Linking knowledge corridors with customer value through knowledge processes

1. Introduction

While nowadays an extensive literature promoting knowledge management (KM) exists, there is a worrying shortage of empirical studies demonstrating an actual connection between KM activities and organizational outcomes (Andreeva and Kianto, 2012). Over the last few decades and in the current climate, a firm's attitude towards the customer is becoming crucial because the role of the customer has changed from that of a mere consumer to one of consumer, co-operator, co-producer, co-creator of value and co-developer of knowledge and competencies (Wang et al., 2004). According to Drucker (1954), the mission and goal of all firms is customer satisfaction; and customer satisfaction is achieved when firms offer a superior value to customers (Darroch et al., 2009). As a result, in the complex competitive environment in which firms operate, they see customer value as a key factor when seeking new ways to attain and maintain a competitive advantage (Woodruff, 1997). KM has become increasingly important as organizations realize that effective use of knowledge assets and resources provides them with the ability to innovate and respond to fast changing customer expectations (Sandhawalia and Dalcher, 2011).

Much has been written about why it is important to manage knowledge, but there is considerably less written about how it should be managed; that is, about the processes that are used to identify, capture, share and use knowledge in firms (e.g., Earl, 2001; Ipe, 2003). There has been also considerable discussion in the recent literature of the relationship between knowledge structures and customer value (Despres and Chauvel, 1999; Gebert et al., 2003; Rezgui, 2007). Although Vorakulpipat and Rezgui (2008) suggest that knowledge structures have inherent value creation capabilities, some questions still remain over this theoretical justification. Moreover, no examples in the literature examine the impact of the relationship between knowledge structures on customer value creation. This study addresses the gap in the literature by proposing a certain sequence of KM processes that increases customer value and aims to identify how these sequence influence customer value creation.

Knowledge in a firm emerges both from inside and outside the firm. Hence the ability of a firm to combine external knowledge with internal knowledge is therefore essential if a business is to align its processes, products and services to build customer value. One way that this might be achieved is to develop knowledge structures to competitively operate in the market and satisfy customer needs (Carballo-Cruz, 2001). It is with this in mind that we propose that the ability and willingness of managers to engage in these activities is enhanced through the combination of what we refer to as ‘knowledge structures’. The focus of this paper is on the combination of these processes, while external knowledge is managed by knowledge corridors (i.e. potential absorptive capacity, realized absorptive capacity), at the organizational level internal knowledge is managed by knowledge processes (i.e. knowledge transfer, knowledge storage/retrieval and knowledge application). Our study addresses this question: “What is the nature and strength of the relationship between the existence of knowledge structures and customer value?” These relationships are examined through an empirical investigation of 76 commercial and savings banks in Spain.

From a practical point of view, the key managerial implication of this paper is to contribute to the knowledge management literature by determining the relationship between the different structures of KM (i.e. potential absorptive capacity, realized absorptive capacity, knowledge transfer, knowledge storage/retrieval and knowledge application) and the potential effects of this relationship for increasing customer value.
creation. We attempt to identify possible combinations of the different structures of KM and propose and analyze a sequence for creating superior customer value.

The paper begins with an explanation of the theoretical context, followed by a presentation of the study model and the positing of a number of hypotheses. The following section contains a description of the principal aspects of the methodology, such as the research context, measures, data collection and the data analysis technique (structural equation modeling, SEM). A discussion of the results and implications of the study follows and the paper concludes with the limitations of the study and possible areas of further research.

2. Theoretical Background

According to Ragab and Arisha (2013), knowledge is the currency of the current economy, a vital organizational asset and a key to creating a sustainable competitive advantage. Knowledge is an intangible resource, and the alignment and integration of intangible resources in a firm, although complex, is a crucial issue in value creation (Kaplan and Norton, 2004). In recent years, intangible resources have replaced tangible ones as key elements of firm value creation (Swamy, 2004). Given the importance of firms’ intangible assets, ways must be found of managing them (Spender, 2006). KM emerges as the management of these intangible resources, versus the previous management of tangible ones (Spender and Scherer, 2007).

The assumption that KM is an organizational capability implies that firms need to possess a set of resources in order to create, use and share knowledge (Chou et al., 2007; Lin, 2007; among others). Given the importance of external knowledge to develop and increase employees’ knowledge and learning capabilities (Jantunen, 2005; Newey and Zahra, 2009), absorptive capacity represents an important part of a firm’s ability to create new knowledge (Chou, 2005; Lane et al., 2006; Liao et al., 2010; Van den Bosch et al., 1999). The first to introduce the concept of absorptive capacity were Cohen and Levinthal (1990). This concept was introduced to explain why some firms are better able to take advantage of available external knowledge compared to others in the industry (McDonald and Madhavaram, 2007). Developing and maintaining absorptive capacity is critical to a firm’s long-term survival and success because absorptive capacity can reinforce, complement, or refocus the firm’s knowledge base (Lane et al., 2006).

Zahra and George (2002) have advanced our understanding of this process by proposing the existence of two subsets of absorptive capacity (i.e. potential and realized). While the term potential absorptive capacity (PACAP) is used to refer to the capacity to acquire and assimilate knowledge, the concept of realized absorptive capacity (RACAP) includes transformation and exploitation capabilities (Fosfuri and Tribó, 2008; Purvis et al., 2001). Whereas ‘acquisition’ refers to a firm’s capability to identify and acquire externally generated knowledge that is critical to its operations, ‘assimilation’ refers to the firm’s routines and processes that allow the firm to analyze, process, interpret, and understand the information obtained from external sources. It should be also noted that ‘transformation’ denotes a firm's capability to develop and refine the routines that facilitate combining existing knowledge and the newly acquired and assimilated knowledge. This is accomplished by adding or deleting knowledge or simply by interpreting the same knowledge in a different manner. ‘Exploitation’ is based on the routines that allow firms to refine, extend, and leverage existing competencies or to create new ones by incorporating acquired and transformed knowledge into its operations.
Research on KM is often limited to internal processes of knowledge; the absorptive capacity, however, focuses on the use of external knowledge within a firm (Lane et al., 2006). In turbulent environments, firms tend to rely strongly on external knowledge (Droge et al., 2008). Since the accumulation of knowledge is a result of not only internal development of knowledge but also the assimilation of external knowledge, the absorptive capacity of the firm (Cohen and Levinthal, 1990) is critical to its success.

2.1 Knowledge corridors

Firms cannot rely solely on their internal knowledge sources, but also have to develop their external knowledge sources to obtain knowledge actively (Escribano et al., 2009; Matthyssens et al., 2005). For the improvements of the process of knowledge acquisition and appropriation, organizations should configure internal and external networks to support this process reorganizing their classical structures (Bohorquez and Esteves, 2013). What distinguish knowledge workers from other workers are tasks that require searching new knowledge, both within and outside firms, which lead to the creation of knowledge. After a review of the existing literature, we argue that many terms have been used to describe the process of knowledge creation, such as: knowledge acquisition (Cui et al., 2005; Gold et al., 2001; Jantunen, 2005; Lin, 2007; Lin and Lee, 2005), knowledge generation (Grover and Davenport, 2001), knowledge construction (McAdam and McCreedy, 1999), and knowledge corridors (Shane, 2000).

The concept of a knowledge corridor has been invoked to characterize the way in which prior knowledge may open up a corridor to future opportunities and options (Shane, 2000). It should be noted here that the term “knowledge corridor” exists in accordance with Ronstadt’s (1988) corridor principle, which posits that opportunity recognition is assumed to be a function of both a person’s stock of knowledge and previous social knowledge (Ronstadt, 1988). For example, an exposure to work experiences from other organizational members also broadens entrepreneurs' range of what they perceive as feasible for an opportunity (Krueger, 2000). From this point of view, for “knowledge corridor” to occur on an individual level, “an organizational corridor” must first take place on an organizational level. The focus of this paper is on the combination of these processes, while corridor may be considered as a way of developing an understanding of the individual who is learning from the interaction (Shane, 2000). Knowledge corridors are places in which powerful leaders or organizational members work with external knowledge.

Taking into account the above we would argue that as “new knowledge” is assimilated the corridor that is opened up provides an organization with potential benefits that may be derived from new opportunities that are available as a result of traversing the corridor. Such corridors can be considered to provide ways of exploring and structuring organization's future course of action (Koller, 1988). Put another way, corridors provide a path which allows for the exploitation and deployment of assimilated knowledge (Short et al., 2009). Considering this we argue that knowledge corridors can be considered to be closely related to Zahra and George’s (2002) notion of absorptive capacity.

2.2 Knowledge processes

The recognition of knowledge as a key resource for firms in the current business environment confirms the need for processes that facilitate individual and collective knowledge creation, transfer and leverage (Becerra-Fernandez and Sabherwal, 2001; Ipe, 2003; Nonaka and Takeuchi, 1995). Every firm should understand the importance of knowledge and of teaching knowledge skills to their employees and every employee
should be encouraged to create, share, search out and use knowledge in their daily routines (Davenport and Prusak, 1998).

The term “knowledge processes” is used to refer generally to the means by which value is added to raw inputs in order to create value for the organisation and its clients (Dawson, 2000). Several attempts have been undertaken to identify and define the different knowledge processes. Although there is little controversy over the number and labeling of knowledge processes (Alavi and Leidner, 2001), a review of the processes identified as knowledge processes by several authors (e.g., Argote et al., 2003; Chang Lee et al., 2005; Chen and Huang, 2009; Gold et al., 2001; Huang and Li, 2009; Ipe, 2003; Lin, 2007; Sandhawalia and Dalcher, 2011) allows us to distinguish the processes below.

Knowledge transfer

Knowledge transfer is basically the act of making knowledge available to others within the organization (Ipe, 2003). To make knowledge become available, it is crucial that individuals and departments are involved in the process of knowledge transfer (Osterloh and Frey, 2000; De Vries et al., 2006). Knowledge transfer with each other is seen as an effective way to improve the knowledge that a firm has about the competitors and the industry, and to acquire local knowledge (Gold et al., 2001). Many terms have been used to describe this process, such as knowledge dissemination (Jantunen, 2005; Chou et al., 2007), knowledge sharing (Earl, 2001), knowledge distribution (Bhatt, 2001), and knowledge conversion (Gold et al., 2001; Cui et al., 2005; Lin, 2007; Sandhawalia and Dalcher, 2011).

The above definitions suggest that there are different definitions of knowledge transfer but common elements include activities that bring organizational members together from the stage of idea generation to implementing evidence-based initiatives. All these terms have a common topic ‘the knowledge exchange between the source and the recipient of it’ (Baskerville and Dulipovici, 2006). As Gold et al. (2001) noted, in order to remain competitive in the market, organizational knowledge and skills must be shared from one part of the organization to another. This means that knowledge transfer activities are an essential component in the process of KM (Alavi and Leidner, 2001; Gold et al., 2001; Lee and Ahn, 2007).

Knowledge storage/retrieval

The increased focus on KM in organizations raises an interesting question regarding its access and protection (Lucas, 2010). All individuals in a firm must have access to the knowledge base in order to obtain the relevant knowledge to help them in their work and decision making. The knowledge accumulated in firms can play an important role in removing obstacles and inefficiencies and, at the same time, in improving management performance (Walsh and Ungson, 1991). However, if knowledge created for years through KM activities is not retained systematically, it cannot be beneficial for future decision-making needs (Chang Lee et al., 2005). The storage and retrieval mechanisms allow firms to quickly access to knowledge.

Many terms have been used to describe the knowledge storage and retrieval, such as knowledge embodiment (McAdam and McCreedy, 1999), knowledge retention (Argote et al., 2003; Levy, 2011), knowledge codification (Baskerville and Dulipovici, 2006; Grover and Davenport, 2001), and organizational memory (Chou et al., 2007). All these terms have in common that they address knowledge retention and its quick and easy access. The objective is to make knowledge accessible to those who need it (Davenport and Prusak, 1998).
The above considerations also imply that knowledge storage and retrieval processes are closely related to the idea of ‘organizational memory’. In fact, Walsh and Ungson (1991) define organizational memory as ‘the stored information from an organization’s history that can be brought to bear on present decisions’. Regarding this, researchers and practitioners recognize that organizational memory is an important factor for the success of the firm operations and reactions to the changes and challenges of the environment (Nilakanta et al., 2006). As such, organizational memory is simply a collection of knowledge stored in different places in a firm. For knowledge to be used in decision making, KM must allow access to that knowledge.

Firms create knowledge and learn, but they also forget; that is, firms can lose track of the acquired knowledge (Darr et al., 1995). Therefore, the knowledge storage/retrieval process, also referred to as organizational memory, constitute an important aspect of effective KM (Chou, 2005). In this paper, we refer to the combination of factors that facilitate organizational memory and knowledge retrieval as the ‘knowledge storage/retrieval’. Hence, we define knowledge storage/retrieval as ‘the retention of stored information from an organization’s history and its quick and easy access in order to be applied on present decisions’.

### Knowledge application

According to Gold et al. (2001), knowledge application seems to be assumed by authors since it does not appear explicitly in the literature. For example, Nonaka and Takeuchi (1995) discuss the ability of a firm to create knowledge, but they seem to assume that once created, knowledge will be effectively implemented. Several authors (e.g. Gold et al., 2001; Lin and Lee, 2005; Cui et al., 2005; Lin, 2007) do not make a distinction between the process of knowledge application and the process of knowledge storage/retrieval. In this vein, many terms have been used to describe the process of knowledge application, such as knowledge leverage (Ipe, 2003), knowledge use (Earl, 2001; Swan et al., 1999), and knowledge utilization (Chan Lee et al., 2005; Jantunen, 2005). One of the most common ways to use knowledge is to adopt the best practices of a leader firm, to find the relevant knowledge and to apply it (Chang Lee et al., 2005). The application of knowledge implies the use of the knowledge generated in the phase of knowledge creation and retained in the phases of transfer and storage/retrieval.

Based on the above discussion, there appears to be some confusion between “the process of knowledge application” and “applying knowledge process”. Although there is a significant overlap between the concepts of knowledge application and applying knowledge, the terms refer to two not identical processes. While knowledge application is a KM process about being good at transferring knowledge from one context to another (Gold et al., 2001), applying knowledge learned in a new context may provide organizations with prompts to improve efficiency (Senge, 1990). Thus, while knowledge application is the capability for effective action, applying knowledge is the effective action in the business, which may involve many intricate issues. In this paper, the process that we refer to is “knowledge application”. We will focus on what we consider “knowledge application” as one way to apply learned knowledge to new understandings and situations to create the perception among customers that the company’s version of its product or service is somehow different and thus has added value that is not available from competitors (Alavi and Leidner, 2001).
3. Research model and hypothesis

Practitioners have long since recognized that the essential elements of a firm’s business strategy consist of being able to understand what customers value within a particular offering, creating value for them, and then managing this value over time (Porter, 1985; Slater and Narver, 1998). Being able to identify what customers want from a product or service also helps a firm to formulate its value proposition. Porter (1985) notes that a firm’s competitive advantage stems from its ability to create value for customers that exceeds the cost of creating that value (DeSarbo et al., 2001).

Although creating a superior value for customers has always been an important issue for firms (Darroch et al., 2009; Drucker, 1954), in the 1990s customer value became a topic of growing interest for firms and academics, and practitioners now view the concept as one of the most significant factors in a firm’s success (Parasuraman, 1997; Woodruff, 1997). Many authors identify customer value as an important source of competitive advantage (Woodruff, 1997; Mizik and Jacobson, 2003; Spiteri and Dion, 2004) and as the foundation of a firm’s marketing activities (Holbrook, 1996). Other authors consider customer value to be a critical strategic tool for attracting and retaining customers (Wang et al., 2004; Lee and Overby, 2004; Sánchez and Iniesta, 2006) and as an indicator of repurchase intentions (Parasuraman and Grewal, 2000).

Over the last few decades, firms have found themselves in a new and complex competitive environment, in which customers increasingly seek customer value (Sánchez et al., 2009). The literature discusses at some length this growing interest in the creation and provision of superior customer value (Smith and Colgate, 2007; Wang et al., 2004) by partially replacing more limited concepts such as quality (Cronin et al., 2000) or satisfaction (Woodruff, 1997).

The knowledge-based view (KBV) identifies value creation as a significant organizational capability that can contribute to a firm’s success and as an important source of competitive advantage (Spiteri and Dion, 2004; Mizik and Jacobson, 2003; Mocciaro and Battista, 2005). Customer value creation results from a firm’s ability to use its resources to achieve a desired aim (Amit and Schoemaker, 1993) and this study demonstrates that a firm’s ability to create superior customer value depends on a certain combination of its knowledge structures. In the current turbulent environment, customer value in organizations depends upon the organization’s capacity to get the right people with the right knowledge in the right place at the right time (e.g., Gebert et al., 2003; Kaplan and Norton, 2004). In fact, many authors describe KM as a bundle of structures that firms need to enable them to use what they know in order to create value for their customers (Vorakulpipat and Rezgui, 2008).

The absorptive capacity provides a good basis to explain the adoption of new knowledge structures (Cohen and Levinthal, 1990). It is suggested by several studies that absorptive capacity can enable firms to acquire external knowledge as it helps companies not only to understand their customers better, but also to learn what their customers know (Tsai, 2001). Although, most studies in the area of absorptive capacity emphasize that RACAP is driven by PACAP (e.g., Zahra and George, 2002; Cohen and Levinthal, 1990), the existing literature has paid little attention to how RACAP is created and developed in the company. By doing so, internal knowledge structures plays an important role in the creation of RACAP since it is a way of transferring knowledge to refine the organization’s existing knowledge and improve its RACAP (Cepeda et al., 2012).
The above considerations lead us to argue that internal knowledge processes play an important role in the creation of RACAP since it is a way to refine the organization’s existing knowledge structures. For example, knowledge transfer may help employees to solve problems by using the same kind of thinking across all points of interaction. In addition, knowledge storage/retrieval facilitates a situation which, when something has been learned, it can easily be used to solve a similar problem. It is with this in mind that we propose knowledge transfer and knowledge storage/retrieval as ways to improve RACAP of organizations. What the firm knows is going to be available for people throughout the firm and is going to be stored in people minds (Daghfous et al., 2013; Dunham and Burt, 2011). Put another way, once knowledge is acquired and assimilated, and it is also stored in an implicit or explicit way, the next step must be the transformation and exploitation of this knowledge; that is, firms need to leverage the knowledge that has been absorbed. It is important for firms to develop a ‘potential absorptive capacity’ because it refers to the ability to use prior knowledge to recognize the value of new information, assimilate it and apply it to create new knowledge and capabilities (Cohen and Levinthal, 1990). This consideration allows us to frame the hypothesis of the present work:

**Hypothesis 1:** Knowledge transfer and knowledge storage/retrieval are mediator variables between PACAP and RACAP.

The application of knowledge implies the use of the knowledge generated via RACAP. With respect to this issue authors have argued that RACAP facilitates the easy search and retrieval of relevant knowledge from the repositories, and enables the stakeholders to apply this knowledge in decision-making (David, 1999). A possible explanation would be the fact that in customer-seller relationships, employees who interact with customers can use RACAP as information filters, becoming better at separating relevant and irrelevant information (Tippins and Sohi, 2003). All these circumstances enable the application of knowledge to continue in times of crisis, such as the Spanish banking industry during the period we have examined. Therefore, we propose the hypothesis:

**Hypothesis 2:** RACAP positively influences knowledge application.

The above considerations lead us to argue that knowledge application plays an important role in the creation of customer value since it is the capability of applying appropriated knowledge to refine the organization’s existing services offered and improve its customer value (Bierly et al., 2009). The application of knowledge facilitates a situation that, when something is being done wrong, the organization can change to quickly resolve it (Fahey et al., 2001; Reichheld and Schefter, 2000; Winer, 2001), which in turn may help employees to coordinate customer relations across all points of interaction and audiences (Day, 2000; Chang, 2007). These circumstances provide a common space of trust between the client and the organization, making customers more likely to restore their confidence (Cabrera and Cabrera, 2002; Stein and Bowen, 2003). Thus, as Kotler (2000) noted, when information or knowledge is not fragmented within a company, customer feedback (and, by extension, customer value) is easy to obtain. Therefore, we propose the following hypothesis:

**Hypothesis 3:** Knowledge application positively influences customer value creation.

Taking into account all of the above, this study proposes the structural model shown in Figure 1. In summary, a firm with KM possesses a key capability for the creation of customer value. To manage knowledge effectively, firms must put in place an organizational culture that encourages KM. And for KM to impact on customer CV, the relationship between the different KM structures must be in the way we have stated.
before. And finally, firms will be able to actual use what they know in order to increase the value created for customers.

Insert Figure 1 about here

4. Methodology

4.1 Data Collection

The context for the research hypotheses is the Spanish banking industry, including retail and commercial banks (bancos) and savings banks (caja de ahorros) that serve the general public, representing around 18% of the national GDP in 2010.

As described above, this industry sector is suitable because banking demonstrates KM capabilities. Banking is a very knowledge-intensive industry and therefore an appropriate one in which to identify, analyze and evaluate the different KM processes. The increasingly intense competition within the financial service industry is forcing banks to recognize the need to seek new ways of creating customer value. In addition to the competitiveness of the industry, the relative intangibility of their products/services creates the need to capture and retain customers by offering them something extra (i.e. KM). These aspects demonstrate that the banking industry is an appropriate setting for an investigation of knowledge corridors and processes and their impacts on customer value because banking institutions require an intensive use of appropriated knowledge.

The crisis in the financial services industry is highly significant (both now and at the time the study took place). The effect of this crisis has been to force many countries to apply severe measures to reduce the impact on their financial services industry. Numerous banks and insurance company takeovers and capitalizations have taken place, the number of company mergers as a rescue measure has multiplied and crashes have increased. The full extent of this crisis is still unknown, since events have occurred at an unusually high speed, leading to enormous changes within a short time span, mainly following the crash of Lehman Brothers in September 2008.

The massive credit granting to construction and property development activities is at the basis of the solvency problems of an important part of the Spanish banking system, namely the savings banks (cajas de ahorros), whose weight in the industry, measured by various indicators, was close to 50% (Confederación Española de Cajas de Ahorros, 2011). To tackle the solvency problems, throughout 2011 an intense restructuring process took place in the banking industry in Spain, which up to now is producing positive results in terms of reorganization, losses recognition and recapitalization (IBE, 2013). Therefore, in this context, it can be stated that there is an increased need for banks to become more customer-oriented organizations aiming at the satisfaction and good service of their customers (Heffernan et al., 2008).

It may also be noted that the banking business is very complex and requires intensive use of knowledge resources to competitively operate in the market and satisfy its customer needs (Carballo-Cruz, 2001). In banking institutions, staff need appropriate and up-to-date knowledge to face many challenges including global competition for deposits, loans, underwriting fees, increasing customer demands, shrinking profit margins, and the need to keep up with new technologies (Wright et al., 2009). In addition, banks provide services to different categories of customers which include individuals, associations, businesses and public organizations, each with different service requirements, such as cash saving, money transfer, loans and foreign trade services (Kubo et al., 2001).
The total number of banks operating in Spain at the time of the study (i.e. 2010) was 110; of which 65 were commercial/retail banks and 45 were savings banks. The small number of players making up the banking industry in Spain could be an advantage as the study can examine the whole population instead of a particular sample. Only 85 of the banks met the requirements of the study (i.e. banks serving the general public). Only 40 of the 65 commercial/retail banks qualified. Of the remaining 25 banks, 17 simply bore a corporate name, but were the capital property of other banks, operating from within their offices and 8 were investment (not commercial) banks. Therefore, the target group consists of 85 financial bodies, representing around 77% of the total. Questionnaires were aimed only to the general manager in the main branch office of each financial entity.

The response rate was high, at around 90%, with 76 of the 85 banks completing the questionnaire by personal interview to the general manager in the main branch office. Of note is that all of the completed questionnaires are valid. Furthermore, because the data sample (76) is very close to the real population in Spanish banking industry (85), we used the factor correction suggested by Malhotra and Birks (2006) to adapt the standard error generated.

4.2 Measures

From the literature review, four key dimensions stand out as affecting KM processes: knowledge creation, knowledge transfer, knowledge storage/retrieval and knowledge application. Churchill's (1979) approach to questionnaire development was used, combining scales from several other relevant empirical studies.

The survey was initially validated by academics in management in Seville (Spain). We then conducted a series of personal interviews with managers who comprised a pilot sample of 15 firms in various industries. As a result of this pre-testing, we made some minor modifications based on the suggestions received.

We opt for an absorptive capacity (AC) scale proposed by Jansen et al. (2005) to measure knowledge creation, which adds to the conceptual richness of the study. This scale consists of 9 items to measure PACAP and 12 items to measure RACAP (see Appendix 1). The final cleaned scale consists of 9 items to measure PACAP and 8 items to measure RACAP.

The model uses Gold et al.'s (2001) scales to measure knowledge transfer (KT) and knowledge application (KA). KT scale consists of 10 items and KA scale consists of 12 items (see Appendix 1). After cleaning the data, KT scale includes 7 items and KA scale includes 9 items.

To measure knowledge storage/retrieval, we use Chou et al.'s (2007) scale, which consists of 4 items and measures organizational memory (OM). Organizational memory refers to the processing of saved knowledge, a concept that coincides with our understanding of knowledge storage and retrieval (see Appendix 1). The final cleaned scale retains the 4 items.

In the case of the customer value creation capability, and after a review of the scales developed in previous investigations, we chose Hooley et al.'s (2005) scale. The lack of proposals for measuring customer value creation created problems when seeking the most appropriate instrument for this construct. The model uses Hooley et al.'s (2005) scale because this scale is complete and refers to the creation of value for customers, as opposed to other proposals, which analyze value creation for all the stakeholders (see Appendix 1).
4.3 Data Analysis

The hypotheses were tested simultaneously using partial least squares (PLS), a structural equation modeling technique employing a principal component-based estimation approach (Chin, 1998). PLS was selected due to the characteristics of our model and sample. Our model uses reflective and formative indicators and our data is non-normal. Other techniques of structural equation modeling (e.g., the covariance-based model performed by LISREL or AMOS) cannot be applied in these circumstances (e.g., Diamantopoulos and Winklhofer, 2001).

Using PLS involves a two-stage approach (Barclay et al., 1995). The first step requires the assessment of the measurement model. This allows the relationships between the observable variables and theoretical concepts to be specified. This analysis is performed in relation to the attributes of individual item reliability, construct reliability, average variance extracted (AVE), and discriminant validity of the indicators of latent variables. For the second step, the structural model is evaluated. The objective of this is to confirm the extent to which the causal relationships specified by the proposed model are consistent with the available data.

To analyze the relationships between the different constructs and their indicators, we have adopted the latent model perspective, in which the latent variable is understood to be the cause of the indicators and, therefore, we refer to reflective indicators for first-order constructs or dimensions. The model contains four reflective constructs: knowledge transfer, knowledge storage/retrieval, knowledge application and customer value creation. Two constructs (PACAP and RACAP) are modeled as second-order formative constructs, because we consider them “causal” drivers of absorptive capacity instead of seeing the dimensions as outcomes of it (Baxter, 2009).

With regard to the measurement model, we began by assessing the individual item reliability (Table 1). The indicators exceed the accepted threshold of 0.707 for each factor loading (Carmines and Zeller, 1979).

From an examination of the results shown in Table 2, we can state that all of the constructs are reliable. The values for both the Cronbach’s alpha coefficient and composite reliability are greater than the 0.7 required in the early stages of research and the stricter value of 0.8 for basic research (Nunnally, 1978). The AVE should be greater than 0.5, meaning that 50% or more variance of the indicators should be accounted for (Fornell and Larcker, 1981). All the constructs of our model exceed this condition (Table 2). To assess the discriminant validity, we compared the square root of the AVE (the diagonal in Table 2) with the correlations between constructs (the off-diagonal elements in Table 2). On average, each construct relates more strongly to its own measures than to others.

The formative dimensions of the second-order constructs, PACAP and RACAP, are evaluated differently from reflective ones. We need to examine the weights (Mathieson et al., 2001), which is a canonical correlation analysis and provides information about how each indicator contributes to its respective construct (see Table 3).
5. Results

A bootstrap test (5000 resamples) was used to generate standard errors and t-statistics (Hair et al., 2011; Hair et al., 2014; Henseler et al., 2009). This enabled us to assess the statistical significance of the path coefficients. Table 4 sets out the model statistics, the path coefficients and the t values observed with the level of significance obtained from the bootstrap test.

Insert Table 4 about here

Adopting the approach used by Tippins and Sohi (2003), we checked for the presence of a mediating effect by comparing the direct effect between variables and the competing links where the mediated variable occurs. More precisely, the direct effect examined the direct relationship between PACAP and RACAP (see Figure 2); the proposed research model examined the partial mediated model from Figure 1 with ‘knowledge transfer’ and ‘knowledge storage/retrieval’ acting as mediators.

Insert Figure 2 about here

Table 4 shows the results of the two competing links. The results of the two mediation links support our hypotheses. First, the partial mediation model explains more variance in RACAP than the direct effect model (0.81 vs. 0.67). Second, positive relationships exist between PACAP and knowledge transfer ($\beta = 0.783$, $p < 0.001$) and knowledge storage/retrieval ($\beta = 0.700$, $p < 0.001$); and between knowledge transfer ($\beta = 0.236$, $p < 0.05$) and knowledge storage/retrieval ($\beta = 0.414$, $p < 0.001$) and RACAP. Third, the significant relationship between PACAP and RACAP in the direct effect model ($\beta = 0.819$, $p < 0.001$) is reduced in the partial mediation model ($\beta = 0.341$, $p < 0.001$).

Together these three points provide evidence that there is a discernible mediating effect of knowledge transfer and knowledge storage/retrieval, and that the partial mediation model represents a significant improvement over the direct effect model. The partial mediation model explains a good amount of the variance of the RACAP ($R^2 = 0.81$). We also estimate the $F^2$ ratio suggested by Chin (1998), to provide the level of significance of the improvement. When $F^2$ is greater than 0.02, the improvement is significant. In our case $F^2$ was 0.71.

Since our model has more than one mediator, Chin (2010) has suggested an alternative way to guarantee that the indirect effect of 0.18 ($0.78*0.23$) for knowledge transfer on RACAP and the indirect effect of knowledge storage/retrieval on RACAP: 0.29 ($0.70*0.41$) are significant. Thus, as Chin (2010) recommends, the significance of an indirect path in a PLS structural model should be assessed by carrying out a new bootstrap with 1,000 sub-samples to calculate the product of the direct effect and then the significance estimated using either a percentile bootstrap or bias-corrected bootstrap (Preacher and Hayes, 2008). This has been shown to have the least biased confidence intervals, greatest power to detect non-zero effects and contracts, and the most accurate overall Type I error (Williams and MacKinnon, 2008). The following table (Table 5) summarizes the results of the test in this case, using a bias-corrected bootstrap.

Insert Table 5 about here

The test shown in Table 5 includes an examination of the total effect and direct effect of PACAP on RACAP. The difference between these is the indirect effect of PACAP on RACAP through mediators. The analysis also yields an estimation of the indirect effect of each mediator. In addition, the bias-corrected bootstrap generates a 95 percent confidence interval for each indicator. Where the interval for a mediator does not
contain zero, it means the indirect effect of this mediator is significantly different from zero. Furthermore, a comparison of the two mediators shows how their indirect effects can be distinguished in terms of magnitude (Chin, 2010). In our case, all indirect effects are significant and can be distinguished in terms of magnitude. In summary, the analysis shows that knowledge transfer and knowledge storage/retrieval mediate the impact of PACAP on RACAP.

6. Discussion

The first contribution of this research is to extend the body of knowledge in the KBV theory. The KBV theory views a knowledge corridor as a path consisting of a series of steps in which a message, the “external knowledge”, is conveyed from a source or sender to a receiver, “a firm which absorbs external knowledge”. In the context of this research, a firm’s absorptive capacity indicates its potential and actual capability to process external knowledge. Regarding this, the relationship between the stickiness of internal knowledge processes and a firm’s absorptive capacity has been dealt with by only a few empirical studies, conducted in developed countries (e.g., Waalkens et al., 2008). This study has examined two key corridors of the learning process (i.e. PACAP and RACAP) and their effects on the ‘knowledge application’. The study has also investigated how RACAP contributes to apply knowledge and create customer value through an empirical study of 76 commercial and saving banks in Spain. The excellent fit of our partial mediation model is a theoretically important finding since it means that determinants of RACAP of banks can be grouped into two main categories: internal and external factors.

The second contribution of this research derives from the results of the empirical test of the hypotheses. The managerial implications of the relationships observed between the factors that constitute the hypothesized relationships are discussed in more detail in below.

The first hypothesis analyses the relationship between PACAP and RACAP. A null proposition (that the transference and storage/retrieval of knowledge are mediator variables between PACAP and RACAP) was tested against the alternative proposition (that ‘the transference and storage/retrieval of knowledge are unnecessary in the creation of the RACAP). The data analysis provides empirical support for our mediation model of the effects of transference and storage/retrieval of knowledge. The results of the three links support a theoretically important finding since it means that knowledge transfer and knowledge storage/retrieval are mediator variables between PACAP and RACAP. We think that this is an important finding, as potential for any firm to develop will depend substantially on its ability to maintain an appropriate balance between PACAP and RACAP (e.g., Cepeda et al., 2012). This is in broad agreement with the conclusions of authors such as Leal and Roldan (2010) who assert that acquiring and assimilating knowledge may occur but this does not guarantee that it will be transformed and exploited efficiently. As Lee and Wu (2010) noted, knowledge alone is not enough, one must also apply it.

A possible explanation for above findings may relate to the advantages and disadvantages of the knowledge types that they highlight as a result of their different structural properties. PACAP comprises acquisition and assimilation and makes a firm receptive to acquiring and assimilating external knowledge, whereas RACAP involves the transformation and exploitation capabilities and makes a firm receptive to using and exploiting knowledge (Zahra and George, 2002). Hence, complementing these authors’ argument, we propose that knowledge transfer and knowledge storage/retrieval processes may contribute to reduce the gap between PACAP and RACAP. On the one hand, the knowledge transfer process renders knowledge easier to understand (Ipe,
2003) and communicate (Gold et al., 2001). On the other hand, the knowledge storage/retrieval process makes knowledge safer from being lost or erased (Darr et al., 1995; Nilakanta et al., 2006) and easier to access (Argote et al., 2003; Levy, 2011). Therefore, managers need to be aware of the role of knowledge transfer and knowledge storage/retrieval in closing the knowledge gap between PACAP and RACAP.

The second hypothesis stresses that organization’s RACAP fuels knowledge application by providing new knowledge (RACAP → knowledge application). Our results also support this hypothesis, indicating that RACAP can be viewed as an important organizational capacity that will encourage the application of new techniques and knowledge structures (as perhaps would be expected). These findings support the views of previous researchers, who drew attention to the fact that the existence of certain work environment characteristics might facilitate and encourage knowledge application (e.g., Al-Alawi et al., 2007; Chang Lee et al., 2005). Put another way, RACAP encourages the challenging of accepted assumptions, values and norms as a prior step to considering whether anything can be applied or used (Alavi and Leidner, 2001; Jantunen, 2005). Therefore, by recognizing knowledge application as a subsequent step of RACAP, it enables a bank to refine and optimize their sales initiatives, which in turn could lead to think that most but not all external knowledge a bank has created is relevant.

With respect to the test of the third hypothesis, our results support that knowledge application positively influences customer value (knowledge application → customer value). This accomplishes what authors, such as Stein and Bowen (2003), express when they refer to the application of knowledge as a basic process that the organization can use to transform corporative knowledge into ‘customer value’. A possible explanation for these findings may relate to the fact that through the application of knowledge, managers have some control over customer relations. For example, a rich understanding of customer types and interaction strategies appears to provide bank managers with a useful way to help customers deal with problems by exhibiting customer-oriented behavior (Agnihotri et al., 2009). It may also be noted that the wide variety of customer situations and services offered by banks might increase the importance of knowledge application processes when recommending financial products and related service as well as when identifying solutions to deal with customers’ demands (Wright et al., 2009).

The considerations above imply that depending on whether banks apply knowledge correctly or incorrectly, employees may have the potential to experiment and learn new process and practices which in turn will fortify customer value (e.g., public opinion about a firm or its brand). These findings draw bank managers’ attention to a wide range of practices that they might adopt to improve customer value. For example, it may be through processes such a self-evaluation program, that bank customers’ can perceive the relationship as worthwhile, equitable and productive (Alavi and Leidner, 2001). With the adoption of appropriate knowledge structures, a customer’s interpretation of events can be fostered, and might even be widely enhanced, by learning new critical norms and routines and, hence, consolidating new understandings (Chang Lee et al., 2005).

7. Conclusions

The Spanish banking industry is facing its worst crisis in the last fifty years and thousands of jobs have been lost. Under this framework, Spanish banks which took rescue packages are trying to find innovative ways to improve customer value. In doing so, the KBV provides insight into why firms exist (and will continue to exist) and, thus
why organizing knowledge is a critical part of what firms do (Brown and Duguid, 1998). Therefore, this study has shed more light on the situation of this field in the Spanish banking industry.

Based on the abovementioned findings, it is worth noting the importance of the transference/storage of knowledge for limiting or removing the hidden risks of a high loss of knowledge in a turbulent context, such as the Spanish banking context during the period we have examined, and address the functionality of the RACAP under different relationship conditions. In our study, we suggest that in order to maintain RACAP and hence enhance knowledge application, banks need to provide and support RACAP though transference and storage of knowledge. Thus, the contribution of these internal processes is related to its ability to prepare the ground for the creation of social knowledge and new knowledge structures. Once individual knowledge is transformed into social knowledge, it takes the nature of ‘public goods’ which can be easily accessible and disseminated to anyone who want to use it (Cabrera and Cabrera, 2002).

This study is not without limitations and, consequently, any conclusion could not be generalizable. Firstly, although the banking industry falls clearly within the category of services, they might not be representative of all services because of the types of products and services they sell. Secondly, national cultural issues might influence the way organizations learn. Thirdly, we are able to provide only a snapshot of ongoing processes and not measures of the same process over time. Another limitation of our study concerns our measurement approach. Although the constructs have been defined as precisely as possible by drawing on relevant literature and validated by practitioners, they can realistically only be thought of as proxies for an underlying latent phenomenon that is itself not fully measurable. Moreover, other factors which have not been included in this study are also likely to affect knowledge corridors in the creation of customer value.

Taking into account its limitations, this study points to the need for new avenues of research. Firstly, we consider that the use of control variables (e.g., career, income or age) might help to capture the rich construct to a greater extent. It might help to assure, for example, that the effects of knowledge corridors on our population sample achievement are independent of the user’s focus on their achievement. Secondly, depending on the knowledge corridors used by the company, some internal knowledge structures will be more successful than others; therefore, we propose a complementary study of the internal knowledge structures used by the company (e.g., relationship memory) to store the knowledge provided by external agents. Thirdly, this paper suggests that a longitudinal research may be needed to examine the relationships between knowledge corridors (PACAP and RACAP), and the ways in which they affect customer value.

The key managerial implication of this paper is that the long term survival and success of an organisation requires that the organisation and its managers meet the challenge of closing the knowledge gap between PACAP and RACAP. A possible explanation for this gap may relate to the fact that since much of the knowledge created as consequence of the PACAP among bank employees is of individual nature, it is necessary to encourage its conversion to social knowledge before applying it to create customer value. Otherwise, people in the bank will have more non-structured information, in other words, employees will spend considerable time and effort on finding new routines, and procedures (i.e. RACAP), which have a negative effect on decision-making rules that govern the behaviour of individuals and teams in the organization. The processes that mitigate the knowledge gap between PACAP and RACAP are those that support what we have termed in this paper as knowledge
transfer and knowledge storage/retrieval. This insight gains momentum if one considers that many Spanish banks are currently experiencing significant cuts in their budgets. Perhaps one might think that bank managers are over-investing in the development of organizational characteristic (e.g. task autonomy, task significance, task identity, skill variety and supervisory feedback) rather than investing in mechanisms to facilitate knowledge transfer and knowledge storage/retrieval. If this is the case our paper can help bank managers to select appropriate knowledge structures to reduce the gap between PACAP and RACAP.
References


Appendix 1. Questionnaire items

PACAP (1=strongly disagree and 7=strongly agree).

Acquisition
ACQ_1: Our unit has frequent interactions with corporate headquarters to acquire new knowledge.
ACQ_2: Employees of our unit regularly visit other branches.
ACQ_3: We collect industry information through informal means (e.g., lunch with industry friends, talks with trade partners).
ACQ_4: Other divisions of our company are hardly visited (reverse-coded).
ACQ_5: Our unit periodically organizes special meetings with customers or third parties to acquire new knowledge.
ACQ_6: Employees regularly approach third parties such as accountants, consultants, or tax consultants.

Assimilation
ASS_1: We are slow to recognize shifts in our market (e.g., competition, regulation, demography) (reverse-coded).
ASS_2: New opportunities to serve our clients are quickly understood.
ASS_3: We quickly analyze and interpret changing market demands.

RACAP (1=strongly disagree and 7=strongly agree).

Transformation
TRA_1: Our unit regularly considers the consequences of changing market demands in terms of new products and services.
TRA_2: Employees record and store newly acquired knowledge for future reference.
TRA_3: Our unit quickly recognizes the usefulness of new external knowledge to existing knowledge.
TRA_4: Employees hardly share practical experiences (reverse-coded).
TRA_5: We laboriously grasp the opportunities for our unit from new external knowledge (reverse-coded).
TRA_6: Our unit periodically meets to discuss consequences of market trends and new product development.

Exploitation
EXP_1: It is clearly known how activities within our unit should be performed.
EXP_2: Client complaints fall on deaf ears in our unit (reverse-coded).
EXP_3: Our unit has a clear division of roles and responsibilities.
EXP_4: We constantly consider how to better exploit knowledge.
EXP_5: Our unit has difficulty implementing new products and services (reverse-coded).
EXP_6: Employees have a common language regarding our products and services.

Knowledge transfer (1=strongly disagree and 7=strongly agree).

KT_1: My organization has processes for converting knowledge into the design of new services
KT_2: My organization has processes for converting competitive intelligence into plans of action
KT_3: My organization has processes for filtering knowledge
KT_4: My organization has processes for transferring organizational knowledge to individuals
KT_5: My organization has processes for absorbing knowledge from individuals into the organization
KT_6: My organization has processes for absorbing knowledge from business partners into the organization
KT_7: My organization has processes for distributing knowledge throughout the organization
KT_8: My organization has processes for integrating different sources and types of knowledge
KT_9: My organization has processes for organizing knowledge
KT_10: My organization has processes for replacing outdated knowledge

Knowledge storage and retrieval (1=strongly disagree and 7=strongly agree),

OM_1: Organizational conversation keeps the lessons learned from service development history at the front of our minds
OM_2: We always audit unsuccessful service development endeavors and communicate the lessons learned
OM_3: We have specific mechanisms for sharing lessons learned in the service development process
OM_4: Formal routines exist to uncover faulty assumptions about the service development process

Knowledge application (1=strongly disagree and 7=strongly agree),

KA_1: My organization has processes for applying knowledge learned from mistakes
KA_2: My organization has processes for applying knowledge learned from experiences
KA_3: My organization has processes for using knowledge in the development of new services
KA_4: My organization has processes for using knowledge to solve problems
KA_5: My organization matches sources of knowledge to problems and challenges
KA_6: My organization uses knowledge to improve efficiency
KA_7: My organization uses knowledge to adjust strategic direction
KA_8: My organization is able to locate and apply knowledge to changing competitive conditions
KA_9: My organization makes knowledge accessible to those who need it
KA_10: My organization takes advantage of new knowledge
KA_11: My organization quickly applies knowledge to critical competitive needs
KA_12: My organization quickly links sources of knowledge in solving problems

Customer value creation (1=much lower and 7=much higher),

CV_1: Levels of customer loyalty compared to competitors
CV_2: Levels of customer satisfaction compared to last year
CV_3: Levels of customer loyalty compared to last year
Figure 1: Knowledge management processes
Figure 2: Alternative Model