

M-COMMERCE AND THE ELDERLY: THE CURRENT STATE OF AFFAIRS

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ABSTRACT

Electronic commerce is growing rapidly, and mobile electronic commerce is the fastest growing segment of electronic commerce for the population at large. However, this may not be true for the elderly. In this paper we review the literature pertaining to these areas with particular emphasis on elderly use of mobile commerce. We also discuss some impediments to the elderly use of this technology, and conclude with some direction for future research in this area.

INTRODUCTION

Mobile commerce (M-commerce) is growing rapidly as part of the overall growth in mobile telephone use in both developed and developing nations. An ever expanding mobile infrastructure and reasonable service charges are driving mobile telephone use, but the increased use of “smart phones” is driving M-commerce. “Smart phones” connect to the Internet and run specialized software called ‘apps’ which turn these telephones into personal computing appliances. Combine this with growth in technology literacy (computer, Internet, etc.), and an increased acceptance of online shopping, and it is no surprise that businesses are seeking opportunities to expand markets and increase sales via M-Commerce.

The younger generation appears to be leading in this socio-technical-economic phenomenon and the elderly appear to be barely involved. Why are the elderly lagging behind? We explore the participation of the elderly in M-commerce in this paper starting with a brief discussion of mobile telephones and trends in mobile telephone use. Next, we examine the growth of M-commerce, characteristics of the elderly, and other factors that influence their use of technology. Finally we propose some direction for research in this area.

THE CURRENT STATE OF MOBILE TELEPHONY

The growth of mobile phone use is staggering and the market penetration amazing for this relatively new modern convenience. Dr. Martin Cooper of Motorola made the first cellular telephone call on the handset that he invented in 1973 (Bellis, 2011). In 2010 there were about 6.7 billion people on planet Earth and approximately 61% of them were believed to have mobile phone subscriptions (Interesting Statistics, 2010). The International Telecommunications Union estimated that figure to be over 76%, more than double the number of worldwide subscribers reported in 2005 (Key Global Telecom Indicators, 2010). While still lagging North America and Western Europe, the growth in subscription rates is greatest in the developing nations of China

and India where, given the relative sizes of their respective populations, the market potential is substantial to say the least (Key Global Telecom Indicators, 2010).

Not all mobile phones are alike; some are simply telephones, some are what the industry calls feature phones, and some are smart phones. Feature phones provide more functionality than a simple telephone including SMS (texting capability), simple E-mail (less synchronization capability), and perhaps a limited number of pre-programmed applications. Smart phones are small computers and offer a much broader range of functionality including accessing the Internet, synchronizing with one's office e-mail or calendar, playing games, watching movies, banking online, and making online purchases. Many other special and general purpose applications (called apps) have been developed for deployment on smart phones, i.e. "there's an app for that!" Modern smart phones typically have a scaled-down QUERTY keyboard and good quality displays. The increasingly popular touch screen soon to be augmented by haptic technology is dramatically changing the way users interact with mobile devices (HD Haptic Experience, 2011). Broadband Nation (Feature phone vs. smart phone, 2011) makes a simple, functional distinction between the feature phone and smart phone in noting that the feature phone is for those who want to talk and text, and the smart phone is for those who wish to do more. That "more" is increasing all the time! Granted either the feature phone or smart phone might allow one to snap a picture or play music, but smart phones typically do it better and provide the user with many other capabilities for work and personal use. In short, the smart phone experience just keeps getting better all the time, but only if you have one and know how to use it! According to Nielsonwire (2011), smart phone use is poised to overtake feature phone use in the US in 2011. Projections for 2014 suggest that smart phone penetration will be approximately 50% in North America and Western Europe (Singh, 2010). While smart phone penetration is somewhat lower in developing nations like India and China, and in Eastern Europe, South America, and Africa (Singh, 2010), the growth in those areas is particularly important because there the smart phone might be the owner's only computing appliance and means of connecting to the "outside world" via the Internet. The ramifications of improved mobile telephone technology, expanding network coverage, trends in mobile phone penetration, and the ever expanding domain of smart phone use are quite important for M-commerce.

M-commerce is growing rapidly, fueled largely by the rapid spread of mobile devices, economic forces, and by a world "on the go." While some would rightly argue that one can engage in M-commerce with a laptop, netbook, tablet PC, PDA, or similar device, it seems quite obvious given current trends that the mobile phone is becoming the device of choice for engaging in M-commerce, particularly in developing nations (Boadi & Shaik, 2006, Mobile Commerce Opportunities and Challenges, 2008). Tablet PCs like the i-Pad and other similarly portable devices (PDAs, Pocket PCs, etc.) are popular, but are generally a bit more costly than an inexpensive smart phone, particularly when the cost of the network service is included. A 2011 survey by BigResearch (Siwicki, 2011) reported that mobile device users are more inclined than other consumers to research products online using computers or their mobile devices before making a purchase. Advances like smart tags make it quick and easy. BigResearch reported that 38.1% of all U.S. adults researched an apparel product online using a computer or a mobile device before buying it in person within the last 90 days (Siwicki, 2011). In short, online shopping and the use of mobile devices for that purpose is becoming mainstream, whether it be for researching products or the actual purchase of products online.

Mobile Internet access is a major factor in mobile commerce growth. Many Internet users, especially in developing nations like China and India, have personal access to the Internet only through their mobile devices (Kumar, 2011a; Kumar, 2011b), largely because the users cannot afford the more traditional computing devices or broadband service, if such a service is even available in their area. This is a basic premise of the Connect Africa Initiative (Senne, 2008), wherein governments, businesses, and non-profits are working together to increase the availability of hand-held devices and the necessary supporting infrastructure on the African continent. If large numbers of Internet users in those areas are going to engage in commerce online, it will take place in the form of M-commerce. While the rapid growth of M-commerce in the US is impressive, the potential in developing nations is even more impressive. For instance, the number of mobile Internet users in China is projected to be 957 million by 2014 (Elkin, 2010), roughly 3 times the population of the US. Chinese mobile Internet users will not all have smart phones, but even with the more limited capabilities of feature phones, there is significant potential for M-commerce growth.

Around the globe, and particularly in developed nations, the fastest growing segment of the population is the elderly. Declining birth rates in developing nations like China (Branch, 2011) and India (India Birthrate, 2011) are producing similar demographic changes in those countries. The United Nations Population Division projects that, based on current trends, the 65 and older population of the world will, for the first time in history, exceed the age 4 and under population of the world by the end of the decade (Haub, 2011). Projecting those trends out to 2050, it would appear that world citizens 65 and older will greatly outnumber the population of 4 and under. With fewer young people and more old people, the ramifications for marketers should be obvious, but it is not just the relative number of seniors that should interest marketers; it is their money. In the US, seniors represent about one third of the population, yet they possess about two thirds of the disposable income (Marketing to Seniors, 2011). Household expenditures of US seniors over 65 exceed those of youngsters under 25 by about 20%, and those over 65 actually spend more on entertainment and things like recreational travel (discretionary expenditures) than those under 25 (Income, Expenditures, Poverty, 2011). The population and income statistics for most developed nations are similar to those of the US. These basic statistics strongly suggest that seniors should be an attractive market segment for mobile marketers; however, drawing seniors to M-commerce is not a simple task. Older adults differ from the general population in their physical abilities and cognitive processes. Research has shown that older adults experience physical changes like diminished hand strength and dexterity (Carmeli, Patish & Coleman, 2003), and impaired vision (Special Report on Aging and Vision Loss, 2008) as they age, and they are of course more prone to health problems. Older adults likewise experience cognitive changes in speed of recall, memory, information processing speed, spatial cognition and more (Czaja & Lee, 2007), but their crystallized intelligence (knowledge acquired through education and experience) tends to remain stable. In short, they are not less intelligent, but tend to be less efficient in processing information and performing other cognitive tasks. Moreover, while people do experience changes in their physical and cognitive abilities as they age, those changes do not occur in a uniform way for all (Birren & Schoolts 1996; Czaja & Lee, 2007). The physical and cognitive changes that seniors experience as they age have been shown to influence their willingness and ability to access and use computers and related technology (Czaja & Lee, 2002; Czaja & Lee, 2007; Hanson & Crane, 2005). Seniors seem generally less well equipped and less inclined than young adults to utilize mobile phones, and in particular smart phones, for fairly complex tasks.

Marketers already know much about what seniors do with their time, what they buy, when they buy, and how they pay. There is evidence that seniors are becoming more accepting of E-commerce and will buy online (Stambor, 2009; Lee, 2010; Passyn, Diriker & Settle, 2011); however seniors are not participating in M-commerce in a big way and seem largely ignored by key players in the M-commerce—vendors, service providers, etc. Perhaps the reason they are being ignored is largely past research that has shown seniors to be laggards when it comes to embracing new technology (Baggozi & Lee, 1989) or product/service innovations (Uhl, Andrus & Poulson, 1970). What evidence is there that the elderly are being ignored when it comes to M-commerce? In the executive summary of a recent and often cited study conducted by Yahoo and Neilson entitled “The Mobile Shopping Framework Study: The Role of Mobile Devices in the Shopping Process,” absolutely nothing was said about seniors while much was said about young shoppers (Ali, Wong, Meeker & Gill, 2011). In another survey on E-commerce merchants regarding their views on M-commerce and plans to ramp up M-commerce efforts, a merchant respondent indicated that his company was not moving toward M-commerce because the company’s customers were older adults (Monteith, 2010)—the implied assumption that the elderly will not be using M-commerce. If more proof is needed of “elderly neglect” in M-commerce, one need only search for statistics on the web. What stands out is not the statistics on elderly participation in M-commerce, but instead the absence of interest in providing/discussing such statistics. Moreover, while many seniors have mobile phones, research suggests that seniors and baby boomers are more likely to have phones that they feel comfortable using, and those are not smart phones (Stambor, 2009), the very ones best suited for M-commerce. Just how important are the phones in the decision by seniors to engage in M-commerce? That is a question that begs an answer.

Mobile Phones and the Elderly

Seniors as the name suggests are older adults, and research shows that older adults typically have different physical and cognitive abilities than other segments of the population (Birren & Schoots 1996; Czaja & Lee, 2002; Czaja & Lee, 2007; Hanson & Crane, 2005). Considerable research has been done to examine cell phone characteristics and their influence on ease of use. Some of that research actually examines influences on ease use and age. Lin, Hsieh and Shiang (2009) conducted experiments to study to the impact of mobile phone design on users. Two groups were studied, older and younger users. The authors varied hardware and software interfaces and examined differences in subjective convenience. They found that both older and younger participants preferred a duplet hardware interface over a cross interface; however, seniors preferred the page software interface (few options presented on different pages), while younger participants preferred a matrix interface (many options presented in a matrix on a single page). They found also that seniors took more time to perform tasks on the mobile phones than did the young users. The experiments revealed that what works for the young might not work so well for the elderly, and what the elderly prefer can probably be used by young users without any problem, but may not be preferred by them.

Leung, Findlater, McGrenere and Yang (2010) conducted experiments using 16 young people and 16 older adults to examine the impact of multi-layered mobile phone interfaces on learning and use. They concluded that the simple layer of the multi layered interface--the simple layer meaning it was less complex--made it easier for both older and younger subjects to complete tasks in less time and with fewer steps. The elderly fared well with the simple layer in terms of

learning, retention, and completion time, but not so when they moved to the complex layer. The elderly did not fare as well with a single layer interface, one with everything available in one place. With the single layer, the elderly subjects could not complete tasks quickly, learn their way around easily, or retain things well. The problem that elderly users experienced with the multi-level interface can be summed up as follows: the elderly had difficulty remembering what was on menus previously accessed, so they had to spend much time navigating back and forth among the menus to find the right menu for the task at hand. These authors made no attempt to examine the hardware component of the user interface. The authors noted that the elderly benefitted from a user interface that had fewer options in order to limit complexity, but fared better when they did not have to move from menu to menu. They suggested that customizable interfaces that allow the user to place the most used functions at the top of the menu would be helpful, but that rather than having multiple layers, the little used functions/tasks should be placed further down the same menu/screen. In other words, what the elderly used most often should be readily available at the top of the menu system. In so designing the interface seniors could do things faster and with fewer problems. The authors attributed differences in performance on the interfaces (speed, learning and retention), to diminished cognitive and physical abilities in the elderly. No effort was made to control on previous device experience, which could have explained the differences between young and old subject performance in the experiment. The results of this study would appear on the surface to contradict those of Lin, Hsieh and Shiang (2009); however, different variables were manipulated in different ways. The complexity of the multi layered interface was apparently not altered by Hsieh and Shiang (2009), going from simple to complex as it was by Leung, Findlater, McGrenere and Yang (2010), and the nature of the tasks were different in the two studies. What is clear from both of these studies is that the elderly seem to have different needs from younger users with regard to the software interface. The interface should be easy to remember, simple to navigate, and easy to use with frequently needed options preceding all others. While younger users certainly have preferences, interface design does not seem to have the adverse impact on their ability to use a mobile phone quite like it does for seniors. Leung, Findlater, McGrenere and Yang (2010) also noted that older adults not only made fewer mistakes with a simple interface, recovery time from mistakes was shorter. Since high recovery costs have been deemed an important issue to seniors (Birdi & Zapf, 1997), this is an important advantage of the simple mobile phone interface for seniors. Jarvelainen and Vahtera (2010) examined seniors' acceptance of a child care information system designed for use with Mobile phones. The subjects were older females working in the public child care system of Finland. The workers were given smart phones, taught how to use them, and told they had no choice but to use them in interacting with a new information system to remain employed. The authors employed the TAM3 technology acceptance model in examining user acceptance. Their model showed that the attitude toward technology, the mobile phone in this instance, was a relevant variable in acceptance of systems using the technology, the new child care information system. Not surprisingly, when people are given technology, trained in its use, and told to use it or else lose their job, most will use it. The authors expected greater resistance to system use by the older females in this study than they actually observed. Noteworthy here is that one might say use was not voluntary, so while the female users did adopt the smart phone technology necessary to interact with the new information system, they might have behaved differently were they making that adoption decision in the context of personal use. It is noteworthy however that the elderly users in this study were capable of using the smart phones for what seemed like more than just menial tasks.

Hong and Tam (2006) proposed and tested a model of user acceptance of technology for personal use by employing a survey administered to users of all ages via an E-government portal in Hong Kong. The study focused not just on the device, but the service as well. The authors' model, based somewhat on TAM and TRA models, examined the influence of technology features, and individual utilitarian, hedonic and social needs on behavioral intention to use the technology—a multipurpose information appliance (like PDA, smart phone, etc.) in their study. More specifically they looked at how general technology perceptions (i.e. ease of use, usefulness), technology specific perceptions (i.e. service availability, value—costs compared to benefits), demographics (i.e. age and gender), psychological influences (i.e. enjoyment, need to be unique), and social influences (subjective norm in TRA) influenced intentions to use the technology. Particularly noteworthy about their study was the finding that technology specific influences, like service availability, influence general technology perceptions such as perceived usefulness and ease of use, which in turn influence behavioral intention to adopt the technology. Also noteworthy in their study is that they found no influence of age on behavioral intent to adopt the multipurpose information device, and that males were more likely to adopt than females. There were significant differences in the perceived usefulness between men and women, and that might very well explain the gender differences in behavioral intention to adopt—men perceive it as more useful, thus are more likely to adopt. Given the time frame for the survey (research was submitted in 2003), those findings are not particularly surprising and might be different today. Furthermore, the inordinate number of younger users relative to older users (nearly 80% of the sample was under 40) could be the reason why no age differences were found in behavioral intention to adopt. It is also seems noteworthy that, while the need to be unique (psychological influence) did not significantly affect behavioral intention to adopt, there were statistical differences between men and women. Perhaps that psychological influence, the need to be unique, was stronger for women than men. It is possible that, were this same model tested with data from only women, the need to be unique may have influenced behavioral intent to adopt. The authors made a particularly interesting observation that information appliances are not just tools to achieve utilitarian goals or a means to signal social compliance, but instead have become personal accessories tied to one's individual identity (something not shared with others). In a report by Clark and Concejero (2010) about the PRISMA (Providing Innovative Service Models and Assessment) project of the European Union, the authors highlight the important role mobile phones, and in particular smart phones, might play in improving the lives of the elderly and disabled. While they recognize that the smart phone has great potential in delivery of medical services and more, and that the devices could play a role in achieving other broader social goals (independent living, social interaction, better quality of life, etc.) related to the elderly and disabled, they note specific issues to be addressed such as the small size of devices and subsequent difficulty with operating those devices for those with declining/limited physical and cognitive abilities. The authors believe that smart phones and other technology could play a role in preventing or eliminating the so-called digital divide. The authors advocate development of “elderly-friendly” user interfaces and literacy training among other things. They point out other obstacles that must be overcome for mobile phones to play the envisioned role in the lives of the elderly and disabled such as bandwidth limitations, the high cost of such devices, and infrastructure limitations. The report suggests that devices, interfaces and services must be tailored to the needs of the elderly and disabled if the technology is to reach its potential for improving the quality of life for the elderly and disabled. Research by others highlights the

potential for mobile phones to improve the lives of the elderly and others through better healthcare (Boulos, Wheeler, Tavares & Jones, 2011, Kaplan, 2006).

Conci, Pianesi and Zancararo (2009) constructed a model of influences on elderly intentions to use the mobile phone and employed data from a survey to test their model. Their research extended the pTAM model and the work of Kwon & Chidambaram, 2000, Nysveen, Pedersen, & Thorbjørnsen, (2005), and others by introducing additional variables believed to impact senior acceptance of mobile phones. Variables introduced included enjoyment and self-actualization, (comprised what the authors referred to as the “motivational structure”), perceived safety (described as an outcome of mobile phone usage), and support (support was help from friends or family with the mobile phones and described as a facilitating condition). These variables were hypothesized to influence perceived ease of use, perceived usefulness, and through them seniors’ behavioral intention to use Mobile phones, and to influence behavioral intention directly. Perceived safety influenced perceived usefulness, and support influenced behavioral intention to use mobile phones, but was strongly negatively correlated with ease of use. The authors asserted that for the elderly subjects studied, that intrinsic satisfaction with the device influenced extrinsic value, thus behavioral intention to use the technology. Put another way, if seniors enjoyed the mobile phone (hedonic value), they saw it as more useful (utilitarian value), then they were more inclined to use it (behavioral intention to adopt). The authors asserted that support (assistance from friends and family) was a facilitating condition that could influence behavioral intention to use mobile phones, or in other words, seniors would be more likely to adopt if they felt they would have help with it when needed. Social influence (subjective norm in TRA terminology) was found in this study to have similar impact on behavioral intention to use mobile phones as in other studies, directly and indirectly as well through perceived usefulness. Noteworthy here are comments by the authors about the source of social influence for seniors; they asserted that social influence emanated from children and other relatives more so than from friends. The authors also noted what appeared to be an important difference in senior adoption and use of mobile phones as compared to adoption and use of technology in the work place; they asserted that with seniors the need for support continues over time and does not diminish with use like it does for new technology in the workplace where over time and with increased experience the technology the need for assistance diminishes.

Biljon and Kotze (2008) collected both qualitative data and quantitative data in the conduct of a study of user acceptance of technology among young people in South Africa. Their study, which focused on cultural influences in technology adoption, was grounded in numerous accepted theories of technology adoption including TRA, TAM, and UTAUT. The authors made modifications to the UTAUT model to show culture influencing Social influences and to reflect the reality that facilitating conditions differ outside the organizational context as in examining individual intentions to adopt mobile phone. As in UTAUT, the authors’ model distinguishes between determining factors and mediating factors, but in the authors’ model personal factors, demographic factors, and socioeconomic factors differ from those used in the UTAUT model of Venkatesh, Morris, Davis and Davis, 2003. The model of Biljon and Kotze (2008) employs the facilitating factors of cost, infrastructure, and service, which emerged from their interviews as important in the context of mobile phone adoption. Because this study included only young subjects, most under 30 and none over 35, it offers little directly related to elderly mobile phone adoption and use, but their inclusion of culture in the UTAUT model and of facilitating factors like cost, infrastructure, and service, that relate directly to mobile phone adoption and use seem important in the study of mobile phone adoption and use within any group.

M-Commerce Adoption and the Elderly

There is a significant body of literature on M-commerce adoption, but very little that focuses on the elderly. Morris and Minor (2006) examined the antecedents of M-commerce adoption in an effort to understand the impact of demographics and other variables on M-commerce adoption. Actually two studies in one, the authors looked at the relationship between demographic variables (sex, age, income, education, and ethnicity) and the intent to adopt M-commerce, and they examined the relationship between ease of use, convenience, usefulness, and enjoyment and subject attitudes toward M-commerce and at their influence on the intention to adopt M-commerce. Attitude toward M-commerce was not treated as a direct influence the intent to adopt. The authors found no significant differences in attitude toward or intent to use M-commerce related to gender, education, age, or income levels. With regard to the non-demographic influences, ease-of-use, perceived usefulness, convenience, and enjoyment all influenced intention to use M-commerce to varying degrees. Regression analysis revealed that usefulness and enjoyment were most influential (1 and 2 in importance based on R²) among the 4 variables on intention to use M-commerce followed by ease of use and enjoyment in that order. The authors' analysis showed that none of the 4 non-demographic variables were particularly useful in explaining attitude toward M-commerce. The authors posited that both hedonic and utilitarian factors influenced the intention to use M-commerce. Hedonic influences like enjoyment, reflect a focus on the process itself and enjoyment of that process (the shopping experience itself), while utilitarian factors reflect a focus on the tangible outcome of the process—a purchased good or service provides utility.

Gunasekaran and McGaughey (2009) explored M-commerce issues and obstacles and developed a framework for categorizing the same. Obstacles identified by these authors included security, trust, marketing challenges, connection stability, high cost of wireless transactions, mobile device limitations, mobile wireless infrastructure, ethical/privacy concerns, uncertainties of the evolving industry structure, and legal/regulatory uncertainty. Some of these obstacles/issues pertain to the mobile phone itself (hardware and software), some to the network, and some to the services necessary to support M-commerce like those provided by payment intermediaries. Security and privacy concerns relate to devices, networks and services, and marketing challenges pertain to the attracting customers to M-commerce and finding appropriate ways to market goods and services in the M-commerce environment. Some of these issues/obstacles remain salient today the most notable of which are trust, security, marketing challenges and device limitations.

Gao and Koronios (2010) conducted research in Australia aimed at examining to what extent M-commerce providers are targeting the elderly with applications that would be useful to them and improve their quality of life. They noted challenges that governments increasingly face in meeting the needs of this growing segment of the population in most developed and developing nations, particularly in the area of healthcare. The authors' primary goal was to advocate a development methodology for apps to meet the changing needs of seniors. They demonstrated in their exploration of apps available at the time of their study, that most are geared to the young, and that very few are geared to the needs of the elderly. They found that even when medical apps are designed for the elderly, there is little business interest in developing hardware plug and play monitoring components designed for use with Mobile devices. Moreover, the apps that the authors did find were not integrated, so seniors might have to use multiple monitoring apps to monitor critical body systems (respiratory, pulmonary, etc.) rather than one integrated app. An

important observation made by these authors is that not all seniors are alike. They asserted that older seniors likely have very different needs than seniors from the baby boomer generation who tend to be healthier and more tech savvy.

Rehman and Coughlan (2011) examined the role of trust in adoption of M-commerce and proposed a design for M-commerce applications based on accepted HCI (human computer interface) principles. They believed that their ideal system would be trusted by consumers and subsequently adopted by them because of its ease of use and support of secure mobile payments. They felt that those two system characteristics, ease of use and secure payments, contributed to consumers' perception of the system as trustworthy, and that if the system was perceived as trustworthy, consumers would use it. The system design the authors actually proposed was essentially a payment system rather than a complete M-commerce application. The authors indicated that usability, cost, and security, previously identified by Cheong and Tan (2001), were significant challenges faced by consumers interacting with payment systems. Citing the work of Li and Yeh (2009), the authors asserted that customer satisfaction was a main determinant of trust and that usability influenced satisfaction. Rehman and Coughlan (2011) were keenly interested in how M-commerce players might create systems that inspire consumer trust, prove acceptable to M-commerce vendors, and encourage M-commerce adoption and use. An important point made by the authors concerns the complexity of trust: numerous players, namely wireless network providers, device makers, M-commerce vendors, and payment intermediaries, influence consumer trust of M-commerce. The authors listed usability attributes including learnability, efficiency, memorability, avoidance of errors, and satisfaction, thus highlighting the multidimensional nature of usability, or what most researchers call ease of use.

Okazaki (2005) presented an interesting model for M-commerce service classification, based on the work of Nysveen, Pedersen and Thorbjomsen (2005). The model is essentially a matrix that has two dimensions, the nature of the interaction and the motive for use. The interaction can be people interactive or machine interactive, and the motive can be goal oriented (utilitarian benefits) or experiential (hedonic benefits). Services might thus be categorized with the matrix as people interactive and experiential, as would be the case for messaging, or perhaps machine interactive and goal oriented as would be the case for stock trading. He noted that there is much research on M-commerce adoption, but it is also noteworthy that little has been done to address specifically adoption of M-commerce by the elderly.

CONCLUSIONS AND FUTURE RESEARCH

The body of knowledge continues to grow with respect to the elderly use of cellular technology, but is still languishing with respect to the elderly use of M-commerce. More empirical research is needed to determine what mobile opportunities interest this demographic. The elderly continue to grow in numbers and as a proportion of the population, and represent a substantial source of disposable income. We believe that the elderly will become more interested in M-commerce, and that marketers will become more interested in reaching the elderly in this way. Future research should address this gap and how we might best close the gap and include the elderly in this new and exciting area.

REFERENCES

Available upon request from Mark E. McMurtrey.