ROLE OF KNOWLEDGE MANAGEMENT WITHIN INNOVATION AND PERFORMANCE

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Abstract

This study seeks to advance understanding and to provide empirical evidence of relationship of knowledge management components (knowledge acquisition, knowledge transfer, and knowledge use), business innovation and organizational performance. In this research are analysed at theoretical and empirical level the knowledge management components: acquisition, transfer and use of knowledge, and its importance for business innovation and organizational performance. We propose a model that includes both direct effects and indirect effects. The predicted effects are tested with data collected of 201 Spanish firms of high-tech services and high-tech manufacturing; the paper performs an empirical analysis using structural equation modelling. Results of this investigation confirm that knowledge management components have positive direct and indirect influences on the business innovation and therefore improve the company's performance.
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JEL Classification: M29.

Introduction

Knowledge management is critical success factor for the organizations and an important antecedent of innovation (Bennett & Gabriel, 1999; Carneiro, 2000; Darroch & MacNaughton, 2002; Lin & Lee, 2005 Chilton & Bloodgood, 2010) and innovation is the keystone of every organization (Carneiro, 2000; Plessis, 2007; Dilk et al., 2008). Furthermore, knowledge management is a complex and continuous process for any organization but it creates a favourable environment for innovation to take place (Goh, 2005; Plessis, 2007;). Despite there are many studies concerning knowledge management as antecedent of innovation it is difficult to find works that examine empirically relationship between both constructs. So considering the need to increase managers and scholarships' concerns about these important topics and due to great scientific interest on knowledge management components and innovation (e.g. Carneiro, 2000; Darroch and MacNaughton, 2002; Goh, 2005; Plessis, 2007; Chilton & Bloodgood, 2010;) it is particularly interesting to deepen our understanding of how these components of knowledge management affect business innovation and the effects of this relationship in organizational performance. Therefore the purpose of this paper is to analyzethe relationship between knowledge management components (knowledge acquisition, knowledge transfer, and knowledge use), business innovation and organizational performance. Thus this paper contributes in two important ways to the analysis of relationship between knowledge management and innovation. First, it presents a careful and rigorous empirical evidence of knowledge management components and their direct and indirect effects on the business innovation. Our results confirm that knowledge management components have positive direct and indirect influences on the business innovation and therefore, and secondly, it provides empirical evidence to the literature that examines the influence of innovation on organizational performance.

Theoretical framework and proposals

According to Darroch (2005) and Bennett and Gabriel (1999) components of knowledge management could be: acquisition, transfer and use of the knowledge throughout the organization. Acquisition is the process of finding knowledge relevant to the organization. This knowledge is transferred into appropriated context in order to be understood for members of the firm. Then this knowledge is applied to the issues confronted by the organization. Thus, knowledge acquisition is very important knowledge source from clients, suppliers, competitors and governmental bodies (Yli-Renko et al., 2001; Darrow, 2003; Andreeva & Kianto, 2011). Organizations obtain more rich and diverse knowledge base by knowledge acquisition and it encourages innovation (Cohen & Levinthal, 1990; Cassiman & Veugelers, 2006; Andreeva & Kianto, 2011). Knowledge transfer is focused in the exploitation and application of existing knowledge, especially supported on the innovation (Cummings, 2001; Savory, 2006; Kumar & Ganesh, 2009). And the appropriate use of knowledge is critical to stimulate innovation processes of organizations (Dits & Berkhout, 1999; Chilton and Bloodgood, 2010). All these knowledge management components support successful innovation

that is complex process and very important in order to get new outcomes and to improve organizational performance (Carneiro, 2000; Dilks et al., 2008). So all this leads us to formulate the following hypotheses:

The influence of knowledge acquisition on knowledge transfer and business innovation.

According to Andreeva & Kianto (2011) knowledge acquisition refers to knowledge obtained externally, and to be able to exploit it the organization needs to disseminate it internally so both components are critical for firms (Cohen & Levinthal, 1990).

In this sense knowledge acquisition is very useful for organization but as Chilton & Bloodgood (2010) have demonstrated it is insufficient to success if it is not transferred. Therefore these authors analyse how explicit and tacit acquired knowledge is disseminated in different ways throughout organization according to preferences of individuals.

According to Lichtenthaler (2007, p. 350) "firm's ability to externally leverage knowledge not only depends on its interface with the external environment but also on the knowledge transfers". That means knowledge acquired by units and subunits will be unrealized if it is not transferred (Cohen & Levinthal, 1990).

Plessis (2007) have argued if knowledge acquired is transferred within the firm it makes more difficult for competitors to replicate it and consequently it is more valuable and easier to code, especially the tacit knowledge.

Yli-Renko et al. (2001) point to knowledge acquisition enhances the firm´s ability to exploit new productive opportunities and this ability is enhanced by sharing knowledge.

Thus, we propose that:

Hypothesis 1: Knowledge acquisition will be positively related to knowledge transfer.

Knowledge acquisition can improve innovation in organizations (e.g. Cassiman & Veugelers, 2006; Andreeva & Kianto, 2011). Thus as Cohen & Levinthal (1990) and Andreeva & Kianto (2011) suggest organizations efficacious in acquiring knowledge possess more varied knowledge base, this diversity of viewpoints stimulates innovation.

Zhou & Uhlaner (2009) have demonstrated that external acquisition contributes positively to innovation. Also work of Andreeva & Kianto (2005) supports knowledge acquisition has a positive impact on innovation. Thus innovation is not only because of internal sourcing but also external knowledge acquisition (Cassiman & Veugeler, 2006). External acquisition allows firms knowledge can be reconfigured (Cohen & Levintahl, 1990) "enhancing a firm´s ability to value the technological opportunities which consequently contribute to a firm´s innovation" (Zhou & Uhlaner, 2009, p. 11). Firms are increasing their knowledge assets externally to improve innovation (Lichtenthaler, 2007).

In addition, the study of Darroch (2005) has shown empirical evidence of the positive impact of knowledge acquisition on innovation. And Cohen & Levinthal (1990) suggested knowledge acquisition contributes to innovation in high technology firms. Also Yli-Renko et al. (2001) proposed knowledge acquisition increases the potential for new innovations. Thus, we propose that:

Hypothesis 2: Knowledge acquisition will be positively related to business innovation.

The influence of knowledge transfer on knowledge use.

Knowledge transfer is closely related to knowledge use (Cohen & Levintahl, 1990). According to Bennett & Gabriel (1999) firms with extensive knowledge management tended to encourage knowledge transfer by training of their employees in knowledge management systems, to make easier the application of this knowledge on the firm.

Knowledge transfer enables the use of existing knowledge for the organization's goals (Kumar &Ganesh, 2009).

Transferred knowledge is used by organization to model new solutions based on the new knowledge or to test good ideas (Darroch, 2005), thus best practices can be used by different firm´s sub-units (Cohen & Levintahl, 1990). In this sense Savory (2006) have shown knowledge transfer facilitates the learning of a new competence through the application of existing knowledge in the organisation.

Dits & Berkhout (1999) summarized how knowledge is transferred into knowledge applications: 1) many technologies integrated into one product; 2) many Scientifics knowledge integrated as input into one technology; 3) one technology to many scientific research disciplines; and 4) one innovative product that facilitates the development of technologies.

Thus, we propose that:

Hypothesis 3: Knowledge transfer will be positively related to knowledge use.

The influence of knowledge use on business innovation.

Knowledge use is a critical factor to innovate and achieve competitive success (Andreeva & Kianto, 2011). As Goh (2005) remarked the critical importance of knowledge and the associated management actions

lies in the use of knowledge as core component for innovation. This author pointed to improve continuously innovation the firm needs use knowledge efficiently.

To Zhou & Uhlaner (2009, p.6) "innovation represents the utilization of knowledge in order to create something which has new economic value".

Bennett & Gabriel (1999) found that firms with extensive knowledge use were more innovative and readier to cope with change. These authors pointed to the application of knowledge is easier when it is transferred to specific duties.

Dits & Berkhout (1999) have shown knowledge use is integrated into different stages of the innovation.

Lin & Lee (2005) have shown knowledge use is the facilitator of successful technological innovation.

Thus, we propose that:

Hypothesis 4: Knowledge use will be positively related to business innovation.

The influence of business innovation on organizational performance.

Chang & Ahn (2005) found utilization of knowledge within the firm positively affected performance. Thus knowledge use rushes the "spiral of innovation" and guarantees better business performance.

Darroch (2005) has provided empirical evidence that the effectively manage of knowledge makes firms be more innovative and with better perform.

A positive relationship between innovation and performance is fairly well established in the extant literature (e.g. Bennett & Gabriel, 1999; Carneiro, 2000; Darroch & MacNaughton, 2002; Lin & Lee, 2005; Zhou & Uhlaner, 2009; Chilton & Bloodgood, 2010).

Firm innovation capability is the most important determinant of product performance (Cavusgil, 2003).

Thus, we propose that:

Hypothesis 5: Business innovation will be positively related to organizational performance.

Methodology of the research

Sample and Procedure.

Choosing a sample of firms located in a relatively homogeneous geographical, cultural, legal and political space enables us to minimize the impact of the variables that cannot be controlled in the empirical research (Adler, 1983). Likewise, a series of chi-square and t-tests revealed no significant differences due to geographical location or size in the variables studied. Since all measures were collected with the same survey instrument, the possibility of common method bias was tested using Harman's one-factor test (see Konrad & Linnehan, 1995). A principal components factor analysis of the questionnaire measurement items yielded various factors with Eigen values greater than 1.0. Since several factors, not just one single factor, were identified and since the first factor did not account for the majority of the variance, a substantial amount of common method variance does not appear to be present (Podsakoff & Organ, 1986). Table 1 summarize technical details of this research.

Table 1. Technical details of the research

Sectors	High-tech services and high-tech manufacturing
Geographical location	Spain
Methodology	Structured questionnaire
Procedure	Stratified sample with proportional allocation (size)
Universe of population	50,000 firms
Sample (response) size	900 (201) firms
Sample error	3.3%
Confidence level	95 %, *p*-*q*=0.50; *Z*=1.96
Period of collecting data	From April 2009 to May 2009

Measures.

Knowledge Acquisition. Based on work presented by Darrow (2003) and Yli-Renko et al., (2001) we developed a Likert-type 7-point scale (1 "totally disagree", 7 "totally agree") of eight items. We developed a confirmatory factor analysis to validate our scales. This required deletion of Items 1, 2, 5 and 6 (χ^2_2=2.49, NFI=.96, NNFI=.98, GFI=.99, CFI=.99, IFI=.99). The scale was one-dimensional. The procedure allowed us to choose four items (see Appendix) with high validity and reliability (α=.755).

Knowledge Transfer. Due to the fact that there is a closer link with our research and that the scale's validity was verified in detail, we used a Likert-type 7-point scale (1 "never", 7 "to a great extent") with

three items from the scale developed by Darroch (2003) and Cummings (2001). These items have been duly adapted to the present study (see Appendix). We developed a confirmatory factor analysis to validate our scales and showed that the scale was one-dimensional and had good validity and reliability (α=.768).

Knowledge Use. Based on work presented by Lee et al. (2005) and Darroch (2003), we developed a Likert-type 7-point scale (1 "totally disagree", 7 "totally agree") of four items (see Appendix). Using a confirmatory factor analysis, we validated our scale (χ^2_2=4.44, NFI=.99, NNFI=.99, GFI=.99, CFI=.99, IFI=.99) and then verified the scale's one-dimensionality and its validity and reliability (α=.878).

Business Innovation. We used six items based on work by Darroch (2003) and Thatcher et al. (2003) to measure business innovation. These items have been duly adapted to the present study. We developed a Likert-type 7-point scale (1 "very few", 7 "a hugh number", see Appendix). We developed a confirmatory factor analysis to validate our scales. This required deletion of Item 4 (χ^2_5=13.25, NFI=.95, NNFI=.95, GFI=.98, CFI=.95, IFI=.95). The scale was one-dimensional and had adequate validity and reliability (α=.799).

Organizational Performance. Having reviewed how performance is measured in different works of strategic research, we drew up a Likert-type 7-point scale (1 "totally disagree", 7 "totally agree") that included four items to measure organisational performance (see Appendix). We developed a confirmatory factor analysis to validate our scales (χ^2_2=3.94, NFI=.99, NNFI=.99, GFI=.99, CFI=.99, IFI=.99) and showed that the scale was one-dimensional and had high validity and reliability (α=.898). We used a Likert-type 7-point scale (1 "Much worse than my competitors," 7 "Much better than my competitors") to ask about the organization's performance as compared with that of its most direct competitors.

Model and analysis.

The LISREL 8.80 program was used to test the theoretical model. Figure 1 shows the basis of the model proposed, together with the hypotheses to be contrasted.

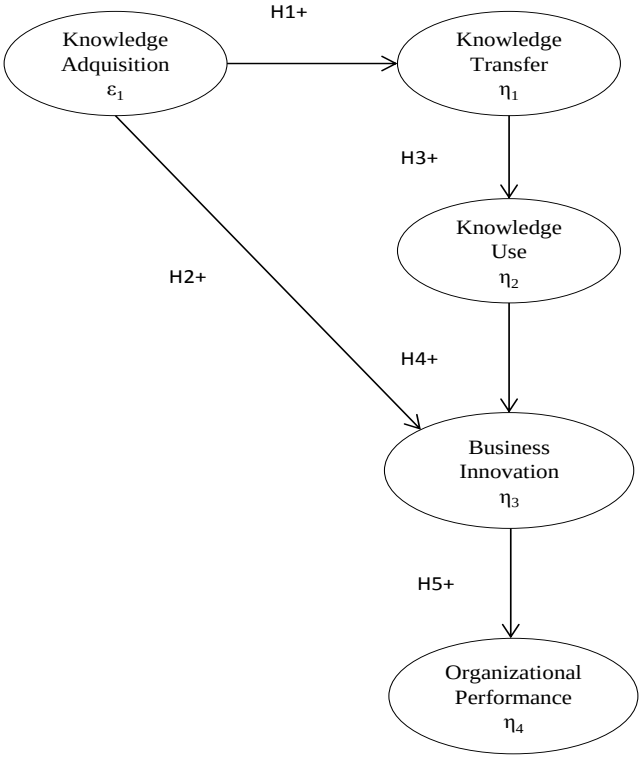

Figure 1. Hypothesized model

We used a recursive non-saturated model, taking knowledge acquisition (ξ1) as the exogenous latent variable, knowledge transfer (η1) as the first-grade endogenous latent variable, and knowledge use (η2), business innovation (η3), and organizational performance (η4) as the second-grade endogenous latent variables. Through flexible interplay between theory and data, this structural equation model approach bridges theoretical and empirical knowledge for a better understanding of the real world. Such analysis allows for modelling based on both latent and manifest variables, a property well suited to the hypothesized model, where most of the represented constructs are abstractions of unobservable phenomena.

Results of the research

This section presents the main results of our research. Table 2 reports the means and standard deviations for all of the measures, as well as the inter-factor correlations matrix for the study variables. Consistent with the two-step approach advocated by Anderson & Gerbing (1988), we estimated a measurement model before examining structural model relationships. We used Lisrel 8.8 to estimate the model.

Table 2. Means, standard deviations and correlations

Variables	Mean	S.D.	1	2	3	4	5
1.- Knowledge acquisition	5.754	0.929	1.000				
2.- Knowledge transfer	4.881	1.258	0.464***	1.000			
3.- Knowledge use	4.669	1.338	0.425***	0.670***	1.000		
4.- Business Innovation	3.812	1.346	0.362***	0.368***	0.380***	1.000	
5.- Organizational Performance	4.694	1.118	0.202**	0.267***	0.275***	0.363***	1.000

Notes: † p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001 (two-tailed).

From Table 3, we can see that all indexes show very good fit with the model.

Table 3. Measurement model results

Variables	Items	λ*	R^2	C.R.	AVE	Goodness of Fit Statistics
Knowledge Acquisition	ACQUI3	0.81***(22.39)	0.66	0.851	0.590	χ^2_{160}=211.16 (*P*>0.01) GFI=0.98 AGFI=0.97 CN=194.72 NFI=0.96 NNFI=0.99 IFI=0.99 NCP=51.16 RFI=0.95 CFI=0.99 RMSEA=0.04
	ACQUI4	0.69***(16.11)	0.50			
	ACQUI7	0.78***(20.51)	0.61			
	ACQUI8	0.78***(20.29)	0.60			
Knowledge Transfer	TRANSF1	0.84***(25.83)	0.70	0.876	0.702	
	TRANSF2	0.82***(25.11)	0.68			
	TRANSF3	0.85***(27.28)	0.73			
Knowledge Use	UTILIZ1	0.83***(28.45)	0.69	0.938	0.794	
	UTILIZ2	0.97***(76.00)	0.94			
	UTILIZ3	0.94***(58.95)	0.89			
	UTILIZ4	0.81***(26.60)	0.66			
Organizational Innovation	INNOV1	0.75***(19.45)	0.56	0.896	0.635	
	INNOV2	0.71***(17.74)	0.50			
	INNOV3	0.84***(28.82)	0.71			
	INNOV5	0.88***(32.31)	0.78			
	INNOV6	0.79***(22.78)	0.63			
Organizational Performance	PERF1	0.90***(43.18)	0.80	0.933	0.733	
	PERF2	0.92***(50.69)	0.84			
	PERF3	0.89***(41.93)	0.80			
	PERF4	0.82***(28.06)	0.67			

Notes: λ* = Standardized Structural Coefficient (t-students are shown in parentheses); R^2=Reliability; C.R.=Composite Reliability; AVE=Average Variance Extracted; *** p < 0.001 (two-tailed).

The constructs display satisfactory levels of reliability, indicated by composite reliabilities ranging from 0.85 to 0.93 and average variance extracted coefficients from 0.59 to 0.79. Convergent validity can be judged by examining the significance of the factor loadings and the average extracted variance (>0.50). All multi-item constructs met this criterion, with loading (λ) significantly related to its underlying factor (t-values>16.11) in support of convergent validity. Discriminant validity was established between each pair of latent variables by constraining the estimated correlation parameter between them to 1.0 and performing a chi-square difference test on the values obtained for the constrained and unconstrained models. The resulting significant differences in chi-square indicate that the constructs are not perfectly correlated and that discriminate validity is achieved among all constructs. We also confirm that the confidence interval for the correlation between each pair of critical dimensions does not produce a value of 1, which shows discriminant validity (Anderson and Gerbing, 1988)

Table 4 presents the results for the structural model in Figure 2. Structural equation modelling was performed to estimate direct and indirect effects using Lisrel with the correlation matrix and asymptotic covariance matrix as input. The overall fit of the structural model was good, and the completely standardized

path estimates indicate significant relationships among the constructs. If we examine the standardized parameter estimates, we see that knowledge acquisition affects knowledge transfer (γ_{11}=.75, p<.001) supported Hypothesis 1. Knowledge transfer is explained well by the model (R^2=.56). Further, knowledge acquisition directly affect knowledge use (γ_{21}=.20, p<.05) and indirect (.56, p<.001) due to knowledge transfer (.75x.75; see Bollen [1989] for calculation rules). The global influence of knowledge acquisition on knowledge use is thus .76 (p<.001) supported Hypothesis 2. Knowledge transfer affects knowledge use (β21=.75, p<.001) supporting Hypothesis 3. Globally, knowledge use is explained well by the model (R^2=.83).

Knowledge use affects business innovation (β_{32}=.70, p<.001) and organizational performance (β_{43}=.33, p<.001). Exist also an indirect effect of knowledge use on organizational performance (.21, p<.001) by business innovation (.70x.29). The global influence of knowledge use on organizational performance is thus .54 (p<.001). Hypotheses 4 and 5 are supported. Globally, business innovation is explained well by the model (R^2=.49). Finally, business innovation affects organizational performance (β_{43}=.29, p<.01) supported Hypothesis 5. Globally, organizational performance is explained well by the model (R^2=.32). Table 4 shows other indirect relationships.

Table 4. Structural model results (Direct, Indirect and Total effects)

Effect from		To	**Direct Effects**	***t***	**Indirect Effects**	***t***	**Total Effects**	***t***	***Hypothesis acceptance***
Knowledge Acquisition	→	Knowledge Transfer	0.75***	12.00			0.75***	12.00	**H1 accepted**
Knowledge Acquisition	→	Knowledge Use	0.20*	2.13	0.56***	6.82	0.76***	12.68	**H2 accepted**
Knowledge Acquisition	→	Business Innovation			0.49***	9.34	0.49***	9.34	
Knowledge Acquisition	→	Organizational Performance			0.44***	8.09	0.44***	8.09	
Knowledge Transfer	→	Knowledge Use	0.75***	7.97			0.75***	7.97	**H3 accepted**
Knowledge Transfer	→	Business Innovation			0.46***	7.05	0.46***	7.05	
Knowledge Transfer	→	Organizational Performance			0.42***	6.37	0.42***	6.37	
Knowledge Use	→	Business Innovation	0.70***	11.74			0.70***	11.74	**H4 accepted**
Knowledge Use	→	Organizational Performance	0.33***	3.30	0.21***	2.90	0.54***	9.49	
Business Innovation	→	Organizational Performance	0.29**	2.91			0.29**	2.91	**H5 accepted**
Goodness of Fit Statistics	χ^2_{164}=222.50 (P>0.01) GFI=0.98 AGFI=0.97 ECVI=1.57 AIC=314.50 CAIC=512.45 CN=188.91 NFI=0.96 NNFI=0.99 IFI=0.99 PGFI=0.76 PNFI=0.83 NCP=58.50 RFI=0.95 CFI=0.99 RMSEA=0.04								

Notes: Standardized Structural Coefficients ; $^{\dagger}p$ < .10, * p < .05, ** p < .01, *** p < .001.

In testing the theoretical framework, we fit several nested models, each incorporating different assumptions about parameters. Comparison to reasonable alternative models is recommended to show that a hypothesized model is the best representation of the data (Bollen, 1989). The statistical summary in Table 5 indicates that Model 1 is preferable to the others, supporting the inclusion of a model with these relationships among the constructs analysed.

Table 5. Model statistics against theoretical model

Model	Description	χ^2	$\Delta\chi^2$	RMSEA	NFI	NNFI	CFI	ECVI	AIC	NCP	CAIC
1	Theoretical	222.50		0.042	0.96	0.99	0.99	1.57	314.50	58.50	314.50
2	Without know. acquisition to know. use	225.98	3.48	0.043	0.96	0.99	0.99	1.58	315.98	60.98	509.63
3	Without know. transfer to know. use	248.11	25.61	0.050	0.95	0.98	0.98	1.69	338.11	83.11	531.76
4	Without know. use to org. innovation	224.19	1.69	0.043	0.96	0.99	0.99	1.58	316.19	60.19	514.14
5	Without know. use to org. performance	232.03	9.53	0.045	0.95	0.98	0.99	1.61	322.03	67.03	515.68
6	Without org. innovation to org. performance	229.70	7.2	0.044	0.95	0.98	0.99	1.60	319.70	64.70	319.70

Notes: n = 201.

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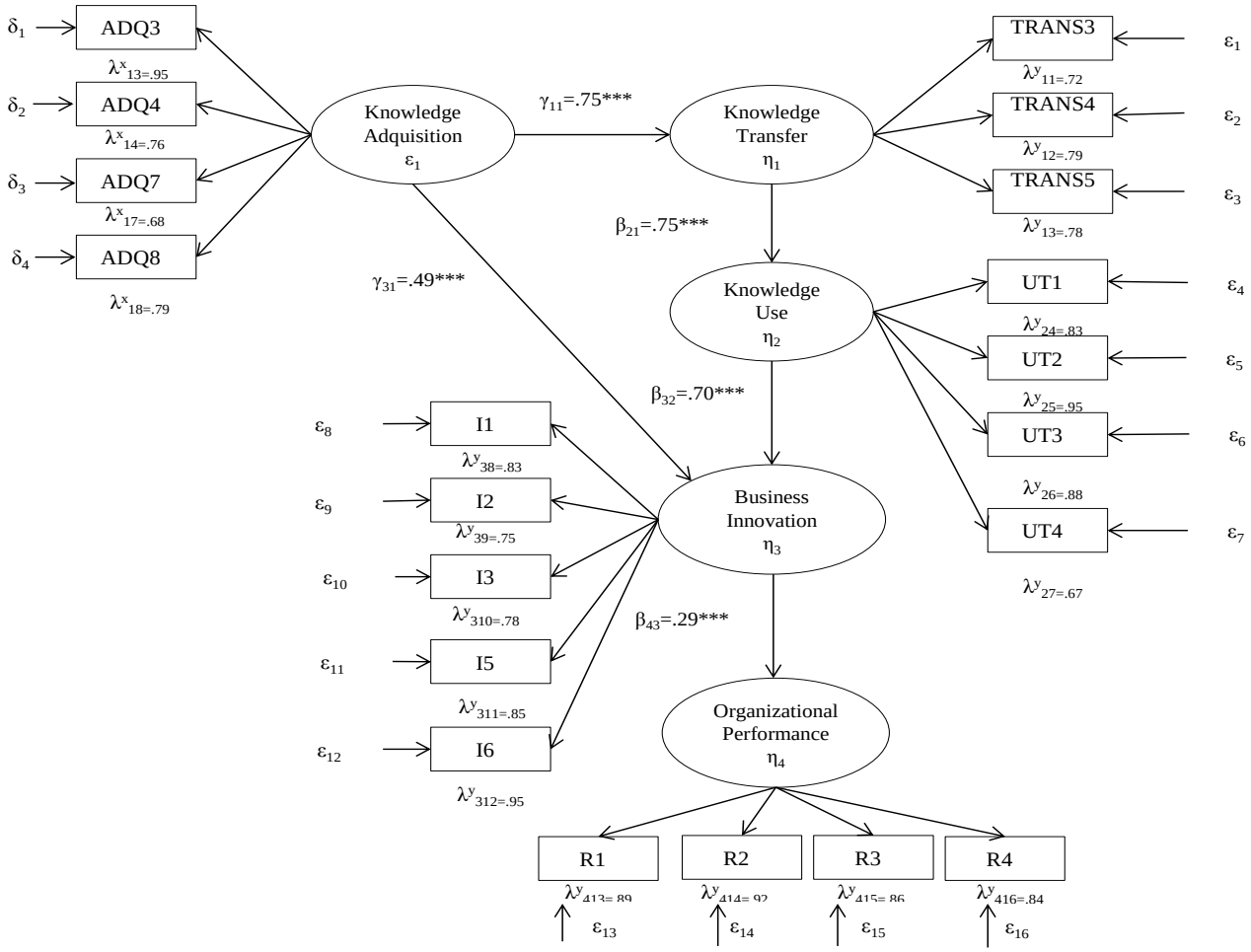

Figure. 2. Results of structural equation model

The proposed theoretical model (see Figure 2) is the most acceptable and parsimonious model. If, for example, we compare Model 1 (theoretical model) to Model 3, we see that the latter has a worse RMSEA (∇=.008), NFI (∇=.01), NNFI (∇=.01), CFI (∇=.01), ECVI (Δ=.12), AIC (Δ=23.61), NCP (Δ=24.61) and CAIC (Δ=217.26), demonstrating that Model 1 is preferred to Model 3 ($\Delta\chi 2$=25.61) and that most of these new, direct relations are not significant.

Conclusions and future research

Knowledge management components are important for innovation and it improve organizational performance (Bennett & Gabriel, 1999; Carneiro, 2000; Darroch & MacNaughton, 2002; Cavusgil, 2003; Chang & Ahn, 2005; Lin & Lee, 2005; Zhou & Uhlaner, 2009; Chilton & Bloodgood, 2010). Given the higher level of competition and complexity of environment, to favor acquisition, transfer and utilization of knowledge should be a key objective for companies, since these knowledge management components contribute business innovation and achieve better organizational performance. Thus, there are valuable managerial implications derived from these results:

Firstly, results show that knowledge acquisition positively affects knowledge transfer and business innovation. Knowledge acquisition enables the firm exploit new opportunities, moreover when this knowledge is transferred throughout the firm (Yli-Renko et al., 2001; Lichtenthaler, 2007; Plessis, 2007; Chilton & Bloodgood; 2010) and it also contributes positively to innovation. Thus firm should favor knowledge acquisition and its dissemination. In this sense, Chilton & Bloodgood (2010) recommend motivating employees through appropriate rewards according the tasks, and also managers should be part of work teams to evaluate the complexity of knowledge when assigning the team particular duties or when changing the makeup of the team by introducing new members or removing members. Also it is important to use technology, for instance Goh (2005) analyzes case of acquisition and dissemination of knowledge by Siemens which use internet and intranet networks to combine employees' abilities with technical expertise of all areas of organization to acquire

and disseminates its patent portfolio. In this sense, from analysis of Freeman (1991) of the critical success factors of 40 innovations, the external sources of technical expertise combined with in-house basic research to facilitate the external linkages were crucial in explaining successful innovation.

Similarly, to share best practices within organization enables significant savings in capital investments, such as in semiconductor fabrication plants (Darroch, 2002).

In addition, collaboration between organizations plays a significant role in acquisition and sharing of knowledge, which in turn positively impacts innovation capability (Cavusgil et al., 2003). According these authors it is especially important in developing fields such as biotechnology, where knowledge is very complex. Here to codify and to combine knowledge with complimentary resources such as cross-functional teams or learning-by-doing capabilities could lead to new product and process innovations. For instance, alliances to get knowledge from other departments and partners and projects with employees of different areas of the firm, working in partnership with suppliers or international customers could reduce innovation costs and risks (Darroch, 2002).

Secondly, our findings show that knowledge transfer positively affects knowledge use. Managers could promote training of their employees in knowledge management systems to make easier the application of this knowledge on the firm, and making concepts and methods more valuable and understandable to members of organization and facilitate their dissemination (Bennett & Gabriel, 1999). Again best practices can be used by different firm´s sub-units (Cohen & Levintahl, 1990).

Thirdly, we also demonstrate that knowledge use is strongly related to business innovation. Managers should encourage employees to use knowledge rapidly and effectively because this knowledge represents a valuable asset to innovate (Lin & Lee, 2005).

Fourthly, we confirm that business innovation positively affects organizational performance. It is complex process that stimulates organizational performance (Carneiro, 2000; Dilks et al., 2008).

In short, the results of the research provide empirical evidence to support theoretical arguments about how knowledge management components enhance the effects business innovation on organizational performance. These results reinforce knowledge management and business innovations are fundamental assets that increase the value of the company (Bennett & Gabriel, 1999; Carneiro, 2000; Darroch & MacNaughton, 2002; Lin and Lee, 2005; Chilton & Bloodgood, 2010). Our results show that knowledge management component generate superior innovation that allows the firm to improve its organizational performance.

Limitations.

This research has several limitations that suggest further possibilities for empirical research. First, survey data based on self-reports may be subject to social desirability bias (Podsakoff & Organ, 1986). However, assurance of anonymity can reduce such bias even when responses relate to sensitive topics (Konrad & Linnehan, 1995).

Second, since all measures were collected in the same survey instrument, we employed several techniques to examine the potential for common method variance. Initially, we used Harman's one-factor test. The results indicated the presence of four factors (eigenvalues>1) that explained 63 percent of the variance, while the first factor accounted for 33.17 percent of the variance. Since multiple factors emerged and the first factor did not account for the majority of the variance, a substantial amount of common method variance does not appear to be present (Podsakoff & Organ 1986; Konrad & Linnehan, 1995).

Third, our model analyses the influence of knowledge acquisition, knowledge transfer and knowledge use on organizational performance through business innovation. Other factors merit study, such as distribution of information, knowledge styles, etc.

Fourth, the cross-sectional nature of the research into a series of dynamic concepts allows us to analyse only a specific situation in time of the organizations studied, not their overall conduct over time. We should consider the lag between the actions on the independent variables and organizational performance. Future research should focus on longitudinal study.

Future research.

Fifth and lastly, future studies should be based on larger samples, preferably in more than one country. It would also be interesting to study similar characteristics with data provided by lower levels of management and employees in the firm.

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