

Knowledge brokers: a winning strategy for improving knowledge transfer and use in the field of health

Saliha Ziam, Réjean Landry, Nabil Amara

In the field of health, decision making based on new evidence is the foundation of a health system that is of quality, efficient, safe and focused on patients' needs. In this context, knowledge brokers can play a crucial role in the renewal of knowledge favouring quality care and justifying the allocation of resources. In health services, several strategies to improve knowledge utilization and innovation have been promoted. Among them, knowledge brokering is growing. The success of this new approach lies in the role of knowledge brokers in interface intensification in a fragmented social system and where the flow of information is often hampered by cognitive, structural, cultural (etc.) barriers. The various facets of the brokers' role require very different skills so that they are able to adequately absorb the knowledge that they are regularly exposed to. However, most authors emphasize this dimension and assume that brokers have the cognitive and experiential skills to carry out their activities. Yet, the role of knowledge brokers as intermediaries is widely recognized, while less has been written on how these actors contribute to innovation through their ability to integrate knowledge. In this study, we propose to address said dimension from an innovative theoretical approach. This study is, to our knowledge, the first attempt to apply the knowledge absorptive capacity model to explore knowledge integration by these strategic players in the health network.

Field of Research: Strategic Management, Management Science

1. Introduction

The gap between scientific knowledge production and its use, in practice, is a challenge for the health sector (Green, 2001; Pang et al., 2004). Despite the efforts of various researchers, practitioners and policy makers, knowledge remains underutilized in practice at the clinical, organizational, as well as at the policy making level (Maynard and McDaid, 2003; Lavis, 2006). Of all the strategies proposed in the scientific literature to increase knowledge utilization (Landry et al., 2001; Landry et al., 2003; Lavis, 2006), knowledge brokering has gained increasing importance during the last decade. This approach was often used to increase knowledge transfer and use by creating links between researchers, policy makers, managers and practitioners.

SALIHA ZIAM, Ph.D. Candidate, CHSRF/CIHR Chair on Knowledge Transfer and Innovation, Department of Management, Laval University, Quebec City, Canada, G1 V0A6.
saliha.ziam@fsa.ulaval.ca

RÉJEAN LANDRY, Professor, CHSRF/CIHR Chair on Knowledge Transfer and Innovation, Department of Management, Laval University, Quebec City, Canada, G1 V0A.
rejean.landry@mng.ulaval.ca

NABIL AMARA, Professor, CHSRF/CIHR Chair on Knowledge Transfer and Innovation, Department of Management, Laval University, Quebec City, Canada, G1 V0A6

This success was often associated with the role played by brokers as intermediaries between researchers and users, viewed as a means of improving the exchange of knowledge between the two communities (CHSRF, 2003; Spencer, 2003; Pawlowski and Robey, 2004). However, for many authors of management science, the role of brokers goes beyond intermediation since it contributes to innovation by facilitating the integration of knowledge (Hargadon, 2003; Cillo, 2005; Howells, 2006). In this perspective, brokers are true innovators since they identify, process and use the ideas developed in different industries or fields to the advantage of their organization (Cohen and Levinthal, 1990; Hargadon and Sutton, 1997; Cillo, 2005). For Nooteboom et al. (2007), the integration of knowledge by the broker is even more important when the knowledge that is used is acquired from domains that have different languages and concepts. As has been highlighted, the integration of knowledge by the brokers is poorly documented. Moreover, current studies do not present any conceptual approach to understand how brokers integrate practical knowledge.

In this study, we will present, in the first part, the history of the brokers' changing role in literature. Secondly, we will describe the main theoretical perspectives on the emergence of this new literature. Finally, we will propose a novel theoretical approach to identify the dimensions of knowledge integration by brokers. In doing so, our study will contribute to the theoretical foundation of a promising strategy that can improve knowledge transfer and use in the health domain.

2. Literature Review

2.1 History of the role of knowledge brokers

The role of knowledge brokers as intermediaries between structural and social entities is not new (Hargadon, 2003; Lomas, 2007). This role had emerged in the late 1800s in Germanic countries, where it helped to create informal networks of communication between universities and industries (Lomas, 2007). Over time, this role has diversified and has often been adapted to different contexts by brokers (Pawlowski and Robey, 2004; Cillo, 2005; Howells, 2006; Van Kammen et al., 2006). This diversity is illustrated, incidentally, by the countless names associated with this role in the literature. It includes the following designations: link or connection officers (Jones, 2006); agents of change (Jones, 2006; Pratim, 2007); third person (CHSRF, 2004), intermediary informers (Cillo, 2005); knowledge brokers (Hargadon and Sutton 1997), boundary-spanners (Pawlowski and Robey, 2004), gatekeepers (Cohen and Levinthal, 1990; Jones, 2006); bridgers (Howells, 2006); innomediaries (Mohabir et al., 2003); infomediaries (Cillo, 2005); etc.. It should be noted that these names further emphasize the involvement of brokers as intermediaries between various networks of actors.

However, recent developments show that the role of brokers goes beyond intermediation as they are required to identify, assimilate and integrate useful knowledge for their activities or those of their organization. Many authors agree that these actors play an important role in innovation (Cohen and Levinthal, 1990;

Hargadon and Sutton, 1997), and are also responsible for the transfer of useful knowledge for decision-making (Lomas, 2007). According to Howells (2006), brokers promote innovation, firstly by facilitating the transfer of knowledge between individuals, organizations and industries; secondly, by contributing more directly to innovation by offering new solutions based on the combination of old and new ideas (Sowe et al., 2006; Pratim, 2007).

It is useful to note that the brokers' contribution to innovation has been demonstrated in various sectors. For example, in the technology sector, brokers are seen as agents of change who have the capability to foster the adoption of new technologies and to support the decision making in their favour. They may be described as real negotiators, mentors with leadership and as having exceptional communication skills (Pratim, 2007: 289). In the services sector, it is often brokerage organizations called "KIBS" (*Knowledge-intensive business services*) that help companies to innovate by acting as an intermediary between researchers and businesses. In Scotland, a group of experts specializing in knowledge transfer recommends the use of knowledge brokers around Scottish government bureaucrats to promote trade between industry and research. According to this expert group, the brokercrats (brokers and bureaucrats) can encourage innovation through collaborative links between different industries.

In the health sector, the role of knowledge brokers in knowledge transfer is widely recognized by researchers (Lyons et al., 2006; Lomas, 2007) and policymakers (CHSRF, 2003; Van Kammen et al., 2006). In Australia, for example, brokerage practices have been introduced with the establishment of new coordinating and monitoring units in the intensive care services (*Intensive Care Coordination and Monitoring Unit-ICCMU*). These knowledge brokerage units aim to promote knowledge transfer in the intensive care network and ultimately improve the effectiveness of its services (Rolls et al., 2008). In Canada, knowledge brokers are seen as a means of promoting a decision-making culture based on evidence including links that may develop between researchers and policy makers (CHSRF, 2003; Lavis, 2006; Lomas, 2007). Since 2002, knowledge brokering has been recognized as one of the priority areas of intervention by the Canadian Health Services Research Foundation (CHSRF) and is promoted as a promising strategy to improve knowledge transfer and use by policy makers and managers in health services (CHSRF, 2003). Finally, if the brokers' role in linking together different actors in the health network is to be questioned, it would be appropriate to consider the level of knowledge integration by the brokers (Hargadon, 2002). We will, in this case, make an attempt to understand how brokers identify, assimilate and exploit knowledge. This dimension is crucial for innovation in health services.

2.2. The theoretical fields associated with the emergence of the role of knowledge brokers

In this section, we briefly present the major explanatory theories that promoted the perspective of knowledge brokers. This theoretical synthesis will help us to better understand the strategic role of these actors in the process of knowledge transfer and use. Two theoretical fields may be associated with the emergence of the role of

brokers as actors facilitating knowledge transfer and innovation. The first field covers the theories of structural networks with two main avenues: the theory of strong and weak ties, and the structural holes theory. The second field relates to the theories of knowledge transfer, particularly the theory of social interaction.

2.2.1 Theories of structural networks

- **The theory of strong and weak ties**

The theory of strong and weak ties highlighted the impact of intermediate links in the flow of information between individuals (Granovetter, 1983; Hargadon, 2003). For Granovetter (1983), the father of this theory, strong links are those between relatives, parents, friends, etc. In contrast, weak ties refer to distanced relations that bind us to neighbours, colleagues, etc. According to Granovetter (1983), these two types of links influence the flow of information between individuals in different manners. He further stresses that strong ties tend to be redundant and are therefore less rich in information, while the weak ties can build bridges between communities of actors which would otherwise not be connected. These links are often privileged channels for strategic information. In this perspective, the role of knowledge brokers as intermediary agents is to provide access to relationship networks beneficial to the advent of new knowledge by intensifying and diversifying the links between various domains and industries.

The structural holes theory

The structural holes theory, as presented by Burt (1992), is based on the idea that individuals and organizations will seek to exploit the discontinuities that characterize weak ties. It is this discontinuity that Burt calls structural holes. According to him, the effective exploitation of structural holes by knowledge brokers will enable them to access strategic information and avoid the redundancy that characterizes the internal networks: "... Rooted in the social network perspective, knowledge brokering describes activities that allow knowledge transfers by creating ties across knowledge clusters internal and external to the organization. Partly because intra-group knowledge is redundant, organizational members rely on social networks of production...." (Burt, 2000, quoted by Pratim, 2007). Mohanbir et al. (2003) went further by emphasizing that structural holes can be filled by the 'innomédiaires' (i.e., intermediary innovators) that connect, recombine and disseminate the ideas of different pools of knowledge that otherwise would not be connected. Referring to Burt (1992), these authors say: "...Innomediaries help companies fill structural holes in the market-gaps between companies and customers that can only be bridged by knowledge brokers: entities that connect, recombine and disseminate otherwise disconnected pools of ideas..." (Burt, 1992, quoted by Mohanbir et al., 2003: 78).

2.2.2 The theories of knowledge transfer

The literature on knowledge transfer presents several explanatory theories for analyzing the transfer and use of knowledge (Landry et al., 2003; Amara et al., 2004; Lavis, 2006). We will present, as part of this study, the theory that is most directly associated with the emergence of the role of knowledge brokers.

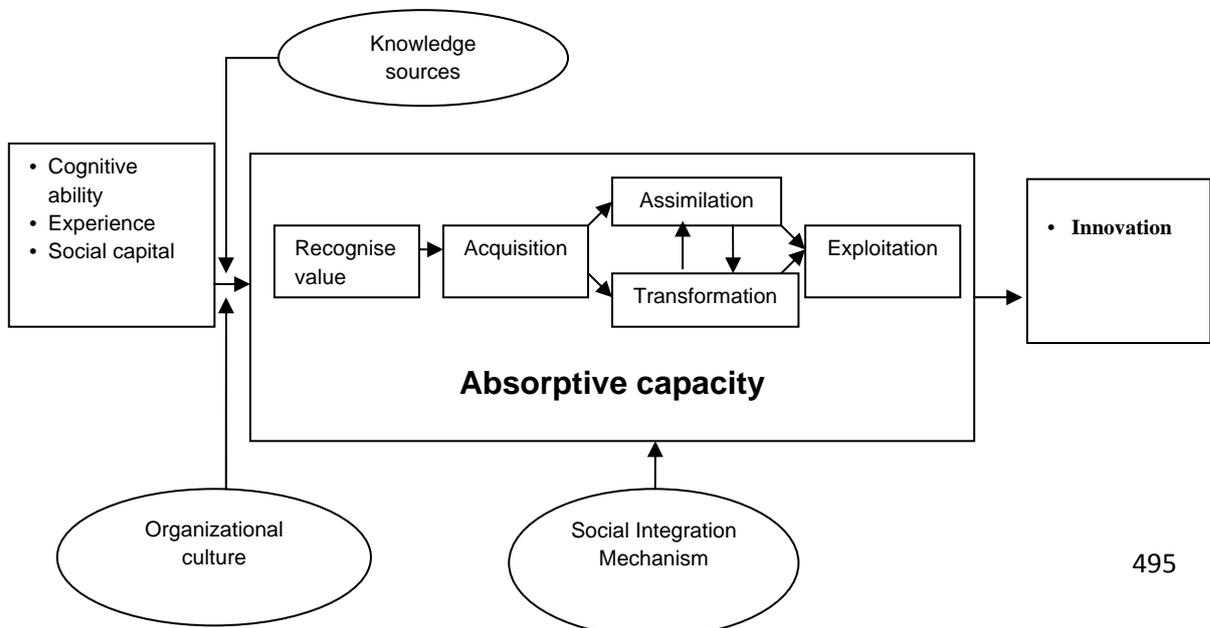
• **The theory of social interaction**

This theoretical path emphasizes the frequency of interaction between knowledge producers and knowledge users. For the defenders of this approach, knowledge transfer is improved by bringing the two communities together (i.e., researchers and users). This union satisfies the effective communication of needs to researchers, as well as a better utilization of research results by users. According to Huberman (1994), this transfer is even more important when those involved in knowledge transfer use a different language and different patterns of interpretation. He further argues that in such cases, knowledge brokers can facilitate transfer by identifying, synthesizing and adapting knowledge for the potential users. To summarize, the theories presented here have highlighted the role of brokers in the development of beneficial networks for knowledge transfer and the occurrence of innovations in organizations; the theories however do not explain how the brokers integrate knowledge. This dimension should be explored to identify particular skills that brokers require to be able to abundantly benefit from the pool of knowledge to which they are regularly exposed.

3. Knowledge absorption capacity: a relevant theoretical approach to analyze the dimension of knowledge integration among brokers

The theory of absorptive capacity, as outlined in the work of Cohen and Levinthal (1990), sheds new light on the dynamics of knowledge use acquired from external sources. In this context, it stresses the role of individuals working in organizational interfaces. For these authors, individuals benefit from a strategic position allowing easier access to external knowledge and therefore, they must develop good skills to be able to properly enjoy all the opportunities for innovation available to them. The theoretical framework presented in this study builds on recent theoretical developments on the concept of absorptive capacity (Cohen and Levinthal, 1990; Zahra and George, 2002; Todorova and Durisin, 2007) (see Figure 2). Let us now take a look at the dimensions of this concept in the case of knowledge brokers.

Figure 2: Theoretical framework of the absorptive capacity of knowledge brokers



Adapted from Cohen et Levinthal (1990), Zahra and George (2002), Todorova and Durisin (2007)

• **Identification of relevant information (to recognise the value of knowledge)**

Through his position in the network, the broker is constantly seeking knowledge opportunities in his immediate environment, capable of introducing promising new innovations (Cohen and Levinthal, 1990; Hargadon and Sutton, 1997). The identification of knowledge value by brokers is a strategic step as it allows selecting pertinent information (Todorova and Durisin, 2007). In this regard, Adams (1980), Ancona and Caldwell (1998) note: "Boundary-spanners serve as both filters and facilitators in information transmittal between the organisation and its environment" quoted by Pawlowski and Robey (2004: 648). Inspired by the boy-scouts' language, Wenger (1998), quoted by Pratim (2007), described the broker as a "scout" who engages in the identification of all the information relevant to his activities or those of his organization: "...Fulfilling the role of scouts in seeking and transforming data into information requires that information agents possess certain attributes. First, given the growing heterogeneity of data sources that information agents need to scan, filter, and transform, information agents need to be highly modular (Wenger, 1998). Second, information agents need to be able to standardize information to restructure extracted data as per organizational specifications...".

• **Knowledge acquisition by brokers**

The acquisition of knowledge refers to the ability of brokers to identify and acquire knowledge that is relevant to said activities or those of the organization (Hargadon and Sutton, 1997; Hargadon, 1998, Zahra and George, 2002; CHSRF, 2003; Pratim, 2007). For Hargadon and Sutton (1997), the acquisition of knowledge by brokers allows supplying the organization with solutions or ideas for future applications. In this study, we focus on the capacity of acquiring knowledge through brokers. This capacity is influenced by the knowledge base and prior investments of the knowledge brokers (Daghfous, 2004).

• **Knowledge assimilation by brokers**

For Zahra and George (2002): "...knowledge assimilation refers to the organizational routines and processes that enable analyzing, interpreting and understanding knowledge from an external source of knowledge...". The assimilation of knowledge by the broker allows translating, clarifying and interpreting information from other disciplines and domains. According to Pawlowski and Robey (2004): "...translation allows the bridging of perspectives by reframing, explaining and clarifying information in the context of organizational practices." Following the same idea, Pratim (2007) notes: "...Knowledge agents thus play a crucial role by communicating, translating, and interpreting perspectives within and between multiple information repositories and knowledge sources within the organization...".

- **Knowledge transformation by brokers**

For Hargadon and Sutton (1997), brokers primarily innovate through the transformation and combination of knowledge: "... KBs innovate by combining in new ways existing technologies that originated in various industries. Hence, they absorb knowledge from other companies...". These same authors point out that solutions are rarely reached when problems arise and the relevant knowledge rarely comes in an easily usable format: "...Valuable solutions seldom arrive at the same time as the problems they solve, they seldom arrive to the people working on those problems, and they seldom arrive in forms that are readily recognizable or easily adaptable..." (Hargadon and Sutton, 1997: 717). In this perspective, the broker may effectively contribute to innovation by synthesizing and adapting knowledge for the concerned users.

It is worth noting that in the literature on absorptive capacity, transformation is often confused with the exploitation dimension. In recent studies, Todorova and Durisin (2007) question the relevance of this dimension which, in their view, is an alternative to knowledge assimilation and not a distinct dimension of the absorptive capacity concept. It would be quite appropriate, in this case, to verify empirically what the importance of this dimension for the knowledge brokers' activities is.

- **Knowledge exploitation by brokers**

The exploitation of knowledge helps to extend existing skills or to create new knowledge by combining the transformed knowledge (Zahra and George, 2002; Fosfuri and Tribo, 2006). For Gianmario et al. (2006: 788): "... KBs innovate by combining in new ways existing technologies that originated in various industries. Hence, they absorb knowledge from other companies....". Finally, the exploitation of knowledge by knowledge brokers may give rise to creative ideas and other promising innovations (Pratim, 2007).

4. Determinants of the absorptive capacity of knowledge brokers

- **Cognitive ability**

Several studies show that an individual's ability to appropriately utilize knowledge sources is limited by his cognitive structures (Cohen and Levinthal, 1990; Todorova and Durisin, 2007). These cognitive structures are strongly influenced by the individual's knowledge base and previous investments (Jones, 2006). However, our review of the literature suggests that the majority of authors take for granted that brokers have the necessary cognitive abilities to assess, understand, transform and apply the knowledge acquired in their external environment. Let us note that the knowledge base of individuals is often measured by their level of education or their previous training. Based on the above, we hypothesize:

Hypothesis 1: The better the knowledge base of knowledge brokers is, the better their ability to absorb knowledge will be.

• **Social capital**

The dimension of intermediation is essentially based on the knowledge brokers' social network. They can develop and maintain relationships with individuals, groups, organizations and industries (Hargadon and Sutton, 1997). For Hargadon (2003), it is the constant stream of problems and solutions, combined with exchanges between individuals, that can create new opportunities, lead to learning from others and developing one's own skills. A wide relations network or a network of contacts will effectively enable brokers to diversify their knowledge sources and access a wider pool of ideas which they can use to initiate innovations or solve current problems. The influence of social capital on the absorptive capacity has been widely documented (Tsai, 2001; Yli-Renko et al., 2001; Kim and Inkpen, 2005; Tsai, 2006; Vinding, 2006). Although most of these authors further mention the importance of social capital held by organizations, more and more authors emphasize the contribution of individuals to the development of networks allowing organizations an access to beneficial knowledge (Szulanski, 2000; Chou, 2005; Jones, 2006; Vinding, 2006). In the case of brokers, the discovery of new networks is essential for the renewal of ideas (Hargadon, 2003; Gianmario, 2006). At the same time, brokers are supposed to maintain and strengthen links with actors whom they deem essential to the development of their domain of activity. For many authors, social capital has more impact when individuals maintain ties (Szulanski, 2000). Within this study, we consider that the social capital held by brokers will facilitate the creation of linkages between various actors in their network.

Hypothesis 2: The more knowledge brokers possess a wide range of social capital, the more improved the absorptive capacity is.

Hypothesis 3: The more knowledge brokers develop their social capital, the more improved the absorption capacity is.

• **Experience**

Many authors stress the importance of the experiential dimension for the absorption process (Zahra and George, 2002; Vinding, 2006). However, this aspect has been rarely explored in the empirical plan and existing studies, showing conflicting results regarding the impact of this variable on the absorption process (Lane et al., 2006). For example, Vinding (2006) measures the experience of managers as the number of years of professional experience. Fosfuri and Tribo (2006) use the number of years of experience in the domain of knowledge localization. Finally, we haven't identified any studies that linked the experience of the knowledge broker and his absorptive capacity. Given these findings, it would be wise to empirically explore the impact of this variable on the absorptive capacity of knowledge brokers.

Hypothesis 4: The more knowledge brokers have a good experience in their sphere of activity, the more improved the absorptive capacity is.

• **Knowledge Sources**

External sources of knowledge are essential for innovation (Cohen and Levinthal, 1990; Hargadon and Sutton, 1997). In this perspective, the brokers' exposure to a large pool of knowledge will enable them to maximize the opportunities for acquiring new knowledge. Thus, they will be better able to judge the value of specific knowledge for their field of activity (CHSRF, 2003). If this literature emphasizes external sources of knowledge, it also does not overlook the importance of internal sources of knowledge for the absorption process, including their importance in the redistribution of knowledge within the organization (Veugelers, 1997; Caloghirou et al., 2004; García-Morales et al., 2007). Finally, the influence of knowledge sources has been measured by various operational measures. Such measures have often been adapted to the implementation context of studies. These measures focus on the participation in research communities (Deeds, 2001), the scanning of knowledge (Stock et al. 2001; Tu et al., 2005), and alliances and collaborations (George et al., 2001; Caloghirou and al., 2004), etc.

Hypothesis 5: The more brokers use a variety of external sources of knowledge, the greater the improvement in their absorptive capacity will be.

Hypothesis 6: The more brokers use internal sources of knowledge, the greater the improvement in their absorptive capacity will be.

• **Mechanisms of social integration**

The capacity of knowledge absorption is enhanced in the presence of mechanisms of social integration which facilitate knowledge sharing (Zahra and George, 2002; Hargadon, 2003; Gianmario et al., 2006). The conceptual work of Zahra and George (2002) presents mechanisms of social integration as a factor facilitating the passage from the potential absorptive capacity (PACAP) to the realized absorptive capacity (RACAP). According to these authors, this factor would have a positive impact on the efficiency of knowledge as it reflects the presence of knowledge sharing and knowledge exchange mechanisms (Zahra and George, 2002: 194). According to Todorova and Durisin (2007), the mechanisms of social integration have a much wider scope than that assumed by Zahra and George (2002), and affect the whole process of absorption (Todorova and Durisin, 2007: 781). We believe that this debate raises a crucial issue, that of the contribution of the organization's endogenous capacities in the absorption process. By endogenous capabilities, we mean all the resources that the organization will use to facilitate the process of individual absorption (i.e., evaluation of knowledge acquisition, assimilation, etc.). To our knowledge, only the study of Jansen et al. (2005) explored the impact of this dimension at the organizational level. Based on the work of Van Den Bosch et al. (1999), Jansen et al. (2005) made the mechanisms of social integration operational with the following: the coordination ability, the systemic ability and the firm's socialization ability. Depending on their perspective, these capabilities reflect the degree of formalization of new knowledge (i.e., their integration into formal procedures, etc.). They also indicate the extent of the knowledge exchange and knowledge sharing mechanisms. The results of this study show that the mechanisms

of social integration positively influence all dimensions of the absorptive capacity, even if they do not have the same effect on each dimension.

Hypothesis 7: The mechanisms of social integration have a positive influence on the absorptive capacity of knowledge brokers.

• **Organizational culture favouring change**

More and more authors are emphasizing the influence of organizational culture on the absorptive capacity (Hargadon, 1998; Chinho et al., 2002; Harrington and Guimaraes, 2005; Caccia-Bava et al., 2006). An organizational culture conducive to innovation is necessarily reflected in the measures that the organization will make available to its members to facilitate knowledge sharing and integration (Harrington and Guimaraes, 2005). According to Hargadon (1998), when being encouraged by the organization, knowledge brokers seize every opportunity to learn and develop their skills.

Hypothesis 8: An organizational culture conducive to change will have a positive influence on the absorptive capacity of knowledge brokers.

5. Conclusion and future research directions

The theoretical approach to the absorptive capacity proposed by this study has the advantage of addressing knowledge integration in terms of the dynamic capacity of individuals, and particularly those who work at the boundaries of organizations. Such an approach will help us to identify the skills that are required of brokers to contribute effectively to innovation.

Finally, the theoretical approach developed in this article suggests several promising future research avenues. Our model can be empirically explored in futures studies. It would identify what skills the knowledge brokers need to integrate the pertinent knowledge available in their environment. By so doing, it will be possible to verify the influence of individual factors such as the brokers' prior knowledge, their experiences, their social capital and the influence of organizational factors, such as corporate culture and social integration mechanisms (ex: coordination mechanisms, etc.). Such results help us to understand how knowledge brokers contribute to innovation in health services.

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