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Chapter 6

Knowledge Management in Canadian Healthcare Organizations: How Do Knowledge Brokers Perform?

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Additional information is available at the end of the chapter

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1. Introduction

Under the Canada's health Act, the health sector is administered and operated on a non-profit basis by the public authority. The sustainability of Canada's public health-care system depends in large part on its ability to implement strategies to improve its performance in terms of social, economic, organizational and professional. Knowledge-brokering is an emerging function in the healthcare systems worldwide. Championed as a cornerstone role for knowledge translation by the Canadian Health Services Research Foundation, the implications of understanding this function and those who undertake it are important for improving knowledge management in the healthcare sector where there is a spread of the evidence informed/based decision making (EI/BDM) movement. Knowledge brokering is defined, by the Canadian Health Services Research Foundation, through a set of basic skills that are *the ability to bring people together and facilitate their interaction; the ability to find academic research and other evidence to shape decisions; the ability to assess evidence, interpret it and adapt it to circumstance; a knowledge of marketing, communication and Canadian healthcare; and the ability to identify emerging management and policy issues which research could help to resolve*. Its mandate is to support in the organization, management and delivery of health services and its main strategy for doing so is to link decision makers and researchers to ensure effective knowledge transfer.

In an era of knowledge society and knowledge economy, the amount of information has reached unimaginable proportions. Hence, in biomedical research, one has about 15000 journals that publish approximately two million articles every year. Web search engines are not always the most accurate and appropriate way to extract the relevant information because they typically generate a large amount of unsorted information. Some

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innovative approaches were developed to optimize information identification and knowledge management through Strategic foresight. However, we rarely find "*ready to go*" solutions to complex problems in published documents (articles or reports). Thus, managers have to address the problem by becoming more proactive in managing how knowledge is accessed, integrated and translated into new or improved products, services or practices (Jbilou and al. 2007). Nevertheless, this knowledge translation process is complex and a major gap still exist, the so-called knowledge-to-action gaps in healthcare sector (Gagnon 2011). One of the options to close this gap between science and practice is related to the concept of boundary practices, developed by Wenger (2000) and the effective system of "bridging" across those boundaries involve organizations, groups and/or individuals acting as 'knowledge brokers'. In healthcare sector, knowledge brokering has become a popular knowledge management strategy to promote interaction/collaboration between researchers and end users; and support EI/BDM (Brownson and Jones 2009). Knowledge brokers are part of the knowledge to action cycle in healthcare (Granham et al. 2006; Strauss et al. 2009). Prior studies on knowledge brokers and brokering have emphasized either the impact of the social intermediation and networks positions (*the social function*) (Granovetter, 1973; Hansen, 1999; Burt, 1992; Burt, 2005) or the impact of knowledge integration and processing (*the cognitive function*) (Rogers, 1995; Hargadon and Sutton, 1997; Hargadon, 2002) in order to explain the acquisition, dissemination, integration, translation and implementation of knowledge into new or improved products, services and practices. These studies consider the cognitive function and the social function as the two basic functions of knowledge management achieved by knowledge brokers. However, the issues of how resources influence the ways knowledge brokers perform these two critical functions have been largely under-explored. This is the first contribution of this exploratory study. Furthermore, prior studies that emphasize those two core functions are useful for describing network positions and knowledge processing, but not for understanding how individual and organizational resources of knowledge brokers influence the role profiles they adopt, like this study does. Moreover, given the fact that the position of knowledge brokers is not yet a well established formal position in most organizations, a large number of prior studies have focused their effort on documenting the roles of knowledge brokers and brokering (Howells, 2006). Most prior empirical studies have tended to rely on a case study approach and had explored these functions separately (Howells, 2006; Hargadon and Sutton, 1997; Hargadon, 2002). A literature review on intermediaries and intermediation also shows that most studies adopt the organization as their unit of analysis (Howells, 2006). This paper aims to contribute to advance knowledge by taking the individuals as its unit of analysis, to explore how the resources available to individuals operating in different types of healthcare organizations influence the way they perform, with respect to the two core functions: *the cognitive function and the social function,* separately and combined. Taken together, these shortcomings of the existing literature led us to address the following questions: How the two core functions can be integrated to derive a typology of knowledge brokering profiles? What are the determinants of these profiles? What are the practical implications deriving from findings on the determinants of these knowledge brokering profiles?

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1.1. Method

1.1.1. Population under study

The population of this study consists of the members of the knowledge brokerage community of practices (CoP) under the initiative of the Canadian Health Services Research Foundation (CHSRF). The purpose of this CoP is to share knowledge and expertise on knowledge brokerage, focus on learning and furthering the practice of knowledge brokerage, develop and share a collective repertoire of communal resources, including activities and means of participation, and operate as an interdependent network defined by the collaborative efforts of the members. This CoP has been operating since 2003. Since its inception, members of the CoP have participated in national or regional workshops, and have shared knowledge brokering resources (through forums and directories of experts) during these face-to-face activities, as well as on the virtual platform of the CoP supported by CHSRF (http://www.chsrf.ca/brokering/). This population was composed of 441 individuals in October 2005. We decided to exclude 12 individuals from the study, who work for CHSRF, in order to avoid response biases. The final population of the study was therefore made up of 429 individuals.

1.1.2. Conceptual framework and measures

1.1.2.1. Dependant variables

The dependent variable is composed of four KB profiles measured using two function indexes: the cognitive function and the social function. The first index included four items assessing how frequently, over the last twelve months, the KB had: 1) read research information, studies and research reports; 2) understood research findings, studies and research reports; 3) cited research information, studies and research reports to his colleagues; and 4) discussed research information, studies and research reports with colleagues. For each statement, a 5-point scale ranging from 1 (never) to 5 (very often) is used. The cognitive function index is the sum of the scores of the items corresponding to the responses of the knowledge brokers to these four statements. Hence, this index can range from 4 to 20. The construction of the social function index was based on the same logic. More specifically, this index was created by adding the scores of four items corresponding to the answers of the respondents to assess, on a 5-point scale ranging from 1 (never) to 5 (very often), how frequently, over the last twelve months, they had: 1) facilitated the involvement of individuals from their organizational unit into research projects; 2) facilitated the creation of research projects' advisory committees; 3) facilitated person-to-person contact between people in their administrative unit and researchers; and 4) organized seminars, meetings, conferences or other events to provide opportunities for exchanges between people in their organizational unit and researchers. Thus, the social function index can range from 4 to 20. Considering that these two indices were based on multiple-item scales, we conducted a principal components factor analysis (PCFA) on the construct scales to assess their unidimensionality. For the index reflecting the cognitive function, the results of the PCFA indicated that one factor explained 65.17% of the original variance of the phenomenon studied, with an initial Eigenvalue of 2.61. Likewise, a PCFA on

the construct scales of the index capturing intensity of the social function indicated that one factor explained 66.20% of the original variance of the phenomenon studied with an initial Eigenvalue of 2.65. In addition, Cronbach's alphas for the two indices were, respectively,.82 and.77, indicating that the items in each index are reliable (Ahire and Devaray, 2001; Nunally, 1967, 1978) (Figure 1).

1.1.2.2. The copula approach

The construction of the dependent variable used in this paper was based on these two indexes and was derived in a two-step process. Firstly, we used the copulas approach to profile knowledge brokers' (KBs) critical functions. Copula has been first introduced by Sklar (1959) in surveys on random metric spaces, and is defined as a joint distribution function of standard uniform random variables. That is:
$C(u_1, \ldots, u_p) = Pr\{U_1 \leq u_1, \ldots, U_p \leq u_p\}$,

where

$$U_i \sim U(0,1) \text{ for } i = 1, \ldots, p. \quad (1)$$

Copulas allow the modelling of the dependency relationships among random variables independently of their marginal distributions. This is of great relevance for two reasons. Firstly, copulas can handle dependency between random variables without the limitations of other dependency measures, e.g., the normality assumption in linear correlation coefficient (Nelson, 1999; Basrak and al., 2004, Gagliardini and Gouriéroux 2006). Secondly, the thresholds calculated with copulas allow determining with high precision the limits for the four profiles conceptually defined in Figure 1.

We used copulas to evaluate the correlation between the cognitive function index (COG_FUN) and the social function index (SOC_FUN), and to determine with 95% of precision the cutting-

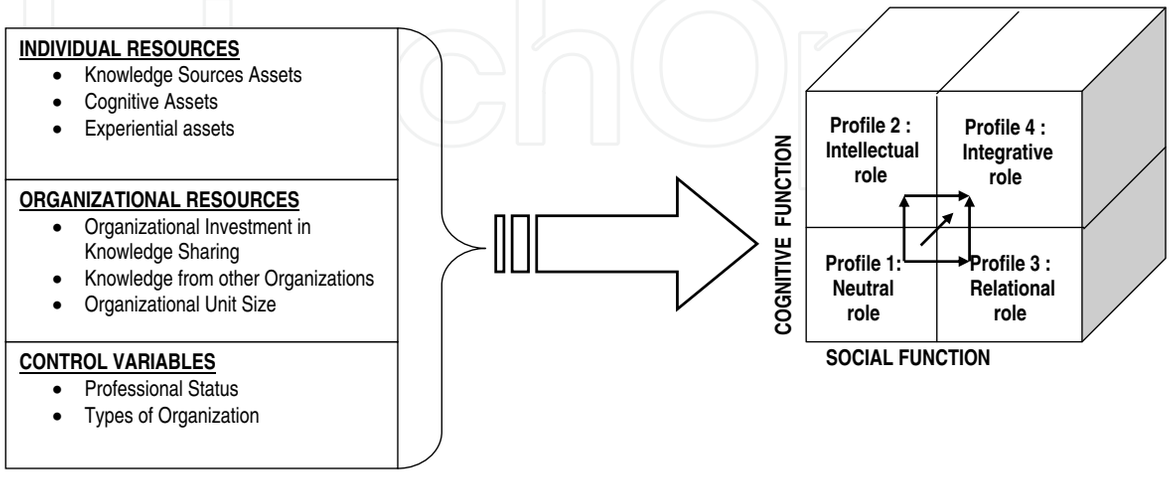


Figure 1. Conceptual Framework

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points (thresholds) that limit the different KBs' profiles. The marginal distribution for COG_FUN is bounded and has an exponential form, thus the Beta distribution is used for this fit. SOC_FUN index follows a normal distribution. More specifically, we calculated the joint conditional probability of the variable COG_FUN knowing SOC_FUN, and we found that the effect of the variable SOC_FUN is more significant for the values superior to 15. This threshold corresponds to a probability in the 72% non-overtaking. The threshold obtained for COG_FUN is 17, which corresponds to a probability in the 73% non-overtaking. The crossing of these two thresholds was used to classify the KBs in their appropriate role profile. This is illustrated by Figure 1 where the four KBs' profiles constructed according to the copulas approach are shown by the four quadrants separated by the bold lines. Figure 1 also illustrates the huge difference between the KBs' profiling based on the copulas approach and an alternative profiling based on medians given by the four quadrants separated by the narrow lines. Indeed, medians are good measures of central tendency, but are less precise than thresholds calculated through copulas (Clemen and Reilly, 1999; Amara et al., 2005).

Secondly, the four KBs' role profiles were characterized by combining the cutting points (thresholds) of the two indexes as follow (Figure 2):

- Neutral role (low cognitive and low social): COG_FUN ≤ 17 and SOC_FUN ≤ 15
- Relational role (low cognitive and high social): COG_FUN ≤ 17 and SOC_FUN > 15
- Intellectual role (high cognitive and low social): COG_FUN > 17 and SOC_FUN ≤ 15
- Integrated role (high cognitive and high social): COG_FUN > 17 and SOC_FUN > 15

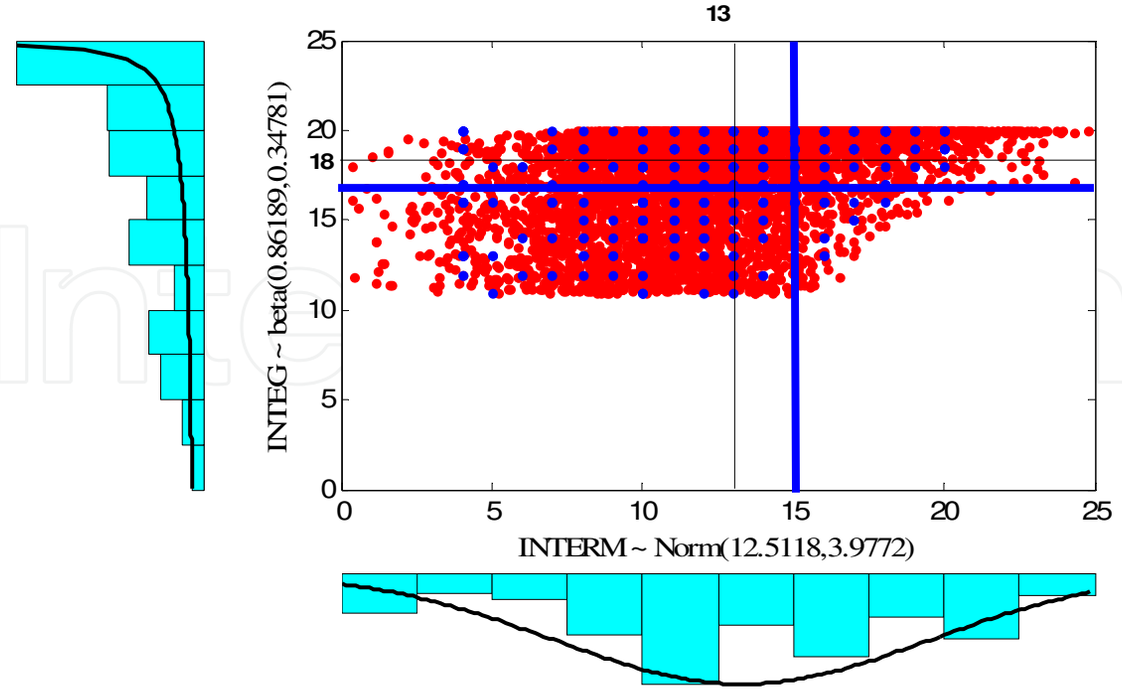


Figure 2. Joint distribution of cognitive (INTEG) and social (INTERM) functions of knowledge brokers

2. Independent variables

In this exploratory study, we build on the resource-based view of the firm (Barney, 1991; Kogut and Zander, 1992; Conner and Prahalad, 1996; Grant, 1996) to argue that KBs' idiosyncratic resources determine how they will achieve their brokering role. The overall exploratory hypothesis of this paper is that the particular role profile that KBs perform will depend on the resources they can mobilize to achieve their brokering activities, in respect to the cognitive function and the social function (see the left hand side of Figure 1).

2.1. Individual resources

2.1.1. Knowledge sources assets

The primary resources inputs of the KB are made up of the ideas and information that they acquire from sources external to their organizations (Hargadon, 2002). One may hypothesize that the larger the variety of the knowledge sources on which the KBs can rely on, the better their opportunities to assess not only the value of external knowledge, but also its validity and reliability. In this paper, broker's knowledge sources assets (SOURCES) were measured in reference to the acquisition by the KBs of studies and research reports from 15 sources of information.

2.1.2. Cognitive assets

The literature on KBs does address the impact of education on how knowledge intermediaries perform their different roles. However, one may hypothesize that individuals engaged in brokering need to have the capabilities required to assess the information collected for its quality, relevance and applicability to a given problem. In this paper, KBs' cognitive assets were measured with a binary variable, to precise the level of education, defined with regard to the most advanced completed degree.

2.1.3. Experiential assets

KBs with more experience has had more opportunities to develop their ability to search, select, integrate and recombine appropriate pertinent knowledge into practical solutions for their organizations (Hargadon, 1998). Similarly, more experience may be instrumental in providing more opportunities to interact with research organizations and therefore to develop more interactions with researchers. Furthermore, experience may generate the production of idiosyncratic knowledge resulting from the history of the relations developed over time between the KBs and the researchers and knowledge users of their organizations. This rationale suggests that more experienced individuals are more likely to play a role of integrative role than the three other roles, or alternatively to adopt an intellectual role or a relational role rather than a neutral role. In this paper, the experience of KBs (EXPER) was measured by the number of years of relevant experience that the KB has in his current job.

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2.2. Organizational resources

2.2.1. Organizational investment in knowledge sharing

Individual resources are necessary, but might not be sufficient to explain how KBs perform their roles. Organization's investments in mechanisms for knowledge sharing may leverage the sharing of the knowledge that KBs have accumulated (Ipe, 2003; Huysman and de Wit, 2004; Berends et al., 2006). Based on this rationale, one may hypothesize that the higher the organizational investments in knowledge sharing mechanisms, the higher the capabilities of KBs to score well on the social function. In this paper, organizational investments in knowledge sharing (SHARE) were measured by using a five-item index regarding the importance of the investment of the broker's organizations in knowledge sharing activities.

2.2.2. Knowledge assets from other organizations

The knowledge assets accumulated by KBs are built on two types of knowledge sources: firstly, they are built on the proactive knowledge search activities of the KBs when they attempt to access knowledge from various sources; secondly, they are also built on the knowledge that KBs receive from people who carry out their professional activities in other organizations. One may hypothesize that the larger the variety of the categories of organizations and people from which the KBs receive ideas, information and reports, the larger is their knowledge assets. In this paper, KBs' knowledge assets provided by people from other organizations (KOTHE) were measured by a variety index referring to ten categories of people from other organizations that have provided the KBs with ideas, information and research reports.

2.2.3. Organizational unit size

As organizations increase in size, KB may face increasing difficulty to recognize and recombine appropriate knowledge, as well as increasing difficulty to share what they know with the appropriate individuals in their organizations (Hargadon, 2002:75-76; Spenser, 2003; Cillo, 2005). Furthermore, as organizations increase in size, they become more specialized, and separations that help organizational units to keep focus also hamper communication and information sharing across organizational units (Hargadon and Sutton, 2000). In this paper, organizational unit size (LNSIZE) was measured by the total number of employees in the KB's organizational unit. This variable was matched with the normal distribution using a logarithmic transformation.

2.3. Control variables

Two control variables were added: the professional status of the KBs and the type of organizations where the KBs carry out their professional activities. The professional status was measured with a series of binary variables defined in reference to the current professional status of the KB. The types of organizations where the KBs primarily carry out their professional activities were measured with a series of binary variables.

3. Data collection

All individuals included in the population were contacted for an interview. The questionnaire and the 429 names composing the population were sent to a private survey firm using the CATI (computer-assisted telephone interviewing) technology, which allows embedding data coding and data entry simultaneously within the data collection phase. The survey was administered by telephone between November 24, 2005 and February 08, 2006. Out of the 429 individuals, 17 respondents were found to be ineligible (e.g., individuals not involved in knowledge brokering activities, or had changed jobs and were no longer involved in professional activities related to knowledge brokering), 63 respondents could not be reached after many telephone calls. In order to increase the response rate, 169 individuals were contacted by email to inform them about the study, its objectives and its sponsors. A total of 39 individuals refused to participate in the study (after a recall). Finally, the survey generated 301 usable questionnaires for a net response rate of 74.69%.

The questions used to survey the respondents never mentioned the expressions "knowledge brokers" and "knowledge brokerage" in order to avoid suggesting that there were good or bad answers. Furthermore, the approach used in this study did not attempt to associate knowledge brokerage activities to a particular definition of knowledge brokerage. Instead, the research strategy used in this study relied on an empiricist approach which led us to ask respondents what they do, how they do it and why they do what they do regarding knowledge management in terms of the acquisition, adaptation, and exchange of knowledge. Therefore, individual respondents could not, in advance, be considered as knowledge brokers or non-knowledge brokers. The research strategy developed for this study aimed at capturing the diversity of the respondents' practices regarding their activities associated to knowledge brokering as part of the knowledge management strategy of Canadian healthcare organizations.

4. Results

4.1. Descriptive statistics

As can be seen in the first part of Table 1, the results of the copulas approach classified the respondents in the four different profiles as follows: 111 respondents or 37.4% of the sample in the neutral role, 17 respondents or 5.7% in the relational role, 111 respondents or 37.4% in the Intellectual role, and 58 respondents or 19.5% in integrative role. The integrative role is the gold standard for knowledge brokering.

The descriptive statistics of the explanatory variables used in this study are reported in Table 1. The average number of knowledge sources from which the 297 KBs acquired studies and research reports in their day-to-day professional activities was 5.68 sources, with a standard deviation of 3.40 sources. The average experience of the respondents, as measured by the number of years of relevant experience in their current job, was 8.64 years, with a standard

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Dependent variable: Knowledge Broker's role profile		**Number of cases**		**Percentage**		
• Neutral role		111		37.4		
• Relational role		17		5.7		
• Intellectual role		111		37.4		
• Integrative role		58		19.5		
Total		**297**[†]		**100.0**		
Independent Variables	**Type of variables**	**Min.**	**Max.**	**Mean**	**Standard deviation**	**Cronbach's ∝**
Continuous variables:						
• Knowledge Sources Assets	Continuous: number	0	15	**5.68**	3.40	--
• Experiential Assets	Continuous: number	0	36	**8.64**	7.56	--
• Organizational Investment in Knowledge Sharing	Index: 5 items	5	25	**17.38**	5.06	.86
• Knowledge from other Organizations	Continuous: number	0	10	**2.74**	2.32	--
• Organizational Unit Size	Continuous: number	1	2700	**44.43**	183.84	--
Categorical variables:						
• Cognitive Assets	• Bachelor's and less degree • Master's degree • PhD degree					16.5% 55.9% 27.6%
• Professional Status	• Top (or executive manager): • Middle manager: • First-line manager: • Professional:					25.6% 29.3% 7.1% 38.0%
• Types of organizations	• Health Care Administrations: • Health Care Settings Organizations: • Universities & Other Research Organizations • Foundations & Funding Agencies: • Private Firms:					38.0% 17.8% 28.4% 10.4% 5.4%

[†] 4 observations in the one or the two indices used to construct the four profiles were missing data. Hence the total number of observations dropped from 301 to 297

Table 1. Descriptive Statistics

deviation of 7.56 years. As for the average number of employees in the respondents' organizational unit, it was 44.43, with a standard deviation of 183.84. On average, the respondents scored 17.38 out of a possible maximum of 25 on the index of organizational investments in knowledge-sharing. The descriptive statistics also show that 16.5% of the respondents have completed a bachelor's or less degree, 55.9% have completed a master's degree, and 27.6% have completed a PhD degree. As for the current professional status of the respondents, the figures of Table 1 show that 25.6% were top managers, 29.3% middle managers, 7.1% were first-line managers, and 38% professionals. Finally, the answers to the question about the type of organizations where the respondents primarily carry out their professional activities indicated that out of the 297 respondents, 38% worked in healthcare administrations, 17.8% in healthcare settings organizations, 28.4% in universities or other research organizations, 10.4% in non-profit foundations or funding agencies, and 5.4% in private firms.

We checked the correlation matrix between the continuous independent variables used in the regression models to test for multi-collinearity (Table 2). Our results indicate absence of multi-collinearity problems.

	SOURCES	EXPER	SHARE	KOTHE	LNSIZE
SOURCES	1	.099	.300	.452	.040
EXPER		1	.094	.040	.147
SHARE			1	.376	.166
KOTHE				1	.066
LNSIZE					1

Table 2. Correlations between continuous explanatory variables

4.2. Analytical plan

Five situations were considered relevant in our investigation aiming to identify the factors which would increase the likelihood that individuals would adopt a higher-value-adding-role profile rather than a lower-value-adding-role profile: 1) a profile of knowledge broker rather than one of neutral role; 2) a profile of integrative role rather than one of relational role; 3) a profile of integrative role rather than one of the Intellectual role; 4) a profile of relational role rather than one of neutral role; and 5) an Intellectual role rather than one of neutral role. A multinomial Logit regression was estimated to ascertain the first three situations, while two bivariate logit regressions were estimated to identify the factors increasing the likelihood that a neutral role adopts a relational role and an intellectual role.

4.3. Specification of the multinomial logit model

For the multinomial logit regression, the qualitative dependent variable used is the KBs' roes determined by the copulas approach presented previously. The four alternative roles are 1, 2, 3 and 4, with 1) being the assessment that the respondent adopted a neutral role (low in cognitive functions and low in social functions); 2) the assessment that the respondent adopted

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a relational role (low in cognitive functions and high in social functions); 3) the assessment that the respondent adopted an intellectual roe (high in cognitive functions and low in social functions); and 4) the assessment that the respondent adopted an integrative role (high in cognitive functions and high in social functions), identified as the reference category in our model.

The probability of choosing a profile category k (k=1,2,3,4) is given by:

$$Prob_{ik} = \frac{e^{\beta_k X_i}}{1 + \sum_{k=1}^{4} e^{\beta_k X_i}} \tag{2}$$

where X_i is the matrix of profile attributes and β_k is m x 1 vector of parameters.

As is the case of bivariate logit models, coefficients for reference choice are set equal to zero. Such normalization will be taken into account when interpreting the rest of model coefficients. In our case, the profile corresponding to integrative role is seen as the gold standard and taken as a reference category and, as a consequence, the estimated parameters will be interpreted in the following sense:

$$\frac{\text{Prob}_{i1}}{\text{Prob}_{i4}} = \frac{e^{\beta_1 X_i}}{e^{\beta_4 X_i}} = e^{(\beta_1 - \beta_4)Xi} = e^{\beta_1 X_i}$$

$$\frac{\text{Prob}_{i2}}{\text{Prob}_{i4}} = \frac{e^{\beta_2 X_i}}{e^{\beta_4 X_i}} = e^{(\beta_2 - \beta_4)Xi} = e^{\beta_2 X_i} \tag{3}$$

and

$$\frac{\text{Prob}_{i3}}{\text{Prob}_{i4}} = \frac{e^{\beta_3 X_i}}{e^{\beta_4 X_i}} = e^{(\beta_3 - \beta_4)Xi} = e^{\beta_3 X_i}$$

or

$$Ln\left(\frac{\text{Prob}_{i1}}{\text{Prob}_{i4}}\right) = (b_1 - b_4)X_i = b_1 X_i$$

$$Ln\left(\frac{\text{Prob}_{i2}}{\text{Prob}_{i4}}\right) = (b_2 - b_4)X_i = b_2 X_i \tag{4}$$

and

$$Ln\left(\frac{\text{Prob}_{i3}}{\text{Prob}_{i4}}\right) = (b_3 - b_4)X_i = b_3 X_i$$

From (3), the estimated coefficients, for instance, β_{1j} (j = 1,….,m), are interpreted as the marginal change in the logarithm of the odds that the respondents were profiled as adopting a neutral role over the category indicating that they were profiled as adopting an integrative role, due to a marginal change in the attribute j. However, while marginal changes in the logarithm of the odds are not always intuitively understandable, we can use the exponential of parameters also referred to as odds ratios. They offer a straightforward model interpretation. Indeed, $\exp(\beta_{1j})$ is the factor by which the odds change when the j^{th} independent variable increases by one unit. If β_{1j} is positive, this factor, i.e., $\exp(\beta_{1j})$, will be higher than 1, which means that the odds are increased. On the contrary, if β_{1j} is negative, $\exp(\beta_{1j})$ is less than 1, implying that the odds are decreased. And if β_{1j} is 0, $\exp(\beta_{1j})$ is equal to 1, which leaves the odds unchanged. For example, for a continuous variable such as the organizational unit size, $\exp(\beta_{1j})$ measures the factor by which the odds of being profiled as neutral role instead of integrative role changes when the organizational unit size is increased by one unit. In an analogous way, if attribute j is a dummy variable, the exponential of parameters, i.e., $\exp(\beta_{1j})$, measures the factor of change in the odds with respect to the reference variable.

4.4. Results of the multinomial logit regression

The regression results of the Multinomial Logit model are summarized in the first part of Table 3 (Panel A). The model has acceptable predictive power, with 59.5% of correct predictions. The value of the Nagelkerke R^2 is.425, which is very good for qualitative dependent variable models. Furthermore, the computed value of the likelihood ratio (i.e., 143.15) is much larger than the critical value of the chi-squared statistic at the 1 percent level, with 39 degrees of freedom. This suggests that the null hypothesis, that all the parameter coefficients (except the intercept) are all zeros, is strongly rejected. Consequently, the model is significant at the 1 percent level. With regard to the variables explaining the likelihood that the respondents adopt a profile of integrative role rather than any of the three other profiles, the three individually controlled resources variables, namely knowledge sources assets, experiential assets, and cognitive assets, have a significant impact in the three situations considered in the Multinomial Logit model. More specifically, increases in the index of respondents' knowledge sources assets (SOURCES) and increases in their experiential assets (EXPER) increase the likelihood that respondents play an integrative role rather than a neutral role, a relational role, or an intellectual role. Likewise, respondents who have completed a PhD degree are more likely to play an integrative role than those who have completed lower degrees. Two out of the three organizationally controlled resources variables do not explain the likelihood that respondents play an integrative role rather than a neutral role, a relational role, or an Intellectual role. However, increasing the index of acquisition of knowledge from other organizations (KOTHE) increases the probability that respondents play the integrative role rather than the Intellectual role.

Finally, regarding the control variables, the results reported in Panel A of Table 3 also show that being a top or middle manager (MANAG), instead of being a professional, decreases the likelihood that respondents play an integrative role rather than a relational role, whereas being a first-line manager (FIRST), instead of being a professional, decreases the likelihood that respondents adopt an integrative role rather than a neutral role or a relational role. As for the

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	PANEL A: Multinomial Logit Estimation						PANEL B: Binary Logit Estimation			
Dependant variables	Neutral to Integrative		Relational to Integrative		Intellectual to Integrative		Neutral to Relational		Neutral to Intellectual	
Independent variables	*Coeff. β*	*EXP (β)*	*Coeff. β*	*EXP (β)*	*Coeff. β*	*EXP (β)*	*Coeff. β*	*EXP (β)*	*Coeff. β*	*EXP (β)*
Individual Variables										
Knowledge Sources Assets [SOURCES]	.482***	1.619	.210**	1.234	.262***	1.299	.176***	1.193	.210***	1.234
Cognitive Assets:										
Bachelor's Degree [BACH] [a]		.352	-2.465***	.085	-1.027**	.358	1.196	3.305	-.075***	.928
Master's Degree [MAST] [a]	-1.120***	.326	-2.082***	.125	-1.044***	.352	.810	2.248	-.055***	.947
Experiential Assets [EXPER]	.073***	1.075	.139***	1.149	.071***	1.073	-.053**	.948	.002	.935
Organizational variables										
Organizational Investment in Knowledge Sharing [SHARE]	.035	1.035	-.050	.951	-.015	.985	.109*	.468	.050*	1.051
Knowledge from other Organizations [KOTHE]	.040	1.041	-.091	.913	.141*	1.151	.102	1.108	-.077	.354
Organizational Unit Size [LNSIZE]	-.029	.971	-.107	.898	-.108	.898	.046	1.047	.087	.457
Control Variables										
Professional Status:										
• Manager [MANAG] [b]	-.326	.722	-1.120**	.326	-.151	.860	.650	1.915	-.236	.790
• First-line [FIRST] [b]	-2.142**	.117	-1.887**	.151	-.835	.434	-.544	.580	-1.312**	.269
Types of Organization:										
• Health Care Administrations [ADM] [c]	-.248	.780	.636	1.889	-.238	.788	-.759	.468	-.029	.971
• Universities & Other Research Organizations [RESEAR] [c]	1.060**	2.866	1.725**	5.612	.368	1.445	-.253	.777	.742*	2.100
• Foundations & Funding Agencies [FUND] [c]	1.077*	2.936	.723	2.061	1.360**	3.896	-.012	.988	-.227	.797
• Private Firms [PRIVATE] [c]	-.317	.728	.183	1.201	-.687	.503	-1.924	.146	.272	1.312
Intercept	-4,338		1.583		-2.479		-5.522			
Number of cases: (Total = 291)	110/58		17/58		106/58		110/17		110/106	
Chi-square (d.f.):	143.15 (39)						22.92 (13)		35.70 (13)	
Nagelkerke R^2(Pseudo *R* Square):	.425						.303		.203	
Percentage of correct predictions:	59.5%						88.2%		69.4%	

[a] PhD Degree is the reference category. [b] Professional is the reference category. [c] Health Care Settings Organizations is the reference category. *, ** and *** indicate that variable is significant at 10%, 5% and 1% level respectively.

Note: Exp(β) is the factor of change in the odds of the dependent variable, due to one unit increase in the specific independent variable.

Table 3. Analytical results

types of organizations, the respondents who primarily carry out their professional activities in universities or other research organizations (RESEAR) are more likely than those employed by healthcare settings organizations (hospitals and private clinics) to adopt an integrative role rather than a neutral role or a relational role. Likewise, respondents who primarily carry out their professional activities in non-profit foundations or funding agencies (FUND) are more likely than those employed by healthcare settings organizations to play the integrative role rather than the neutral role or the Intellectual role.

4.5. Specification of the binary logit models

Since the Multinomial Logit regression permits comparison only with regard to one reference category like we did by using the integrative role as reference category, two bivariate logit regressions are also estimated to capture two other relevant situations that refer to the likelihood that the respondents in the neutral role be either in the relational role or in the intellectual role group.

For each of these two situations, the following equation was estimated:

$$Log\left(P_i/1-P_i\right)=$$
$$b_0+b_1SOURCES+\ +\ \ b_2BACH+b_3MAST+\ \ +b_4EXPER+b_5SHARE+b_6KOTHE+$$
$$+\ b_7LNSIZE+b_8MANAG+b_9FIRST+b_{10}ADM+b_{11}RESEAR+b_{12}FUND+b_{13}PRIVATE$$

where, $b_i(i=0\ldots\ldots13)$ are the coefficients.

Log (P_i/1-P_i) is the logarithm of the ratio of the probability that a neutral role be in the profile of a relational role or in that of the Intellectual role, relative to the probability that the same neutral role would be in none of these two profiles.

4.6. Results of the binary logit regressions

The regression results of these binary Logit models are summarized in Panel B of Table 3. The computed value of the Chi-square statistics for each of the two Logit regressions is greater than its critical value (i.e., 27.69) with 13 degrees of freedom at the 1% level. The two equations have good predictive power, with 88.2% and 69.4% of overall correct predictions for the situation corresponding to being in a relational role rather than in one of neutral role, and for the situation corresponding to being in an Intellectual role rather than in one of neutral role. Finally, the value of Nagelkerke pseudo R^2 is.303 for the first binary Logit regression and.203 for the second one, which is quite reasonable for qualitative dependent variable models. The variable individual knowledge sources assets was the only one that significantly explains the likelihood that respondents have of being in a profile of relational role rather than in one of neutral role, and of being in an Intellectual role rather than in one of relational role. Moreover, the positive sign of this variable suggests that increases in the index of the respondents' knowledge sources assets (SOURCES) increase the probability that respondents adopt a relational role or an intellectual role rather than a neutral role. Likewise, the respondents who have completed a PhD degree are more likely than others to adopt the Intellectual role instead of adopting a neutral role. However, the respondents' cognitive assets were not found

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significant to explain the likelihood that the respondents perform a relational role rather than a neutral role. Finally, increases in the index of the respondents' experiential assets (EXPER) decrease the probability that respondents perform a relational role rather than a neutral role. The variable organizational investments in knowledge-sharing (SHARE) is the only organizationally controlled resources variable that was found to be positively and significantly related to the likelihood of respondents being relational role or the Intellectual Profile rather than neutral role. With regard to the control variables, the results reported in Panel B of Table 3 show that being a first-line manager (FIRST) decreases the likelihood who the respondents adopt an Intellectual role rather than neutral role, whereas the respondents that primarily carry out their professional activities in universities or other research organizations are more likely than those employed by healthcare settings organizations to adopt the Intellectual role rather than neutral role.

5. Discussion and conclusion

The purpose of this paper was exploratory and it aimed to inspire more conceptual and quantitative studies on knowledge brokering core functions, not to validate or invalidate particular conceptual approaches. Instead of adopting a particular definition of knowledge brokers and knowledge brokering, we have conceptually and empirically defined the concept of knowledge broker in reference to two dimensions that literature present as being tightly interdependent but have never explored empirically in a quantitative study: Theses dimensions are the social function and the cognitive function on which KBs can achieve a high or low performance. The combination of these functions generated four KBs role profiles: neutral role, relational role, Intellectual role, and integrative role. The individuals who adopt the integrative role in carrying out their professional activities are the ones who contribute the most significantly to effectively manage knowledge 9internal to their organization and external) and improve the creation of value for their organizations. Such a perspective invites to consider factors that would help individuals to move from one profile to another, up to the profile of the integrative role. Such factors were considered in terms of resources controlled either by individuals or the organizations where they primarily carry out their professional activities.

The results of the regression models suggest that individually controlled resources such as the proactive role of KBs in searching for ideas, information and reports from various sources located in other organizations, their level of education and experience, are the major drivers of knowledge brokering activities. Organizationally controlled resources do not seem to help individuals as much to improve their knowledge brokering performance. Indeed, organizational investments only help to move from a profile of neutral role to a profile of relational role or intellectual role: in other words, these investments help only to move from the lowest performance to a slightly better knowledge brokering performance. Furthermore, increasing the variety of external organizations that provide ideas, information and reports to KBs helps these individuals to evolve from an Intellectual role to one the integrative role. Finally, it is worth pointing out that the number of employees in the respondents' organizational units had

no impact on their performance in performing the KBs core functions. The fact that individually controlled resources are the major drivers of knowledge brokering activities suggests that knowledge brokering is still an emerging role that is not yet formally institutionalized, even in large healthcare organizations. In such an informal context, individuals engaged in knowledge brokering activities have to rely primarily on resources that are individually, rather than organizationally, provided. The resource-based approach to knowledge brokering adopted in this study has implications for how organizations might enhance their knowledge brokering capabilities by better exploiting the resources that contribute to improve and value the cognitive and social function of KBs in healthcare organizations. By focusing the attention on resources as explanatory variables of knowledge brokering, the results of this paper allow to derive implications for how healthcare organizations might improve their knowledge brokering capabilities. Hence, the results of this study suggest that managers would improve the knowledge brokerage capability of their personnel by investing resources to:

- Reinforce the cognitive function and its related knowledge absorptive capability by relying on individuals who have completed doctoral degrees, the so-called highly qualified personnel (HQP);
- Increase the knowledge capability of neutral role, relational role and Intellectual role by relying on individuals that have many years of experience;
- Facilitate the graduation of individuals from neutral role, relational role and Intellectual role to the integrative role by supporting the effort of individuals to expand their sources of ideas, information and reports from other organizations.
- Support organizational investments in various knowledge-sharing mechanisms.

In devising their policy interventions, managers of healthcare organizations should also keep in mind that professionals are more likely to improve the cognitive and social function capabilities than top, middle and first-line managers, and that individuals that primarily carry out their professional activities in universities, research organizations, foundations and funding agencies are also more likely to improve the networking and learning functions than the professionals carrying out their professional activities in other types of organizations.

Our results offer some interesting information for those who are involved in human resources management. We have identified critical criteria that may be used as indicators to select a knowledge broker during a job interview. We name here: 1) intellectual assets or qualifications (holding a PhD), 2) number of years in the organization (local experience), 3) past experience in universities, research organizations, foundations and funding agencies (research experience), 4) social assets (extend and variety of personal network) and 5) Research skills (scientific and governmental databases knowledge). However, individual skills and capabilities need an organizational infrastructure to help them perform in their role, especially the integrative role. Organizations have to invest in knowledge management and brokering through the improvement of access to information (databases, internet...) and the implementation of sustainable diversified mechanisms of knowledge sharing (organization of workshops, training courses and continuing professional education credits; and attendance to conferences and colloquiums as well as the scientific one as the professional ones).

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This exploratory study suffers form limitations that could inspire future research. First, our survey was based on a self-reported questionnaire that may imply a social desirability. However, we used some strategies to reduce its impact on the validity of the collected data. We did not precise that the questionnaire was targeting the exploration of KBs role neither their performance in this role. In such way they were not feeling as being assessed. Second, the minor role played by the organizational resources that support knowledge brokerage should be considered as an invitation to consider other types of organizational investments in future research. Third, although our quantitative study revealed factors that explain why individuals adopt different brokering profiles, the study does not provide a temporal perspective on the development of brokering. Fourth, the study covered healthcare organizations and may therefore reflect the idiosyncrasies of this particular sector of activity. Fifth, knowledge brokering may fail. The outputs of knowledge brokers can be ignored or rejected. One limit of this study is that it did not take into account the recipient's (in)ability to value, assimilate and apply the knowledge translated by the KBs, in short, this paper did not consider the knowledge absorptive capacity of the recipients (Cohen and Levinthal, 1990; Zahra and George, 2002). Future research could be inspired by these limits and may help to improve knowledge about key attributes and responsibilities of KBs, and give more suggestions for improving this role in healthcare organizations.

The central role of KBs is to provide policy, decision-makers and managers with the best (accurate, relevant and feasible) information available on how to redesign the healthcare structures and processes to efficiently respond to the challenge of decision-making in a dynamic political, economic, epidemiologic and demographic environment. The novelty of the KB role in healthcare organizations provide a unique opportunity to assess the need for and reaction to clarify precisely its associated activities and the requested skills and conditions for the performance of its critical functions, and clearer direction on how to move forward with it to leverage knowledge management in knowledge based organizations. This research has practical implications for public health organizations in Canada and elsewhere in the world. Public health decision makers and managers are facing systemic challenges and constraints. Thus, they need to adequately understand the critical factors (individual and organizational) of knowledge management to foster their organization's performance. Knowledge brokers (KB) are seen as major KT strategic agents for fostering EI/BDM in public health organizations. Our results show that attention should be placed on organizational openness to innovation and innovative approaches, strategic KB recruitment and KB's professional stability in the organization. Knowledge brokering performance is tightly related to supportive mechanisms. Nevertheless, our results are context sensitive (Canadian organizations); they shed light on what is strategically to be undertaken in public health organizations in general. Thus, we clearly show that top-managers have to identify a middle manager with at least a 10 year experience in the organization, holding a PhD and having an extended relational capital (in and out of their organization and as well as in governmental as in private organizations and universities). Moreover, research competencies are highly requested (in terms of timely and relevant evidence acquisition, synthesis, adaptation and communication). This skilled professional has then to be trained as a KB (specific training and continued education for systematic reviews, policy briefings and communication skills).The organization has to

provide the KB with 1) an electronic infrastructure (Internet and registration to electronic academic databases) to access and manage information and maintain social links with academia and knowledge users, and 2) adequate and sustained resources to attend relevant conferences and workshops (to be up-to-date with new evidence and extend his social network). Once these prerequisite are made available and operational in the organization, an effective monitoring and process and outcomes evaluations are needed to identify determinants of KB performance in terms of quality and cost-effectiveness of their role in public health organizations.

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References

[1] Acedo, F. J, Barroso, C, & Galan, J. L. (2006). The Resource-Based Theory: Dissemination and Main Trends. *Strategic Management Journal.* 27(7), 621-636.

[2] Amara, N, Landry, R, & Ouimet, M. (2005). Milieux innovateurs: Determinants and Policy Implication. *European Planning Studies*. 13(6), 939-965.

[3] Andersen, E. W. (2005). Two-stage Estimation in Copula Models Used in Family Studies. *Lifetime Data Anal.* 11(3), 333-350.

[4] Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*. 17(1), 99-120.

[5] Barney, J. (2001). Resource-Based Theories of Competitive Advantage: A Ten-Year Retrospective on the Resource-Based View. *Journal of Management.* 27(6), 643-650.

[6] Bartram, S. M, Taylor, S. J, & Wang, Y. H. (2007). The Euro and European Financial Market Dependence. *Journal of Banking & Finance.* 31(5), 1461-1481.

[7] Basrak, B, Klaassen, C. A. J, Beekman, M, Martin, N. G, & Boomsma, D. (2004). Copulas in QTL Mapping. *Behavioural Genetics.* 34(2), 161-171.

[8] Berends, H, Van Der Bij, H, Debackere, K, & Weggeman, M. (2006). Knowledge Sharing Mechanisms in Industrial Research. *R&D Management*. 36(1), 85-95.

[9] Bhargava, H. K, & Choudhary, V. (2004). Economics of an Information Intermediary with Aggregation Benefits. *Information Systems Research.* 15(1), 22-36.

[10] Brownson, R. C, & Jones, E. (2009). Bridging the gap: translating research into policy and practice. *Prev Med,* 49(4), 313-315.

[11] Burt, R. S. (2005). *Brokerage and Closure*, Oxford University Press, New York;

[12] Cillo, P. (2005). Fostering Market Knowledge Use in Innovation: The Role of Internal Brokers. *European Management Journal.* 23(4), 404-412.

[13] Clemen, R. T, & Reilly, T. (1999). Correlations and Copulas for Decision and Risk Analysis. *Management Science.* 45(2), 208-224.

[14] Cohen, W, & Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly*. 35(1), 128-152.

[15] Conner, K. R, & Prahalad, C. K. Theory of the Firm: Knowledge versus Opportunism. *Organization Science*. 75(5), 477-501.

[16] Dobbins, M, Robeson, P, Ciliska, D, Hanna, S, Cameron, R, Mara, O, Decorby, L, Shawna, K, & Mercer, S. (2009). A description of a knowledge broker role implemented as part of a randomized controlled trial evaluating three knowledge translation strategies. *Implementation Science* 4 (April), , 1-9.

[17] Fernandez, E, Montes, J. M, & Vazquez, C. J. (2000). Typologies and Strategic analysis of Intangible Resources: A Resource-Based Approach. *Technovation*. 20(2), 81-92.

[18] Gagliardini, P, & Gouriéroux, C. (2006). *An Efficient Nonparametric Estimator for Models with Nonlinear Dependence.* Journal of Econometrics. 137(1), 189-229.

[19] Gagnon, M. L. (2011). Moving knowledge to action through dissemination and exchange. *Journal of Clinical Epidemiology.* 64(1), 25-31.

[20] Gould, R. V, & Fernandez, R. M. (1989). *Structures of Mediation: A Formal Approach to Brokerage in Transaction Networks.* Sociological Methodology. 19(1), 89-126.

[21] Graham, I, Logan, J, Harrison, M. B, Straus, S. E, Tetroe, J, Caswell, W, & Robinson, N. (2006). Lost in knowledge translation: Time for a map? *The Journal of Continuing Education in the Health Professions,* 26(1), 13-24.

[22] Granovetter, M. (1973). The Strength of Weak Ties. *American Journal of Sociology*. 78(6), 1360-1380.

[23] Grant, R. M. (1996). Toward a knowledge-based theory of the firm. Strategic. *Management Journal*. 17(Special (109-122), 109-122.

[24] Howells, J. (2006). Intermediation and the role of intermediaries in innovation. *Research Policy.* 35(5), 715-728.

[25] Hull, J. C, & White, A. D. (2006). *Valuing Credit Derivatives Using an Implied Copula Approach.* Journal of Derivatives. 14(2), 8-28.

[26] HuysmanM & de Wit, D. (2004). Practices of Managing Knowledge Sharing: Towards a Second Wave of Knowledge Management. *Knowledge and Process Management.* 11(2), 81-92.

[27] Ipe, M. (2003). Knowledge Sharing in Organizations: A Conceptual Framework. *Human Resource Development Review.* 2(4), 337-359.

[28] Jbilou, J, Amara, N, & Landry, R. (2007). Research-based-decision-making in Canadian health organizations: A behavioural approach. *Journal of Medical Systems*. 31(3), 185-196.

[29] Kimble, C, Hildreth, P, & Wright, P. (2000). Communities of practice: Going Virtual. In *Knowledge Management and Business Innovaion*. Hershey PA USA: Idea Group Publishing.

[30] Kogut, B, & Zander, U. (1992). Knowledge of the firm, combinative capabilities,and the replication of technology. *Organization Science*. 3(3), 383-397.

[31] Landry, R, Amara, N, Pablos-mendes, A, Shademani, R, & Gold, I. (2006). Knowledge Translation- Conceptual Framework and Approaches. *Bulletin of the World Health Organization.* 84(8), 597-602.

[32] Nelsen, R. B. (1999). *An Introduction to Copulas*, Springer, New York.

[33] Newbert, S. C. (2007). Empirical Research on the Resource-Based View of the Firm: An Assessment and Suggestions for Future Research. *Strategic Management Journal*. 28(2), 121-146.

[34] Obstfeld, D. (2005). Social Networks, the Tertius Lungens Orientation, and Involvement in Innovation. *Administrative Science Quarterly*. 50(1), 100-130.

[35] Owzar, K. Jung, Sin-Ho, & Sen, P.K. ((2007). A Copula Approach for Detecting Prognostic Genes Associated With Survival Outcome in Microarray Studies. *Biometrics.* 63(4), 1089-1098.

[36] Peng, L, & Fine, J. P. (2007). Regression Modeling of Semicompeting Risks Data. *Biometrics*. 63(1), 96-108.

[37] Petersen, L, Sorensen, T. I, et al. (2006). Inference Methods for Correlated Left Truncated Lifetimes: Parent and Offspring Relations in an Adoption Study. *Lifetime Data Anal.* 12(1), 5-20.

[38] Shaw, W. T, & Lee, K. T. A. (2007). *Copula Methods vs Canonical Multivariate Distributions: the Multivariate Student T Distribution with General Degrees of Freedom*, Working Papers. Departement of Mathematics King's College, London, UK. http://www.mth.kcl.ac.uk/~shaww/web_page/papers/MultiStudentc.pdf

[39] Sklar, A. (1959). *Fonctions de répartition à n dimensions et leurs marges*, Publications de l'Institut de Statistique de l'Université de Paris 8. , 229-231.

[40] Strauss, S, Tetroe, J, & Graham, I. (2009). Knowledge translation in health care: Moving from evidence to practice. London, UK: Wiley-Blackwell.

[41] Van Kammen, J, De Savigny, D, & Sewankambo, N. (2006). Using Knowledge Brokering to Promote Evidence-based Policy-Making: the Need for Support Structures. *Bulletin of the World Health Organization*. 84(8), 608-612.

[42] Verona, G, Prandelli, E, & Sawhney, M. (2006). Innovation and Virtual Environments: Towards Virtual Knowledge Brokers. *Organization Studies*. , 27(6), 765-788.

[43] Wenger, E. (2000). Communities of practice and social learning systems. *Organisation* 7(2), 225-246.

[44] Zahra, A. S, & George, G. (2002). Absorptive Capacity: A Review, Reconceptualization, and Extension. *Academy of Management Review*. 27(2), 185-203.

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