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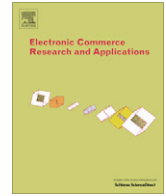
Groups of services delivered by Brazilian branchless banking and respective network integration models ☆

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ABSTRACT

Over the last decade, Brazil has pioneered an innovative model of *branchless banking*, known as *correspondent banking*, involving distribution partnership between banks, several kinds of retailers and a variety of other participants, which have allowed an unprecedented growth in bank outreach and became a reference worldwide. However, despite the extensive number of studies recently developed focusing on Brazilian branchless banking, there exists a clear research gap in the literature. It is still necessary to identify the different business configurations involving *network integration* through which the branchless banking channel can be structured, as well as the way they relate to the range of bank services delivered. Given this gap, our objective is to investigate the relationship between network integration models and services delivered through the branchless banking channel. Based on twenty interviews with managers involved with the correspondent banking business and data collected on almost 300 correspondent locations, our research is developed in two steps. First, we created a qualitative taxonomy through which we identified three classes of network integration models. Second, we performed a cluster analysis to explain the groups of financial services that fit each model. By contextualizing correspondents' network integration processes through the lens of transaction costs economics, our results suggest that the more suited to deliver social-oriented, "pro-poor" services the channel is, the more it is controlled by banks. This research offers contributions to managers and policy makers interested in understanding better how different correspondent banking configurations are related with specific portfolios of services. Researchers interested in the subject of branchless banking can also benefit from the taxonomy presented and the transaction costs analysis of this kind of banking channel, which has been adopted in a number of developing countries all over the world now.

1. Introduction

The access to banking services is one of the most important conditions to improve the chances of self-employed individuals living close to the poverty line (Abramovay 2004). There is a great potential market for financial products and services that could contribute to improve the quality of life of poor people, and therefore the infrastructure that microfinance providers could use to access these individuals, needs to be understood and improved (Ivatury 2006, Mas 2009). Besides, difficulties related to scale and geographic reach still prevent microfinance penetration from growing (Ivatury 2006).

Branchless banking has been considered an important alternative to extend the distribution of financial services to poor and remote areas, usually underserved by traditional bank branch networks (Ivatury and Mas 2008). Being a low cost channel for banks and largely adopted by the low income population for some basic financial services such as remittances, bill payments or to receive benefits from governmental aid programs, branchless banking is experiencing a significant number of implementations in Africa (Kenya and South Africa), Asia (Philippines and India) and Latin America (Peru, Colombia and Brazil).

Although branchless banking can be based on many possible configurations between banks and business partners of all kinds, the most successful experiences of the last decade strongly rely on information and communication technology (ICT) infrastructure connecting a diverse group of actors involved in the network arrangement necessary to deliver financial services out of regular bank channels. As stated by authors such as Mas (2009), three main elements typically compose the network: (1) retail stores easily accessible by low-income clients, (2) an electronic payment infrastructure, and (3) an account platform, this latter being pro-

vided mostly by traditional banks. The account platform is necessarily operated internally; that is, within the organizational boundaries of a banking institution. Retail establishments, in contrast, are obviously outside agents, acting as intermediaries between the institution and its customers. The payment infrastructure, however, is the only element that can be operated either by the bank or by third parties.

There are two main approaches for ICT-based branchless banking, one of them related to mobile phone networks and the other one to points-of-service (POS) or personal computers (PC) terminals (Prochaska and Brix 2008). The first one tends to be dominant where bank penetration is very low and client interaction with the network is driven by mobile phone operators. The second one tends to be bank-led, and client interactions with the network are made through technologies that are commonly used in the bank industry, such as plastic cards. The first approach tends to be more common in Africa and Asia, whereas the second one has been most successful in Latin America, although, in some countries, it is possible to find both of them (Ivatury and Mas 2008).

Brazil has developed a particularly interesting bank-led solution, called *banking correspondents* (BCs), which involves the use of IT-based terminals installed at local retailers. A BC typically involves an agreement between two institutions: a *correspondent* (usually a local retailer hired by a bank) takes deposits and provides services on behalf of the bank (Diniz 2007).

This particular case of branchless banking in Brazil is remarkable for many reasons. First of all, branchless banking benefits about forty million users by means of a network with more than 100,000 service locations situated even in the poorest and most remote municipalities of a very large country. Second, the model has turned out to be the only way available to a large portion of the country's population to access financial services. Finally, it delivers a complex portfolio of services, mostly designed for the poorest segments of society.

In a short period of time following their regulation in the early 2000s, BCs reached the equivalent to five times the number of bank branches in the country. Given the importance of the phenomenon, an extensive literature has been produced in recent years, investigating the development of this new channel (Lyman et al. 2006, Ivatury 2006, Mas and Siedek 2008, Soares and Melo Sobrinho 2008, Diniz et al. 2009). These studies clearly demonstrate from the data on the extent, coverage, number of transactions and the amount of cash involved, the paramount importance acquired by correspondents in integrating low-incomers into the Brazilian banking sector.

As pointed out by Kumar et al. (2006, p. 10), the Brazilian branchless banking model is unique because of "the range, scale and quality of services provided, and the new technological platforms that enable such service provision."

Regarding the technological platform, a POS machine is installed on the premises of the businesses hired as a branchless banking outlet, which we refer to as a *correspondent*. This basic POS machine can be replaced by a PC and combined with other equipment, such as barcode scanners, keypads, cash drawers, etc., depending on the complexity of the financial services that each particular correspondent provides.

These terminals (POSs or PCs) are connected to servers of the bank that has hired the correspondent, via dial-up or broadband Internet connection, GPRS (General Packet Radio Service, a data transmission technology used for mobile networks), or even satellite connections. Data can be transmitted online or periodically, at set times during the day, depending again on the complexity of the services and structure provided at each correspondent.

An important aspect of the Brazilian correspondent channel is the fact that its innovativeness is not directly related to the technologies employed (since POS, PCs, and the involved data transmission technologies were, in fact, already a commonplace in supporting traditional banking activities), but instead, to new business arrangements through which such technologies are used. Such arrangements involve banks, a variety of retailers all over the country and a significant number of network integrating companies, the latter being responsible for all or part of the services related to network settling and operation. Despite the number of studies covering the correspondent model, there is a clear research gap in the literature: the network integration process and its structuring role in defining the extent and profile of services offered through the channel still deserve attention. Thus, one important question still not answered about correspondent banking business is the relation between different approaches for organizing the channel in terms of network integration process and the different banking services offered for each one of them.

The main objective of this paper is to contribute to knowledge on the network integration processes behind the operation of the Brazilian correspondent model. More specifically, we aim to investigate the relationship between the different network integration models and the different groups of services offered through each of them. In depth knowledge in the network integration process and services coverage is key to understanding the success of correspondents' implementation in Brazil and may contribute decisively to public policy developments related to financial inclusion not only in Brazil but also in other countries interested in adopting such branchless banking model.

In order to fulfill its objective, the paper is organized as follows. Section 2 presents an explanation of the main drivers that have pushed the Brazilian correspondent model to its current level of development and extent. Section 3 describes the conceptual approach and theoretical background employed in the research. Section 4 details the methodological approach adopted to perform the research, which is composed of two steps: a qualitative, taxonomical study, and a quantitative cluster analysis. The results of each step are presented in Sections 5 and 6. They present (1) a taxonomy of the different network integration models that are recognizable behind the operation of the channel, and (2) a quantitative analysis aimed at understanding how each different model connects to different groups of services. A discussion in Section 7 is included with theory-based interpretation of the findings. The paper closes with concluding remarks on the contributions and limitations of the study, as well as suggestions for further research.

2. Drivers of the Brazilian branchless banking model

The advent and growth of the banking correspondents model is considered the greatest technological phenomenon in the Brazilian banking industry since the arrival of Internet banking (Diniz 2007). In recent years, this model enabled Brazilian banks to expand their service network on an unprecedented scale. Service locations were multiplied without incurring costs associated with the operation of branches, mini-branches or other traditional bank channels. Moreover, considering that a sizable share of the partner businesses is located in poor communities or remote municipalities, the model revealed itself an efficient tool for extending the offer of financial services to the poorest segments of society (Ivatury 2006, Kumar et al. 2006).

Although the regulatory framework allowing the creation of banking correspondents draws from many resolutions since 1973, major changes occurred in 1999 and in 2003. These changes consolidated and extended previous norms, creating the regulatory basis for current correspondent activities (Soares and Melo Sobrinho 2008).

Fig. 1 shows the evolution of the main bank channels in Brazil from 1998 to 2008, comparing correspondents with branches and
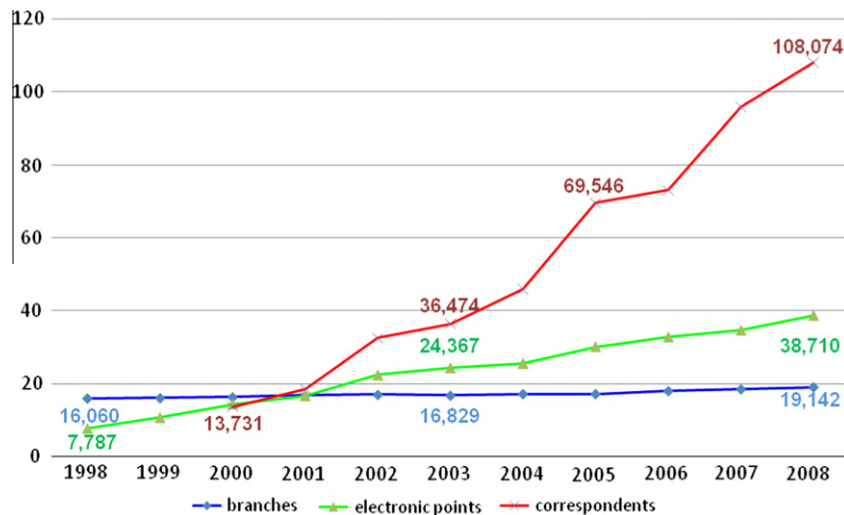
Fig. 1. Evolution of bank branches, ATMs and correspondents in Brazil, 1998–2008. *Source:* Diagnóstico (2009) and CIAB (2010).

ATM networks in terms of number of service points. The correspondent channel in 2008 had more than five times the number of locations compared to bank branches and almost three times the number of electronic points of service (ATMs outside of branches). A report from Febraban, the Brazilian Banks Federation, indicates that the 150,000 correspondent points in the country account for 6% of all banking transactions. Correspondent banking is also the bank channel that is growing fastest, serving mostly the poorest and the most remotely located population (CIAB 2010). The correspondent network guarantees that banking services are available in all of the country's municipalities, delivering 80% of all Federal Government social benefits to more than 40 million Brazilians, most of whom have little or no access to financial services (Feltrim et al. 2009). According to Feltrim et al. (2009), besides these beneficiaries, correspondents also benefit local economies by improving the quality of life in the localities where they operate, which are often remote from developed centers.

Although the model's success in Brazil can be attributed to a complex variety of reasons, three of them have been particularly decisive: first, the development of the so-called *bill collection networks*, during the 1990s, in regions with limited coverage of bank branches; second, the development of cash transfer programs by the federal government; and third, banks' interest in adopting the channel as a way for alleviating traffic in their regular branches. A more detailed explanation follows.

2.1. Bill collection networks: the first driver

In Brazil, banks are responsible for all bill payment collection related to utilities and other government services since the 1960s (Henrique 2001). Along the 1980s, Febraban (the Federation of Brazilian Banks) sponsored the standardization of bill payments for other types of commercial transactions through a single instrument called *boleto*, also payable in banks. Since then, most Brazilian bills must be paid in banks, even for those who don't have bank accounts. In 2010 alone, more than 2 billions of boletos were paid in different bank channels (Fonseca et al. 2010). As pointed by these authors, the creation of such boletos represented an enormous interbank process integration, since bills could be easily collected in whatever channel of whatever bank, no matter the bank which had issued the bill to be paid. This boleto system is considered one of the most important demonstrations of the high level of interbank integration in the country.

Brazilian social inclusion programs that have been implemented since the 1990s, also contributed – by increasing access to electricity and water supply – to an increase of the number of utility bills that had to be paid in banks by the lower income population, usually living far away from bank branches.

On the other hand, there is a wide regional disparity in the distribution of bank branches in the country (Bemerguy and Luporini 2006). As pointed out by the Brazilian Institute of Geography and Statistics, the poor Northeast region has 21,200 inhabitants per bank branch, whereas in the rich and better developed South and Southeast regions, this ratio is 7.6 and 8.5 thousand inhabitants per branch, respectively (IBGE 2007).

As a result of this shortage of bank coverage in the Northeast, by the early 1990s a number of companies began to flourish in the region in agreement with utility companies, specializing in assembling *collection networks*, that is, networks of retail establishments where the public could pay their utility (water supply, electricity and telephone) bills (Jayo and Diniz 2009). One of the first experiences of these *collector businesses* was developed by a leading drugstore chain in the region, and later worked as a guide to those companies' business model (Castro and Santos 2007). Although agreements with utility companies involved a flat fee paid per bill received, the main objective of the drugstore chain was to increase customer traffic into their stores, by allowing customers to pay their bills close to their homes instead of having to travel to a far bank branch.

Within a short period of time, similar agreements eventually expanded and were replicated not only by other drugstore and retail chains. Apart from companies operating their own retail outlets, the practice of signing agreements with utility companies was embraced by companies focused in hiring a large number of local, small merchants, to act as collection points. The low-income population quickly adopted the idea of paying their bills in a more affordable (less traveling costs) and convenient (no need for queuing in a bank branch) way.

From the technology point of view, these collection networks were far from being sophisticated. Payment receipts were issued using old mechanical authentication machines abandoned by the banking system, which had replaced them by computer terminals in branches. All back office processing was manual, and data transmission was carried out in paper-based form by couriers (Jayo and Diniz 2009).

2.2. Social benefits delivery: the second driver

A second explanation for Brazilian correspondents' success can be related to the launching of cash transfer programs by the federal

government, starting in the late 1990s (Diniz 2007). A set of new regulatory measures launched at the time, as described by Fig. 1, aimed to foster correspondent banking in order to provide the payment network infrastructure needed to deliver payments to the large population segments across the vast territory of the country. Implementing cash transfers to the poor would only work if there were a suitable payment infrastructure. The country's continental size and the difficult access of inhabitants from remote locations to banks (and sometimes even for those living in peri-urban centers), would defeat any governmental intent to establish social aid programs. Within this context, ICT based correspondents were identified as an appropriate solution to provide the needed payments infrastructure (Stal 2002).

By 2002, the new regulatory framework had already made possible for Caixa Econômica Federal (CEF), one of the biggest Brazilian public banks, to expand its reach to every municipality in the country. This fact is particularly noteworthy considering that, prior to the development of the correspondents channel, about one third of the more than 5600 Brazilian municipalities were in total lack of bank service points. In addition, besides its normal tasks as a commercial bank, CEF also acts as a payer of government benefits (retirement, disabilities, unemployment, etc.) to significant portions of the low-income population. CEF initially extended correspondent banking functions to 9000 lottery shops, taking advantage of this extensive network electronically connected to CEF (Costabile 2002; Soares and Melo Sobrinho 2008).

Costabile (2002, pp. 1–2), commenting on the creation of the correspondents, stresses the success of the channel according to social criteria: "correspondents bring with them a strong process of social inclusion and increase of citizenship, . . . by transferring government benefits to citizens, improving the quality of life, increasing self-esteem and creating opportunities for income improvement."

2.3. The alleviating traffic effect: the third driver

In the early 2000s, the regulatory framework that allowed the hiring of non-bank agents as correspondents begins to consolidate in Brazil. One of the measures introduced in 2003, comprising the normative basis currently in effect for the activity of the correspondents, was the permission to include subrogation clauses in correspondent banking contracts. Through this mechanism a correspondent contracted by a bank has the faculty to transfer to third parties the functions endowed by the contract, instead of performing them. Previously, only companies that would perform the functions of correspondents themselves could be hired by banks (Soares and Melo Sobrinho 2008).

Such change in the regulation met the banks' interests, which often found it costly to keep local structures, in different regions of the country, in order to manage the hiring, installation and maintenance of each of its correspondent locations. Subrogation allowed a more cost effective arrangement for banks by transferring these functions to local businesses – outsourced network integrators – that became responsible for mediating the relationship between banks and correspondents (Jayo and Diniz 2009).

As a result, the previously mentioned collection businesses that had emerged in the 1990s, already spread out across the Northeast region, have gradually become outsourced correspondent network integrators, providing, then, services to banks. In addition to the collection contracts already set with utility companies, these companies could now sign correspondent banking contracts to operate banking correspondent networks, thus transforming their local collecting networks in correspondent locations for a contracting bank.

Such incorporation of the old collection model by banks encouraged technological modernization. To adjust to banks' demands, the manual processes of data capture, processing and transmission, that were typical of the collection companies, became computerized. POS terminals connected by dial-up systems by acquiring banks have become the dominant technology platform to connect the retail outlets to bank systems (Jayo and Diniz 2009).

3. Conceptual approach

The main objective of this paper is to contribute to knowledge on the network integration processes behind the operation of the Brazilian correspondent model. More specifically, the aim is to investigate the relationship between the different network integration models and the different groups of services offered by each of them. The problem of networks integration is not a new topic in channel management literature. It has been studied, for example, by Omta et al. (2001) and Lazzarini et al. (2001), among other authors, always focusing on manufacturing industries. This study, however, differs from others to the extent that it analyses the network integration problem in a particular context – the banking industry – with a number of specificities.

A distribution channel is usually defined as the way that a product travels from production to consumption (Rosembloom 2002) or, more accurately, as a set of interdependent organizations involved in the process of delivering a product or service for use or consumption (Stern et al. 1996). Distribution channels can therefore be classified according to the number of intermediaries involved: direct "zero level" channels are those that do not involve any mediation (i.e., where the product or service is delivered directly by the producer to the consumer); "one level" channels involve one intermediary; "two level" channels have two of them (wholesale distributor and retailer, for example), and so on (Bowersox and Cooper 1992).

Normally, channels for the distribution of services tend to be shorter than those for physical products, mainly because services are intangible and because their production and consumption are usually simultaneous (Bowersox and Cooper 1992). Bank distribution channels do not escape this rule, and unlike manufacturing organizations, their distribution channels usually do not involve intermediaries. In this sense, the emergence of branchless banking, and particularly of BCs in Brazil, represent the first time that the banking industry uses intermediated channels (Cernev et al. 2009).

This means that we are faced with a research object – the emergence of network integration processes for the distribution of bank services – about which very little is known or documented by previous literature. From the theoretical point of view, this fact stimulated us to develop what Gregor (2006) calls descriptive theory or type 1 theory, instead of adopting a priori assumptions from previous theory.

A descriptive theory, according to authors like Gregor (2006) and Fawcett and Downs (1986), is a conceptual elaboration that seeks to describe "what is," as opposed to explaining causality or attempting predictive generalizations. This type of theory is important to be developed when very little is known about the phenomenon in question (Fawcett and Downs 1985), which is the case of the subject under investigation.

Gregor (2006) characterizes the development of classification schemes, such as taxonomies and typologies, as descriptive theory. At the heart of such classification schemes is the capability to analyze and summarize salient attributes of the phenomena, and conceptualize the relationships among them.

It is useful, however, to contextualize correspondents' network integration processes with the approach of transaction costs economics (TCE). According to Williamson and Masten (1999), the background of such approach consists on firms and outsourcing markets being alternative modes of organization, and decisions regarding vertical integration or outsourcing are driven by differential transaction costs. The boundaries of the firm, or the portfolios of activities it performs internally (as opposed to contracting inside the market), are determined by the attributes of transactions, such as the costs of monitoring and controlling. The complexity of products and processes, and the specificity of assets needed to run businesses are drivers of studies based on TCE.

The intangible costs involved in harmonizing conflict and in dealing with contract breaches are issues concerning the decision of whether going to the market or not (Williamson 1983). Thus, the approach of transaction costs economics has frequently served to support studies about contractual arrangements between firms and the role and extent of participation of government agencies in these arrangements (Williamson and Masten 1999).

Transaction costs economics serve as a background for investigations regarding vertical integration, contracting, and regulation. In the domains of vertical integration, internal marketing organization and development of company-specific human capital are frequently under study. Research about contracting, on its turn, has been focusing on contractual terms and decisions to contract, depending on the complexity of transactions and considerations about efficiency. Regarding regulation, research has been oriented by the analysis of merits of political and legal institutions in dealing with regulatory processes and constitutional protections and facilitating trade by economizing on transaction costs. Overall, transaction costs economics have contributed to the understanding of organizational forms in terms of variety and complexity, and to the analysis of antitrust and regulation policies.

Specifically in terms of vertical integration, Williamson's (1971) seminal paper introduces the arguments in favor of internal organization as opposed to contracting inside the market. His vision of the firm as being more than an efficient instrument for production, defines it as being an institution with coordinating potential, sometimes greater than that of the market itself. The advantage of internalizing processes would be the capacity of firms to control information and achieve consistency among activities. The coordination of complexities of activities such as employment, remuneration, resource allocation, conflict resolution, exchanges, and communication, should determine organizational structures. Also, specialization and availability of suppliers, together with the costs related to adaptation, are aspects that firms take into account when evaluating the possibility of going to the market.

The need for contracting may inhibit outsourcing, because of contractual incompleteness, which may lead to exhaustive contingency prevention and/or high costs of litigation. The risk derived from uncertainty and the possibilities of opportunistic behavior by counterparts, add some complexity to the decision of outsourcing. Information leakage is another risk that firms face when sharing processes with third parties. Finally, economies of scale may justify vertical integration.

Particularly in the banking industry, Ang and Straub (1998) state that there are transaction costs related to the effort, time, searching, creating, negotiating, monitoring and enforcing a service contract between buyers and suppliers, which can erode production economies that organizations achieve when relying on the marketplace to buy goods and services in which they have comparative cost disadvantages. Their results show that banks have been able to substantially reduce technology expenditure by lowering labor and equipment costs with outsourcing, but also that transaction costs significantly influence bank managers' decisions of buying in marketplaces.

Aubert et al. (2004) present empirical data revealing that uncertainty, which may make contracts difficult to write, is the main deterrent to IT outsourcing in the banking industry, whereas technical skills are the most important reason to outsource. Their findings suggest that the market is seen as less efficient to ensure execution of transactions under high uncertainty than when under internal governance.

Despite the existence of studies about transaction costs involved in outsourcing decisions of the banking industry, there is a gap in the literature concerning the organizational forms of network integration of branchless banking, especially when banking correspondents are under investigation. This gap reinforces the choice for the descriptive theory conceptual approach of this paper, with TCE as a theoretical background. The objective is to explore and describe how correspondents' networks integration processes occur, and how alternative forms of network integration relate to the group of services offered by correspondents.

4. Methodological approach

As for the methodological approach, our research was composed of two steps: a qualitative, taxonomical study, and a quantitative cluster analysis. The first of these steps was designed with the purpose of identifying and mapping all relevant different business network integration models practiced in the channel, and the second one permitted identifying a relation between different network integration models and different profiles of services delivered through correspondents.

4.1. Methodology to develop a taxonomy for network integration management

Carper and Snizek (1980, p. 65) consider that "the classification of observed phenomena is one of the most important and basic steps in conducting scientific inquiry." Gregor (2006), as well as Fawcett and Downs (1986), say that development of taxonomies, typologies or other forms of classification is particularly useful when the researcher has little prior knowledge about the object, which is the case step of our study, which aims to understand and compare a diversity of network integration models.

Authors such as Sanchez (1993), Doty and Glick (1994), and also Bailey (1994) make a distinction between taxonomy and typology as methods or strategies for classification. Both aim to cluster phenomena into exhaustive and mutually exclusive classes. However, while typology involves classifying phenomena into a priori, theory-driven classes, taxonomy means grouping them in empirically built classes. That is to say, in applying a taxonomic method, not only the grouping of phenomena in classes, but the classes themselves, are the result of the investigation process. Since there is no a priori conceptual classification for the network integration management in the correspondent activity available, we have adopted a taxonomic strategy.

Organizational and social phenomena are multifaceted, that is, they can be described according to multiple attributes (Sanchez 1993), and therefore, the core of a taxonomic procedure is the researcher's ability to select, among the many attributes that describe different observations of a certain phenomenon, a subset of critical attributes that will be used as criteria for comparison and grouping (Gregor 2006).

The decision of selecting the attributes that should be adopted as critical, and which ones should be discarded for classification purposes, must reflect the research objectives and the researcher's interests. As different critical attributes lead to different classes,

and thus to different taxonomies, it is the role of the researcher to select those critical attributes that will better help to answer the research questions. The resulting taxonomy also must be easily understood by social actors, to whom researchers eventually want to communicate the results (Whittaker et al. 1998). In Gregor's (2006, p. 619) words, "as taxonomies are proposed to aid human understanding, we would like the classes to be easily understood and to appear natural."

4.1.1. Application of the method: collecting and analyzing data

The taxonomy development started with our selecting banks with the most relevant correspondent operations. The choice of banks took into account three criteria. First, we considered the size of their correspondent networks, privileging those with the highest numbers of locations. Second, we sought to include banks with different origins of capital (public and private). Finally, responsiveness of institutions to provide information, and availability of executives to be interviewed, were also considered. The final choice fell on the seven institutions listed in Table 1, whose networks of correspondents, combined, totaled about 65,500 locations in October 2009.

Then we conducted semi-structured interviews with executives and directors involved in the operation of the seven networks. Interviewees were selected according to a snowball strategy (Atkinson and Flint 2001), which consists of identifying a first group of respondents (in our case, bank executives) who are then used to refer to other relevant, potential respondents (in our case, executives from network management companies). This strategy was needed because, at the beginning of the data collection process, we had no information about which were the relevant players to be interviewed, apart from the banks.

In total, a number of twenty person-to-person interviews were conducted: seven with executives responsible for the correspondents operations of the seven banks listed in Table 1, and thirteen with executives from network integration management companies. Due to a request expressed by interviewees, names of network integration companies were omitted in this article. Semi-structured interviews allowed respondents to freely express their views, at the same time that allowed us to capture information needed in order to compare arrangements adopted by different correspondent networks. Interviews were conducted between March and September 2009, lasted about ninety minutes in average, and were recorded with the consent of the interviewees, and then transcribed for analysis.

Analysis was based in data coding techniques. The collected material was coded by creating labels associated with text blocks. This procedure reduces the raw textual material to smaller pieces, with simpler units of meaning that can be more easily analyzed and compared (Miles and Huberman 1994, Ryan and Bernard 2000, Strauss and Corbin 1990).

Table 1
Correspondent networks considered in the taxonomic process. Source: Data from Febraban (available at http://www.ictformicrofinance.org/?q=node/46).

Bank	Number of locations (October 2009)
Bradesco	24,200[a]
Caixa Econômica Federal	15,200[b]
Banco do Brasil	8600
Banco Lemon	6700
Banco HSBC Brasil	5000
Unibanco	3700
ABN Amro Real[c]	2200

[a] Includes 6000 locations in Postal Offices (Banco Postal).
[b] Includes 9000 locations in lottery shops.
[c] Already merged with Santander at the time of research, however correspondent operations have not been unified.

The coding process went through a sequence of phases, as suggested by Miles and Huberman (1994). In our case, two phases were adopted. In the first phase, the collected raw material was examined by assigning free labels to text excerpts (sentences, paragraphs, words, etc.). Then, in a second phase, connections and hierarchies were established between the labels that had resulted from the first phase. In the first phase, emerging labels were closer to the language used by respondents, while in the second phase less descriptive and more interpretative categories emerged. Such categories allowed us to identify the critical attributes of the taxonomy.

4.2. Methodology to develop quantitative cluster analysis

Once the taxonomy was created for identifying different types of integration network management classes, the investigation proceeded into analyzing the relation between each model and the predominant groups of services delivered through each one of them. The intention of such analysis was to deepen the knowledge on the network integration effectiveness as a financial inclusion instrument and to contribute more decisively to public policies and managerial issues related to financial delivery of services to low income people.

4.2.1. Collecting data

In order to collect data from correspondents related to services delivered, a questionnaire was developed and applied either in the correspondent locations themselves or with network integrator companies (firms responsible for mediating the relationship between banks and correspondents) (see Appendix A). The strategy was to conduct a survey and to obtain enough observations for the cluster analysis considering the groups of services. The questionnaire was pre-tested in four correspondent locations and then refined to be applied to a larger group of correspondents.

Bank managers at the three main correspondent networks in Brazil in terms of size (see Table 1) – Bradesco, Caixa Economica Federal and Banco do Brasil – were contacted and helped data collection at the network integrators and at the correspondent locations.

In order to have data from regions representatives of such a big country as Brazil, interviews were scheduled with correspondents of the Amazonas state (in underserved areas of the poor North region of the country), Ceará state (Northeast region, the poorest in the country), Brasilia (central part of the country and Federal Capital) and outskirts of Sao Paulo (the poorest neighborhoods of the most developed capital). A few interviews were also conducted in other poor states in the Northeast (Maranhão and Piauí) and in the North (Pará) regions. As a result, the study involved a convenient sample of banking correspondents from North, Northeast, Southeast and Central regions of the country. Support was provided by network integrator companies so that they could make researchers trustable to retail stores owners in the visits to correspondent locations, allowing them to collect information about transactions in each location.

Table 2 presents economic indicators with reference to 2009 (IBGE 2010) of the regions where the sampled correspondents concentrate. Ceará and Amazonas state present low GDP per capita, while the other two main locations are big cities with intensive economic activities: São Paulo and Brasilia. The idea was to have locations in the sample which were representative of the poorest regions in the country, where per capita distribution of social benefits such as Bolsa Família (the main public program of income transfers in Brazil) tend to be significant (see per capita and per family distribution of Bolsa Família in Table 2), and representativeness of underserved areas in the surroundings of cities where economic activities tend to be more intense (see the information about GDP per capita in Table 2).

Table 2
Economic indicators of regions where correspondents in the survey concentrate. Source: IBGE (2010).

Region	GDP per capita (R$)	Benefits from "Bolsa Família" (2009) (R$)	Family members (mean)	Number of families receiving Bolsa Família	Montly Bolsa Familia per family (R$)	Monthly Bolsa Familia per capita (R$)
Ceará (state)	6390.00	15,952,551.25	3,4	18,462	72,00	21,17
São Paulo (city)	29,394.00	178,851,899.00	3,1	327,188	45,55	14,69
Brasília	40,696.00	33,909,722.00	3,1	108,119	26,13	8,43
Amazonas (State)	20,894.00	101,359,160.00	3,6	97,246	86,86	24,13

Note: Data refers to 2009, when US$ 1.00 was roughly equivalent to R$ 2.00.

The research group was divided into three teams, each of them responsible for collecting data in the four different regions in the survey. The first team covered the North region; the Northeast region was covered by a second team mainly in the outskirts and surroundings of Fortaleza, capital of Ceará state, and a third team covered the cities of São Paulo and Brasília. Data collection was carried out during December 2009.

4.2.2. Cluster analysis: methods applied

A cluster analysis with use of statistical package Minitab 15 was developed, with data regarding frequencies of different types of transactions performed by correspondents in the sample. The objective was to identify whether clustering correspondents in terms of transaction types and activity levels would be consistent with the taxonomy proposed regarding integration models.

Since correspondent network aimed to deliver financial services to low income people, it was possible to define groups of services provided by correspondents associated to the previously described drivers of the Brazilian branchless banking model (payments; social benefits delivery; and regular banking services). The first group of services is related to bill payments, which represents a significant volume of correspondents' activities as aforementioned. The second group is related to the social benefits delivery and the third group is related to other regular banking services – such as banking account opening, cash withdrawals from accounts, and deposits. This definition for groups of services was the basis for the collection of data transactions performed by correspondents. The variables presented in Table 3 were used in the development and/or interpretation of cluster analysis. Although other variables associated with groups of services were collected (see the questionnaire in Appendix A), the respondents declared that these transactions were practically inexistent in their activities.

We collected all variables with the respondents on a monthly basis, referring to November 2009. Because the objective was to analyze business volumes and groups of services delivered in relation to the taxonomy classes, and no technique presuming a probabilistic sample such as regression analysis or analysis of variance would be suitable for a convenient sample, the decision to employ an algebraic procedure leading to natural correspondent profiles regarding service volume of different transaction types would be proper to later describe service delivery in terms of the predominant class of the developed taxonomy in each group. Cluster analysis does not presume a random sample, but it is desirable to have a sample with characteristics representing a population of interest. In such a scenario, the criteria used to data collection was to access correspondents serving Banks heading the three main correspondent networks in Brazil, placed in regions serving areas of poverty such as the North and Northeast regions and outskirts and surroundings of big cities like São Paulo and Brasilia.

Since the procedure was to cluster observations based on the volume and nature of different groups of services performed by correspondents, with no inclusion of information about the previously created taxonomy, there was an expectation to check if correspondents belonging to the same categories of the taxonomy would be grouped together. So transaction-oriented clustering was used to put correspondents together and check if they were classified in the same taxonomy classes, without previous imposition for that; a typical application of cluster analysis validation is to verify the distribution, among groups, of a variable not used in the clustering procedure.

Ward's (1963) hierarchical linkage was employed for clustering the data, because it seeks to minimize the error (deviation from the mean) sums of squares when fusing clusters. Distances between observations were calculated by means of the Manhattan metric, which considers the sum of the absolute distances between all variables, providing easily interpretable results. The Manhattan metric is like walking from a location to another inside a city where the streets form rectangular angles with each other: the distance between two points in space is the summation of the distance walked from east to west with the distance walked from north to south (Lattin et al. 2011). All variables were standardized to be properly weighted and, in order to avoid multicollinearity (and therefore misbalance variables in the solution), no correlation higher than 0.80 was allowed, resulting in the exclusion of a few variables in the clustering procedure. The remaining variables were: number of withdrawals from bank accounts; number of withdrawals of social programs benefits; number of deposits on bank accounts; number of payments of boletos; and number of checking account openings.

The result was a solution with three clusters based on the similarity within groups, compared to an optimization procedure of cluster k-means, which seeks to optimize results by putting each

Table 3
Variables in the cluster analysis.

Variable name	Description	Group of service
Withdrawals_bank_account	Number of withdrawals from bank accounts	3 – regular banking services
Withdrawals_social_transfers	Number of withdrawals of social programs benefits	2 – social benefits delivery
Deposits_bank_accounts	Number of deposits on bank accounts	3 – regular banking services
Payment_boleto	Number of payments of "boletos"	1 – payments
Payment_utility	Number of payments of utility services	1 – payments
Payment_taxes	Number of tributes payments	1 – payments
Account_opening	Number of checking accounts openings	3 – regular banking services
Total_transactions	Total of transactions	_____

Note: The reference month is November 2009. Data was collected by the authors.

observation in the cluster with the nearest mean (Hartigan and Wong 1979). The results of Ward's hierarchical procedure were very similar to those of the k-means technique and cluster interpretation was practically equivalent in both methods. The Ward's hierarchical solution was kept, because the distribution of the observations in each cluster could slightly better discriminate customer classes of the developed taxonomy.

5. Results

The results of the study will be presented following the two steps taken for this research work. We will first present the taxonomy developed for the integration network process and then will discuss the cluster analysis carried out to evaluate the relations between groups of services and different categories emerged from the taxonomy.

5.1. Taxonomy for network integration management models

In the first phase of coding, collected material was referred to coding, assigning codes (labels) to portions of text in which respondents made references to the various activities involved in the integration network management of correspondents. This first phase was done in parallel with the collection, that is, began soon after the completion of the first interviews. According to Miles and Huberman (1994, p. 65), it allows even the process of data collection in subsequent interviews, thus enriching the analysis.

From the information collected in the interviews, eight labels emerged, applied to text blocks identifying different types of activities or services mentioned by respondents as part of operational management of correspondent networks. From that, we could identify the different activities of the integration management in a correspondent network, whether they are performed directly by the acquiring bank or delegated to an outsourced network integrator. These labels are presented in Table 4.

In the second phase of coding, we established axial coding between the eight labels, in order to group them into larger categories. Axial coding is the term by which authors such as Strauss and Corbin (1990) refer to the process of grouping different concepts in broader categories, according to their similarities and differences via a combination of inductive and deductive thinking. This reduced from eight to two the number of units of meaning, bringing together the eight original labels into two general categories, representing two major groups of activities related to the management of correspondents' networks. We name them "business process activities" and "technical and logistics activities," represented in Fig. 2 and detailed below:

- Business process activities: consist in managing commercial and contractual relationships between a bank and the businesses hired as its correspondents. The category includes prospecting and contracting retailers to be correspondents in a particular geographic area. Such activities can either be performed by the bank directly, or delegated to a third party (i.e., a network management firm which coordinates a network of establishments for a bank). In the case of delegation, the network management firm also assumes the responsibility for values held by its network. Each correspondent must transfer periodically to the acquiring bank the net proceeds of its transactions, according to the pre-agreed limits between bank and the hired integrator for that specific location. If funds are not transferred accordingly, the network integrator responds for losses associated to mistakes, fraud or theft.
- Technical and logistics activities: consist in managing the logistics of installation and maintenance of the correspondent locations, needed to ensure the day-to-day well functioning of the network. It includes installation of hardware and peripherals, installation and software upgrades, provide remote support and technical assistance, technical visits to locations, logistics and supply of consumables such as tapes and paper for printing.

The interviews suggested that these two categories of services include the portfolio of activities related to operational management of correspondents' networks that may be delegated or performed internally by the bank. It was also found that delegation to third parties, when practiced, involves one or the other entire category, that is, banks usually delegate to a third party the full group of activities related to business processes, and the full group of activities related to technical and logistic operations.

Given this, different models of network management could be identified based on two criteria: (1) a bank delegation or (2) non-delegation of business process, and technical and logistics activities. The resulting taxonomy is summarized in Table 5. It shows six different integration network management models grouped into three classes, described in Table 4. We defined them as models because they represent abstractions of a reality. As any model, they are simplifications that allow us to highlight certain features of complex situations (Huber 1981). Below is a description of the classes and models identified in the taxonomy and summarized in Table 5.

- *Full delegation*: The first class includes two models in which both business process and technical–logistic activities are outsourced to network management companies. This class of models is practiced by two among the seven surveyed banks (Banco do Brasil and Lemon Bank).
  - ○ *Outsourced integrator subrogates contract model (Model 1.1)*: The model consists in the complete outsourcing of the activities related to managing the network of BCs to a network management firm. Both business process and technical–logistic activities are outsourced. Thus, it is the network manager who selects, hires and

Table 4
Eight activities associated to correspondent network management.

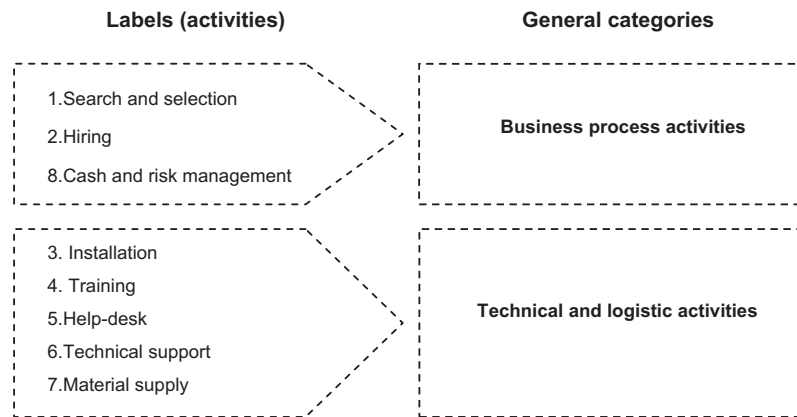| Label	Description
1 – Search and selection	Searching and selection of retail stores (or other non-bank agents) capable to become correspondents
2 – Hiring	Contracting selected stores/agents to be correspondents, as well as subsequent disqualification of the store as a correspondent bank
3 – Installation	Installation of the technical infrastructure and set up procedures in hired stores, needed for correspondent operation. Includes both software and hardware installation
4 – Training	Training staff that will operate correspondent systems at stores. Includes both technical (systems functionalities) and business (characteristics of financial products and services) training
5 – Help-desk	Remote assistance to retail stores through phone to solve day-to-day problems related to systems operation
6 – Technical support	Repairing and replacement of malfunctioning equipments
7 – Material supply	Provision of supplies and consumables such as tapes and print paper
8 – Risk and cash management	Responsibilities related to risk of losses at the correspondent level (fraud, theft, etc.)

Labels (activities) General categories

Fig. 2. Second phase: grouping activities into two general categories.

Table 5
Taxonomy for correspondent network management.

Class	Class description	Model	Model description
Full delegation of network integration activities	Both categories of services (business process; technical and logistics) are outsourced	Outsourced integrator subrogates contract	Bank hires third-party integrator as correspondent, and this agent hires independent retailers under sub-agency contract Practiced by Banco do Brasil and Banco Lemon, totaling 8100 locations
	More frequent in underserved areas Outsourced managers is liable for net balances collected by the network under their responsibility.	Outsourced integrator operates own locations	Bank hires third-party integrator as correspondent, and this agent operates its own service locations, mostly inside retail stores Retail store only provides physical space; contractually, the integrator is the actual Banking Correspondent (BC). Tends to be practiced in BCs where large volumes of cash are handled Practiced by Banco do Brasil and Banco Lemon, totaling 1400 locations
Partial delegation of network integration activities	Business process activities performed by bank; technical and logistical activities outsourced. Tends to be more frequent in areas already served by the banks' branches	"Traditional" VAN model	Bank prospects and hires individual retailers, usually through its regular branches, that identify potential BCs among their corporate clients. Network acquirer (VAN company) is hired to provide needed infrastructure to capture transactions Practiced by Bradesco, HSBC Brasil, Banco do Brasil, Unibanco and Banco Real, totaling around 22,900 locations
	Bank assumes risks of non-transfer of net balances collected by network	"Emergent" VAN model	Bank prospects and hires individual retailers from a list of stores already served by a network acquirer (VAN company) Practiced by Banco do Brasil with the network acquirer Cielo, totaling 3100 locations.
No delegation of network integration activities	No activities are outsourced to network integrators	Direct management	Bank assumes directly all activities related to integration activities, both business process and technical–logistic. Practiced by Caixa Econ. Federal, totaling 5600 locations.
	Prevalent before 2003	Use of proprietary networks	Bank takes advantage of a pre-existing payment network infrastructure, by delivering services though a network already in operation. Examples include use of lottery network by Caixa Econ.Federal; of postal network by Bradesco; of retail chains infrastructure by Banco do Brasil; totaling 24,500 locations.

informs the bank about the designation of the corresponding retail outlets, being also responsible for ensuring the functioning of the network concerning technical aspects. The model is usually practiced with small, individual retailers, and tends to be more frequent in areas provided with low bank coverage. The contract applied is based on the legal mechanism of 'substabelecimento' (subrogation) of an umbrella BC contract signed between the bank and the integrator. From a technological standpoint, the model is based in POS terminals or dedicated personal computers (PCs), operated by the retailer's staff. The bank pays the outsourced network manager a flat fee per transaction, a part of which is transferred by the network manager to the retailers.

o *Outsourced integrator operates own locations (Model 1.2)*: This second model can be seen as an evolution of the above model. As in the previous one, both categories

of network management activities are delegated (outsourced) by a bank to a third party (network manager). The difference between models is that, instead of being operated by the establishment's staff, service locations under the second model above are operated by the own network manager's employees. That is to say, the BC retail outlet only provides physical space for the installation of services. A kiosk will be typically installed inside the BC's store, but from the legal standpoint, it is the manager, and not the establishment who formally acts as BC. According to the interviewees, one of the reasons behind the practice of this model is related to cash risks incurred: the model is usually practiced in locations with high volumes of accounts collection and cash handling. Although there are exceptions – the most important of which are companies originated from the cash transport business – network integrators

who work in this model are the same ones who work in the previous model, practicing this second configuration at those locations that involve more transactions and higher values handled in cash. The model involves a payment from the bank to the network management firm in the form of a fixed fee per transaction. Normally, no payment is made for the retailer involved, which benefits basically from the increased customer traffic. The network manager, however, has the autonomy to negotiate with retailers, without interference from the bank. From a technological standpoint, the solution is similar to that adopted in the previous model: POS terminals or PCs running as dedicated locations of service, installation and maintenance being the entire responsibility of the network manager.

- *Partial delegation*: A second class of models is characterized by banks performing themselves the business process activities, while technical and logistic activities are delegated (outsourced) to a third party. This class is present in five of the seven banks examined (Bradesco, Banco do Brasil, HSBC, Unibanco and Banco Real).

  o *Traditional VAN model (Model 2.1)*: In this configuration, a bank assumes business process activities, normally supported by its branch network. Usually, branch managers prospect individual BCs among their corporate clients, and as a consequence, the model tends to be practiced in areas or regions already covered by the banking system, having a lower incidence in underserved areas. Once BCs have been already selected and hired, the technical and logistic integration activities are outsourced to acquiring companies (known in the market as *VANs – value added networks*) that ensure the capture and transmission of electronic transactions. These companies end by playing the role of a technical and logistic manager of the network. Technology used typically involves POS terminals provided by VANs' managers, which typically also provide the software solution for capturing and transmitting information, as well as technical assistance, support, training and other activities included in the technical–logistic category.

  o *Emergent VAN model (Model 2.2)*: This is a recent variation of the previous model, which began to be practiced in early 2009 and, and so far has been practiced by only one bank (Banco do Brasil) in partnership with only one network acquirer (Cielo). Different from the traditional VAN model, in this case BC selection is made by the bank, but searching from a list of retail establishments already served by the acquirer's payment infrastructure, and which therefore already have POS terminals installed (for transactions with debit and credit cards). Once hired as BCs, these establishments start using that same infrastructure to operate also BC services.

- *No delegation*: A third class of management includes models that do not involve any kind of outsourcing to network integrators. Two models were grouped into this class, as follows:

  o *Direct management (Model 3.1)*: A first model within this class consists in the usage of small, individual retailers, which are hired directly by a bank, with no participation of network integrators. Both categories of network management activities – business process and technical–logistic activities – are the responsibility of the bank. The model is practiced only by Caixa Econômica Federal, which ran throughout the model about 5600 municipalities at the time of the research in October 2009. From a technological standpoint, the solution is made possible through the use of a PC operating as a dedicated terminal at each establishment. The entire management of these establishments, in what refers to business process and technical–logistic activities, is entrusted to the bank internal departments.

  o *Use of proprietary networks (Model 3.2)*: This second model does not involve the participation of network integrators since it consists in taking advantage of the entire, pre-existent electronic payment networks (e.g., the check-outs of a retail chain), eliminating the need for prospecting or installing individual locations. The most relevant cases in which this model is observed are related to the institutional partnership between Empresa Brasileira de Correios e Telégrafos (the national postal company) and Bradesco, as well as to Caixa Econômica Federal's strategy of using the lottery network as BC locations of service. Several partnerships involving banks and retail chains can also be considered as examples of this model.

5.2. Quantitative results

5.2.1. Data

The gross sample size included 295 correspondents. Because the analysis depended on consistent information about the numbers of different transaction types, the researchers had to ask to the respondents to check the answers on their closing report of the previous month, November 2009. In cases when it was not possible to check the closing report, the research team decided not to include the respective observations in the analysis. After deletion of observations with missing or inconsistent, unchecked data, 147 questionnaires remained.

Histograms of the variables revealed that their distributions were not normal and all of them presented excess of zeros, since many correspondents do not offer many types of transactions. The criterion for identifying outliers was to check the distance of each observation from the variables means, measured in standard deviations. If such distance was higher than four standard deviations from the variable mean, the respective observation was deleted, because, according to Chebishev's theorem, at least 96% of the observations in any kind of distribution should be within four standard deviations below and above the variable mean. This cutting point led to the deletion of four observations, so the final sample under analysis consisted of 143 cases.

Ninety-one correspondents use Model 3.1 (no delegation/proprietary network) and 52 operate under Class 1 (Full Delegation): 48 work under Model 1.1 (outsourced management subrogation); and four according to Model 1.2 (Outsourced manager operates own locations).

We did not have data of correspondents managed by means of Class 2 (Partial Delegation) and that constitutes a limitation of this study. However, there is not interest in this class, usually located in less underserved areas than Classes 1 and 3, since the objectives of this study relate to the social impact of BCs in terms of range and amount of services delivered specifically in poor areas. Also, having data on the two extremes of delegation (Classes 1 and 3) would allow useful description of their relationship to the groups of services provided as complete opposite classes.

Because we had only four correspondents which operate under Model 1.2 (full delegation with own locations) and no correspondent that operates under Model 3.2 (no delegation–direct management) in the sample, we decided to analyze data only considering general Classes 1 and 3. That decision was consistent to the fact that there is no difference in the arrangement of networks in terms of outsourcing and vertical integration of business processes and technical and logistic activities between Models 1.1 and 1.2 and between Models 3.1 and 3.2.

The sample average of transactions equals to 2875 transactions; these transactions concentrate mostly on boleto and utility payments (with averages of 594.7 and 752.6, respectively). Next, we describe the three clusters resulting from our analysis.

Clusters were named based on the predominant class of the taxonomy and, when distinguishable, service volume. Clusters with

high average of monthly transactions were named following its class name complemented by the term "Wide Service". Clusters with low average of monthly transactions received the denomination of its class followed by the term "Narrow Service".

5.2.2. Cluster descriptions

Table 6 presents the means of each transaction type for each cluster, and these data will be used to describe and compare clusters. Table 7 has data on the regional concentration of correspondents in each cluster, with local descriptions regarding economic activity and distribution of social benefits, also used to characterize clusters.

Cluster 1 was named the "Full Delegation Group", because 96.23% of the 53 correspondents in this group use the full delegation management class. In Cluster 1, correspondents performed on average 1665 transactions in November 2009, mostly concentrated on boleto and utility payments, with averages of 670 and 725, respectively. Twenty-six (49.06% of the cluster) out of 27 correspondents sampled in the poor regions of Ceará state were grouped in this cluster, with seven located in Fortaleza, the state Capital. Also, all correspondents sampled in São Paulo City, seven in total, belong to this group and represent about 13.20% of its observations. Five correspondents (9.43% of the cluster) are from Manaus (out of 26 sampled in this municipality) and all the observations from Brasília (six in total, representing 11.32% of the cluster) are in this group. The remaining nine correspondents in Cluster 1 are in the following locations: one in the countryside of the Amazonas state, one in the countryside of Maranhão state, two in the countryside of Minas Gerais state, one in the countryside of Piauí state, two in the countryside of São Paulo state, and two in Pará state (one in the countryside and the other in the state capital).

The means of total transactions in November 2009 of the sampled correspondents in Cluster 1 for Ceará state, São Paulo City, Manaus, and Brasília were: 2159, 397, 3000, and 485, reflecting the levels of economic activity in each location, being transactions in this cluster predominantly related to the payment group of services (boleto and utility) and not to social services delivery or regular banking services.

Cluster 2 is the "No Delegation, Wide Service Group," with 100% of its 37 correspondents linked to the transactional systems of a private bank (Bradesco). They are all located in the Amazonas State (21.62% in Manaus) and configure direct management. This group presents the highest average of monthly transactions, 5432, mostly concentrated on withdrawals – involving both bank accounts (988.80) and social benefits (134.69), deposits on bank accounts (1022.90), and payments of boleto (832.6) and utility services (1161.00). Even though tax payments and account openings are not the most frequent activities of correspondents in this cluster, they are significant in this group (see Table 6). Thus, all three groups of services are represented in this group.

Cluster 3 is the "No Delegation, Narrow Service Group." There were 52 of the 53 correspondents in this group located in the Amazonas State (25% in Manaus) and their most common transactions concentrate on withdrawals of bank accounts (average of 415.90), deposits on bank accounts (432.50), boleto payments (352.90) and utility payments (494.70). Tax payments, account opening and withdrawals of social benefits are not the most performed activities in this group, but they occur moderately and are significantly more common in Cluster 3 than in Cluster 1 (full delegation group), in which these activities are seldom observed (see Table 6). The average of total transactions in Cluster 3 is intermediary when compared to the other groups, equal to 2301. All correspondents

Table 6
Average of different types of transactions performed by banking correspondents (CB) in each cluster.

Cluster	Number of boleto payments per CB	Number of Utility payments per CB	Number of bank accounts withdrawals per CB	Number of deposits on bank accounts per CB	Number of social benefits withdrawals per CB	Number of taxes payments per CB	Number of account openings per CB	Total transactions per CB
1 – Full Delegation Group	670.00	725.00	29.04	84.80	18.25	0.14	2.64	1665.00
2 – No Delegation, Wide Service Group	832.60	1161.00	988.80	1022.90	134.69	95.26	38.28	5432.00
3 – No Delegation, Narrow Service Group	352.90	494.70	415.90	432.5	57.84	39.89	16.03	2301.00

Table 7
Regions where the correspondents of each cluster tend to concentrate.

Cluster	Region	Number correspondents	Description
1 – Full delegation group	Ceará (state)	26	Underserved areas surrounding the capital of a poor state with low GDP per capita and significant distribution of social benefits per family and per capita
	São Paulo (city)	7	Outskirts of the most economically developed city in Brazil, with a high GDP per capita and intermediate distribution of social benefits per capita and per family
	Brasília	6	Outskirts of the Brazilian Federal Capital, with high GDP per capita and low distribution of social benefits per capita and per family
	Manaus	5	Underserved areas of a state capital with intermediary GDP per capita and large distribution of social benefits per family and per capita
2 – No delegation, wide service group	Amazonas (state)	37	A poor state with low GDP per capita and significant distribution of social benefits per family and per capita
3 – No delegation, narrow service group	Amazonas (state)	53	A poor state with low GDP per capita and significant distribution of social benefits per family and per capita

Table 8
Summary of the cluster analysis.

Cluster	Activity level	Groups of services	Locations
1 – Full delegation group	This group presents the lowest average of monthly transactions	Mainly payments ("boleto" and utility)	Mostly rural areas or regions in the outskirts of big cities, or small towns with limited economic activity
2 – No delegation, wide service group	This group presents the highest average of monthly transactions	Mainly regular banking services (mostly withdrawals of bank accounts and deposits, and significant account openings); social benefits delivery (withdrawals), and payments ("boleto" utility services, taxes)	Mostly locations in the Amazonas State, with limited economic activity
3 – No delegation, narrow service group	This group presents an intermediate average of monthly transactions	Mainly regular banking services (mostly withdrawals of bank accounts and deposits, and significant account openings); and payments (mostly "boleto" and utility services, and significant tax payments)	Mostly locations in the Amazonas State with limited economic activity

in Cluster 3 operate under the no delegation class and also tend to perform transactions of the three groups of services, even though in a smaller scale than Cluster 2.

6. Discussion

The results of the cluster analysis, although exploratory and based on a convenience sample with information of correspondents serving two banks (Banco do Brasil and Bradesco), tend to reinforce the taxonomy developed in the qualitative stage of this study, since the three groups were created with basis on the numbers of different transactions types performed, with no imposition of the information about the taxonomy. Practically all correspondents of integration types 1 and 3 were grouped together. Also, correspondents in Cluster 1 seem to focus basically on the group of transactions related to payments, while Clusters 2 and 3 seem to incorporate, besides payments, groups of transactions involving social transfers and other services such as deposits, account opening and withdrawals.

Being Classes 1 and 3 far opposite organizational forms in terms of process internalization and outsourcing, it may the case that the costs perceived in monitoring and controlling transactions related to Clusters 2 (social benefits delivery) and 3 (regular banking services) are higher, characterizing these services as more complex than payments. The results also suggest that uncertainty regarding contingencies of contract breaching may be more frequent for transactions involving Clusters 2 or 3, which require asset specificity and qualified human capital. This interpretation implies that the market is seen as less efficient to ensure execution of transactions than internal governance for activities of banking correspondents different from payment services. A possible reason could be that coordinating activities like searching, training, communicating, negotiating, monitoring and enforcing particular services are more viable by means of internalization.

Still concerning the observed association between internalization of network processes by banks and the broadening of the range of services offered by correspondents, it could be that the banks do not recognize the merits of political and legal institutions in dealing with regulatory processes and constitutional protections in case of service contracting in branchless banking. The need for ownership of information about processes and customers may also be a driver for vertical integration when the range of services is increased by a bank, especially when this increase is based on the third group of transactions (regular banking services). All these possible explanations, however, should be addressed in future research by means of in depth data collection and analysis. Table 8 summarizes the results of the cluster analysis.

Because correspondents in Cluster 1 tend to be in locations with wider economic activities than the locations of correspondents in the other clusters, it may be the case that branchless banking locations in more economically dynamic regions face less demand or operate in smaller scales, since less transactions are performed and a narrower range of services are provided by correspondents in Cluster 1. A possible explanation could be that correspondents in these economically intensive regions face more competition with traditional bank branches, or even with other correspondents, because there tend to be more branchless locations per capita in these regions. However, a significant part of the locations where correspondents of Cluster 1 tend to concentrate is situated in poor underserved areas of the North and Northeast regions. In such a scenario, it seems that the scale and scope of services the bank is willing to offer, are the drivers of the network integration class in use. Those banks interested only in traffic alleviation in branches by means of offering payment services in BCs may count on the production economies of outsourcing business processes and technical-logistic activities to firms which developed know how in doing so.

Nevertheless, banks willing to amplify their range of services and gain scale with pro-poor services by means of BCs, apparently take into account transaction costs and proceed into vertical integration. Besides the benefits regarding coordination and controlling of processes, economies of scale may justify internalizing activities, what is consistent to the facts that both clusters operating under the no delegation class present more intense activity than the cluster operating under the full delegation class. Furthermore, the availability of firms with expertise for performing transactions other than payments may be scarce, thus allowing banks behind the full delegation models to gain scale only in the first group of services.

It may also be the case that the Full Delegation integration class limits the activities of correspondents, which are not structured and controlled as bank branches and therefore lack know-how and infrastructure to improve their range of activities as providers of banking services and to increase their scales of operation. Under those circumstances, the far opposite integration class, No Delegation, may allow banks to manage directly their correspondents networks to expand their services portfolio and operate in larger scales. It seems contradictory that the non-delegation models are found in remote areas such as the Amazon, but the reason can be that banks are very interested in providing banking services in areas where there were an unexplored demand.

7. Conclusion

The results of this research can be summarized as follows. First, the study provides a better understanding of the diversity of network integration models that lay behind the operation of the Brazilian banking correspondents' channel. Although an extensive literature has been produced in recent years studying this important branchless banking channel, no light had been shed yet on the diversity of business relations and partnerships that can make the channel work. The paper addressed this research gap by identifying six different business integration models that were, in turn,

classified into taxonomy of three classes, according to the level of delegation to third parties of the activities involved in the management of a correspondent network. This led us to understand the variety of models through which the channel can be managed.

Second, we were able to identify a relation between different network integration models and different profiles of services offered through correspondents. Through a quantitative cluster analysis, we found that the more suited to deliver a wider range of social-oriented, "pro-poor" services correspondents networks are, the more they are controlled by banks. Correspondents managed according to Class 1 – Full Delegation revealed themselves more suited to collection services (invoice and utility payments), whereas those belonging to Class 3 – No Delegation, are, in general, more suited for a wider range of services that includes collection but also encompasses account openings, social transfers, and deposits. That is to say, the less "delegated" the network integration model is, the wider will be the expected range of services delivered.

Apart from addressing a relevant research gap and bringing new evidence to the academic debate, such findings can also be helpful for banks, policy makers and other groups of practitioners. From a public policy point of view, identifying which models have revealed themselves more suited to the delivery of each group of services certainly is of considerable value in regulating the channel, since regulators may be interested in promoting a more purposely "pro-poor" use of the channel. This, of course, is valid not only to Brazilian policy makers, but also to those of other countries interested in replicating the channel.

In what it refers to banks, the results presented can be also helpful to render their correspondent integrating practices better fitted to their strategies concerning the range of services to be delivered through the channel: managing correspondents through full delegation to a third party can work properly if the bank's aim is to alleviate branch traffic by taking collection off the branches, but will not be the most adequate model if the intention is to use correspondents as a channel for opening new accounts or delivering credit or insurance services, for instance.

Giving the growing importance of the branchless banking model as a way to expand access to banks in developing countries, the Brazilian correspondent model is also an interesting source of investigation for researchers concerned with social and economic development of the poorest areas of the globe. Researchers interested in the subject of branchless banking can benefit of the taxonomy presented in this paper and the transaction costs analysis of this kind of banking channel which has been adopted in a number of developing countries all over the world.

A significant limitation of the study, however, is the fact that our data collection process for the quantitative phase of the research (Step 2) included correspondents operating according to only two of the three network integration classes identified at the qualitative phase (Step 1). This led us to run the quantitative analysis considering only two model classes (1 – Full Delegation, and 3 – No Delegation). Thus, the results of this step are still exploratory and useful only as a limited extension of the information employed in the creation of the qualitative taxonomy, and are expected to motivate more complete data collection in future research.

Appendix A. Questionnaire

Correspondent banking: Questionnaire
Date:
Interviewer(s):
Location:
Store name:

Respondent's name & title:

1. What are the names of the bank and integrator that you are a correspondent with?
   Bank:
   Integrator:
2. How many correspondent locations do you have besides this one?
3. What was the first year you began working as a correspondent?
4. INSTRUCTIONS: Read the instructions below and the following items on the Revenue Sheet. Rely on the closing report to fill out this worksheet. The list below includes all types of transactions which a correspondent may offer, however the respondent may not offer all of them.

Now we need to know some details about the types of bills you receive. For this, it would be better if you could show us your closing report from yesterday or the most recent one available.

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