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Mobile payments: a scoping study of the literature and issues for future research

João Porto de Albuquerque
University of Sao Paulo

Eduardo Henrique Diniz
Escola de Administração de Empresas de São Paulo

Adrian Kemmer Cernev
Escola de Administração de Empresas de São Paulo

Abstract

Despite its huge potential, the use of mobile technology for carrying out payment transactions and replicating monetary features, has only taken off in a limited number of countries. The fact that mobile payment services are not being provided on a worldwide scale, suggests that the reasons for the successful cases are not yet fully understood, and as a result, cannot be easily replicated. This paper seeks to fill this knowledge gap by providing a comprehensive scoping study, which seeks to map out the literature published between 2001 and 2011. An investigation has been carried out of a total of 94 peer-reviewed papers, with the aim of providing a comprehensive picture of the knowledge, production and dissemination about mobile payments. Furthermore, this study includes a detailed analysis of 12 primary case studies on existing mobile payment schemes, as well as a consultation exercise with stakeholders. The main contribution of this study is to provide a clear account of the knowledge that exists on mobile payments. As a result, it has been possible to detect serious gaps in this knowledge base (in geographical, methodological and conceptual areas) and show how future research can make improvements in the field.

Keywords

mobile payment, mobile money

There is a need to analyze the success factors in mobile payments schemes

1. Introduction

With the current ubiquitous deployment of mobile telephony, mobile payment platforms have the potential to change the landscape of monetary transactions. Some authors – e.g. Yang et al. (2012), Kim et al. (2010) – have cited mobile payments as one of the key drivers of mobile commerce, since they make mobile commerce transactions both feasible and convenient. According to the Gartner Group (2012), mobile payment transaction values will surpass $171.5 billion in 2012 worldwide, 61.9% higher than the figure of $105.9 billion in 2011. The same report states that the number of mobile payment users in 2012 reached 212.2 million, an increase of 32.2% over the 2011 figures.

Since access to mobile devices is fairly widespread compared with the much more limited access to traditional financial services, mobile payment is also regarded as a key instrument in improving financial inclusion and lowering the costs of services that are

Corresponding author:
João Porto de Albuquerque, Visiting Professor, Institute of Geography, Heidelberg University, Germany and Professor, Departamento de Sistemas de Computação, Instituto de Ciências Matemáticas e de Computação, Universidade de São Paulo, Brazil. Postal Address: Berliner Str. 48, D-69120 Heidelberg, Germany. Phone: +49 (0) 6221 54-4520 | Fax: +49 (0) 6221 54-4529. Email: jporto@icmc.usp.br Web: http://www.icmc.usp.br/pessoas/jporto; http://www.geog.uni-heidelberg.de/gis/albuquerque.html

offered to the financially underserved people (Alampay and Bala 2010; Duncombe and Boateng, 2010). Indeed, while about 50% of the global adult population have access to formal financial services, the rate of mobile penetration had reached 87% by the end of 2011, with about 6 billion active lines. Thus, if financial services were to be provided through mobile phones, they could (relatively easily and cheaply) reach, people who are currently excluded from formal financial services (Diniz et al., 2013).

Mobile payment platforms are built on an interdependent network of companies which adopt different market approaches and are regulated in specific areas, such as the financial and the telecommunication sectors. In view of this, the establishment and management of these highly complex and interdependent networks makes mobile payment platforms an object of study of particular interest for Information Systems research. The continuous emergence of new technologies, lack of clarity in the regulatory framework, and the need for compliance with the competition rules emerging from the diversified market sectors, are some of the challenges that must be faced when establishing mobile payment platforms. Furthermore, another important factor to be considered is the demand side: the public acceptance of new kinds of payment is closely intertwined with cultural perceptions of money (Yang et al., 2012). As Maurer (2012) points out, people do not simply adopt a new system for value transfer and storage, but adapt to payment systems and seek to modify them as their experience with mobiles and money grows.

Although there are more than 120 mobile payment projects being undertaken in about 70 emerging markets (Beshouri et al., 2010), mobile payment has only become a standard practice in a few countries. The fact that this service is not provided on a worldwide scale despite its huge potential shows that successful cases have not been clearly understood, and as a result, are not easily replicated. This suggests that lessons are not being learnt from the places where the system has been successfully adopted. Furthermore, one suspects that the obstacles to its adoption in most countries are not being investigated in sufficient depth to allow strategies for its implementation that are based on reliable business models. If these issues can be clarified, it will be possible to assess the potential social and economic effects of mobile payment more effectively and hence persuade policy makers to create a regulatory environment that is favourable for digital payments.

In view of the importance of mobile payments, and the comparative lack of knowledge in this field, this paper seeks to provide a knowledge base for mobile payment. This is the result of a comprehensive scoping study, which can serve to highlight significant experiences, and the type of mobile payment models being deployed around the world. Although there are literature reviews that are currently available both in the general context of mobile payments (Dahlberg et al., 2008) and in the field of mobile financing in developing countries (Duncombe and Boateng, 2009), this study focuses on mobile payment (as opposed to mobile financing in general) and lays particular stress on its implications for local development (while not being confined to studies concerned with development or developing countries). This article also updates and expands the existing literature on the subject. Whereas Dahlberg et al. (2008) analysed 73 peer-reviewed papers, and Duncombe and Boateng (2009) reviewed 43 research papers (17 peer-reviewed and 23 non-peer-reviewed), this review examines a total of 94 peer-reviewed papers published between 2001 and 2011.

The remainder of this paper is structured as follows: Section 2 outlines the conceptual background of this study; Section 3 describes the methodology employed. Following this, the results are analysed in Section 4. Section 5 discusses what has been achieved in this investigation and its implications for future research. Finally, Section 6 makes some concluding remarks.

2. Conceptual background

Financial services that are provided by means of digital mobility technologies have multiple configurations, goals, and characteristics. A combination of agents, technologies and objectives enables them to acquire certain banking features, which are known as mobile banking. They may also display the features involved in transaction payments, which are recognized as mobile payments. Finally, they may be able to replicate the concept of digital currencies, which is then called mobile money.

However these concepts are not defined in rigid terms and their boundaries are not very clearly fixed. In fact there is considerable confusion about the terms, which are often used loosely, with a disregard for their original meanings. This is the case with the expression ‘mobile payments’: it may refer to bill payments, acquisition payments, or a transfer of funds

Table 1. Definitions of the main concepts employed in this research study (adapted from Cernev 2010).

Concept	Definition
Mobile transactions	This refers to transactions carried out through mobile devices and other technologies. In addition to making mobile payments, it includes every kind of mobile transaction made possible by technology, whether or not in financial areas.
Mobile payments	Mobile payments include payments that are effected or made possible through digital mobility technologies, via handheld devices, with or without the use of mobile telecommunications networks. These payments are digital financial transactions, although they may not necessarily be linked to financial institutions or banks. There are several models for mobile payments that are currently employed worldwide.
Mobile banking	Mobile banking can be understood as a set of mobile banking services, involving the use of portable devices connected to telecommunications networks. These provide users with access to mobile payments, transactions and other banking and financial services linked to customer accounts, with or without the direct participation of traditional banking institutions. This concept can also be applied to the banking channel through which the digital mobile services are provided by the institutions to their clients, i.e. by integrating the concepts of the service and channel.
Mobile money	Electronic money – since it is essentially digital – has attributes related to mobility and portability, and is equivalent to mobile-money or mobile-cash. It can be differentiated from other means of electronic payment (such as credit cards, debit cards, smart cards, etc.) because of its ability to replicate the essential attributes of traditional money, such as: liquidity, acceptability and anonymity. Mobile money can be operated by means of a 'mobile wallet', which refers to a digital repository of electronic money that is implemented via mobile devices, and allows peer-to-peer transactions (P2P) between mobile devices (M2M) from users of the same service. It is similar to a normal physical wallet and is able to store money and credit and debit cards.

or money between financial agents, as well as being employed in the banking sector. In certain contexts, other concepts might be more precise, such as mobile money, mobile transfer and/or mobile banking. Donner et al. (2008) enumerate even more related terms in this field by pointing out that "m-banking, m-payments, m-transfers, m-payments, and m-finance refer collectively to a set of applications that enable people to use their mobile telephones to manipulate their bank accounts, store value in an account linked to their handsets, transfer funds, or even access credit or insurance products".

The widespread use of these ambiguous definitions has made it necessary to establish an initial conceptual basis, to underpin the literature review. For accomplishing this, we followed the approach developed by Cernev (2010) based on previous work (Jenkings et al, 2008; Laukkanen et al., 2008; Shen, 2011). According to Cernev (2010), to understand the many terms related to financial transactions delivered by mobile devices, four main concepts should be defined: mobile transactions, mobile payments, mobile banking and mobile money. The proposed definitions for these terms are presented in Table 1 and their semantic relationship is depicted in Figure 1.

In this manner, according to Cernev (2010), mobile banking, mobile money and mobile payment are all included in the concept of mobile transactions, which means that any of them is a singular transactional application made via a mobile device (see Fig. 1). Some specific mobile banking transactions are contained in the overlap with mobile payment, since they consist of payment services via mobile devices. This is the case, for instance, of a bill payment made from a banking account manipulated in a mobile device. Similarly, mobile money can be used to make mobile payments, usually by relying upon cash stored in some type of digital wallet, or directly to a merchant, without the use of a banking system.

On the basis of these definitions, the focal point of this study is the concept of Mobile Payment (MP), which is also the term most widely used by practitioners and researchers to study the phenomenon of the mobile means of payment. MP includes the payment operations linked to other concepts (mobile transactions and mobile money, as depicted in Fig. 1), and has the advantage of being more neutral and general and is thus best suited to the goals of our study.

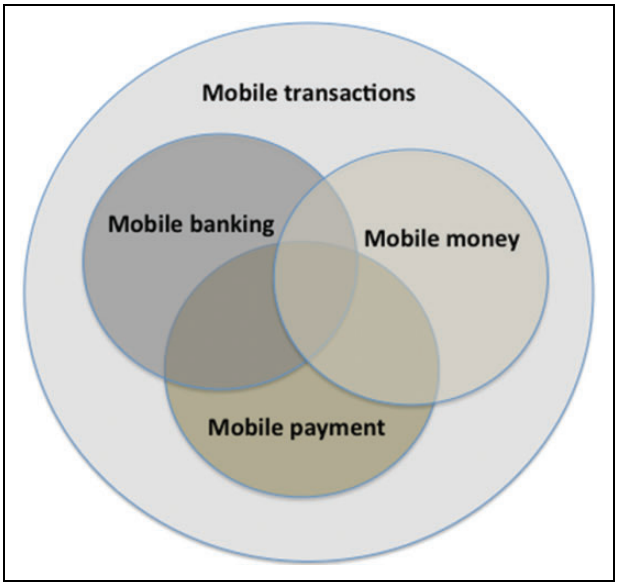

Figure 1. Relationship between the main terms used in the field of financial transactions via mobile devices - adapted from Cernev (2010).

3. Research design and methodology

This study is aimed at mapping out the existing literature in the field of Mobile Payments (MP). Since the existence of MP is a relatively recent phenomenon, a literature review is an opportune moment for offering a 'big picture' of the research studies in the area, so as to identify issues that have not been fully addressed, or need to be further explored in future research (Webster and Watson, 2002).

There are different types of literature review and the terminology used for characterizing them includes terms such as systematic review, meta-analysis, narrative review, research synthesis, and structured review. Recently, researchers have shown a preference for systematic literature reviews (Kitchenham, 2004) and meta-analysis rather than traditional narrative reviews (Bem, 1995; Webster and Watson, 2002). A systematic review generally raises a well-defined question and seeks to provide answers to questions from a relatively narrow range of quality-assessed studies (Arksey and O'Malley, 2005). A meta-analysis involves the use of statistical procedures to integrate research findings from different studies (Hwang, 1996). For this reason, neither systematic literature reviews nor meta-analysis are suited to the broader focus of this study. The objective of this study is better characterized as involving a scoping study or a mapping study (Kitchenham et al., 2011), with the purpose of summarizing a range of evidence and thus being able to convey the breadth and depth of the field (Levac et al., 2010). As such, it aims at examining the extent, range and nature of research activities in MP, as well as identifying gaps and recommending areas for future research (Arksey and O'Malley, 2005). This is a useful means of providing an overview of a subject area and determining whether there are sub-topics which have a sufficient number of primary studies to allow a conventional systematic literature review to be conducted and also of finding sub-topics where further primary studies are needed (Kitchenham et al., 2011).

In this paper, we adopt the methodological framework for conducting scoping studies initially proposed by Arksey and O'Malley (2005) and further developed by Levac et al. (2010) and Daudt et al. (2013). This framework consists of the most detailed and precise methodological guidelines that can be found for conducting scoping studies and is based on an explicit approach, i.e. it is aimed at providing sufficient details about the methods used to enable replication. It consists of six stages (Fig. 2): 1) identifying the research question; 2) identifying relevant studies; 3) selecting the studies; 4) charting the data; 5) collating, summarizing and reporting the results; 6) consultation exercise.

In the sections that follow, we will describe the procedures that we adopted for each stage.

3.1 First stage: Research question

Rather than concentrating on a sharply defined research question, which is a useful means of seeking particular study designs, the scoping study method is guided by the need to take account of all the relevant literature regardless of the study design (Arksey and O'Malley, 2005). The research question chosen for our study was as follows: '*What is the current state of knowledge about Mobile Payment (MP)?'* This can only be answered by investigating studies about MP that are viewed from either a technical, managerial, or social perspective.

This general research question was addressed by defining the following subquestions:

- RSQ1: How much research activity has been carried out in the area of MP?
- RSQ2: What areas are the studies of MP targeted at (i.e. the geographical locations)?
- RSQ3: What types of studies have been conducted on MP (i.e. what are the methodological approaches employed)?

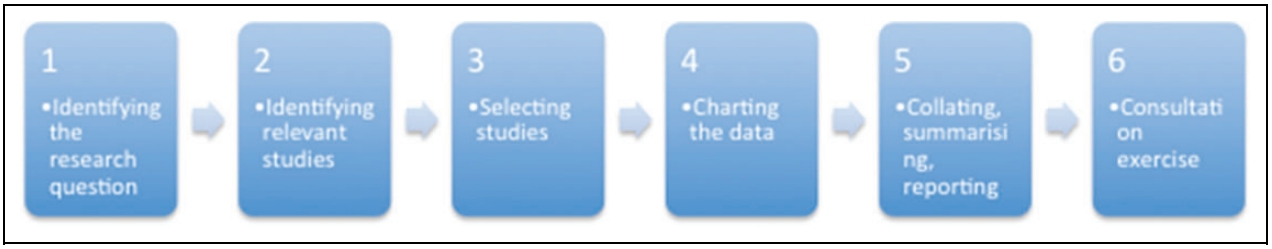

Figure 2. Overview of the stages of this study.

- RSQ4: What are the different thematic areas/application contexts for MP studies?
- RSQ5: What is the theoretical basis that underpins the studies of MP?
- RSQ6: What are the obstacles to using MP?
- RSQ7: What MP case studies have been described in the literature and what can we learn from them?

These high-level research questions are consistent with the common features of scoping studies/mapping studies, where there tend to be a larger number of research questions (compared with systematic reviews), which are usually based on information about publications, rather than research outcomes (Kitchenham et al., 2011).

3.2 Second stage: Identifying relevant studies

The second stage of the methodology involves being as all-inclusive as possible in determining which primary studies and reviews are suitable for answering the central research question (Arksey and O'Malley, 2005). In the pursuit of this goal, the strategy adopted in this review was to locate relevant publications by employing a keyword-based search in the most important electronic research indexes, databases, and digital libraries. As a first step, the terms 'mobile payment' and 'mobile money' were defined as keywords that might be found in the titles or abstracts of relevant peer-reviewed journals and conference publications. These two keywords were chosen based on the conceptual background presented in Section 2. In addition to our preferred term 'mobile payment', the keyword 'mobile money' was used as well due to the aforementioned lack of precision in the use of the terms in the literature and since our previous experience in the field showed that this is a widely-used term by practitioner and research communities when referring to our subject.

The following electronic databases were used as sources for the keyword-based search: ACM Digital Library, AIS Electronic Library – AISEL, CAPES database[1], EBSCO Academic Search Premier, EBSCO ISTA, IEEExplore, INFORMS – Information Systems Research, ISI Web of Knowledge, SCOPUS. Owing to time and budgetary constraints, we included some additional criteria which were that the studies must be written in English and published between August 2001 and August 2011. Although these restrictions had to be adopted for practical reasons, it is worth pointing out that this meant a number of potentially valuable papers might have been missed.

A total of 3386 papers were returned from this initial search. This figure includes papers that are repeated in various sources and contain both keywords. Our initial perusal of the returned papers revealed that most of them deal with the situation in developed countries and rarely address social and developmental issues, which are very important in the context of MP. It has been argued that, in countries where mobile devices are more widespread than bank accounts, mobile technology is an attractive way of solving the problem of access to banking (e.g. Bader and Savoia, 2013). Thus, it makes sense to extend our search to journals that are particularly concerned with ICT for development.

For this reason, another set of 15 journals (listed in Table 2) was selected to cover sources that are not indexed in the databases referred to above, but are closely linked to Information and Communication Technologies for Development. This new set of journals was extracted from the ranking list issued by the University of Manchester[2]. Although there is a risk that this choice might bias the selection made for our paper, this decision is supported by Duncombe and Boateng's (2009) statement that the study of mobile payment in developing countries has received greater attention and grown in importance since the second half of the last decade. The inclusion of these publication venues is also in line with the recommendations of Webster and Watson (2002) that there should be a broad geographical coverage, because in this way,

Table 2. Journals with a specific focus on ICT for development.

	Journal Title
1	African Journal of Information & Communication Technology
2	African Journal of Information and Communication
3	African Journal of Information Systems
4	Asian Journal of Communication
5	Asian Journal of Information Management
6	Asian Journal of Information Technology
7	Electronic Journal of Information Systems in Developing Countries
8	Information Development
9	Information Technologies and International Development
10	Information Technology for Development
11	International Journal of Education and Development Using Information and Communication Technology
12	International Journal of Information Communication Technologies and Human Development
13	International Journal on Advances in ICT for Emerging Regions
14	Journal of Health Informatics in Developing Countries
15	South African Journal of Information Management

the value of the current review can be enhanced with information about the idiosyncrasies of mobile payment projects in societies and cultures that are under-represented in the mainstream journals.

As a result, a new search was undertaken in the journals listed in Table 2 by using the same keywords 'mobile payment' and 'mobile money'. On the basis of this new search, 55 articles were found.

3.3 Third stage: Study selection

This stage consists of screening the articles that resulted from the second stage of the research outlined above, to ensure that only those articles would be selected that came within the scope of the research – i.e. 'mobile payment'. However, an initial examination of the titles and abstracts of the papers showed that despite containing the keywords, many of them are not within the scope of the research (e.g. they only mention the keywords *en passant* whilst discussing a different topic). Thus, we had to define a strategy to filter the relevant papers.

Since it was not feasible to read all the returned papers in full when making this selection, the first step was to analyse the titles and abstracts of the papers, on the basis of inclusion and exclusion criteria. Our main inclusion criterion was whether the paper addressed our research question, i.e. whether the article included 'mobile payment' as a part of the research question, regardless of its research type, methodology or theoretical basis. In the cases where there were doubts about the relevance of a paper in this step, it was included. The exclusion criterion applied consisted of disregarding papers if they included the keywords but their main topic/research question did not include mobile payments (e.g. they were not focused on payment transactions carried out via mobile technologies).

In the next stage, the full texts of all the papers that met the inclusion/exclusion criteria were retrieved for a second round of checking, since many abstracts fail to reflect the real scope of the paper (Arksey and O'Malley, 2005). We were able to acquire copies of all the selected papers and again applied the inclusion and exclusion criteria to all of them. Doubtful cases were discussed with the other authors.

As a result of this filtering process, out of our more than 3,000 references, a list of 94 articles was selected for more detailed analysis, as explained in the following section. The complete list of selected peer-reviewed papers can be found in Appendix 1.

3.4 Fourth stage: Charting the data

This stage of the study consists of 'charting' key information items that have been obtained from the primary research reports being reviewed (Arksey and O'Malley, 2005). In doing so, the first step was to define the dimensions of the analysis, i.e. those through which each of the 94 selected articles would be classified. For this reason, we employed a prepared 'data charting form' using a spreadsheet program, with columns corresponding to the information needed to answer each of the research questions defined in Sect. 3.1 (but excluding RSQ.8 which is handled in Stage 6, see Sect. 3.5). In this way, we included the following fields for each article:

- Author(s), year of publication, centre(s);
- Publication outlet type (journal/conference) and name;
- Target location of the study;
- Application context;
- Methodology;
- Theoretical underpinnings;
- Obstacles faced in the implementation of MP.

Every paper in the entire corpus was analysed by one of the researchers and tabulated in each of the analytical dimensions listed above. This tabulation was conducted by picking quotations from the corresponding paper that matched a certain dimension and/or adding the researchers' own comments. In this way, these analytical dimensions formed a general descriptive scheme, but at this stage the contents of each dimension were flexible and unstructured.

3.5 Fifth stage: Collating, summarizing, and reporting the results

The fifth stage of this study consisted of an analysis of the resulting tabulation and entailed collating, summarizing and reporting the results. This stage of a scoping study should aim at providing an overview of all the material reviewed, but unlike a systematic review, the scoping study does not seek to synthesize the evidence or to aggregate findings from different studies (Arksey and O'Malley, 2005).

As pointed out by Levac et al. (2010), the thematic analysis of the results resembles a qualitative data analysis and can be conducted by using the analytical techniques required for this. We employed a guided approach using an 'accounting-scheme' as suggested by Miles and Huberman (1994, p. 61): We formulated codes inductively that were based on the analysis of the tabulation for each dimension of the general descriptive scheme that was defined in the previous stage. In other words, we used an open coding system for each of the dimensions. The important criteria for the definition of a code were as follows: a) each paper must be assigned to one code (to ensure completeness and exclusiveness); b) the codes should produce significant groupings, i.e. the papers could be put into subgroups that contained other similar papers. The final codification was thus used as a basis for producing the graphics and for drawing the conclusions outlined in Section 4.

One of the goals of a scoping study is to identify subsets of works that can be subject to a more comprehensive analysis (Kitchenham et al., 2011). On the basis of one of our research questions (RQ7) – which was to draw lessons from the existing MP cases – we were thus able to establish a group of studies that involved case studies that were based on empirical evidence. Hence, we performed a detailed analysis of these primary case studies, which follows the recommendations of Levac et al. (2010) and is endorsed by Daudt et al. (2013) to add a stage that resembles data analysis techniques, or a thematic analysis in qualitative research.

Our review of the literature found 12 primary case studies and we read these papers in full with a dual purpose: a) to distinguish thematic clusters in the case studies involving mobile payments; b) to make an assessment of the methodology employed in the studies. For the second part, we used the framework proposed by Duncombe and Boateng (2009), and classified information from the papers regarding the following: the type of data used (qualitative, quantitative, mixed), data gathering methods (interviews, focus groups, etc.), the volume of the data (e.g. number of questionnaires), use of triangulation, source of data (primary and/or secondary), use of methods for improving reliability and validity (e.g. comparison of user and non-user groups), timing (cross-sectional or longitudinal), level of analysis (micro, meso, macro), and the country studied.

3.6 Sixth Stage: Consultation exercise

The final stage of our study consists of a consultation exercise, which was proposed as an optional task by Arksey and O'Malley (2005) as a way of involving key stakeholders so that they could supply information and validate the findings of a scoping study. Levac et al. (2010) argue that the consultation element increases the methodological rigour of the research and should be regarded as an essential component. Daudt et al. (2013) agree with Levac et al. but add a caveat that this must allow room for interpretation of how this consultation should be achieved. They argue that inviting suitable stakeholders to form a part of the research team might be one way to incorporate the consultation. We agree with Daudt et al. (2013) and found this alternative particularly well-suited in our case.

Indeed, our study was part of a larger research project funded by the International Development Research Centre/Canada (IDRC) and carried out by a multidisciplinary research team, which included researchers with a background in information systems, computer science, economics, and business management, as well as members of a non-governmental organization concerned with applied research and practical applications in the field of mobile payments for local development. Hence, we were able to include key stakeholder groups in the study – researchers from different disciplines and practitioners involved in the design and implementation of mobile payment platforms. The consultation

with these stakeholders was carried out by means of a continuous exchange throughout the period of the study, between the authors (responsible for this scoping study) and the other researchers in the project team. The main purpose of this was to share preliminary results, obtain different perspectives and discuss future stages of the research. Additionally, we presented our preliminary findings of the literature review, (together with a review of practitioner publications in the domain), to the scientific community at *GobDev 2011 – 4th Annual Workshop in ICT on Global Development at the International Conference on Information Systems* (Diniz et al., 2011). The feedback from the reviewers and participants of the workshop on content and methods was thus used in the final analysis of the literature that is presented below.

The second important stakeholder group that we identified for our study comprised policy makers and analysts in the field of mobile payments. As Daudt et al. (2013) point out, a strategy that involves each stakeholder group must take into account certain factors about them (e.g. time availability) and in our case, the strategy we employed was only to invite them to take part after we had completed the initial stage, i.e. after the conclusion of a preliminary analysis of the reviewed studies. When this was completed, we invited the stakeholders of this group to join a workshop. In accordance with the suggestions of Levac et al. (2010), this entailed a presentation of the results by the authors, followed by a moderated discussion which was geared towards exploring alternative perspectives, meanings, and insights and assessing the applicability of the results achieved in this scoping study.

The workshop was held at the IDRC regional office in Montevideo in October 2011 and was attended by a select audience comprising 16 people: two IDRC program managers, six members of the research team, and eight representatives of the following external organizations: Office of Planning and Budget (OPP) of Uruguay, National Co-operative Institute of Uruguay (INACOOP), National Food Institute (INDA), National Agency for Electronic Government and Information Society (AGESIC), National Post Office (DNC) and Electronic Stock Exchange (Paraguay) (BEPSA). The authors shared their preliminary findings from the literature review with the stakeholders and asked them if they had found any additional factors related to MP that had not yet been published. Their feedback was used both for analytical purposes (e.g. they suggested a detailed examination of existing case studies), and to point out gaps in the literature (e.g. they missed research into the implications of MP for local development).

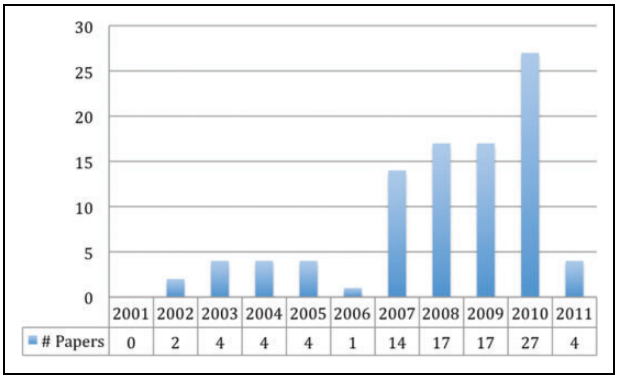

Figure 3. Distribution of the analysed papers over time (n=94).

An additional form of consultation employed in this study emerged from a presentation of the findings and implications of our study during the *4th Brazilian Central Bank Forum on Financial Inclusion*. This was given to an audience consisting of practitioners from the banking, financing and telecommunications sectors, politicians, policymakers, and representatives of social movements and non-governmental organizations[3]. It was thus a valuable opportunity for knowledge transfer and exchange with stakeholders in the field about the results of this study.

4. Results

The following sections outline the results of the scoping study by addressing each of the research questions listed in Section 3.1.

4.1 How much research has been carried out in the area of MP?

Figure 3 shows the number of papers that were analysed for this review in the period from 2002 until the first half of 2011 (although the timeframe defined for the review was 2001–2011, the search results did not include any paper published in 2001). This clearly shows that mobile payment is a recent phenomenon, a fact that is borne out by the significant and continuous increase in the number of publications since 2007. It should be noted that the review was only able to cover the first half of 2011.

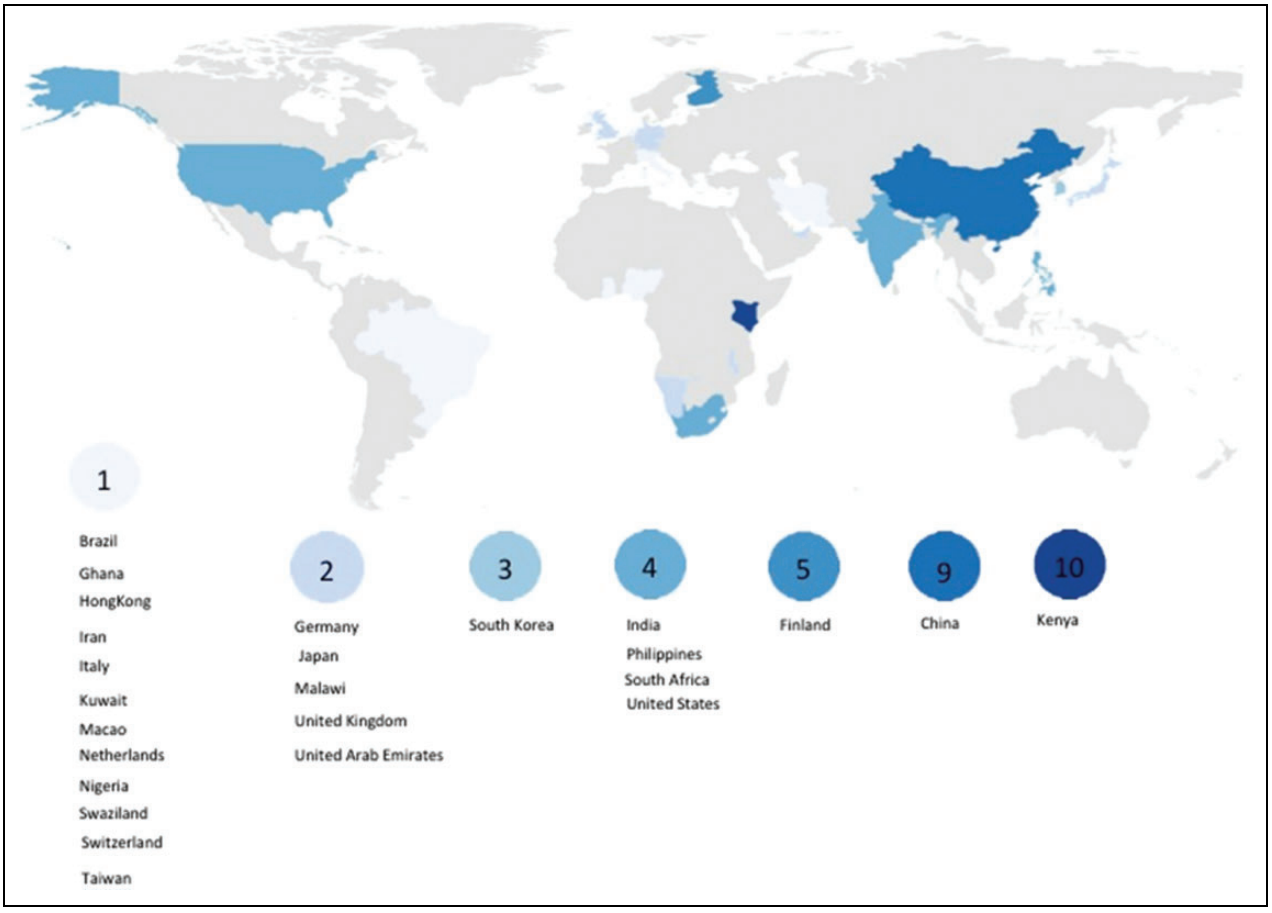

Figure 4. Target location of the analysed studies.

4.2 What areas are the MP studies targeted at?

The analysis of the selected peer-reviewed papers offers some interesting insights into the target location of the studies published in the reviewed papers (Fig. 4). At the top of the list is Kenya with 10 papers, which should not come as a surprise in the light of the success of the paradigmatic M-PESA case. China is second in the rankings, with 9 papers, which can be explained by the large number of Chinese institutions that are active in the area. The list of countries analysed with 5 or 4 papers of the corpus includes Finland, India, the Philippines, South Africa, and USA. The Philippines and South Africa have most likely been included because of their recent mobile money/payment schemes, while Finland, India and USA provide a suitable context for the studies carried out, owing to their large number of centres in the field. It should be pointed out that our attribution of location to a paper is not restricted to a single category – i.e. it can handle two or more location categories at the same time; conversely, not all the papers can be attributed to a location category but only those that mention a specific country/region as their object of study.

Table 3. Location of studies in papers investigated (categorized).

Location	Papers
USA, Europe and Japan	26
Africa	14
Latin America	1
China and India	22
Other Asian/Oceania Countries	21

When the location of the studies that are grouped into categories is analysed (Fig. 4 and Table 3), it can be seen that prominence is given to the situation of developed countries (in the category of countries like Europe/USA/Japan) with 26 papers, followed by a significant number of articles (22) that address today's two largest emerging economies (China and India); additionally, 21 papers study many other

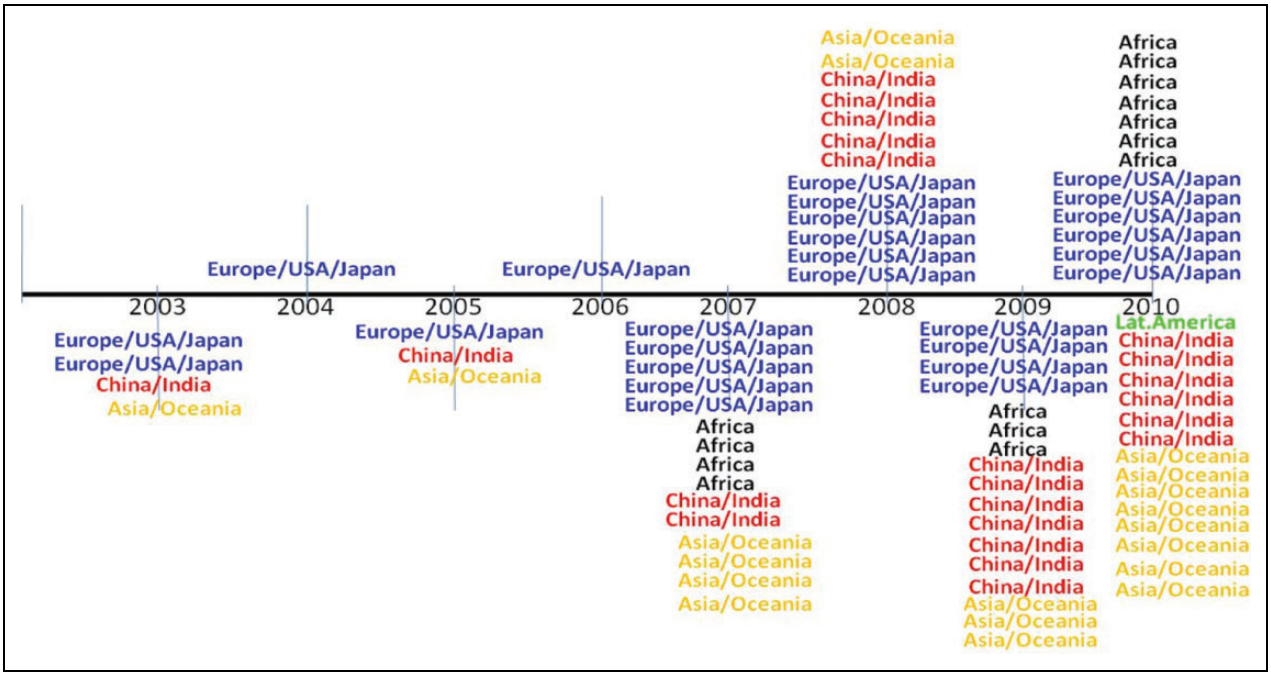

Figure 5. Location of studies over time.

different countries in Asia and Oceania. As regards the situation of developing countries, African countries are cited in 14 papers, while only one of the analysed papers was targeted at Latin America.

Figure 5 shows the distribution of the location of the studies in the papers of the specific period that was analysed, and makes clear that the growing number of studies since 2007 (referred to above) was accompanied by a trend which sought to broaden the spectrum of countries addressed by including more studies on China/India, and other Asian/Oceania countries. One of the notably difficult regions is Africa, which has been included as an object of study in mobile payment/money articles since 2007, probably due to the spread of knowledge about the success of individual cases like Kenya.

4.3 What types of studies have been conducted on MP (i.e. what methodological approaches are employed)?

With regard to the methodology employed (Table 4), most of the peer-reviewed articles that were analysed, consist of essays (i.e. articles that set out and/or analyse a situation in a theoretical manner, without a more extensive discussion of specific cases and/or undertaking other types of empirical research). Other methods that are used by many of the analysed articles include surveys (27 articles) and case studies (24 articles). The latter are subdivided into analyses based on primary empirical research (13 articles) and case studies relying upon secondary data (11 articles). In this context, the term 'case study' is broadly used to cover different types of analysis of specific cases (that mostly refer to countries as units of analysis), but do not always entail rigorous methods.

Table 4. Methodology employed in the studies.

Methodology	Papers	%
Case study: empirical research	12	13%
Case study: based on secondary data	12	13%
Essay	32	34%
Experiment	1	1%
Focus groups	2	2%
Research design: development of new technology / processes	3	3%
Review of existing research	5	5%
Survey	27	29%

Table 5 makes a cross-sectional analysis comparing the methodology employed by the peer-reviewed papers analysed and the location of their objects of study. Here, it is evident that most case studies, whether based on secondary data or on empirical research, were conducted in developed countries (9 in USA/Europe/Japan), although Africa also appears as a frequent location for case studies

Table 5. Cross-analysis methodology vs. location.

Methodology	USA/Europe /Japan	Africa	Latin America	China/ India	Asia/ Oceania
Case study: empirical research	7	4	0	5	3
Case study: based on secondary data	2	4	0	1	2
Essays	7	4	0	6	2
Experiments	0	0	0	0	1
Focus groups	2	0	0	0	1
Design research: development of new technology and/or artefacts	0	0	0	1	0
Essays	7	4	0	6	2
Review of existing research	0	2	1	1	2
Surveys	6	3	0	8	10

Table 6. Key thematic areas.

Context	Papers	%
Consumer Adoption	29	30%
Market analysis	27	28%
MM for the BoP	23	24%
Technical frameworks / approaches	7	7%
Merchant adoption	4	4%
Analysis of failure	4	4%
Technological factors	3	3%

with 8 papers. With regard to the total number of papers on China/India and Other Asian/Oceania countries, although this is closer to that of USA/Europe/Japan (see Table 3), in terms of methodology they are distributed in a different way, since there are relatively fewer case studies on China/India (6 articles) and other countries in Asia/Oceania (5 articles) – in these two latter categories, surveys are more often relied on. It should be added that the complete absence of empirical studies of any kind on Latin America or Arab countries is remarkable.

4.4 What are the different thematic areas/ application contexts for MP studies?

With regard to the main thematic areas investigated by the surveyed studies, the most common issues addressed are consumer adoption, market analysis and mobile money and payment for the poor (see Table 6). Consumer adoption studies are common in the field of Management Information Systems, and seek to determine the factors that may influence the adoption of mobile money/payment technology. As regards Market Analysis, this is a label that covers a wide range of studies that, to some extent, discuss the prospects and patterns of the mobile money/payment market and/or the obstacles it faces.

When the distribution is analysed over a period of time, as shown in Figure 6, it is clear that the use of Mobile Payment for serving the 'bottom of the pyramid' (i.e. for development purposes) was first studied in 2007, and this coincides with the point in time at which research studies began covering typical developing countries (e.g. Africa, see Fig. 3) – a fact that may also be due to the widespread knowledge of the Kenyan case.

4.5 What is the theoretical basis that underpins the studies of MP?

With regard to the main theories drawn on to understand mobile money and payment, the results of Table 7 show that the predominant models for explaining technology adoption rely on well-known theoretical models for the acceptance of technology like TAM and its succeeding variations (TRA, UTAUT, TPB, DTPB). Together these models comprise 28% of the analysed papers, and reflect the (previously mentioned) thematic emphasis on studies about consumer adoption (Table 6). A cause of concern, however, is the large number of papers (44%) that do not resort to any theory (Table 7). This figure reflects the fact that most of the available literature on mobile payment consists of case studies and essays (see Table 5) and is not grounded on a sound theoretical basis.

4.6 What are the obstacles to using MP?

Only a half of the analysed papers mention any obstacles to the implementation of mobile payment

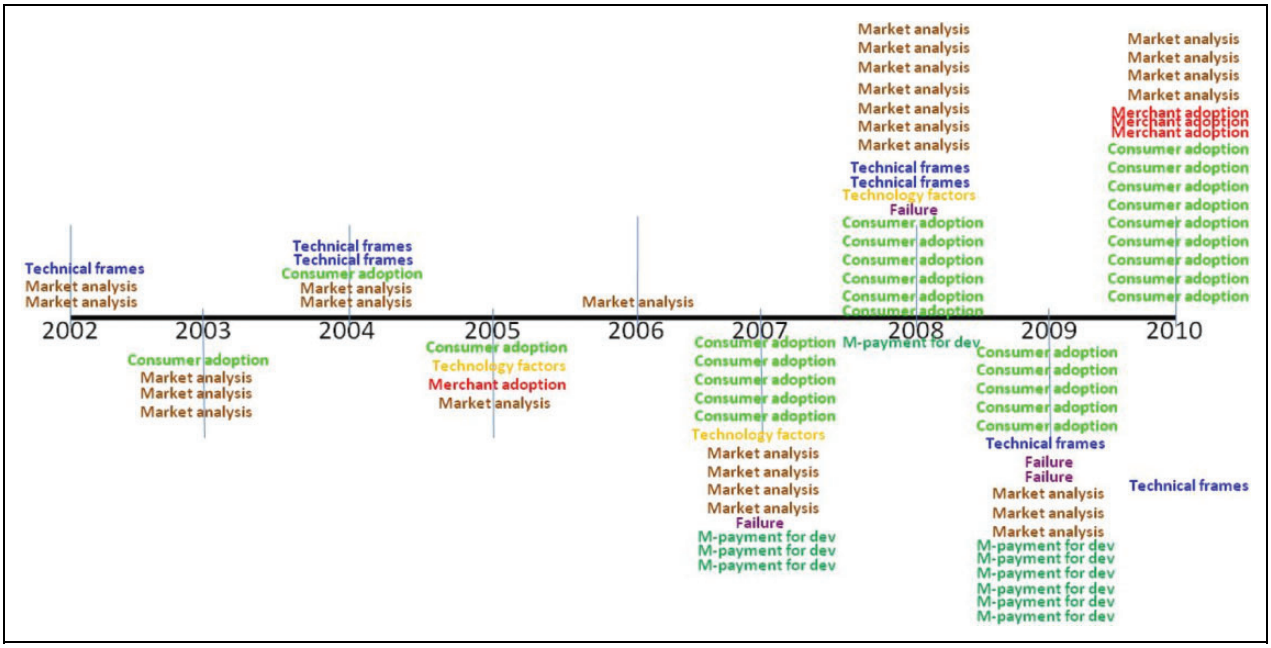

Figure 6. Key thematic areas per year.

Table 7. Theories used in the papers.

Theories	Papers	%
Technology Acceptance Model (TAM)	16	15
One's own theory	14	13
Diffusion of innovations	8	7
Theory of Reasoned Action (TRA)	5	5
Unified Theory of Acceptance and Use of Technology (UTAUT)	3	3
Theory of Planned Behaviour (TPB)	3	3
Decomposed Theory of Planned Behaviour (DTPB)	2	2
Morphological Box	2	2
Resource-based theory	1	1
Revenue management theory	1	1
Delone and McLean IS success model	1	1
Consumer life- cycle theory	1	1
Business model ontology	1	1
Input-process-output theory	1	1
Interpretive/hermeneutic theories	1	1
Game theory	1	1
Maslow's Hierarchy of Needs	1	1
No theory	48	44

schemes. The main drawbacks that are mentioned concern technological issues (e.g. security or interface design) and the unwillingness (of consumers or retailers) to adopt them; each of these factors is mentioned in 16 papers (Table 8). The lack of acceptable standards leading to interoperability problems, and a lack of knowledge of mobile payment are mentioned by 10 papers.

A cross-analysis between obstacles to implementation and location of studies is shown in Table 9. An interesting result is that whereas in papers about developed countries (e.g. USA, Europe, Japan) 'technological limitations' and 'the unwillingness of consumers and/or retailers to adopt it / lack of trust' are most often cited, the studies about African countries put more emphasis on issues like 'regulations' and 'high costs / overheads'.

4.7 What MP case studies have been described in the literature and what can we learn from them?

In this review, we found 12 research papers that include case studies based on primary data from practical mobile payment schemes. Table 10 provides an overview of these papers.

All the papers in Table 10 are broadly concerned with the use of mobile phones as a technology for enabling payment transactions, but there are two papers included that have a somewhat unusual focus. Li et al. (2009) conduct a cross-country comparison of 17 smartcard adoptions for public transport, and thus are not concerned with the use of mobile phones as an enabling technology. However, we decided to keep this paper in our selected sample since our working definition of mobile payment includes smartcards

Table 8. Peer-reviewed papers: obstacles to implementation.

Obstacles to implementation	Papers	%
Limitations regarding technology/ security / user interface	16	18%
Unwillingness of consumers and retailers to adopt it / Lack of trust	16	18%
Lack of Standards / interoperability	10	11%
Lack of knowledge of m-money / m-payment	10	11%
High Costs / Overheads	8	9%
Regulations / Legal framework	7	8%
Problems of Scale / Network Effect	6	7%
Lack of Infrastructure (electricity, mobile coverage, etc.)	5	6%
Lack of cooperation between market players	4	5%
Low Levels of Literacy and Financial Education	3	3%
Other factors	2	2%

(Sect. 2), although generally this technology is far more restrictive and has less potential than mobile phones. The second paper which was included although it does not directly address the question of the use of mobile phones for payment (Lim 2008), is concerned with the role of inter-organizational consortia in defining standards for mobile payment. Since standardization is a key issue in mobile payments, the paper was also included among those selected.

Among the remaining papers that examine the use of mobile payment in the light of the main issues that are explored here, four groups of papers can be distinguished:

- *Market for m-payments* (Ondrus and Pigneur 2006; Ondrus et al. 2009; Balloco et al. 2008): the papers in this group focus on a specific (national) market at the macro-level, and attempt to determine key market factors for the success of m-payment. Whilst Balloco et al. (2008) carry out a largely descriptive study which is not grounded on any particular theory, Ondrus and Pigneur (2006) establish their own framework, although this is based on other existing frameworks (e.g. Technology Acceptance Model) and apply the game theory to gauge a consensus of opinion on the question of market factors for m-payments. On the other hand, when analysing their case studies, Ondrus et al. (2009) juxtapose three different frameworks (based on economic theories, Porter's five forces, and resource-based analysis).
- *Organizational strategy/business value of m-payment* (Boadi et al. 2007; Srivastra et al. 2008)*:* these papers are concerned with typical business management questions (at the meso-level), such as firm strategies and the managerial benefits of mobile payment (e.g. improved efficiency/performance, 'de-intermediation', personalized service for users). Boadi et al. (2009) analyse companies in Ghana that employ a generic framework for m-commerce benefits (cost, communication, convenience), whilst Srivastra et al. (2008) carry out a descriptive case study on the benefits of mobile payments for tourism in the United Arab Emirates.
- *Adoption of m-payment technology*: (Alampay and Bala 2010; Medhi et al. 2009; Ngugi et al. 2010) this group of papers also takes mobile payment schemes as a starting point but examines the adoption of mobile payment technology by individuals (at the micro-level) by relying on surveys involving questionnaire with users. Medhi et al. (2009) do not make any use of an existing framework, whilst Alampay and Bala (2010) use van Dijk's model on the stages of access to digital technologies, to analyse the secondary data of a survey, and to hold focus group discussions. Ngugi et al. (2010) loosely draw on concepts from the Technology Acceptance Model (TAM) and its extension in the Unified Theory of Acceptance and Use of Technology (UTAUT) to find out what factors in the phenomenon of mobile phones and mobile money in Kenya have ensured success. Their study is based on a literature review and a survey.
- *Social aspects of m-payment* (Chavan et al. 2009; Morawczynski 2009): these articles are mainly concerned with examining the needs of mobile payment users at an individual level (micro-level) by means of ethnographic studies and assessing the impact m-payment has had on their lives. Chavan et al. (2009) address how far the specific needs of low-income groups in India should be taken into account when designing mobile payment technology that is based on Maslow's hierarchy of needs (Chavan et al. 2009), whilst Morawczynski (2009) seeks to assess the impact of the strategies adopted

Table 9. Peer-reviewed papers: obstacles to implementation vs. location.

Barriers	USA Europe Japan	Africa	Latin America	China India	Oceania Asia
Limitations regarding technology / security / user interface	6	2	0	3	7
Lack of Infrastructure (electricity, mobile coverage etc.)	0	2	0	0	2
Unwillingness of consumers and merchants to adopt it / Lack of trust	6	2	0	1	5
Lack of acceptable Standards / interoperability	4	2	0	2	3
Regulations / Legal framework	1	4	1	2	1
Problems of Scale / Network Effect	3	2	1	1	1
High Costs / Overheads	4	4	1	1	1
Lack of cooperation between market players	1	0	0	2	0
Lack of knowledge of m-money / m-payment	3	2	0	1	6
Low Levels of Literacy and Financial Education	0	0	0	0	0

for mobile payment users in Kenya on the quality of life and livelihoods of the people.

With regard to methodological issues, we classified the reviewed studies by employing the schema used by Duncombe and Boateng (2009) in Table 10. Most of the reviewed studies adopt a qualitative approach (in some cases combined with quantitative methods) and rely upon data gathered from a variety of methods (interviews being the most common). Somewhat more robust methodological approaches can be found among the studies that are concerned with adoption issues (Alampay and Bala 2010, Medhi et al. 2009, Ngugi et al. 2010). These adopt a mixed quantitative/qualitative approach based on questionnaire research techniques; two of them (Alampay and Bala 2010, Medhi et al. 2009) also take measures to improve reliability and validity (e.g. by making a comparison between the user and non-user groups). There are methodological shortcomings in the remaining papers since few of them use triangulation (either through using multiple research methods or comparing data obtained from different stakeholders) and many do not provide enough information to ensure their findings are representative – e.g. many lack information on the size of the samples, stratification, and coverage. It is also worth noting that the only two reviewed case studies that involve more than one country are concerned with the business value of mobile ticketing (Li et al. 2009) and in investigating the variations in adoption and usage among low-income groups (Medhi et al. 2009).

5. Discussion

This paper has provided a scoping study of the academic literature on the subject of mobile payment and money. As Arksey and O'Malley (2005) make clear, the value and strength of a scoping study is that it provides a rigorous and transparent method for mapping a field of interest, so as to illustrate the volume, nature, and characteristics of the primary research. This information can act as a starting-point for drawing up a research agenda that can be adopted by academics, policymakers and practitioners who are concerned with the subject of mobile payments.

Thus it is hoped that this study has been able to make a significant contribution to understanding this area of study by highlighting the most important issues currently being investigated by specialists in the field with regard to mobile payment. The next sections discuss the results achieved by presenting considerations about the limitations and threats to the validity of this study, the gaps detected in the evidence, as well as the implications for research and practice.

5.1 Limitations and threats to validity

It must be admitted that this study shares some of the limitations that are common to scoping studies. For example, these kinds of review are not able to appraise the quality of the evidence obtained in the primary research (Arksey and O'Malley, 2009) or to aggregate the primary studies in terms of the research outcome (Kitchenham et al., 2011), largely because of the sheer amount of studies covered. As a result, a

Table 10. Methodological approaches of reviewed case studies.

	Authors (Year)	Type of data	Data gathering methods	Volume of data	Triangulation	Source of data	Reliability and Validity	Timing	Level of analysis	Country focus
1	Alampay, E., & Bala, G. (2010)	Mixed	Interviews, Literature Review, Focus group sessions	800 questionnaires	Yes	Primary and secondary	Yes	Cross-sectional	Micro	Philippines
2	Balocco, R. et. al. (2008)	Qualitative	Interviews	n/a	No	Primary	No	Longitudinal (2004 compared with 2006)	Meso	Italy
3	Boadi, R. A. et.al. (2007)	Qualitative	Interviews, Ethnography	29 interviews	No	Primary	No	Cross-sectional	Micro/ Meso	Ghana
4	Chavan, A. L., et. al. (2009)	Qualitative	Ethnography	6 participants		Primary	No	Cross-sectional	Micro	India
5	Li, T., van Heck, E., & Vervest, P. (2009)	Qualitative	Interviews, documentary analysis, e-mail	16 interviews	Yes	Primary	No	Longitudinal (from 1997 to 2006)	Meso	
6	Lim, A. (2008)	Qualitative	Documentary analysis, interviews	26 interviews	Yes	Primary	No	Longitudinal (from Feb-03 to Feb-05)	Macro	
7	Medhi, I., Ratan, A., & Toyama, K. (2009)	Mixed	Documentary analysis, interviews, survey	90 interviews and user studies	Yes	Primary	Yes	Cross-sectional	Micro	India, Kenya, Philippines, South Africa
8	Morawczynski, O. (2009)	Qualitative	Interviews, ethnography	n/a	No	Primary	No	Longitudinal (across 14 months)	Micro	Kenya
9	Ngugi, B., Pelowski, M., & Ogembo, J. G. (2010)	Mixed	Documentary analysis, e-mail survey	102 questionnaires, 67 used	Yes	Primary and secondary	No	Cross-sectional	Micro	Kenya
10	Ondrus, J., Lyytinen, K., & Pigneur, Y. (2009)	Qualitative	Documentary analysis, interviews	n/a	Yes	Primary	No	Longitudinal (results compared with previous research studies)	Meso	Switzerland
11	Ondrus, J., & Pigneur, Y. (2006)	Qualitative	Interviews, focus groups	n/a	No	Primary and secondary	No	Cross-sectional	Meso	Switzerland
12	Srivastra, A. et.al. (2008)	Qualitative	Interviews, Documentary analysis	15 interviews	Yes	Primary and secondary	No	Cross-sectional	Meso	United Arab Emirates

Table 11. Summary of the implications for research.

Types of gaps in the evidence	Description of the gaps	Recommendations for future research
Theoretical/ Conceptual	Socio-economic benefits of MP are taken for granted in most studies in developing countries	Theoretical foundations must be developed for analysing the transformational effects of MP in cost reduction and local development
	There is currently no sound theoretical basis to describe and analyse different mobile payment schemes	Future studies should concentrate on theory building for a more nuanced understanding of the types of business models of MP, the legal issues involved in its implementation, the kinds of technology associated with the particular business models adopted, cultural and commercial conditions required for a model to be disseminated, obstacles that might impede its adoption, gender issues and services etc.
Methodological	Lack of in-depth case studies with methodological rigour	More in-depth primary studies must be conducted on existing mobile payment schemes to provide rigorous evidence on MP arrangements and socio-economic effects at the micro (household), meso (community) and macro (regional/country) levels
Geographical	Most research studies are concentrated on few famous cases; there is a lack of evidence for theory building and evidence-based policy making	Future studies should have a broader geographic coverage in order to achieve a more complete view of the variety of experiences with mobile payment around the world
	Lack of cross-country comparisons	Cross-country comparisons should investigate the differences between obstacles to MP in developed vis-à-vis less developed countries

scoping study does not seek to form a 'synthesis' of the results, but rather provides a narrative or descriptive account of the available research (Arksey and O'Malley, 2009). Systematic reviews or meta-analysis, on the other hand, are usually conducted to make a thorough evaluation of the high-quality studies, largely at the cost of reducing the scope (Kitchenham et al., 2011) and number of studies included in the review (Arksey and O'Malley, 2009). In this study, we have attempted to reach a compromise, by performing a scoping study of the overall scientific literature on mobile payments, whilst also choosing a specific group of papers – namely, primary case studies of mobile payment schemes – for a more detailed analysis.

Furthermore, the threat related to the subjective nature of our classifications cannot be ruled out. Due to the lack of well-established classification frameworks and common vocabularies in the area of mobile payments, as well as lack of conventions for summarizing research (e.g. structured abstracts), determining the type of studies entailed some degree of subjective judgment. However, we attempted to mitigate the subjective bias and improve validity with a two-step classification procedure (i.e. first charting information from the papers, then categorizing, see sections 3.4 and 3.5), as well as by jointly discussing polemical primary studies.

5.2 Research gaps and directions for future work

Our research and analysis revealed some clear gaps in the current knowledge of mobile payments. Table 11 summarizes the implications of the gaps detected in our study and presents suggestions for future research to fill the gaps, which is further elaborated as follows.

Theoretical/conceptual gap. This study confirmed the existence of an important theoretical gap with regard to the central areas of study in the analysed articles. Many of the papers reviewed (44%) do not explicitly resort to any theoretical foundation (Section 4.5). As

for the primary case studies on MP analysed in detail (Section 4.7), they are clustered in groups related to 'market of MP', 'organizational strategy/business value of MP', and 'adoption of MP'. Although there are also a very few in-depth case studies that analyse the social implications of MP for individual users at a micro level, these studies are largely in their initial stages and representative of work-in-progress.

In this manner, most of the MP case studies devote a good deal of attention to areas such as analyses of market forces or 'technology adoption', and are thus restricted to a limited number of theories. Many of the reviewed papers rely on theoretical models like TAM (Technology Acceptance Model) and its variations (see Section 4.5), in an attempt to determine the factors that may influence the adoption of payment by consumers and/or merchants at the micro (individual) level. Although these are important issues that need to be addressed, these studies tend to neglect other important contextual and institutional factors, such as regulation and socio-economic implications. As a result, there is currently no general theoretical framework that would allow describing and analysing the main features and implications of different mobile payment schemes.

For instance, in many of the studies analysed, it is taken for granted that the financial inclusion of the unbanked poor social classes is a socio-economic benefit that accompanies MP. However, we could not find a case study that carries out an in-depth empirical investigation of mobile payment for society/communities (local development) nor a theoretical model that could explain its effects. Thus it can be inferred that the consequences of mobile payment for local development are mostly taken for granted as an expected outcome, but not analysed and evaluated in detail. This is especially remarkable in the light of the expected transformational effects resulting from mobile payment, e.g. the provision of banking services to new users, the expansion of economic opportunities, and its implications for local development. Hence, this is an important direction to be pursued by future research efforts for advancing theorizing in the field of mobile payments.

Among the many questions in the area of mobile payment studies that require answers by future efforts in theory building, the following should be highlighted: the types of business models for MP, the legal issues involved in its implementation (whether successful or unsuccessful), the kinds of technology associated with the particular business models adopted, the cultural and commercial conditions required for a model to be disseminated, an analysis of the telecommunications and banking market, obstacles that might impede its adoption, gender issues.

Methodological gap. The analysis of these case studies has revealed that the information provided by the reviewed studies is a valuable means of shedding light on different aspects of the mobile payment phenomenon, even though it is clearly insufficient to provide a solid basis for more general theorising and for evidence-based policymaking. Furthermore, there is a noticeable lack of in-depth case studies that closely analyse the wider socio-economic implications (i.e. at the meso-level of communities and macro level of countries) of practical mobile payment schemes.

This matter was of particular concern for the stakeholders with which we interacted during the consultation phase (see Sect. 3.9). They stated that there was a need for future studies to evaluate the success of MP schemes not only by relying upon technical factors, market share, or the size of the achieved user base, but by providing rigorous evidence of the effects of reducing the total transaction costs and fostering local development.

Geographical gap. Analytical research in the literature is concentrated on only a few regions/countries, with a clear emphasis on Kenya and the Philippines. Our results thus confirm the claim made by Duncombe and Boateng (2009) that the available number of case studies based on primary data is small and geographically concentrated. Since, at present, there are mobile payment schemes spread throughout the world (Beshouri et al. 2010), this fact cannot be attributed to a lack of schemes available for study. Rather, the findings of this study show that most research studies are concentrated on a few mobile payment projects that have become famous and established, and thus more recent and smaller projects have been neglected. This means there is evidence of a serious geographical gap in the literature. Furthermore, there is a lack of primary multiple case studies with cross-country comparisons of mobile-payment schemes that can be used to illustrate the different institutional arrangements, business models, and particular contextual issues that mobile payment entails.

The importance of the geographical gap that has been detected in this study is reinforced when account is taken of the analysis of the obstacles faced by the MP projects mentioned in the literature (Sect. 4.6).

Our results show that whereas in primary studies about developed countries the most serious obstacles arise from technological limitations and the problems of adoption by consumers/retailers, research into less developed countries tends to emphasize regulation issues and costs as being the main constraining factors. However, since there are only few primary studies and a lack of cross-country comparisons, the current evidence is not sufficient to enable comparative investigations to be carried out. A broader geographic coverage is thus important for future studies as well as involving a wide range of countries, so as to investigate the underlying causes of the perceived differences in MP in developed vis-à-vis less developed countries.

5.3 Implications for research and practice

By analysing a broader timeframe and larger number of studies than the previous related study of Duncombe and Boateng (2009) – which only reviewed 43 papers, in contrast to our 94 reviewed studies – we were able to confirm some of their results, whilst also complementing their findings. In particular, our analysis was able to identify interesting differences between obstacles found in studies on developed countries in comparison to developing countries (Section 4.6). Furthermore, different groups of case studies on MP could be identified (Section 4.7), thus helping to better characterize the current streams in the scientific research about mobile payments.

Even though our analysis was of an altogether different and more comprehensive sample, the gaps that were detected in our study were similar to those found by Duncombe and Boateng (2009). This implies that further research is still needed to fill the gaps and improve the knowledge base on MP. It is thus hoped that the results of this study (summarized in Table 11) can serve as a baseline for future research endeavours in this direction.

An example of a research area that can be addressed by researchers is the current experience of financial inclusion brought about by branchless 'correspondent' banking networks. These were successful in providing alternative payment channels for the poor classes in countries like Brazil, Colombia and Peru, for example, long before mobile payment models were employed on an international scale (Diniz et. al. 2011; Mas 2009; Kumar et. al. 2006). Although unlike each other in many ways, what the 'correspondent' and mobile payment systems have in common is that they all require a complex web of relationships among a wide range of players so that they can provide financial services to an underserved part of the population, which is at the same time supported by a strong regulatory environment. Understanding the process of building such a complex network of relationships can be helpful for researchers in this area in at least two ways: first to encourage an analysis of the interactions of the different actors, which is fostered by this complex network in countries in the region; and second, to seek opportunities to include the use of mobile devices in the 'correspondent' model, since it is still based on a system of cash payments, which is clearly an inefficient method that must be superseded.

As for implications for practice, the gaps found in the literature may also help to explain why a service with such a huge potential as mobile payments, has not spread throughout the world. The reasons for this failure can be attributed to the following factors: (a) the fact that successful cases are not clearly understood, and as a result, are not easily replicated; (b) the fact that obstacles have arisen and that in most countries, unsuccessful cases are not being investigated in sufficient depth to allow strategies for their implementation to be based on reliable business models; and (c) the fact that their potential social and economic effects are not being assessed properly with the result that policymakers are not convinced of the need to invest heavily in fostering the kind of regulatory environment that is suitable for digital payment. Hence, the present study points out to the need of carrying out a detailed analysis of the existing mobile payment schemes to determine the key factors that can ensure success (and determine which business models are most suitable) so that they can be better designed and made acceptable on a worldwide basis.

6. Concluding remarks

This paper has conducted a scoping study of the academic literature regarding the important question of mobile payment. After conducting a search of significant sources to discover who is publishing what (the related topics), how (methodologies) and where (the countries studied, journals and databases), this study has provided a comprehensive picture of the knowledge, production and dissemination of mobile payments around the world. Moreover, our study included a consultation exercise with key stakeholder groups and a detailed analysis of 12 primary case

studies that give an account of mobile payment schemes. On the basis of our results, we found serious gaps in the extant literature and suggested directions for future research in the field.

What has emerged is a scenario that can be regarded as the dawn of a new era for investigating the question of mobile payments. In view of the recent history of this subject-area, this can be expected. Similarly, answers to the questions raised here must be found to ensure that mobile payment really 'takes off', as everybody involved in this market believes it is bound to happen in the near future, and money as we know it today, will soon be largely handled by electronic devices. Moreover, this trend should be welcomed for the sake of social and economic development and to benefit a large section of the public.

Appendix 1 – Analysis of peer-reviewed literature

#	Name	Author(s)	Year of Publication	Journal/Conference
1	Toward an understanding of the behavioral intention to use mobile banking	Luarn, P; Lin, H	2005	*Computers in Human Behavior*
2	The role of technological and social factors on the adoption of mobile payment technologies on the adoption of mobile payment technologies	Lee, Cheon-pyo; Warkentin, Merrill	2004	*MIS Quarterly*
3	Mobile payment industry: Toward a comprehensive research model	Amoroso, Donald L	2010	*Annual Conference of Japan Society for Management Information 2010 Autumn*
4	A comparison of mobile payment procedures in Finnish and Chinese markets	Zhong, Junying	2009	*Proceeding of the 22nd Bled eConference eEnablement*
5	Information capability and value creation strategy: Advancing revenue management through mobile ticketing technologies	Li, Ting; van Heck, Eric; Vervest, Peter	2009	*European Journal of Information Systems*
6	Customer satisfaction with cell phone banking in South Africa	Brown, Irwin; Licker, Paul	2010	*AMCIS 2010 Proceedings*
7	Evaluating the role of trust in consumer adoption of mobile payment systems: An empirical analysis	Chandra, Shalini; Srivastava, S.C.; Theng, Y.L.	2010	*Communications of the Association for Information Systems*
8	Exploring consumer adoption of mobile payments – A qualitative study	Mallat, N	2007	*The Journal of Strategic Information Systems*
9	Why mobile payments fail? Towards a dynamic and multi-perspective explanation	Ondrus, Jan; Lyytinen, Kalle; Pigneur, Yves	2009	*42nd Hawaii International Conference on System Sciences*
10	Incorporating m-commerce into organizational strategy: A case study in the tourism sector	Srivastra, A.; Tassabehji, Rana; Wallace, D.J.	2007	*AMCIS 2007 Proceedings*
11	Intention to use mobile commerce: A demographic analysis of the Chinese market	Dai, Hua; Singh, Rahul; Iyer, Lakshmi	2007	*AMCIS 2007 Proceedings*

(continued)

Appendix 1. (continued)

#	Name	Author(s)	Year of Publication	Journal/Conference
12	Agent enabled composition of Services bundles for m-commerce applications	Leary, Thomas	2004	*AMCIS 2004 Proceedings*
13	A risk assessment framework for mobile payments	Clark, Roger	2008	*BLED 2008 Proceedings*
14	Lost opportunity why has dominant design failed to emerge for the mobile payment services market in Finland?	Dahlberg, Tomi; Huurros, Milla; Ainamo, Antti	2008	*Proceedings of the 41st Annual Hawaii International Conference on System Sciences (HICSS 2008)*
15	Understanding changes in consumer payment habits-do mobile payments and electronic invoices attract consumers?	Dahlberg, Tomi; Oorni, A.	2007	*System Sciences, 2007. HICSS 2007. 40th Annual Hawaii International Conference on*
16	The industry chain of mobile payment and its future development mode	Zexi, A.; Xuecheng, Y.; Tong, W.	2010	*Communication Systems, Networks and Applications (ICCSNA), 2010 Second International Conference on*
17	The importance of trust and risk in m-commerce: A South African perspective	Joubert, Janine; Van Belle, J.P.	2009	*Pacific Asia Conference on Information Systems*
18	Current mobile payment procedures on the German market from the view of customer requirements	Pousttchi, K.; Zenker, M.	2003	*14th International Workshop on Database and Expert Systems Applications, 2003. Proceedings.*
19	Merchant adoption of mobile payment systems	Mallat, N.; Tuunainen, V.K.	2005	*International Conference on Mobile Business (ICMB'05)*
20	An exploratory study of information systems resistance: The case of mobile banking systems in Korea and Finland	Lee, Cheon-pyo; Mattila, Minna; Shim, J P	2007	*AMCIS 2007 Proceedings*
21	Empirical research of mobile payment user behavior based on perceived risk	Xianfeng, Wu; Jihong, F.	2010	*Communication Systems, Networks and Applications (ICCSNA), 2010 Second International Conference on*
22	User acceptance testing of mobile payment in various scenarios	Ho, Henry; Fong, Simon; Yan, Zhuang	2008	*2008 IEEE International Conference on e-Business Engineering*
23	Research on mobile payment in the e-commerce	Li, Yunhong; Luo, Siwen	2008	*2008 International Conference on Management of e-Commerce and e-Government*
24	A proposal for a multi-perspective analysis of the mobile payment environment	Ondrus, J.; Camponovo, G.; Pigneur, Y.	2005	*International Conference on Mobile Business (ICMB'05)*
25	Analyzing the elements of the business model for mobile payment service provision	Pousttchi, Key; Schiessler, Max; Wiedemann, Dietmar G.	2007	*International Conference on the Management of Mobile Business (ICMB 2007)*
26	Mobile payment applications: An exploratory analysis of the Italian diffusion process	Balocco, Raffaello; Ghezzi, Antonio; Bonometti, Giuseppe; Renga, Filippo	2008	*2008 7th International Conference on Mobile Business*
27	A study of mobile payment mode in u-commerce	Qiang, Yan; Lu, T.	2008	*Wireless Communications, Networking and Mobile Computing, 2008. WiCOM'08. 4th International Conference on*

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#	Name	Author(s)	Year of Publication	Journal/Conference
28	A study of major mobile payment systems' functionality in Europe	Mohammadi, Shahriyar; Jahanshahi, Hediye	2008	*2008 11th International Conference on Computer and Information Technology*
29	Research on the influence of mobile payment and its industry chain on customer value	Lu, Xiang; Shu, H.	2009	*Management and Service Science, 2009. MASS'09. International Conference on*
30	Mobile payment: A journey through existing procedures and standardization initiatives	Karnouskos, S.;	2004	*Communications Surveys & Tutorials, IEEE*
31	Consumer acceptance of mobile payments: An empirical study	Suhuai, L.; Peter, S.	2010	*New Trends in Information Science and Service Science (NISS), 2010 4th International Conference on*
32	Mobile payment: An exploratory study of customer attitudes	Petrova, Krassie; Mehra, Ridhima	2010	*2010 6th International Conference on Wireless and Mobile Communications*
33	Are mobile payment and banking the killer apps for mobile commerce?	Hu, Xianpei; Li, Wenli; Hu, Qing	2008	*Proceedings of the 41st Annual Hawaii International Conference on System Sciences (HICSS 2008)*
34	Study of mobile payments system	Zheng, Xiaolin	2003	*Proceedings of the IEEE International Conference on E-Commerce (CEC'03)*
35	Issues in mobile e-commerce	Tarasewich, Peter; Nickerson, R.C.; Warkentin, Merrill	2002	*Communications of the Association for Information Systems (Volume 8, 2002)*
36	M-PESA: Mobile money for the 'unbanked' turning cellphones into 24-hour tellers in Kenya	Hughes, Nick; Lonie, Susie	2007	*Innovations: Technology, Governance, Globalization*
37	The failure of mobile payment: Evidence from quasi-experimentations	Rouibah, Kamel	2009	*Proceedings of the 2009 Euro American Conference on Telematics and Information Systems: New Opportunities to increase Digital Citizenship*
38	Mobile money transfer services: The next phase in the evolution in person-to-person payments	Merritt, Cynthia	2010	*Retail Payments Risk Forum*
39	Comparative study on m-commerce applications in various scenarios	Fong, Simon; Yan, Zhuang	2008	*2008 IEEE/WIC/ACM International Conference on Web Intelligence and Intelligent Agent Technology*
40	A scenario-based analysis of mobile payment acceptance	Goeke, Laura; Pousttchi, Key	2010	*2010 Ninth International Conference on Mobile Business and 2010 Ninth Global Mobility Roundtable (ICMB-GMR)*
41	A study on the success potential of multiple mobile payment technologies	Mathew, Mary; Balakrishnan, N.; Pratheeba, S.	2010	*Technology Management for Global Economic Growth (PICMET), 2010 Proceedings of PICMET'10:*
42	Developing an analytical framework for mobile payments adoption in retailing: A supply-side perspective	Lai, P.M.; Chuah, K.B.	2010	*2010 International Conference on Management of e-Commerce and e-Government*
43	Mobile banking services	Mallat, Niina; Rossi, Matti; Tuunainen, Virpi Kristiina	2004	*Communications of the ACM*

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Appendix 1. (continued)

#	Name	Author(s)	Year of Publication	Journal/Conference
44	Mobile commerce at crossroads	Jarvenpaa, S.L.; Lang, K.R.; Takeda, Y. Tuunainen, V.K.	2003	*Communications of the ACM*
45	Ranking secure technologies in security provision financial transactions mobile commerce	Saghafi, Fatemeh; NasserEslami, Fatemeh; Esmaili, Maryam	2009	*Proceedings of the 2nd International Conference on Interaction Sciences Information Technology, Culture and Human - ICIS '09*
46	Study on consumer demands and merchant participation motives of mobile payment services in China	Xinyan, Zhao; Wei, Ge; Tingjie, Lu	2009	*Proceedings of the 2nd International Conference on Interaction Sciences Information Technology, Culture and Human - ICIS '09*
47	Mobile commerce adoption in China and the United States: A cross-cultural study	Dai, Hua; Palvi, P.C.	2009	*ACM SIGMIS Database*
48	Mobile Payments at the retail point of sale in the United States: Prospects for adoption	Crowe, Marianne; Rysman, Marc; Stavins, Joanna	2010	*Review of Network Economics*
49	An empirical examination of factors influencing the intention to use mobile payment	Kim, Changsu; Mirusmonov, Mirsobit; Lee, In	2010	*Computers in Human Behavior*
50	Inter-consortia battles in mobile payments standardization	Lim, a	2008	*Electronic Commerce Research and Applications*
51	A modeling approach and reference models for the analysis of mobile payment use cases	Pousttchi, K	2008	*Electronic Commerce Research and Applications*
52	A game analysis of the relationship among government, mobile operator and finance organization in China mobile payment industry chain	Ou, Haiying; Lv, Tingjie; Chen, Xia	2009	*2009 International Conference on Business Intelligence and Financial Engineering*
53	Towards a holistic analysis of mobile payments: A multiple perspectives approach	Ondrus, J; Pigneur, Y	2006	*Electronic Commerce Research and Applications*
54	Understanding consumer acceptance of mobile payment services: An empirical analysis	Schierz, Paul Gerhardt; Schilke, Oliver; Wirtz, Bernd W.	2010	*Electronic Commerce Research and Applications*
55	Towards an understanding of the consumer acceptance of mobile wallet	Shin, Dong-Hee	2009	*Computers in Human Behavior*
56	Mobile payment procedures: Scope and characteristics	Kreyer, Nina; Pousttchi, Key; Turowski, Klaus	2003	*e-Service Journal*
57	Standardized payment procedures as key enabling factor for mobile commerce	Kreyer, N.; Pousttchi, K.; Turowski, K.	2002	*E-Commerce and Web Technologies*
58	A model of consumer acceptance of mobile payment	Chen, Lei Da	2008	*International Journal of Mobile Communications*
59	Mobile banking services in the bank area	Shirali-Shahreza, Mohammad; Shirali-Shahreza, M. Hassan	2007	*SICE Annual Conference 2007*

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Appendix 1. (continued)

#	Name	Author(s)	Year of Publication	Journal/Conference
60	Diffusion of mobile commerce application in the market	Huang, Hao; Liu, Lu; Wang, Jianjun	2007	*Second International Conference on Innovative Computing, Informatio and Control (ICICIC 2007)*
61	Factors influencing the adoption behavior of mobile banking: a South Korean perspective	Lee, KS; Lee, HS	2007	*Journal of Internet Banking and Commerce*
62	A contextual acceptance model of mobile commerce based on TAM	Xu, Zhengchuan; Zhang, Chenghong; Ling, Hong	2008	*2008 The Third International Multi-Conference on Computing in the Global Information Technology (iccgi 2008)*
63	Design and evaluation of m-commerce applications	Wang, J.J.; Song, Z.; Lei, P.; Sheriff, R.E.	2005	*2005 Asia-Pacific Conference on Communications*
64	Study on trust in mobile commerce adoption – A conceptual model	Meng, Decai; Min, Qingfei; Li, Yuping	2008	*2008 International Symposium on Electronic Commerce and Security*
65	Assessing the mobile banking adoption based on the decomposed Theory of Planned Behaviour	Beiginia, A.R.; Besheli, A.S.; Soluklu, M.E.; Ahmadi, M.	2011	*European Journal of Economics, Finance and Administrative Sciences*
66	What is the influence of context and incentive on mobile commerce adoption? A case study of a GPS-based taxi dispatching system	Xu, Zhengchuan; Yuan, Yufei	2007	*International Conference on the Management of Mobile Business (ICMB 2007)*
67	Innovations to make markets more inclusive for the poor	Mendoza, Ronald U.; Thelen, Nina	2008	*Development Policy Review*
68	Mobile banking and economic development: Linking adoption, impact, and use	Donner, J.; Tellez, C.	2008	*Asian Journal of Communication*
69	M-commerce implementation in Nigeria: Trends and issues	Ayo, CK; Ekong, UO; Fatudimu, IT; Adebiyi, AA	2007	*Journal of Internet Banking and Commerce*
70	M-Pesa: A case study of the critical early adopters's role in the rapid adoption of mobile money banking in Kenya	Kgugi, Benjamin; Pelowskl, Matthew; Ogembo, Javier G.	2010	*The Electronic Journal of Information Systems in Developing Countries*
71	Mobile 2.0: M-money for the BoP in the Philippines	Alampay, Erwin; Bala, Gemma.	2010	*Information Technologies & International Development*
72	ICT, development and povery reduction: Five emerging stories	Spence, Randy; Smith, Matthew L.	2010	*Information Technologies & International Development*
73	Adopting mobile payment channels: Key challenges for US financial institutions	Kapostasy, Janet L.	2008	*Journal of Payments Strategy & Systems*
74	The enigma of mobile money systems	Ernesto M. Flores-Roux and Judith Mariscal	2010	*Communications & Strategies*
75	Mobile money: Implications for emerging markets	Alleman, J.: Rappoport, P.	2010	*Communications & Strategies*
76	The role of payment systems in reaching the unbanked	Sergio de Sousa	2010	*Journal of Payments Strategy & Systems*
77	Mobile phones and financial services in developing countries: A review of concepts, methods, issues, evidence and future research directions	Richard Duncombe; Richard Boateng	2009	*Third World Quarterly*

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Appendix 1. (continued)

#	Name	Author(s)	Year of Publication	Journal/Conference
78	Framing M4D: The utility of continuity and the dual heritage of 'mobiles and development'	Donner, Jonathan	2010	*The Electronic Journal of Information Systems in Developing Countries*
79	Innovative payment solutions in agricultural value chain as a means for greater financial inclusion	Tushar Pandey; Nagahari Krishna; Venetia Vickers	2010	*Agricultural Economics Research Review*
80	A financial analysis of mobile money services	Peter Lyons	2010	*Communications & strategies*
81	Mobile payments: Moving towards a wallet in the cloud?	Sophie Pernet-Lubrano	2010	*Communications & strategies*
82	Preliminary insights into M-commerce adoption in Ghana	Raymond A. Boadi, Richard Boateng, Robert Hinson and Robert A. Opoku	2007	*Information Development*
83	From microfinance to m-finance innovations case discussion: M-PESA	Mudit Kapoor; Jonathan Morduch; Shamika Ravi	2007	*Innovations: Technology, Governance, Globalization*
84	Cell phones, electronic delivery systems and social cash transfers: Recent evidence and experiences from Africa	Katharine Vincent; Tracy Cull	2011	*International Social Security Review*
85	Cooperation for innovation in payment systems: The case of mobile payments	Marc Bourreau; Marianne Verdier	2010	*Communications & strategies*
86	Who will be the winners and losers in the battle for mobile payments market share?	Olivier Cognet	2011	*Journal of Payments Strategy & Systems*
87	Three keys to M-PESA's success: Branding, channel management and pricing	Ignacio Mas; Amolo Ng	2011	*Journal of Payments Strategy & Systems*
88	Mobile opportunities, mobile problems: Assessing mobile commerce implementation issues in Malawi	E. Saidi	2009	*Journal of Internet Banking and Commerce*
89	Mobile communications and treasury management – making mobile money work for the business	Morten Hofstad	2010	*Journal of Corporate Treasury Management*
90	Legal issues in mobile banking	Rolf H. Weber; Aline Darbellay	2010	*Journal of Banking Regulation*
91	How mobile money can drive financial inclusion for women at the Bottom of the Pyramid (BOP) in Indian urban centers	A. L. Chavan; Sarit Arora; Anand Kumar; Praneet Koppula	2009	*Internationalization, Design and Global Development: Third International Conference, IDGD 2009, Held as Part of HCI International 2009, San Diego, CA, USA, July 19–24, 2009, Proceedings*
92	Mobile-banking adoption and usage by low-literate, low-income users in the developing world	Indrani Medhi; Aishwarya Ratan; Kentaro Toyama	2009	*Internationalization, Design and Global Development: Third International Conference, IDGD 2009, Held as Part of HCI International 2009, San Diego, CA, USA, July 19–24, 2009, Proceedings*

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Appendix 1. (continued)

#	Name	Author(s)	Year of Publication	Journal/Conference
93	Mobile remittances: design for financial inclusion	Supriya Singh	2009	*Internationalization, Design and Global Development: Third International Conference, IDGD 2009, Held as Part of HCI International 2009, San Diego, CA, USA, July 19–24, 2009, Proceedings*
94	Examining the usage and impact of transformational M-banking in Kenya	Olga Morawczynski	2009	*Internationalization, Design and Global Development: Third International Conference, IDGD 2009, Held as Part of HCI International 2009, San Diego, CA, USA, July 19-24, 2009, Proceedings*

Notes

1. CAPES [Federal Agency for the Support of Post-graduate Education] is a department of the Brazilian Ministry of Education that is responsible for post-graduate education programmes. It currently keeps a database of more than 29 thousand journals; the complete list of papers are available to all public higher education institutions (http://periodicos.capes.gov.br).
2. http://ict4dblog.wordpress.com/2010/04/14/ict4d-journal-ranking-table/, retrieved in May 2012.
3. The programme for this event can be accessed at http://www.bcb.gov.br/? INCFIN2012EV (in Portuguese, access date: February 2013).

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About the authors

João Porto de Albuquerque is Visiting Professor, Institute of Geography, Heidelberg University, Germany and Professor, Departamento de Sistemas de Computação, Instituto de Ciências Matemáticas e de Computação, Universidade de São Paulo, Brazil. He obtained his BSc. (2002) and PhD in Computer Science (2006) from the Institute of Computing at the State University of Campinas, Brazil. Part of the PhD was completed at the Technical University of Dortmund (2004–2006). Fellow of the

Alexander von Humboldt Foundation and spent a post-doctoral research stay (2006–2008) at the Department Informatics of the University of Hamburg, and short research stays at the London School of Economics and Politics (2007) and the University of Heidelberg (2011–2012). Since 2008 is Professor of Information Systems at University of Sao Paulo and since 2013 he is Visiting Professor at Heidelberg University. His research focuses on a socio-technical approach to information systems management and development. Has published 10 journal papers, 4 international book chapters and several conference papers in important scientific outlets of the areas of computer science and information systems. Contact: Berliner Str. 48, D-69120 Heidelberg, Germany. Phone: +49 (0) 6221 54-4520 | Fax: +49 (0) 6221 54-4529. Email: jporto@icmc.usp.br Web: http://www.icmc.usp.br/pessoas/jporto; http://www.geog.uni-heidelberg.de/gis/albuquerque.html

Eduardo Henrique Diniz is an electronic engineer. He holds an MSc and PhD in Business Administration, with focus in Information Systems Management. Visiting scholar at University of California, Berkeley from 1996 to 1998, and at HEC Montreal in 2007. Professor at Escola de Administração de Empresas de São Paulo (Fundação Getúlio Vargas) (FGV-EAESP), São Paulo, Brazil since 1999, member of the, Center for Microfinance Studies at FGV and coordinator of the Technology and Automation Group of CEB (Center for Excellence in Banking). Has researched on technology in banking and government since 1991 and published several papers and articles on those subjects. Chief-Editor of *Revista de Administração de Empresas* since 2009. Contact: Fundação Getulio Vargas – SP, Escola de Administração de Empresas de São Paulo, Departamento Imq Informática e Métodos Quantitativos. Rua Itapeva, 474, Bela Vista 01332-000 – Sao Paulo, SP – Brasil. Phone: (11) 37997724. Fax: (11) 37997701. Email: Eduardo.Diniz@fgv.br Homepage: http://www.fgv.br

Adrian Kemmer Cernev is a Professor at Escola de Administração de Empresas de São Paulo (Fundação Getúlio Vargas) (FGV-EAESP), São Paulo – Brazil, in the Department of Information Technology and Quantitative Methods since 2004. He was the Associate Dean of the Institutional Assessment Office until 2012. Member of the Center for Microfinance Studies at FGV, and a MBA program coordinator in the same institution. He holds a BA, MSc and PhD degrees in Business Administration, with research focus on E-Business and Mobile Banking & Payments. He has also professional experience as executive in multinational companies. Contact: Fundação Getulio Vargas – SP, Escola de Administração de Empresas de São Paulo, Departamento Imq Informática e Métodos Quantitativos, Rua Itapeva, 474, Bela Vista 01332-000 – Sao Paulo, SP – Brasil. Phone: (11) 37997724. Fax: (11) 37997701. Email: Adrian.Cernev@fgv.br Homepage: http://www.fgv.br