches that explain the decisions of adoption and use of Information Technology:

- Theory of Reasoned Action (TRA) (Davis, Bagozzi and Warshaw 1989 applying Fishbein and Ajzen 1975);
- Technology Acceptance Model (TAM) (Davis, 1989, Venkatesh and Davis, 2000);
- Motivational Model (MM) (Vallerand, 1997, Davis, Bagozzi and Warshaw, 1992);
• Theory of Planned Behaviour (TPB) (Taylor and Todd, 1995a applying Ajzen, 1991);
• Integrated TAM and TPB (CTAM-TBP) (Taylor and Todd, 1995);
• Model of PC Utilization (MPCU) (Trandis, 1977, Thompson, Higgins and Howell, 1991);
• Innovation Diffusion Theory (IDT) (Moore and Benbasat, 1991 applying Rogers, 1962);
• Social Cognitive Theory (SCT) (Compeau and Higgins, 1995 applying Bandura, 1986).

These eight theoretical models share a common approach as they consider as key the dependent variable the intention and/or use of technology (Figure A2.3). The objective is, therefore, to understand the phenomenon of the use of information technology. The role of intention as an antecedent of behaviour (i.e. use) is critical and has been extensively analyzed and tested in the literature (Venkatesh et al. 2003).

**Figure A2.3** Common approach of the “user acceptance” models (Venkatesh et al. 2003)
The most relevant model constructs are as follows:

- Perceived usefulness as the degree of conviction of a person about the fact that the use of a particular system increases their level of job performance (Davis, 1989, Figure A2.4);
- Perceived ease of use defined as the degree of an individual's conviction that the use of a particular system is free of effort (Davis, 1989).

The two constructs of perceived usefulness and ease of use impact attitude, which, in turn, drives behavioural intention. In addition, ease of use affects attitude directly (Davis, 1989; Davis, Bagozzi and Warshaw, 1989).

TAM’s advantage is that the two related beliefs can generalize across different settings. Thus, some argue that it is the most robust, parsimonious and influential model in explaining information technology adoption behaviour (Ellot and Loebbecke, 2000., Teo and Pok, 2003., Venkatesh et al., 2003). Since the development of the model, it has received extensive empirical support through validations, applications and replications for its
prediction power (Taylor and Todd, 1995., 1995a., Venkatesh and Morris, 2000a).

The “exclusion of the possibility of influence from institutional, social, and personal control factors” (Dillion and Morris, 1996 p.49) is a major theoretical limitation of TAM. Thus the suitability of the model for predicting general individual acceptance needs to be re-assessed as the main TAM constructs do not fully reflect the specific influences of technological and usage-context factors that may alter user acceptance (King et al. 1994, Taylor and Todd, 1995). In response to this, a number of modifications and changes to the original TAM models have been made.

The most prominent of these is the Unified Theory of Acceptance and Use of Technology (UTAUT), a unified model that integrates constructs across eight models (Dholakia and Dholakia, 2004). UTAUT provides a refined view of how the determinants of intention and behaviour evolve over time and assumes that there are three direct determinants of intention to use (performance expectancy, effort expectancy and social influence) and two direct determinants of usage behaviour (intention and facilitating conditions) (Rao and Troshani, 2007). However, the problem in applying both TAM and UTAUT beyond the workplace and/or organisation for which they were originally created being the primary criticism (Carlsson et al. 2005). This criticism is applicable to mobile services as these are used across the spheres of work, home and leisure of an individual (Rao and Troshani, 2007). Venkatesh and Bala’s work continues with the development of TAM2 and TAM3.