THE CHALLENGE OF MEETING USERS' REQUIREMENTS OF A MOBILE ACCOUNTING INFORMATION SYSTEM

EUSEBIO SCORNAVACCA
UNIVERSITY OF BALTIMORE
escornavacca@ubalt.edu

BALSAM AL-DABBAGH
VICTORIA UNIVERSITY OF WELLINGTON
balsam.aldabbagh@vuw.ac.nz

ABSTRACT

Due to the rise of adoption of mobile technologies, a New Zealand based firm proposed an interest in extending their online accounting service to a mobile channel. While there is awareness in extending online accounting to mobile devices there is scarce empirical research examining the user requirements and challenges associated with the development of mobile accounting applications. This paper present a research project comprised of two phases: the first phase aimed to elicit users' mobility requirements of an existing online accounting system; while the second phase investigates the extent to which each requirement elicited in the first phase was able to be incorporated by the partner company development team during the development of a mobile accounting application. The paper concludes with a summary of the findings and recommendations for future research.

Keywords: Mobile service, accounting, system requirements, mobile accounting system

INTRODUCTION

Traditionally, accounting was organized in a paper-based manner to "identify, measure, and communicate economic information to permit informed judgment and decisions by users of the information" [4]. Accounting is now an essential function in any organization [16, 45].

Since the late 1960s, Accounting Information Systems have been used by organizations to streamline their accounting functions [18]. The first-generation of Accounting Information Systems enabled accountants to record, store and process data electronically on stationary computers [28]. Most recently, online Accounting Information Systems services have allowed accountants to manage financial information from any networked computer [8, 30]. This is impacting accounting practices tremendously as accountants are no longer dependent on physical data transmissions in form of diskettes or magnetic tapes [40].

In parallel, many industries have developed applications tailored specifically for Internet enabled mobile devices such as the iPhone or Blackberry handhelds [3, 38]. Particularly the financial industry has recognized this trend and nowadays most banks offer Internet banking applications adapted specifically for mobile devices [39].

Accountants rely heavily on time-sensitive financial information [9]. Therefore, it seems reasonable to believe that accountants would appreciate a mobile extension of Internet based accounting services [19]. Extending

Internet based accounting systems could help practitioners to stay informed on their accounting activities while performing other business activities on the move [39]. Figure 1 illustrates the evolution of Accounting Information Systems and its current challenge: can online accounting systems be successfully extended to a mobile channel?
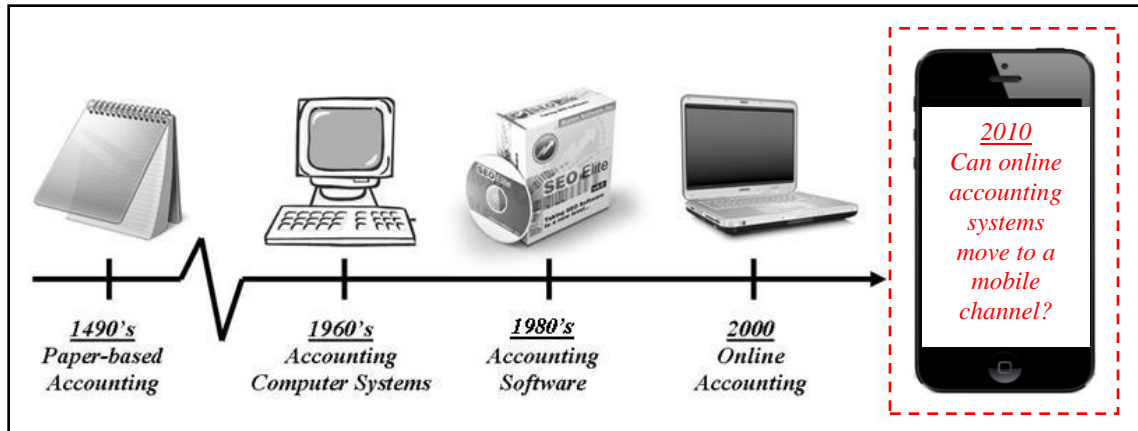

Figure 1: Evolution of Accounting Information Systems

The goal of this paper is twofold: in the first phase, it aims to elicit the perceived mobility requirements of users of an existing online accounting system. In the second, it investigates the challenges of meeting the users' requirements elicited in the first phase encountered by the partner company's development team during the development of an actual mobile accounting application.

The paper is structured as follows: the next section discusses the literature on accounting services and mobile information systems. Then, the research methodology used for this research is explained. Next, the findings are discussed before the paper rounds off with a summary and conclusions.

LITERATURE REVIEW

Initially, an intensive literature review on mobile information systems (mobile IS) was conducted [38]. None of the 1200 articles identified has investigated the perceived mobility requirements of users of an online accounting system. Due to the interdisciplinary character of this topic, an additional keyword search was executed in accounting and business related bibliographic databases such as Proquest and Scopus which did not find any research articles regarding mobile accounting information systems. Therefore, it is believed that the existing literature on accounting services in combination with extant research on mobile IS / mobile services provide a good foundation for this research.

The Evolution of Accounting

The history of accounting starts more than 500 years ago with the publication of Luca Pacioli's "Summa de Arithmetica, Geometria, Proportioni et Proportionalita" in 1494 [6]. For the first 400 years, accountants relied on paper and ink as the key tolls for undertaking their jobs [9].

As technology evolved, accounting services have appeared to profit from it [23]. Starting in the mid-1960's, system designers automated the manual process of accounting and introduced accounting computer systems [18]. Later in the 1980's, the release of IBM's Business Management series introduced accounting software. These accounting information systems achieved new levels of effectiveness and efficiency as they were introduced to record, store, and process data to produce information for decision makers [34].

Most recently, the emergence of the Internet has provided a platform for software as a service such as online accounting systems. This allows individuals to update and retrieve accounting related information from any internet enabled computer systems without having to worry about software installations or data management [19]. Online accounting services have quickly changed the way by which organizations communicate their financial performance to stakeholders [5].

Mobile Information Systems

During the past fifteen years, the convergence of the Internet and mobile communications have nurtured the development of mobile IS [25, 39, 42, 41, 43]. The rapid adoption of mobile devices by consumer markets sparked the development of a series of mobile services such as mobile marketing, entertainment and information services [9, 11, 22, 27, 37].

Financial institutions were one of the first industries to successfully extend their Internet banking applications to a mobile channel [29]. Nowadays, most banks offer Internet banking applications adapted specifically to mobile devices [21, 39]. From a consumer perspective, mobile financial applications are convenient since they allow access to banking services and financial information while being on the move [14]. Organizations appreciate mobile services as they lead to cost reduction, competitive advantage, and allow them to retain or expand the existing customer base [14, 36].

It is important to note that academic research and practitioners alike have frequently pointed out the limited input and display capabilities, perceived financial cost, usability and security issues as being the greatest barriers for the adoption of mobile services [2, 15, 17, 35, 44]. These barriers are important to consider before developing new mobile services.

The following section discusses the methodology taken to collate data for this research.

RESEARCH METHODOLOGY

This research comprised of two phases: The first phase focused on understanding users' requirements for the development of a mobile accounting information system, while the second phase investigates the extent to which the requirements elicited in the first phase were able to be incorporated during the development of the mobile accounting application by the partner company development team. The following section explains in detail the data gathering and analysis procedures for each phase of this research.

Phase One

The sample for this phase was composed by existing users of an online accounting system - for the purposes of the paper it will be called 'AccyPlus'. It was required that each participant had a minimum of 6 months experience with AccyPlus in order to make sure they were confident using the product and were aware of its key functionalities [12]. Users from different industries and roles were conveniently selected in order to represent the population using AccyPlus and to be able to evaluate to what extent requirements changed according to individuals' backgrounds [26].

Following the criteria described above, a list of 28 Wellington based clients of small to medium enterprises was provided by a partner company. Initially each of these selected clients was invited to participate in this research via email. Follow up phone calls were used to contact clients who had not responded within one week from the initial invitation. As a result, 12 clients agreed to participate in the research.

In order to elicit user requirements, data collection was achieved in a qualitative manner using face-to-face, semi-structured interviews [7, 13, 26, 31]. To help gather insights, a questionnaire was designed based on user requirements elicitation techniques [13, 20, 31]. Since this research explored the mobility requirements of a non-established mobile service, it seemed appropriate to borrow the 'scenario-envisioning' element from the BURE model [12]. At the interview, participants were asked to picture using AccyPlus via their favored mobile device and to specify their requirements accordingly.

Another method of user requirements elicitation that guided this research questionnaire was developed by Gerlach and Kuo [10]. Similarly, to elicit a sharper understanding of requirements [10], the research participants for this study were asked to explain their perceptions in a metaphorical manner.

Each interview was recorded and lasted on average 30 minutes. Interviews were subsequently transcribed and put into a matrix for analysis [24]. Sentences or keywords were highlighted to enable data comparison and development of conceptual categories - open coding. Accordingly, the data later went through the process of axial coding to discover any connections between these previously formed groups [33]. Results from this phase were presented to the partner company intended for use during the product's development.

Phase Two

For the second phase of data gathering, follow-up interviews were undertaken with the software developers of the partner company to scrutinize to what extent the previously identified requirements had been met during the development of the mobile application. These interviews took place one year after the results of phase one were presented to the partner company. Interviews were also transcribed and put into a matrix for analysis [24]. During the interviews, the software developers were able to re-examine the set of requirements acknowledged and

compare them with the current status of their mobile accounting information system in place [12].

Results of both phases are discussed in the following section.

RESULTS

This section presents the results for the two phases of this research. Firstly, it identifies the mobile application requirements including the desired accounting functionalities perceived by users of future mobile AccyPlus application. Secondly, it outlines the challenges encountered by the partner company's software developers to meet the requirements defined during the first phase of this research.

Phase One Results

The purpose of this section is to establish and define the mobility requirements of users of an online accounting service. The research participants were asked to imagine they would be able to access AccyPlus via mobile devices such as the iPhone and Blackberries. Laptop computers, tablet PC's and net-books were specifically excluded from this investigation.

Application Requirements and Desired Accounting Functionalities

When participants were solicited to state the accounting functionalities they would perform via a mobile device, they sought after both application requirements and existing AccyPlus accounting functionalities. Table 1 below illustrates these requirements.

Table 1: Desired functionalities for Mobile Accounting Information Systems

Application Requirements
Easy Navigation
Personalized
Simple Tasks
Retrievable Information
Desired Accounting Functionalities
Accounts Receivable
Dashboard – overview of financial position and transactions
Bank Reconciliation
Bank Details
Contacts
Accounts Payable
Reports

In general, users suggested the implementation of accounting tasks that were easy and simple to perform. For instance, Participant 11 commented that it should only be a snapshot of what they can access via a computer: "Mobile is an efficiency tool, it's a snapshot of what I can do on my laptop [online accounting], I don't want to do complex invoicing and price lists…If I'm mobile I'm going to be sitting somewhere cramped, going to be moving, and not going to be there long." Similarly, others participant thought that mobile accounting services should be used simply for the retrieval of information.

Users also revealed the need for personalization of the mobile accounting application. Participant 11 wanted an application customized to his needs: "You could almost have it into a set of tasks of what you want to do in a mobile, so it's my menu." Siau and Shen [43]also suggested that mobile services should be personalized to filter information or provide services in ways appropriate to tailor each individual user. In additional, one participant mentioned that the application to perform "Smart tasks...instead of just a number of links that you would click. I might log in to the home page and click on one link to go and see what needs to be reconciled." Similarly, Pousttchi and Schurig [32] found that users of mobile services required 'One-Click Requests'.

Participants were also able to state existing accounting functionalities that they would exploit via this mobile service. These desired existing accounting functionalities are summarized in Figure 2.

Users were interested in viewing view who owed the business money. As a result Accounts Receivable was commonly selected as a desired functionality while being mobile. Nine out of ten participants recommended that this feature would be essential for mobile accounting information systems.

On the other hand, only two participants regarded Accounts Payable as a desired functionality of mobile accounting systems. Users were generally not interested in finding out who the business owed money to while being mobile. In line with Accounts Payable, reporting (profit and loss statements) was only desired by two participants.

Business owners specifically asked for a 'dashboard' function which should give them an overview of the business financial information simply illustrated in graphs and tables. Participant 5 suggested: *"A Dashboard type functionality just to give you an overview of AR/AP, bank account balances, and also the ability to review an invoice either payable or receivable and make a payment to that or forward it on via email would be really useful."*
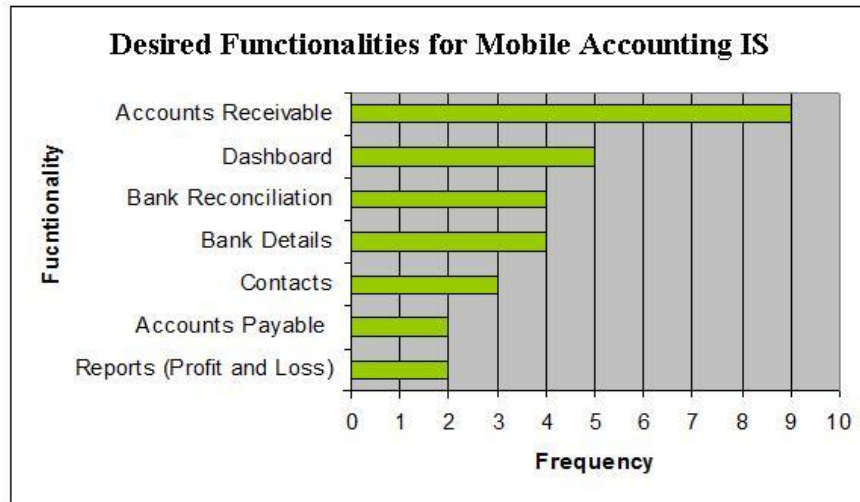
Figure 2: The Desired Existing Functionalities for Mobile Accounting Information Systems

Bank reconciliation was another desired feature of mobile accounting information systems as the participants wished to compare and match figures from the accounting records against those recorded in their bank accounts. Banking details such as account balances and statements were something that participants thought they would also want to check via their handheld device.

Lastly, AccyPlus has a 'contacts' feature which allows its users to save a list of their business contacts. Some participants found that having access to those contacts while on the go is important as it would enable them to be in touch with their business networks anytime.

Possible Constraints of Mobile Accounting Information Systems

The research respondents also mentioned several factors that could potentially constrain the use of mobile accounting systems. Four participants thought that accounting tasks requiring the input of large amounts of information would be difficult to perform on a mobile device. A participant stated: "It's anything that requires big lists or undue amounts of data." Therefore, mobile accounting systems should display a reduced set of information to fit the hardware limitations of mobile IS [15].

It seemed that certain characteristics of mobile IS could form a constraint for mobile AccyPlus due to the existing features in the product. Four participants thought physical characteristics of mobile technologies such as screen size and graphical interface would form a constraint on extending key functionalities of the existing AccyPlus online product to a mobile channel. Conse-

quently, AccyPlus' features (such as the Dashboard and Bank Reconciliation) illustrating data in large amounts of graphs and tables would be challenging to be adapted to mobile devices.

Data transmission speed and security were equally thought of as constraints when implementing mobile accounting as a service. Participants did not discuss the issue of security in detail, however they stressed that the speed of the product or application in particular would raise a challenge in mobile accounting. According to Pousttchi and Schurig [32], security requirements such as encrypted data transmission, authorization of access, and simple authorization were also requested by users for mobile banking services. Security was also a key mobile IS characteristic found by Hoehle and Scornavacca [15].

Required Device Properties for Mobile Accounting Information Systems

The participants were asked to identify mobile device properties required for a mobile accounting system. These are demonstrated in Table 2 along with their level of importance.

The usability of the mobile device was a critical factor sought after by half the participants. Participant 3 suggested that it needs to be easy to use: "I expect the mobile device to be as easy as my computer." Similarly with mobile services, Pousttchi and Schurig [32] found that usability requirements included simple and easy tasks carried out by users. Also, Sarker and Wells [35] propose that manageable navigation and simple menus are more tailored for the uptake of mobile technologies.

Table 2: Key Device Propoerties for Mobile Accounting Information Systems

Required Technical Traits	Level of Importance
High Speed/Connectivity	High
Low Network Costs	Low
High Screen Resolution	Low
Required Physical Traits	**Level of Importance**
Input Interface	High
Screen Size	High

Five users perceived that a large screen size was required in order to perform certain functionalities. The constraint of screen real estate has been known to be an issue with mobile technologies [2]. Although users suggested they would try to avoid accounting functionalities with high input of data, they still thought the mobile IS would require an 'easy-to-use' input interface. Consequently, a large enough keypad that can be easily used to type with is required. The challenges associated with the small size of portable handheld devices have been well documented in the literature [2].

Noticeably, a connection to a network is required to enable access to online accounting from a mobile device. Users were concerned that the slow data connection would lead to delays in performing their day-to-day accounting tasks including downloading and uploading accounting / financial/account statement: In addition the issue of cost was raised by the majority of interviewees [15].

Phase Two Results

The purpose of the second phase was to examine whether the user requirements presented above were able to be met realistically by the AccyPlus software development team. As indicated in the methodology section, follow-up interviews were undertaken with the software developers exploring the challenges encountered during the development of the first version of the mobile accounting application.

Application Requirements and Desired Accounting Functionalities

The degree to which each user requirement was incorporated in the mobile accounting application was assessed by the software development team. The developers were asked to elaborate and provide reasoning to why certain requirements were not met or only partially met. Table 3 summarizes the results.

Table 3: Functionalities Incorporated in the Mobile Accounting Application

Users Requirements	Incorporated	Software Developers' Comments
Easy Navigation	Fully	Navigation is easy for the current application, as the feature set was simple and smaller than the ordinary desktop version. Most of the challenges are based around device size, therefore this was a primary requirement to fulfil.
Personalized	Not	The application is so simplistic right now that it is not worth the development effort to do this. This is an extra feature to look into towards the end of the development of the final version of the application.
Simple Tasks	Fully	Viewing only tasks is what is currently being offered. There was no challenge in the development.
Retrievable Information	Partially	Currently there is no ability to download from the application due to technical challenges, however users can retrieve information successfully only to view.

The next step was to access the degree to which desired accounting functionalities were incorporated in to the mobile application (Table 4). Overall, most user requirements identified in phase one had been met. Challenges such as the physical constrains of the mobile device prevented some requirements from being fulfilled. The software developers also confirmed that lack of resources working on the product's development is slowing down the general progress of the application. However, with the rise of new mobile technologies, the partner company is enthused to introduce enhanced versions of mobile AccyPlus featuring a wider range of user requirements.

Table 4: Desired Accounting Functionalities Incorporated in the Mobile Accounting Application

Desired Accounting Functionalities	Incorporated	Software Developers' Comments
Accounts Receivable	Fully	Users can view their accounts receivable with read only access.
Dashboard	Fully	A simplified dashboard is offered with no rich data such as graphs. This is found to be slightly more functional.
Bank Reconciliation	No	This is a very complex task to perform in a mobile context. Future versions of the product could possibly have this feature.
Bank Details	Fully	Basic set of details are provided including balance, transactions and whether there are items to reconcile.
Contacts	Fully	Users are able to add, synchronize, locate and call their contacts.
Accounts Payable	No	This feature is a book keeping duty that does not fit in the mobile world. Instead, the feature of claiming expenses will be introduced in the future. Users will be able to claim their expenses on the go, and also take a photo of the receipt to add into the invoice details.
Reports	No	Although this is a challenge because of the device size, this is seen to be an interesting feature for the mobile accounting application. At this stage previous requirements are prioritised in terms of importance. Currently the aim is to get a minimum viable product, and then use customer feedback to make enhancements. In the future there are plans for simplified monthly reporting on a business's financial status.

Challenges Associated to Mobile Device Properties

One of the key challenges on extending an existing online application to the mobile medium is the hardware limitations associated with mobile handheld devices [15]. Tables 5 and 6 summarize the challenges encountered by the developers in regards to the technical and physical traits of mobile devices elicited in the first phase.

Table 5: Challenges Faced with Required Technical Traits of the Mobile Accounting Application

Required Technical Traits	Software Developers' Comments
High Speed / Connectivity	This challenge remains. It is a matter of latency where this issue is dependant on the amount of time it takes for data to go over the network. In this case, every request made over the network needs to be compressed. Therefore, the aim is to try and keep the overall size of the application to a minimum so the packets in which data is transferred over the net are kept as small as possible.
Low Network Costs	This is becoming less of an issue now in New Zealand. If the packets of data sent over the network are kept small, then users can keep costs to a minimum. Mobile AccyPlus is however all data, so it needs a high data usage plan.
High Screen Resolution	Most recent mobile technologies have become touch devices and no longer have single pixel precision. Developers now need to make applications accessible with the human thumb. So elements on the screen need to be clear and big enough, touchable with enough gaps in between. All these need to be considered.

Table 6: Challenges Faced with Required Physical Traits of the Mobile Accounting Application

Required Physical Traits	Software Developers' Comments
Input Interface	Certain features in the accounting application require a keyboard and mouse to enter and data and it creates this challenge. It is also important to consider animation in mobile devices – for instance scrolling down a page while using a touch screen technology there is momentum caused. This usability sets expectations and must be maintained with upcoming mobile applications to contain consistency for mobile device users. The current version of mobile Accy-Plus only requires log in details to be input by the user. However future versions of this application should aim at keeping consistency in the way users add information into their application. People are used to a certain way of adding detail in their application, for instance when trying to zoom in, you would expect to pinch in the screen. Users would expect the same in this mobile application. These traits need to be aligned with future versions of mobile Accy-Plus.
Screen Size	This is similar to the requirement of high screen resolution. Device size in general is the key issue. However, it is a matter of good information design on how the application menu and navigation is organised.

The tables above identify some common challenges that mobile applications' developers are still facing. Network connectivity and costs remain an open issue however they are gradually being addressed by the industry. The key physical trait of limited mobile device size has been forming a challenge in creating accessible interfaces. It seems that mobile technologies have started to set expectations for users where features of recent mobile devices are required to be adapted in upcoming mobile applications, to remain consistent with users' current online experience with the product. Although all physical and technical device traits remain a challenge in the mobile application development field, there is clearly a lot of careful consideration and plans being made to work around these barriers.

Initial Receptivity of Mobile Accounting Information Systems

Since the launch of the mobile application, AccyPlus users have been able to access this mobile accounting application through mobile devices such as the iPhone, Blackberry, and all regular mobile phones running Opera Mini – a web browser specifically designed for mobile phones, smart phones and personal digital assistants. From the partner company point of view, the overall perception towards mobile accounting information systems is quite positive despite a low adoption rate within the customer base (approximately 5% by the end of 2010).

While the current initial version of mobile Accy-Plus is very static and very simple allowing read –only access, its users support this application and have provided positive feedback about the product. This, along with the trend of emerging mobile technologies, has motivated software developers to maintain this mobile accounting information system and enhance it along the way.

The current challenge is applying more accounting functionalities in a mobile context. The mobile application is made to enhance the users' experience and have seamless offering between the desktop application and the mobile version. Both products are complimentary and not in competition. There are technical risks involved in this mobile application development. Technology is evolving and requires maintenance and compatibility. The development of mobile applications requires a specific skill set and this has raised the issue of lack of resources available to work on such developments.

There is a shift in the market where mobile technologies are no longer a 'nice to have' but a 'must have' feature. Software developers are stimulated about future mobile application developments. A newer version of mobile AccyPlus is expected to be released early 2011, with more functionalities and targeted for all mobile applications specifically iPhones and Android phones. The product developers predict that by next year, 10% of their customers will be utilizing mobile AccyPlus.

CONCLUSION

Although academic research on mobile IS has produced over a thousand peer-reviewed papers, to the best of the authors' knowledge, this is the first empirical study exploring user requirements and the challenges associated to the development of a mobile accounting software service.

This paper aimed to present an initial point of discussion for system development in this area by combin-

ing an extensive literature review with an empirical investigation of end-users' perceptions towards the desired characteristics of mobile accounting systems as well as the challenges encountered by a software development team when deploying a mobile accounting application.

This study was able to consolidate key required characteristics and functionalities of a mobile accounting systems and explore the issues associated with the deployment of each of them. Some of the general characteristics identified in this research such as easy navigation, personalized and simple tasks are also commonly found throughout the literature on mobile IS [32, 35, 43].

Similarly to the literature, the perceptions captured in this research regarding the constrains associated to a mobile accounting service included: input of large amounts of data, cumbersome navigation, screen size and graphical interface [9, 15, 34, 35]. It seemed that accounting tasks such as viewing and uploading invoices as well as spreadsheets would be constrained by physical limitations of the devices. It was interesting that data security was not mentioned by any of the users as well as the developers, whereas previous literature considers it a key limiting component of mobile technologies [15, 32].

The device properties required for the mobile accounting information system – e.g. high speed connectivity, low network costs, high screen resolution and easy input interface – were proven to bound the extent key accounting tasks and functionalities could be incorporated in the mobile accounting application [2, 17, 35, 44].

The findings described in this research, while generalizable to its peculiar context, must be closely scrutinized in their application to other situations. Each phase of the research was conducted at a singular point in time. The results were drawn solely from the interviewees' perspectives and thoughts.

While providing an initial point of discussion for the development of a mobile accounting system, future research should aim on broadening the scope of this study in order to provide results that are indicative of a broader range of online accounting users, and of other accounting systems. Researchers should specifically approach users of a mobile role to gain a better understanding of the mobility requirements. This research was solely qualitative; therefore a quantitative approach is suggested for testing and validating some of the findings here described [1]. If further investigation on this topic was to continue, this study could be of value and considered a starting base for researchers and particularly for practitioners in the accounting systems development industry.

REFERENCES

[1] Alreck, P. and Settle, R., *The Survey Research Handbook* (3rd ed.), McGraw-Hill, New York, New York, 2004.

[2] Andreou, A.; Leonidou, C.; Chrysostomou, C.; Pitsillides, A.; Samaras, G. and Schizas, C. "Key issues for the design and development of mobile commerce services and applications," *International Journal of Mobile Communications*, Volume 3, Number 3, 2005, pp. 303-323.

[3] Barnes, S. and Scornavacca, S. "Wireless applications in New Zealand Business: A strategic assessment," *The Journal of Computer Information Systems*, Volume 47, Number 1, 2006, pp. 46-55.

[4] Bazley, M.; Hancock, P.; Berry, A. and Jarvis, R., *Contemporary accounting: a conceptual* approach (5th ed), Thomson, Melbourne, 2006.

[5] Debreceny, R. and Gray, G. "The production and use of semantically rich accounting reports on the Internet: XML and XBRL," *International Journal of Accounting Information Systems*, Volume 2, Number 1, 2001, pp. 47-74.

[6] Fischer, M. "Luca Pacioli on Business Profits." *Journal of Business Ethics*, Volume 25, Number 4, 2000, pp. 299-312.

[7] Fouskas, K.; Pateli, A.; Spinellis, D. and Virola, H., "Applying Contextual Inquiry for Capturing End-Users Behaviour*," Paper* presented at the 1st International Conference on Mobile Business, June 2002

[8] Guido L. Geerts, Lynford E. Graham, Elaine G. Mauldin, William E. McCarthy, and Vernon J. Richardson "Integrating Information Technology into Accounting Research and Practice. Accounting Horizons: December 2013, Vol. 27, No. 4, pp. 815-840.

[9] Gelinas, U. and Sutton, S., *Accounting Information Systems (5th ed.)*, South-Western, Ohio, 2002.

[10] Gerlach, J.and Kuo, F. "Understanding Human-Computer Interaction for Information Systems Design," *MIS Quarterly*, Volume 15, Number 4, 1991, pp. 527-549.

[11] Gupta, M. and Goyal, E. (2011) "Applicability of Mobile Learning Engine - Moodle In Computer Application Course" *Journal of Information Technology Management*, Volume XXII, Number 3, 2011, pp 51-58

[12] Hebler, S.; Tuunanen, T. and Peffers, K. "Blind User Requirements Engineering for Mobile Services", *Paper presented at 15th IEEE International Requirements Engineering Conference*, October, 2007.

[13] Hengst, M.; Van de Kar, E.and Appelman, J. "Designing Mobile Information Services: User Requirements Elicitation with GSS Design and Application of a Repeatable Process", *Paper presented at 37th Hawaii International Conference on System Sciences*, January, 2004.

[14] Herzberg, A. *Payments and banking with mobile personal devices*, Communications of the ACM, Volume 46, Number 5, 2003, pp. 53-58.

[15] Hoehle, H. and Scornavacca, E. "Unveiling experts' perceptions towards the characteristics and value proposi-

tions of mobile information systems", *Paper presented at the 7th International Conference on Mobile Business*, July, 2008.

[16] Hussain, M. "The role of management accounting in corporate social responsibility measures: experience with the financial services industry," *International Journal of Business Governance and Ethics*, Volume 2, Number 1, 2006, pp. 129-144.

[17] Jarvenpaa, S.; Lang, K.; Takeda, Y. and Tuunainen, V. "Mobile Commerce at Crossroads," *Communications of the ACM*, Volume 46, Number 12, 2003.pp. 41-44.

[18] Johnson, H. and Kaplan, R., *Relevance Lost: The Rise and Fall of Management Accounting*, Harvard Business Press, Boston, Massachusetts, 1991.

[19] Lin, P. "Web-based Accounting Systems," *The CPA Journal*, Volume 74, Number 10, 2004, pp. 68-69.

[20] Majchrzak, A.;Beath, C.; Lim, R. and Chin, W. "Managing Client Dialogues During Information Systems Design to Facilitate Client Learning," *MIS Quarterly*, Volume 29, Number 4, 2005, pp. 653-672.

[21] Mallat, N. and Tuunainen, V. "Merchant Adoption of Mobile Payment Systems, in Proceedings of the Fourth International Conference on Mobile Business," IEEE Computer Society, Sydney, Australia, 2005, pp. 347-353.

[22] McIntosh, J. and Baron, J. "Mobile commerce's impact on today's workforce: issues, impacts and implications," *International Journal Mobile Communications*, Volume 3, Number 2, 2005, pp. 99 - 113.

[23] R5 E. and Niles, W. "Software that makes computers easier to use," *Journal of Accountancy*, Volume 172, Number 4, 1991, pp. 85-90.

[24] Miles, M. and Huberman, A., *An Expanded Sourcebook- Qualitative Data Analysis*, Sage Publications, Thousand Oaks, California.

[25] Munterman, J. "Automated Mobile Alerting Services - Towards a Level Playing Field in the Financial Community," *Journal of Electronic Commerce Research*, Volume 6, Number 3, 2005, pp. 241-250.

[26] Myers, M., "Qualitative Research in Information Systems". Retrieved March 11th, 2014 from http://www.qual.auckland.ac.nz/

[27] Naismith, L., Lonsdale, P., Vavoula, G., and Sharples, M., *Literature Review in Mobile Technologies and Learning*, Future Lab, Bristol, 2006.

[28] Needle, S. and Hunt, D. "Micros in Accounting," *The Journal of Accountancy*, Volume 162, Number 1, 1985, pp. 86-102.

[29] Ondrus, J. and Pigneur, Y. "Towards a holistic analysis of mobile payments: A multiple perspectives approach," *Electronic Commerce Research and Applications*, Volume 5, Number 3, 2006, pp. 246-257.

[30] Palmer, R. J. and Gupta, R.M. "Technology-Driven Convergence of Business Processes in the Acquisition Cycle: Implications for Accountants and Educators". *Journal of Emerging Technologies in Accounting*: December 2011, Vol. 8, No. 1, pp. 65-87.

[31] Peffers, K., and Tuunanen, T, "Planning for IS applications: a practical, information theoretical method and case study in mobile financial services," *Information and Management*, Volume 42, Number3, 2005, pp. 483-501.

[32] Pousttchi, K., and Schurig, M. "Assessment of Today's Mobile Banking Applications from the View of Customer Requirements," *Paper presented at the 37th Hawaii International Conference on System Sciences*, January 2004.

[33] Punch, K., *Introduction to Social Research Quantitative and Qualitative Approaches (2nd ed.)*, Sage, London, 2005.

[34] Romney, M., and Steinbart, P., *Accounting Information Systems (10th ed.)*, Pearson Education, New Jersey, 2006.

[35] Sarker, S. and Wells, J. "Understanding Mobile Handheld Device Use and Adoption," *Communications of the ACM*, Volume 46, Number 12, 2003, pp. 35-40.

[36] Saxena, A., Das, M. L., and Gupta, A. "MMPS: A Versatile Mobile-to-Mobile Payment System, in Proceedings of the Fourth International Conference on Mobile Business," *IEEE Computer Society: Sydney*, Australia, 2005, pp. 400-405.

[37] Scheepers, H., and Scheepers, R. "Implementing Mobile Technology in Organizations," *Paper presented at the Twenty-Fifth International Conference on Information Systems*, December 2004.

[38] Scornavacca, E., Barnes, S., and Huff, S. "Mobile Business Research Published in 2000-2004: Emergence, Current Status, and Future Opportunities," *Communications of the Association for Information System*, Volume 17, 2006, pp. 635-646.

[39] Scornavacca, E., and Hoehle, H. "Mobile Banking in Germany: a strategic perspective*," International Journal of Electronic Finance*, Volume 1, Number 3, 2007, pp. 304-320.

[40] Scott, R. "Life on the Web," *Accounting Technology*, Volume 22, Number 2, 2006, pp. 16-20.

[41] Serenko, A.; Turel, O.; and Yol, S. "Moderating Roles Of User Demographics In The American Customer Satisfaction Model Within The Context Of Mobile Services". *Journal of Information Technology Management*, Volume XVII, Number 4, 2006, pp 173-185

[42] Sharma, S., and Kitchens, F. "A new approach for mobile communication: web services using flexible services architecture*," International Journal of Mobile Communications*, Volume1, Number 3, 2003, pp. 301-311.

[43] Siau, K., and Shen, Z. "Mobile communications and mobile services," *International Journal of Mobile Communications*, Volume 1, Number 1/2, 2003, pp. 3-14.

[44] Tarasewich, P. "Designing Mobile Commerce Applications," *Communications of the ACM*, Volume 46, Number 12, 2003, pp. 57-60.

[45] Yasin, M., Bayes, P., and Czuchry, A. "The Changing Role of Accounting in Supporting the Quality and Customer Goals of Organizations: An Open System Perspec-

tive," *International Journal of Management*, Volume 22, Number 3, 2005, pp. 323-331.

AUTHOR BIOGRAPHIES

Eusebio Scornavacca is Thompson Professor of MIS and Dean James Chair for distinguished teaching at the Merrick School of Business, University of Baltimore. Prof. Scornavacca has also held academic positions in New Zealand, Japan, Italy and Brazil. His research interests include mobile and ubiquitous information systems, disruptive ICT innovation and electronic surveys. During the past 15 years he has conducted qualitative and quantitative research in a wide range of industries, including research sponsored by the private sector. Professor Scornavacca's research has appeared in journals such as the Journal of Information Technology, Communications of the ACM, Decision Support Systems, Communications of the AIS and the Journal of Computer Information Systems. He is currently chair of the standing committee of the International Conference on Mobile Business—an AIS affiliated conference.

Balsam Al-Dabbagh is a PhD candidate and co-lecturer at the School of Information Management, Victoria University of Wellington, New Zealand. She has had several years of industry experience before returning to academia. Her research focuses on the impact of information and communication technologies (ICTs) on employee productivity.