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Technological capacity and knowledge acquisition as key performance factors in SMEs of the industrial sector of Cali-Colombia

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La capacidad tecnológica y la adquisición del conocimiento como factores claves de desempeño en las Pymes del sector industrial de Cali-Colombia

Omar Javier Solano Rodríguez*
Docente, Facultad Ciencias de la Administración, Universidad del Valle, Cali, Colombia.
e-mail: omar.solano@correounivalle.edu.co

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Abstract

Information technologies (IT) can be largely the solution or the problem of the sustainability and performance of small and medium enterprises (SMEs). IT is an important source of resources that can improve the competitiveness of SMEs. Therefore, the aim of this article is to identify the IT competences of SMEs and to establish their relationship with knowledge acquisition (KA), the way of managing the accounting information system (AIS) and its impact on the performance of the company. The model uses the technique of structural equations based on variance, making an empirical study based on the information of 124 Colombian SMEs in the industrial sector. The results obtained allow us to conclude that IT directly and through KA processes significantly help to increase organizational performance. It is confirmed that IT is decisive for an efficient management of AIS information, although this does not contribute to the performance of the company, given that in the relations between the SIC management variable and performance (DSEMP) a negative coefficient was identified between the constructs and with no statistical significance. This research contributes to the development of resource and capacity theories and dynamic capacity. It also allows the identification of technological capabilities of the SME, its processes in KA and how to measure the efficiency of AIS, management and organizational performance.

Keyword: Capacity in information technologies, Acquisition of knowledge, Organizational performance, Accounting information system, SMEs.

Resumen

Las tecnologías de la información (TI) pueden ser en gran parte la solución o el problema de la sostenibilidad y desempeño de la pequeña y mediana empresa (Pyme). La TI es una fuente importante de recursos que pueden mejo-

* Contador Público, Universidad del Valle, Doctorado en Administración y Dirección de Empresas, Universidad Politécnica de Cartagena, España. Integrante, Grupo de Investigación Gestión y Evaluación de Programas y Proyectos - GYEPRO.

rar la competitividad de la Pyme, por consiguiente, el objetivo de este artículo es identificar las competencias de las TI que tienen las Pymes y establecer su relación con la adquisición del conocimiento (AC), la manera de administrar el sistema de información contable (SIC) y su impacto en el desempeño de la empresa. En el modelo se usa la técnica de ecuaciones estructurales basada en la varianza, realizando un estudio empírico a partir de la información de 124 Pymes colombianas del sector industrial ubicadas en Cali (Valle del Cauca). Los resultados obtenidos permiten concluir que las TI de manera directa y a través de los procesos de AC ayudan significativamente a elevar el desempeño organizacional. Se confirma que las TI son determinantes para una eficiente administración de la información del SIC, aunque este no aporta al desempeño de la empresa, dado que en la relación entre las variables de la administración del SIC y el desempeño (DSEMP) se identificó un coeficiente negativo entre los constructos y con ninguna significancia estadística. Esta investigación contribuye al desarrollo de las teorías de recursos y capacidades y a la capacidad dinámica. También permite identificar capacidades tecnológicas de la Pyme, sus procesos en la AC y la forma de medir la eficiencia del SIC, la gestión y el desempeño organizacional.

Palabras clave: Capacidad en tecnologías de la información, Adquisición del conocimiento, Desempeño organizacional, Sistema de información contable, Pyme.

Résumé

Les technologies de l'information (TI) peuvent être en grande partie la solution ou le problème de la durabilité et de la performance des petites et moyennes entreprises (PME). Le TI est une source importante de ressources qui peuvent améliorer la compétitivité des PME, par conséquent, l'objectif de cet article est d'identifier les compétences de l'informatique des TI qui ont les PME et établir leur lien avec l'acquisition de connaissances (AC), la manière de gérer le système d'information comptable (SI) et son impact sur la performance de l'entreprise. Dans le modèle de la technique d'équation structurelle basée sur la variance est utilisé, faisant une étude empirique à partir de 124 PME colombiennes du secteur industriel du Cali (Valle). Les résultats obtenus nous permettent de conclure que l'informatique, directement et à travers les processus AC, contribue significativement à l'amélioration de la performance organisationnelle. Il est confirmé qu'il est essentiel pour la gestion efficace de l'information SI, bien que cela ne contribue pas à la performance de l'entreprise, puisque la relation entre l'administration des variables SI et de la performance, un coefficient négatif est identifié parmi les constructions avec aucune signification statistique. Cette recherche contribue au développement des théories des ressources et des capacités et de la capacité dynamique. Elle permet aussi d'identifier également les capacités technologiques des PME, dans les processus AC et la façon de mesurer l'efficacité du SI, la gestion et la performance organisationnelle.

Mots-clés: Capacité dans les technologies de l'information, Acquisition de connaissances, Performance organisationnelle, Système d'information comptable, PME

1. Introduction

In the present work the role of the IT capacity is examined through the influence of the relations of two variables, KA and AIS information management, as a possibility to optimize performance at SMEs in the industrial sector of Cali-Colombia. For the analysis of the variables, the classification of Nonaka and Takeuchi (1995) and Teece (2007) is considered, as well as Cohen and Levinthal's (1989, 1990) theoretical postulates who have been studying knowledge management and incorporating new factors that affect a company's performance (Vaccaro, Parente, and Veloso, 2010).

IT as a factor has been impacting the way knowledge is acquired, thereby optimizing the performance and competence of companies (Kohli and Devaraj, 2003, Teece, 2007, Sabherwal and Jeyaraj, 2015). The incorporation of IT into new knowledge-generating practices has improved the competitive development of companies (Pillania, 2008). Knowledge can be a source of competitive advantage, and the organizations that take advantage of it see a positive effect on the company's performance (Peeters and Van Looy, 2017, Eisenhardt and Santos, 2002, Tanriverdi and Venkatraman, 2005).

The current business environment upon being dynamic and turbulent requires more efficient business capabilities (Pavlou and El Sawy, 2006) that articulate the technology and its accounting information system (AIS) in order to have timely and reliable information (Prasad and Green, 2015). In order to obtain such information, AIS processes must be standardized, whereby IT must be managed from its usage and infrastructure (Wang, 2010), in order to contribute to decision-making, as well as foster an IT culture that allows adequate conditions for information systems to achieve their objectives.

Therefore, this research proposes a study that: a) inquires about technological competence (i.e., the SMEs' domain in taking advantage of an IT-specific capabilities area)

and its integration with knowledge acquisition, in addition to establishing its impact on organizational performance; and b) determines the effect of IT capacity, its synergy with AIS information management and the results of the company. Thus, it contributes to the development of organizational theory, the information system (IS) and performance in the organization (López-Nicolas and Meroño-Cerdán, 2011).

This research is consistent with the resource-based theory (Barney, 1991) and its extension on the dynamic capacities thesis (Teece, 2007, Teece, Pisano and Shuen, 1997), theoretically and empirically explaining the role of the relationship between IT capacity and knowledge acquisition as a key mechanism wherefore IT competences influence the performance of Colombian SMEs. The study of IT capabilities helps to establish the impact thereof on the competitiveness and performance of the company (Swierczek and Shrestha, 2003). Nonetheless, other research on SMEs who adopt new technologies question that type of results in the business world (Fuller and Collier, 2003). In the industrial sector, KA has a significant link with IT due to its contribution to the modernization of business processes and performance (Noruzy, Dalfard, Azhdari, Nazari-Shirkouhi and Rezazadeh, 2013). Therefore, the objective of this document is to analyze the relationships between IT capacity, KA and its impact on the performance of industrial SMEs. Also, to establish the link between the management of AIS information and organizational performance.

The hypotheses are based on the following research questions: is there a relationship of causation between IT capacities and knowledge acquisition? Is the performance of SMEs positively associated with IT capacity, knowledge acquisition and AIS information management? This study examines these issues in the context of SMEs that operate in the industrial sector of Cali (Colombia).

To answer the research questions, an empirical study was carried out by collecting data through a survey applied on 124 executives at the companies selected in the sample. A set of hypotheses is examined using *partial least squares* (PLS) structural equations, allowing to statistically infer contrasts between IT capacity (management and technological infrastructure), knowledge acquisition (internal and external), and AIS management and organizational performance variables.

The structure of the article is divided into four parts: the first comprises the theoretical framework with a review of the literature and hypothesis approach; the second corresponds to the description of the methodology; the third one analyzes the results, and the last one contains the discussion and the main conclusions obtained, describing the limitations and future research lines.

2. Theory and hypothesis

1.1. IT capacity in organizations

The companies adopt, design and put into operation new technologies to support knowledge management activities (Alavi and Leidner, 2001), which that must be supported by the competencies of the employees and by an organizational, operational and technological plan (Hansen and Haas, 2001). Practices that provide the company with a competitive advantage (Teece, 2007). Likewise, IS based on technologies such as: Internet, intranet, databases and program applications are tools that boost knowledge management (Lee, Lee and Kang, 2005, López-Nicolas and Meroño-Cerdán, 2009; Markus, 2001). Technological knowledge-generating tools that brings new capabilities to the organization (Akgün, Byrne, Lynn and Keskin, 2007).

The interaction between IT and KA optimizes the company's performance (Frankort, 2016, Sampson, 2007) and helps to increase sales, develop new innovative products and be more competitive (Kale and Karaman, 2012; Søilen and Tontini, 2013). In addition, the internal and external sources that manage knowledge allow and individual's ideas, thoughts and creations of to be transformed into new knowledge (Oh, Yang and Kim, 2014; Simatupang and White, 1998).

When a strong link exists between research and engineering development (R & D), knowledge acquisition increases the performance of the company (Frankort, 2016). Knowledge demands the strengthening of techniques and technological instruments in

order to achieve greater competence and IT capacity (Gaines, 2013). Technological competences that should be used to manage AIS resources (Tippins and Sohi, 2003), directing their processes to the design and implementation of controls (Kloviene and Gimzauskiene, 2014). On the other hand, the AIS has a fundamental role in the collection, processing and storage of financial data (Cannon and Growe, 2004). The new business environment demands important changes from the accounting area regarding its organizational structure, the manner in which resources are managed and the setting-up of strategic and tactical objectives (Kloviene and Gimzauskiene, 2014). For the above, the following hypotheses are proposed:

H1: in SMEs, IT capacity is positively associated with the acquisition of knowledge, thus generating value to the company.

H2: in SMEs, IT capacity is positively associated with AIS information management.

2.2. IT capacity and its impact on organizational performance

For Bharadwaj (2000), empirical studies examine the relationship between IT capacity and organizational performance, and analyze IT behavior, the competence of the staff and their influence on the acquisition of knowledge (Hagedoorn and Duysters, 2002). Aspects that capable of improving SMEs' management and performance, as long as harmony exists between R & D and the methods that enable it to acquire both internal and external knowledge (Arora, 2002). Knowledge that must fulfill an important function for the management of the company and the strengthening of organizational performance, especially when knowledge and value-creating dynamics is what companies look for when involving academic experience in their technological efforts (Peeters and Van Looy, 2017). The ability to manage knowledge acquisition and dissemination is a transcendental factor for the performance of the company (Nielsen, Rasmussen, Hsiao, Chen and Chang, 2011).

Other studies conclude that the firms that develop and effectively apply knowledge acquisition attain positive operational results and organizational performance (Darroch, 2005, Nunes, Annansingh, Eaglestone and Wakefield, 2006). In general, the acquisition of knowledge helps the organization to generate strategies to face the critical issues impeding its good performance (Chen and Lin, 2004), and knowledge influences so that a company obtains superior performance to that of organizations from its sector (Darroch, 2005; Mills and Smith, 2011). Therefore, acquiring knowledge becomes a significant organizational capability whereby different areas of the company are impacted to obtain business results.

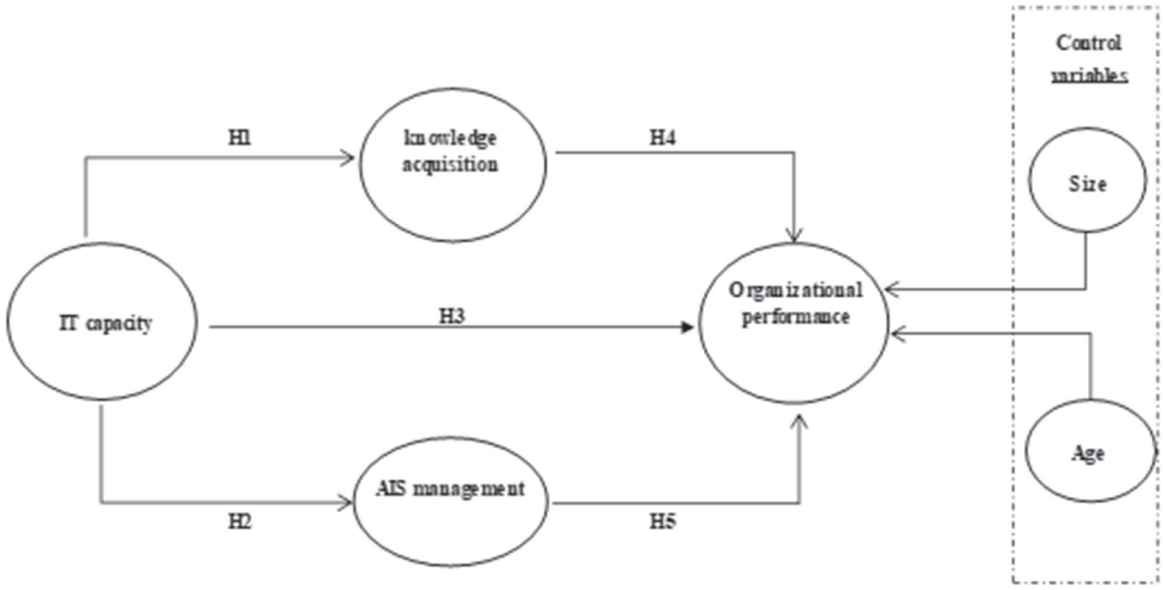
IT capacity generates a valuable differentiation in product design and service provision, creating greater economic benefits for the company (Hitt and Brynjolfsson, 1996), and, by using web technology, IT capacity can originate new sources of information and greater knowledge to the company. Thusly, a firm is capable of improving its business performance, increase revenues, reduce costs and become more competitive (Porter, 2008).

A case study conducted in a Lithuanian organization that reveals the relationships between the business environment and an organization's accounting system, and the developments of information technology established that through technological capacity administrators improved the information of the AIS, making timely corrections to accounting and improving the presentation of accounting reports (Kloviene and Gimzauskiene, 2014). In this way, an objective and timely information provided by the AIS guarantees the operational efficiency of the organization (Christauskas and Miseviciene, 2012). The AIS along with technological tools aids in the assessment of processes, and the monitoring of key business functions and processes (Prasad and Green, 2015). It is important to keep in mind that the main function of the AIS is the processing of transactions, the presentation of accounting information for decision-making and the management of the control environment (Nicolaou, 2000, Romney, Steinbart, Zhang and Xu, 2006). Therefore, the following research hypotheses are posed as follows:

H3: In SMEs of the industrial sector, IT capacities are positively associated with performance.

H4: in SMEs of the industrial sector the acquisition of knowledge is positively asso-

Figure 1. Theoretical model proposed



Source: Author own elaboration

ciated with the performance of the company.

H5: in SMEs of the industrial sector the AIS information management SIC is positively associated with the performance of the company.

The variables described appear in Figure 1, in order to show the conceptual model on which the research is based.

3. Research methodology

3.1. Sample and data collection

The population of companies is constituted by SMEs from the industrial sector (Cali -Colombia), and it was obtained from the information of the Chamber of Commerce of Cali, (2015). As a result of the application of stratified random sampling, the survey was applied on 124 heads and managers of companies. The technique to collect information was a personal survey by using a self-administered questionnaire. These respondents were chosen on account of their greater knowledge about the company (Gable, Sedera and Chand, 2003). The Table 1 presents the description of the main characteristics of the sample.

Table 1. Structure of the instrument and component description

Characteristic	Description
Population	Small and medium- size businesses
Geographic area	Cali (Colombia)
Economic sector	Industrial
Data collecting method	Personal interview (managers and heads)
Sampling method	Stratified random sampling
Sample size	124 SMEs
Sample error	± 9.55% error, 95% reliability level (p = q = 0.5)
Field work	July to September 2015

Source: Author own elaboration.

3.2. Measurements and data analysis

The applied scales of measurement have been widely tested in previous investigations. The survey items were measured with a 5-point Likert-type scale, where 1 is unimportant and 5 is very important. In order to ensure that the survey was correctly understood by the respondents, it was previously re-

viewed by academic experts on AIS, IT areas and knowledge management. In addition, to avoid ambiguities, a pilot test and a questionnaire pre-test were carried out with several SMEs, which contributed to a better writing of the questions and to identify the main factors that underlie the set of variables.

For data analysis and to guarantee a rigorous scheme within its statistical application, the use of a structural equation model (SEM) was proposed, since its execution requires the fulfillment of some habitual phases, just like any statistical linear model. Hence, the technical development considered the following stages: specification of the model, identification of the model, estimation of the model, verification and adjustment of the model and, finally, interpretation of the results. To adequately define and analyze the variables of the proposed theoretical model, the nature and direction of the causality between the constructs was taken into account as proposed by Esposito, Chin, Henseler and Wang (2010). This sort of analysis requires setting the statistical technique to be used in order to comprehend and better assess the measurement model and the structural model (Dijkstra and Henseler, 2015, Henseler, Ringle and Sarstedt, 2015, Peng and Lai, 2012), aspects explained in the assessment of the measurement model.

Reflective type variables were handled in the study. The annexed appendix provides detailed information on the text of the indicators included in this research. The measurements used per factor along with their source are developed below:

a) Information technology capacity*: described as* IT capacity, it is understood as the company's IT competence level, with the following measures: resources and IT infrastructure, and user skills in IT techniques and management (Bharadwaj, 2000; Ho-Chang, Chang and Prybutok, 2014). IT capacity refers to the management, usage and IT infrastructure, variables used to measure capacity and its performance within the organization (Kmieciak, Michna and Meczynska, 2012, Tippins and Sohi, 2003, Turulja and Bajgorić, 2016). In the case of technological infrastructure, it refers to networks, data centers and *software* that allow information to be used as a platform on which decisions are made (Gold, Malhotra and Segars, 2001). *Hardware* and *software* resources and computer services can be indicators of impact on the work of the IS user (Karat and Karat, 2003).

b) Acquisition of knowledge**:** understood as the degree to which new knowledge is acquired by the company through technology or operational and manual processes (Frankort, 2016). For their measurements, indicators from different sources, internal and external, are considered, where they are later transformed into new knowledge (Lee, Tsai and Lee, 2011). After a large number of studies, reference data has been used to measure the acquisition of knowledge (Frankort, Hagedoorn and Letterie, 2012, Gomes-Casseres, Hagedoorn and Jaffe, 2006) with the support of the same employees, meetings, and through manuals and procedures. Recently knowledge acquisition has been strongly related to indicators such as: technological platforms and social networks, turning companies into potential agents for the generation of innovations and transformation of information (Heath and Bizer, 2011, Sultan, 2013).

c) *Organizational performance*: in the development of this variable, the main models that contemplate theory and empirical research have been taken as reference. In this work indicators that measure the satisfaction of all the stakeholders of the company are used. Therefore, accounting measurements are not used, since they are based on historical values that do not accurately reflect the reality of the firm (Neely, Adams and Kennerley, 2002). The measurements used are qualitative to assess the performance of the organization. Researchers have proposed variables such as economic performance (Tanriverdi, 2006, Vaccaro *et al*. 2010), perspectives of production processes, market share, and growing data sources and technologies (Taticchi, Cocca and Alberti, 2010). Adapted measurements of the rational system have been utilized, which include questions related to market share, productivity (Price,

[1] In Colombia, the current parameters to classify companies by size (law 905/2004) set the fulfillment of two conditions: for small companies a site staff between eleven and fifty workers and total assets between five hundred and one, and less than five thousand current legal minimum monthly salary (CLMNS); for medium-sized companies a site staff between fifty-one and two hundred workers, and total assets worth between five thousand one and thirty thousand CLMNS.

Stoica and Boncella, 2013) and profitability increase (Cohen and Olsen, 2015, Mills and Smith, 2011).

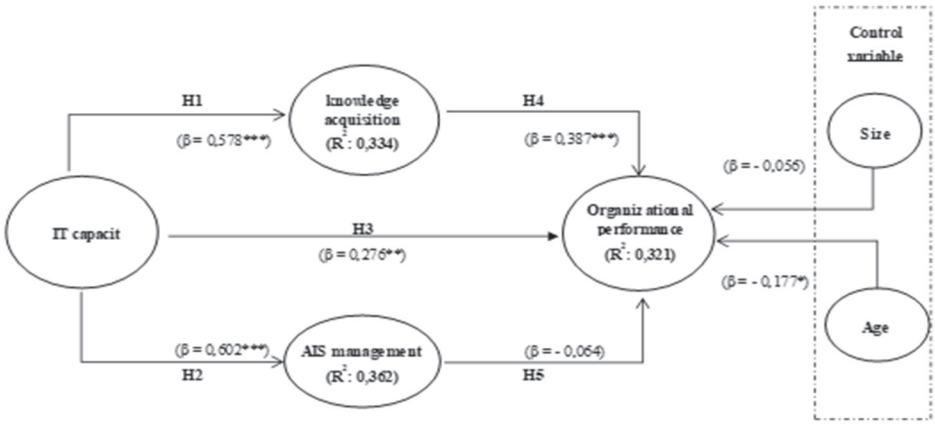
d) *Accounting information system management*: includes the activities linked to the obtaining of accounting information in time, value and proper place to make and appropriate decision. AIS information management is measured with three variables: the performance of transaction processing, the yielding of financial reports and the management of the control environment (Prasad and Green, 2015). From the business standpoint, the AIS is capable of having a turning point between the organization and administration, which based on technology is an integrated system to provide information that supports operations, accounting administration and decision-making functions (Laudon and Laudon, 2007), that is why it is used as indicated for support in IT management. The AIS uses computer equipment, databases, *software* and procedures -analysis models and administrative processes in pro of sound technological management (Almazán, Tovar, and Quintero 2017), aspects adopted as measurement indicators.

e) *Control variables:* the variables analyzed were: a) size: traditional indicators to measure size are the volume of assets and the number of workers. This variable was measured logarithmically through the average number of employees in 2015. The number of employees was used as a size measure in this type of work among others: Anderson and Reeb (2003). The size of an SME is established in the business stratification criteria[1]; and b) age: measured by the number of years elapsed since the establishment or kicking off of activities according to its registration in the Chamber of Commerce. This variable has been used by Holmes and Nicholls (1989) and Chua, Chrisman and Chang (2004). Notwithstanding, secondary data (size and age), once corroborated, were taken as a secondary source to the record that appears in the city's chamber of commerce.

4. Empirical analysis and results

With regards to the analysis of the data, the *structural equation model* (SEM: structural equation model) was employed using the PLS methodology; Called PLS-PM (partial *least squares-path modeling*) and used to address the research model (Chin, Marcolin and Newsted, 2003). To validate the hypotheses raised in this research work and verify the link between the variables, we made use of Smart PLS Professional *software* version 3.2.5. This allows us to examine a series of dependency relationships (Bollen, 2014; Ringle, Wende and Becker, 2015) represented graphically in Figure 2. In general, the objective pursued by PLS modeling is the prediction of dependent variables (both latent and manifest).

Figure 2. Conceptual model with measurements



Source: Author own elaboration

Table 2. Reliability and convergent validity of constructs

Construct	Cronbach's Alpha	Composite reliability	AVE	Factorial loads
			0.579	
IT capacity (ITCAP)	0.879	0.906	0.55390	0.712*** - 0.826***
A. of knowledge (AQCKOW)	0.839	0.881	0.697	0.693*** - 0.800***
AIS management (AISMAN)	0.891	0.920	0.594	0.806*** - 0.878***
Organizational performance (ORGPER)	0.863	0.897		0.699*** - 0.866***

† p < 0,10; * p < 0,05 ** p < 0,01 *** p < 0,001

Source: Author's own elaboration.

This technique uses the partial least squares method, and was designed to reflect the theoretical and empirical conditions of social and behavioral sciences. Technique that translates into an attempt to maximize the explained variance (R^2) of the dependent variables, which leads to the estimations of the parameters being supported in the capacity to minimize the residual variances of the endogenous variables (Carrión and Salgueiro, 2004). The PLS-PM methodology implies following an approach divided into two stages (Barclay, Higgins and Thompson, 1995; Thompson *et al.* 2008): the measurement model and the structural model. Its statistical study works better with small samples than the SEM based on the covariance (Chin, 2010), as is the case of this document whose sample consists of 124 companies.

The used variables' statistical analysis was carried out through the development of the PLS-PM model (Ringle, Wende and Becker, 2014). In addition, variance-based SEM has been widely used in information systems and IT research (Pavlou and El Sawy, 2006; Wang, Chen and Benitez-Amado, 2015), its use has been recommended despite theoretical knowledge on the subject being scarce (Petter, Straub and Rai, 2007). This technique uses the method of partial least squares and was designed to reflect the theoretical and empirical conditions of the social and behavioral sciences (Wold, 1980).

Its usage is quite appropriate in exploratory and confirmatory research (Chin, 2010, Petter *et al*. 2007). To test the five hypotheses raised, it was considered in principle: to analyze the reliability and validity of the measurement scales and study the structural model thereafter. The measurements performed are supported by a confirmatory factor analysis, the reliability of measurement scales by using Cronbach's alpha, the composite reliability index and the average variance extracted (AVE).

4.1. Measuring model assessment

In the study, reflective variables per construct are used, which implies that unobserved construction gives rise to the observed indicators (Pérez and Machado, 2015). The direction of influence goes from the construct to the indicators, and the variables (indicators) observed constitute a reflection or manifestation of the construct. Reliability, convergent validity and discriminant validity are evaluated, following the criteria of Fornell and Larcker (1981) (Hair Jr., Hult, Ringle and Sarstedt, 2013).

In the values of Table 2 the composite reliability varies from 0.881 to 0.920, being above the minimum 0.70 limit (Chin, 2010, Hair Jr., Ringle and Sarstedt, 2011), showing high internal consistency of the block of indicators (Hair Jr. *et al*. 2011). Unlike Cronbach's α coefficient, it takes into account that the indicators defining the construct assume different loads and, therefore, contribute to defining of the construct's reliability at different magnitudes (Henseler, Ringle and Sinkovics, 2009).

The factorial loads of the indicators range from 0,693 *** to 0,878 *** as shown on Table 2. The 0,693 and 0,699 loads of the knowledge acquisition and organizational performance variables are below the allowed limit;

Table 3. Discriminant validity and constructs correlations

	ACQKNOW	PRMANCE	ITCAP	AISMAN
Acquisition of knowledge (ACQKNOW)	**0.744**			
Organizational performance (ORGPER)	0.511	**0.771**		
IT capacity (ITCAP)	0.578	0.457	**0.761**	
AIS management (AISMAN)	0.412	0.259	0.602	**0.835**

Note: the numbers highlighted in the diagonal row are square roots of the AVE.

Source: Author own elaboration.

the measurements are decided to be kept for the following reasons: a) they are significant at the level of 0.001; b) its load is very close to the suggested threshold of 0.71; and c) to preserve content validity, since it is an indicator that refers to the internal strength of the knowledge acquisition construct, and to the way of measuring an SME's rational performance. And, according to Chin (1998) this rule should not be so rigid in the initial stages of scales development, especially when the loads between 0.5 or 0.6 can be accepted if the scales are applied in different contexts (Barclay *et al.* 1995).

Table 2 shows Cronbach's α coefficient, used as a reliability index of the construct (α> 0.7 is considered as the cut-off point). This index can be estimated as an average correlation between variables and indicators of a reflective construct (Sánchez, 2013). The results show α coefficients greater than 0.7, accepted in empirical studies (Chin, 1998, Fornell and Larcker, 1981, Nunnally and Bernstein, 2010). Finally, the results from the reliability and validity assessment of the convergent construct are presented. The AVE is satisfactory for the dimensions analyzed, being able to explain over half of the variance of its indicators on the average (Henseler *et al*. 2009).

The convergent validity of the latent variables was appraised by the AVE examination, as shown in Table 3. According to the criteria of Fornell and Larcker (1981)(Baumgartner and Weijters, 2017) AVE values> 0.5 are accepted. The ranges of AVE values range from 0.553 to 0.697 above the recommended value of 0.5 (Hair, Jr., Black, Babin, Anderson, Tatham and Black *et al*. 2010).

Lastly, discriminant validity is checked through the assessment of the constructs, considering whether the AVE's square root is vertically and horizontally greater than its correlation with other constructions (Gefen, Straub and Boudreau, 2000). This test does not detect any anomaly as displayed in Table 3. In addition, each construct shares more variance with its own block of indicators than with other latent variable represented by a different block of indicators (Henseler *et al*. 2009). In general, the results attained point to the suitability of the measurement scales used, and the reflective constructs show sound measurement properties in terms of reliability, convergent and discriminant validity.

4.2. Structural model assessment

According to the obtained results the hypotheses raised in the research model, as observed in Table 4, their associated coefficients are statistically significant at a significance level of α = 0.05. The ITCAP construct has a positive impact and is statistically significant in explaining the constructs: ACQKNOW (β = 0.578 ***) and AISMAN (β = 0.602 ***), thus supporting hypotheses H1 and H2, which, at the same time, allows SMEs to improve organizational performance. With regard to the ITCAP-ORGPER relationship (β = 0.276 **), it can be observed that the IT capacity allows improving the SME's performance given that the results are statistically significant. IT capacity, when understood as the level of competencies of the company's IT, contributes to the performance of the organization from computer resources and the adequate use of the information. The results confirm hypothesis H3 and coincide with several studies that support the positive relationship between the IT's capacity and the output of

Table 4. Statistical significance of the path β coefficients- Hypothesis test

	β	Mean bootstrap	Standard error	T statistics	P value	f2	Results
ITCAP -> ACQKNOW (H1)	0.578***	0.592	0.062	9.288	0.000	0.501	Accepted
ITCAP -> AISMAN (H2)	0.602***	0.615	0.063	10.836	0.000	0.568	Accepted
ITCAP -> ORGPER (H3)	0.276**	0.272	0.121	2.286	0.022	0.057	Accepted
AQCKNO -> ORPER (H4)	0.387***	0.405	0.103	3.748	0.000	0.144	Accepted
AISMAN -> ORGPER (H5)	− 0.064	−0.068	0.108	0.593	0.553	0.004	Rejected
SIZE -> ORGPER	− 0.056	−0.063	0.075	0.739	0.460	0.004	
AGE -> ORGPER	− 0.117*	−0.115	0.070	1.671	0.095	0.482	
R 2 / Q 2							
IT capacity							
Knowledge acquisition	0.334 / 0.169						
AIS management	0.332 / 0.244						
Organizational performance	0.321 / 0.177						

† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

Source: Author own elaboration.

the company (Bharadwaj, 2000, Ho-Chang *et al*. 2014, Santhanam and Hartono, 2003). The acquisition of knowledge construct (AQCKNOW) has a positive impact and is statistically significant with the ORGPER construct (β = 0.387 ***), indicating that there is an important degree of knowledge acquisition through technology and that it in turn contributes to organizational performance. Consequently, hypothesis H4 is accepted.

Lastly, in the relations (AISMAN) with the latent variable (ORGPER) a negative coefficient between the constructs is observed with no statistical significance (β = - 0.064), hence, hypothesis H5 is rejected. According to the control variables, only the effect of the company's age on the performance of the organization shows a positive and significant influence with a β = 0.177 *, which can be highlighted.

The effect's size was estimated (f^2) (predictive power of the model); for Chin (1998) the values of 0.02, 0.15 and 0.35 indicate a small, medium or large effect. The results reveal a varied effect of the different constructs of the model. The relationships between IT capacity with AIS management and the knowledge acquisition construct bear the highest contribution (0.568 and 0.501) of the structural model; unlike the weight of AISMAN-ORGPER (0.004) and size-ORGPER (0.004), which indicates that these relationships have the least contribution within the structural model.

In a PLS estimate, the values of the trajectory coefficients, their level of importance, R^2 and Q^2 values are individual measures of explanatory power and predictive relevance of the structural model (Chin, 2010). For Chin (2010) R^2 having values higher than (0.2) signals good explanatory capacity of the model's independent variables. The trajectory coefficients of the model's key constructs: AISMAN with one (R^2 = 0.362); this is the best-explained latent variable by the IT capacity construct. Notwithstanding, the R^2 values, as seen in Figure 2, for the other endogenous variables AISMAN (0,334) and ORGPER (0,321) display a moderate level with respect to AISMAN; nonetheless, the variation explained within the model is important. Therefore, the proposed model has a strong explanatory power and reveals a substantial amount of variation in connection to organizational performance in the SMEs under study.

In the statistical test Q^2 (cross-validated redundancy index) a value greater than (0) implies it having such predictive relevance of the structural model, while a value lower than (0) suggests the model having shortage thereof (Hair Jr. *et al*. 2013). The results appearing in table 4 confirm that the structural model counts with satisfactory predictive relevance for the constructs: acquisition

of knowledge (0.169), AIS information management (0.244) and organizational performance (0.177).

This analysis proposes the good explanatory capacity of the model. On the other hand, in order to evaluate the importance of the standardized path coefficients (β), a *bootstrap* procedure was performed with five thousand samples to check the statistical significance of each of the β coefficients, as was shown by Table 4.

5. Discussion

In the literature and in our results we can see the importance that the articulation of IT and KA capacities represent for organizational performance development at SMEs in the industrial sector (Hwang and Lee, 2010). Also, the scope represented for SMEs by the connection between IT capacity and AIS management becomes evident as elements allowing to manage economic and financial results information. The results support four of the five hypotheses proposed and strengthen the literature on resources theory, dynamic capacities and organizational management in Colombian SMEs.

The most important and strongest results focus on the ITCAP relationships with the ACQKNO and ORGPER variables, which reflects a significant correlation with regards to organizational performance. The ITCAP relationship with the AISMAN and ORGPER variables receives a negative influence on the organization's performance. This allows us to deduce that the majority of SMEs depend on IT for accurately and timely handling information, and accounting generates accounting records, financial statements and a quantity of data processed by software applications that users usually do not know what to do with. In this vein, an adequate administration of the AIS controlling the effect of the information processing capacity on resources and competences to carry out business activities and processes must exist. Given its contribution to organizational effectiveness, its impact is intangible until financial profit or loss is set through financial statements (Oppenheim, Stenson and Wilson, 2004). This would show that SMEs are more concerned with preparing financial statements for tax purposes; forgetting that the main objective of accounting is to provide information for decision making (Kloviene and Gimzauskiene, 2014). The AIS will generate value insofar as it aligns with the strategic direction of the organization (Prasad and Green, 2015).

The study shows that SMEs are working efficiently on technological competencies, and from their IT management and infrastructure contribute to improving organizational knowledge and performance. These results align with dynamic capabilities and the theory of resources and capabilities proposed by Teece *et al.* (1997). This association between IT capacity, the organization's performance and the knowledge acquisition intermediate variable, can generate opportunities for the development and competitiveness of the company (Frankort, 2016).

The knowledge that is captured within and without SMEs through IT can be managed, stored and transmitted through IT (Tseng, 2008; Zahra and George, 2002). Finally, the organization is able to create its own knowledge, which may be used as a resource to carry out its transformation (Campos, Rodríguez and Sánchez, 2000). For IT capacity to generate a superior competitive advantage in the company over its competitors (Ho-Chang *et al*. 2014) and a direct effect on business results (Carr, 2003).

6. Conclusions

This study examines the role of IT capacity through the influence of the relationships between two variables, knowledge acquisition and AIS information management, as a possibility to optimize the performance of SMEs in Colombia's industrial sector. With the analysis of IT competence in the organizational performance of the 124 companies examined in the city of Cali (Colombia), it was established that:

IT capacity enables the integration of technologies into knowledge-acquiring processes so as to improve organizational performance.

AIS information management bears a negative relationship with organizational performance. Analyzing accounting information should allow evaluating the degree to which the financial information system of a com-

pany captures its economic reality and, therefore, permits to identify the quality of the information, signs of possible risks and different growth possibilities (Palepu, Healy and Bernard, 2002)

IT from its management and infrastructure competencies have a significant impact on an SME's performance, thereby coinciding with a study carried out by Tian and Xu (2015)

On the other hand, investing in technologies does not necessarily improve the company's productivity and profitability. It is essential for SMEs to develop their IT competencies so as to optimize the company's performance (Tippins and Sohi, 2003). The first factor analyzed refers to the extent to which SMEs are capable of understanding how technological knowledge can be acquired and transformed in favor of their products and competitiveness (Frankort, 2016), thus confirming the significant impact held by IT and KA on the performance of organizations (Bharadwaj, 2000, Ho-Chang *et al.* 2014, Santhanam and Hartono, 2003). It was also established that IT is rapidly developing, and accounting systems are not aligned with business IT strategies (Christauskas and Miseviciene, 2012) or with the business environment (Kloviene and Gimzauskiene, 2014). The results stemming from the AISMAN-ORGPER relationship suppose the AIS not being soundly managed, and businessmen being exposed to tax risks and inadequate information for decision making. The use of accounting information should not be conditioned or limited to a managerial profile, it is important to understand that decision-making involves having a series of data and relevant information that actually contributes to organizations' financial, managerial and control accountancy.

This research bears three key contributions. Firstly, it presents the academic community with the conceptual construction of the integration between IT capabilities and knowledge acquisition. Then, usage and technological infrastructure in association with knowledge-acquiring techniques can aid the transformation business processes. Finally KA with IT improve a company's competence and contribute to good business outcomes (Frankort, 2016). Secondly, the role of integrating IT competence to optimize SME performance is theoretically and empirically explained, namely, the greater the IT capacity held by a company means it will have a significant competitive advantage over its competitors (Ho-Chang *et al*. 2014). Finally, SMEs must seize IT capacities and knowledge (internal and external) to facilitate access to the firm's strategic competences (Gerwin, 2004), thusly improving the theoretical understanding and the quality of empirical evidence on the role of IT as a solution to knowledge management and its business performance (Frankort, 2016).

The last contribution is the possible development of a methodological framework to check the validity and relationships between the variables measuring IT competence, knowledge acquisition, AIS information management and their degree of impact on SMEs' performance.

To scholars, it helps them to understand long-term business success fundamentals, and it would aid managers in outlining, in accordance to their strategic considerations, the priorities to be adopted so as to improve the company's performance (Teece, 2007). Based on resource theory, companies with greater IS competence are capable of generating IT capacity and of seizing it as a source of competitive advantage to attain high profitability (Ho-Chang *et al*. 2014).

The results of this work have significant implications for SMEs highly relevant for entrepreneurs, managers and IS specialists. IT plays a very important role in its usage and the manner of transforming business processes, thus contributing to the company's sustainability. It could be argued that instead of reflecting absorptive capacity, the technological relationship may also reflect such competition among companies (Frankort, 2016). The seizing that SMEs can make of technological infrastructure, the staff's IT skills and the strategic alignment of the business enable IT integration with knowledge management processes and business development.

In a world where markets, products, technologies, competitors and standards change rapidly, the knowledge within companies becomes a key element for their success (Nonaka and Takeuchi, 1995). The empirical analysis suggests the manner in which IT ca-

pacity and the knowledge acquired are managed as the most valuable axis in this objective. Companies with high IS and IT capacity tend to maximize performance, and then obtaining benefits based on lower costs (Bharadwaj, 2000). An important component to this capacity consists in it allowing complementary organizational strategies, such as business processes and improving work practices (D'Souza and Sequeira, 2011).

This work based on IT capabilities improves business performance, as it contributing from the financial standpoint to reducing negative impacts on the company's profitability (Montabon, Sroufe and Narasimhan, 2007). Taking into account the number of companies forced to shut down their commercial operations, SMEs in Colombia's industrial sector should take advantage of these IT-based lessons learned, believe in their technological capabilities and seek out sustainability for their company by increasing the impact of performance of your business activities.

Notwithstanding, this study has limitations which suggest future lines of research. On the one hand, the information is geographically specific and deals with certain society forms, which means the results cannot be generalized. Nevertheless, the results may be applicable within the context analyzed and in similar organizations (Khazanchi, 2005). In the same manner, analyzing the role of IT and its competencies for the sustainability and performance of a company bear several future research opportunities.

It is difficult to suppose a contemporary SME with lesser technological deployment and development which does not manage the knowledge of its own environment. Therefore, such responsibility may be shared between SMEs and IT manufacturers. Further research should examine how to get the industry manufacturing IT resources, i.e. *software* suppliers, and SMEs to work together on the solution of these technological resources in order to develop new technologies having different ways to convert knowledge, that allow organizations to easily transfer and share it (Fenz, Heurix, Neubauer and Pechstein, 2014), considering their commercial activity, size and seniority.

7. References

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