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The Role of Working Relationships in SCM Performance

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ABSTRACT

This paper evaluates the relationships between support networks (social capital) and skills (human capital) on both employees' job satisfaction and companies' expansion of their supply chain (SC). A structural equation model (SEM) is tested based on four constructs: relationship orientation, job skills, job satisfaction, and supply chain expansion. To do this, we conducted a survey of Colombian supply chain professionals and managers. The results reaffirm the literature's previous findings of a strong relationship between employees' social capital and their job skills. We also found a significant relationship among SC members' skills and job satisfaction. SC expansion determinants were not conclusive, probably because other factors affected the expansion of companies; however, the research overall highlights the indirect importance of human resources management on supply chain performance.

KEYWORDS: Human Resource Management; Skills; Satisfaction; Latin America; Performance

INTRODUCTION

As the importance and influence of supply chain functions grow in all businesses, the importance of the supply chain's human resources is becoming evident (Barnes and Liao, 2013). Long-term, high-performance supply chain management (SCM) depends, in part, on human capital and data-driven decision-making processes (Barnes and Liao, 2012; Waller and Fawcett, 2013). However, scant research is available to characterize the influence of multiple factors on organizational performance and only a handful of papers link Human Resource management (HRM) to overall supply chain performance (Gunasekaran et al. 2004; Ou et al. 2010; Smith–Doerflein et al. 2011; Swart et al. 2012; Lengnick-Hall et al. 2013; Gómez-Cedeño et al. 2015).

The available HRM studies in SCM have either focused on deepening the understanding of diverse job skills or on mapping social relationships to see their effects on human and organizational performance (Barnes and Liao, 2012). Yet only a couple of these studies propose metrics related to this overall performance. Furthermore, little research has examined the impact of the job satisfaction of SCM professionals on SC performance (Antoncic and Antoncic, 2012).

To address this gap in the literature, this paper evaluates the (somewhat obvious) hypothesis that in order to deliver high-quality organizational SC performance, supply chain employees must possess a sufficient level of skills, an adequate network supporting them, and satisfaction with their jobs. Even though this research does not establish causality, its aim is to contribute to setting the foundations of how to develop future talent in SCM in order to respond to challenges in the discipline, such as rapidly changing environments, fragmented logistics operations, growing urbanization rates and dynamic data-driven decision-making processes (Rivera at al., 2019). These contextual features are present in emerging regions such as Latin America and countries such as Colombia. Thus, our contribution targets a better understanding of the role that high-skilled SCM professionals should have in transferring skills, to make SCM a more active member of the talent development process via social relationships and employees' job satisfaction, and to promote organizational and SC growth.

Therefore, some unique aspects that distinguish our study from the existing body of similar works in the literature involve the inclusion of employee's skills, satisfaction, and social networking in order to model, analyze, and derive conclusions about their performance in SCM. Hence, this paper contributes to the literature 1) empirically, by providing new insights about the aforementioned constructs of HRM in a Latin American country through primary data collected via surveys, and 2) methodologically, by explicitly modeling the relationships among these constructs and their effect on overall supply chain performance. Our model differs from (and builds onto) the existing body of traditional structural equation models (SEM) in that it enables us to first evaluate the relationships that have a significant effect on skills development and how these skills influence employee's satisfaction and supply chain performance.

Section 2 reviews the theoretical background, explains the relationship between HRM and SCM, and provides some context for the HRM in Latin America. Section 3 presents the research model and hypotheses. Section 4 depicts the methodology, questionnaire design and data collection. Section 5 presents the results, including Confirmatory Factor Analysis (CFA), SEM and cluster analysis. Finally, Section 6 discusses the results and Section 7 concludes with final observations.

LITERATURE REVIEW

Supply chain management and logistics are topics that have gained traction in the academic and practitioner communities in the last two to three decades. In fact, SCM has shifted from having a secondary role in organizations, to becoming a core strategic function that builds a competitive advantage among diverse stakeholders (i.e., suppliers, manufacturers, retailers, distributors and end customers) (Mentzer 2001; Gunasekaran et al. 2004; Hult et al. 2007). In consequence, the characteristics required of supply chain personnel have also evolved dramatically (Slone et al. 2007; Flöthmann and Hoberg, 2017). This evolution has also affected the way in which companies perform HRM for the purpose of recruiting, training, and retaining superior SCM professionals to improve the performance of organizations and grow their productivity and profitability (Swart et al. 2012).

Human resources have proven to be a key factor for the undertaking of successful supply chain activities, ensuring greater customer satisfaction and enhanced organizational performance (Menon, 2012). In addition, the role played by individuals is critical for the execution of SCM and its complex web of relationships. Hence, HR practices in firms must be aligned with SCM in order to promote the integration of the chain and safeguard better business outcomes. (Gómez-Cedaño et al. 2015). However, few studies in the literature describe the relationship between human resource activities or organization variables and supply chain success. This omission may be due to the emphasis on technical or "hard" determinants of supply chain performance (Shub and Stonebraker, 2009).

On the other hand, there is an ongoing shortage of SC managers who have the broad range of competencies and managerial skills needed to promote operational innovation (Jordan and Bak, 2016). Moreover, SCM personnel may not be sufficiently aligned with the objective of developing the "soft" side of SC managers. Perhaps the reason behind it all is that organizational development (OD) is often left to organizational leaders and managers who are tasked with such responsibilities but may not be trained to execute them. (Ellinger and Ellinger, 2014). Regarding the lack of research that examines the so-called "soft side" of SCM, more research in this area would help organizations to better manage strategically significant supply chain processes with the adequate connection between the needs of the chain, the SCM personnel and the responsibilities asked of them (Ellinger and Ellinger, 2014; Othman and Ghani, 2008).

HRM in Latin America

Despite the noted progress of Latin America in terms of access to education and healthcare, as well as increased prosperity and decreasing poverty rates during the last decade, the region still needs further improvement (UNDP, 2017). There is still a remarkable lack of high-quality human capital, which hinders regional economic growth and obliges firms to work with a large base of low-skilled workers in various productive sectors (Santos, 2016). Even worse, rapid technological pace threatens to broaden the existing gap between the skills required by regional labor markets and those available from regional human talent. This further polarizes the socioeconomic situation in developing countries, where most of the labor is trained for mechanical and manual tasks to develop a low-cost workforce, at the same time limiting the professionalization in technology, data-driven decision-making processes, critical thinking, and non-routine cognitive skills (Elvira and Davila, 2005; Perez-Arrau et al. 2012). Further trends, such as growing urbanization and poor

policymaking, shape labor markets and in some cases are likely to be even more important than technology (Santos, 2016).

Elvira and Davila (2005) is, to our knowledge, the first study to describe the state-of-the-art of HRM in Latin America. Since that pioneering work, solid constructs related to HRM in SCM such as social relationships, job satisfaction, and personal contact were identified to be important manifestations of the Latin American working environment. Later, Perez-Arrau et al. (2012) showed that HRM depends on cultural and country-related characteristics that affect human and organizational performance. Despite the authors' focus on Chile, their study updates the state-of-the-art of HRM in Latin America, without analyzing particularities and implications of SCM professionals. Therefore, even with the growing efforts to address HRM in Latin America, there are still several research opportunities available.

HRM and SCM: which relationships?

It is clear that HRM has a deep impact in configuration of SCM professionals and workforce, which in turn has a significant consequence for organizational and company performance (Gómez-Cedeño et al. 2015). But there is scarce research connecting HR skills and SCM performance, especially in Latin America. By looking at recent literature (e.g., Mangan and Christopher, 2005; Murphy and Poist, 2007; Derwik and Hellström, 2017; Flöthmann et al. 2018), four important constructs that allow for mapping and building a detailed model of how SCM professionals and logistics managers might affect organizational and supply chain performance emerge. Thus, it is important to investigate the effects of multiple HR factors from a twofold perspective: 1) from a typical HRM perspective, by analyzing *relationship orientation* (i.e., social connections and networking), employees' satisfaction and their work skills; and, 2) from a SCM perspective, by linking employee features (e.g., experience, technical training) to supply chain expansion and organizational growth (Brauner et al. 2013).

Relationship orientation. Social relationships reflect the connective power of networking for the employee. Such relationships can be in the form of organizational collaboration, camaraderie, professional networking, and friendship that facilitate personal communications, knowledge co-creation, knowledge sharing, and empathy among organizational members (Elvira and Davila, 2005; Hitt and Ireland, 2007; McCallum and O'Connell, 2009, Wood et al. 2016). This idea relies on systems where the party and the state are intertwined and let individuals facilitate access to broader and better sources of information; develop influence, control and power to achieve goals; increase solidarity; and reduce the need for formal controls (Adler and Kwon, 2002). In particular, it measures the extent to which individuals have established connections to potentially influential people, such as leaders, policy makers, and decision makers (Barnes and Liao, 2012).

Employee-related features. Hohenstein et al.'s (2014) recent extensive literature review on human capital management in SCM and Flöthmann et al.'s (2018) study of the key competencies of SCM personnel can be considered as a benchmark when dealing with the level of job *skills*. In particular, their framework suggests the inclusion of four categories of skills: 1) technical expertise; 2) general management skills; 3) interpersonal skills; and 4) analytical and problem-solving abilities. These categories are defined by the employee's socioeconomic profile, education, experience, skills, values and abilities that increase their value in the workplace (Elvira and Davila, 2005; Forret, 2006; Murphy and Poist, 2007; Derwik and Hellström, 2017).

Employee's satisfaction. In line with several past (Wanous et al. 1997) and more recent (Dobrow and Ganzach, 2018) studies, employees will more effectively contribute to organizational (and SCM) success when they are satisfied with their work status, both in terms of its economic and non-economic aspects. The factors contributing to job satisfaction include working environment, flexible job descriptions, team work, and rewards that lead to the well-being and high performance of the personnel (Menon, 2012; Goffnett et al. 2012). Humphrey et al. (2007) used a large meta-analytical review to show that job satisfaction depends heavily on motivational-human capital characteristics. Moreover, Antoncic and Antoncic (2011) found that job satisfaction characteristics significantly influence a firm's growth.

Organizational/supply chain expansion. Finally, the growth potential expresses the traditional dimension to measure supply chain coverage (van Hoek, 2001), and it is linked to the characteristics of people (Fawcett and Waller, 2013). Since the diffusion of the SCM culture, authors have debated the need for SCM and whether supply chain evolution is strictly related to the people operating in it (Chapman et al., 2000); in this regard, Gunasekaran et al. (2004) proposed a set of performance metrics to measure SCM activities' growth. The authors linked SCM activities – plan, source, make/assemble and deliver – at different levels with the aim to create flexibility, effectiveness, accuracy and speed in the flow of goods/services, information, cash, and knowledge along the supply chain. Besides this focus, the current literature has little evidence on the connection between the SC expansion and the characteristics of SC professionals.

The next section proposes a research model that is grounded in the above theoretical considerations. Three constructs are considered and three related hypotheses are proposed for the relationships among them. This model may serve to increase the understanding of the relationships among HRM-related activities and SCM performance.

THEORETICAL DEVELOPMENT/MODEL

The need to select highly competent supply chain employees is grounded in the knowledge-based view (KBV) of the company (Grant, 1996). This theory proposes the idea that knowledge and capabilities may become a source of competitive advantage that supply chain management can exploit (Handfield et al. 2105). Strategic knowledge, in particular, can be rooted both in the individuals and in the organizations (McCallum and O'Connell, 2009; Wood et al. 2016).

Personal knowledge can be seen as the combination of individual skills and abilities possessed by an employee and applied in day-to-day job activities (Fossum and Arvey, 1986). As cited in the HRM literature (Wright et al. 2001; Kang and Snell, 2009), highly skilled employees can be a strategic resource that facilitates competitive advantage to a firm. Furthermore, these skills and the expertise accumulated by employees over time become a source of sustained differentiation, especially, if the skills are valuable, rare, inimitable, and non-substitutable (Barney, 1991).

This is particularly true in the context of SCM. SCM has become a profession that requires a mixed of technical and managerial skills. These skills need to be cultivated by adopting a multidisciplinary and cross-functional perspective, in order to link numerous functions within and across companies that manage an integrated value flow (Flöthman et al. 2018).

Therefore, this paper is grounded in the idea that in order to deliver high-quality performance and help companies expand and grow, supply chain employees need to possess a sufficient level of skills, a broad network supporting them, and be satisfied with their jobs. To analyze these linkages, the theoretical model illustrated in *Figure 1* has been tested.
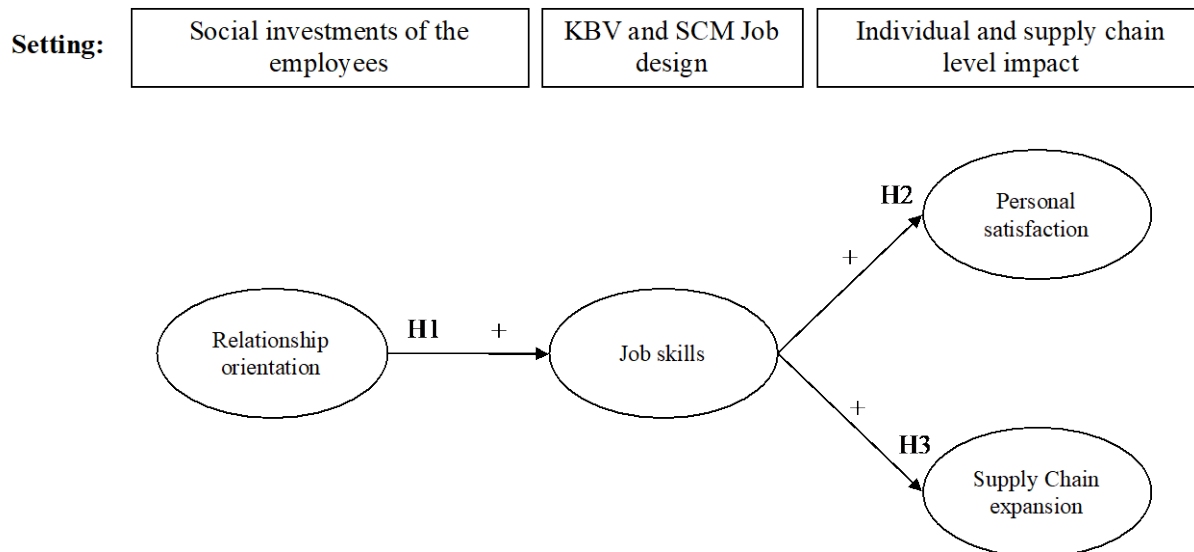
Setting:	Social investments of the employees	KBV and SCM Job design	Individual and supply chain level impact

Figure 1. Research model

When we talk about competence and skills, we adopt the perspectives provided by McCormick (1976) as well as Fossum and Arvey (1986), who define skills as *developed abilities that facilitate learning or the more rapid acquisition of knowledge*. These skills influence performance and they are not subject to a big change.

An important property of skills is that they can be trained or acquired "on the job" and that several elements can contribute to enhancing them (Mumford et al., 1999). Under social exchange relationships theory, the establishment of an extensive network of relationships promotes interpersonal exchange and individual growth, which may affect skills and knowledge improvement (Möller and Halinen, 1999; Baron and Markman, 2000).

Among the different possible external relationships for an employee – those involving people who have a relevant role and/or qualifications for the employee's context (i.e., managers, executives, policy makers) – are recognized as being the most valuable in fostering individual skills development (Barnes and Liao, 2012; Dowell et al. 2015; Schermuly and Meyer, 2016). This is even more important in supply chain management, where the possibility to build relationships and grow networking (i.e., connection power) is amplified by the complexity of the unit of analysis. This puts employees in contact with several supply chain actors such as suppliers, distributors, and retailers at diverse levels (Wright and Kaine, 2015).

Based on these reasons, we can thus formulate the following hypothesis:

H1: In SCM, a greater orientation toward employees having external business relationships is associated with a greater level of job skills

By developing skilled workers and investing in human resources, companies can obtain payback on two levels: employee satisfaction and organizational performance. If we examine the HRM literature, there is a broad set of scholars (Messersmith et al. 2011; Kehoe and Wright, 2013; Kianto et al. 2016) who discussed that, in companies pushing for development of employee competencies – in line with job requirements and the organizational environment – the employee's personal job satisfaction is higher.

SCM jobs require multifaceted skills to manage flexibility, change, risk, complex decision-making processes, creative thinking, and technical knowledge. SCM positions give employees the

opportunity to express their capabilities in a more extensive way, as well as to improve and demonstrate their abilities. Companies also reward workers for the complex tasks and challenges they have to face by providing them higher benefits in terms of salary, non-economic privileges, work-life balance, and better work environment (Lai Wan, 2007). Altogether, this results in higher satisfaction of the employees in their jobs, maximizing the company's ability to retain the best performers and develop high-potential employees to become the next generation of decision makers (Myers et al. 2004).

We can thus formulate the following hypothesis:

H2: In SCM, a higher level of job skills is associated with a higher level of employee satisfaction

Finally, the human resources department at any organization should focus on recruiting, investing in, and developing talented supply chain professionals to maximize their satisfaction and the company's talent retention. The latter creates a crucial, long-term competitive advantage because relying on a high-skilled employee base has been linked positively to overall improvement of organizational performance (Chowhan, 2016).

Specifically focusing on the SCM literature instead, several authors have promoted the idea of a linkage between the skills of SCM employees and the growth of the supply chain (Fisher et al. 2010; Mendes and Machado, 2015; Huo et al. 2016; Flöthman et al. 2018). Therefore, skilled SCM professionals might enable improvement of supply chains, in terms of the market served and the global reach of supply and distribution networks (Hohenstein et al. 2014; Jordan and Bak, 2016). We can thus formulate the following hypothesis:

H3: In SCM, a greater level of job skills is associated with a greater level of supply chain expansion

METHODOLOGY

To investigate the research model, a survey-based methodology was used, being suitable for testing purposes (Choi et al. 2016). The hypotheses were tested through a questionnaire that collected information about human resources management, employee and SC characteristics, in multiple main cities of Colombia during 2018 and 2019.

Questionnaire design and scale development

The questionnaire collected data from SC professionals pertaining to the four areas included in the model (i.e. the extent of networks of relationships, types of job skills and capabilities, job satisfaction, and company growth). We also collected socioeconomic data and years of experience from the surveyed professionals. In addition, we asked respondents for values and principles followed at their positions, as well as the employee trainings and course offerings at their organizations.

The survey items used to measure the theoretical constructs were derived from an extensive literature review about HRM, according to which the questionnaire was designed. Based on these constructs, we formulated diverse questions to form a large pool of items. Also, we compared these constructs in order to fill the two identified literature gaps (i.e., the existing link between the skills required by regional labor markets and those available from regional human talent; and the relationship between human capital characteristics and SC performance), and we added questions to the survey to fill these gaps. We piloted a preliminary version of the survey that contained 35 questions, which was reduced to 21 items for the sake of respondent time,

uniqueness, and significance of the results. The pre-test allowed us to improve the items of each dimension, alter the five-point Likert scale, and design a better survey. Following the suggestions in literature to reduce non-response, we carefully designed the survey instrument, established the research significance, and balanced survey length (Rogelberg and Stanton, 2007). The final version of the questionnaire in Spanish is presented in Appendix 1.

Table 1 summarizes the main items adopted for each construct and their operationalization in the survey.

Table 1. Operationalization of constructs

First-order construct	Indicators	Label	Scale
Relationship orientation	I have relationships with entrepreneurs in successful start-ups	REL 1	1 = "no relationships" 5 = "with more than 15 people"
	I have relationships with executive managers in medium companies	REL 2	
	I have relationships with decision makers in large firms	REL 3	
Job skills	I have leadership capabilities	SKILL 1	1 = "not at all" 5 = to a large extent
	I have goal orientation	SKILL 2	
	I can manage efficient decision-making and problem-solving processes	SKILL 3	
	I have quantitative skills	SKILL 4	
Personal satisfaction	I am satisfied with my current salary	SAT 1	
	I am satisfied with my non-economic incentives	SAT 2	
	I am satisfied with my work-life balance	SAT 3	
Supply chain expansion	In the last 10 years, my company has changed the number of employees	EXP 1	1 = "0%" 5 = "more than 15%"
	In the last 10 years, my company has changed the number of products or production lines	EXP 2	
	In the last 10 years, my company has changed the number of suppliers	EXP 3	

Data collection and sample characteristics

Logistics professionals face a double challenge because their role encompasses both the diverse functional departments of their company as well as coordinating similar tasks with logistics roles at external supply chain stakeholders (e.g., suppliers, customers, and carriers). Therefore, there are strong interdependencies between SCM and human resources (HR) that require an integrative, cross-functional, multi-company vision and a developed HR ability to create levers to avoid imposing activities and hindering the growth of certain actors of the supply chain (Jurčević et al. 2009).

However, there is still a lack of knowledge and research in this complex topic (Jurčević et al. 2009). Moreover, a few authors (Brauner et al. 2013) argue that incorrect decisions in HR-related

realms lead to lower performance not only for the company, but also for other actors of the supply chain. Furthermore, Latin America faces multiple difficult challenges, such as poor infrastructure, ineffective logistics operations, income inequality, and social and political instability (Velazquez-Martinez et al. 2018). Moreover, Latin America lacks a strong educational system that instills the required abilities in its population that logistics job positions nowadays require.

Developing countries display labor market polarization in which a large number of workers perform manual labor, while in developed regions these tasks are largely handled more efficiently by automated processes and technology. This pattern prevails in most of Latin America as well, due to the low skill levels of workers that makes their jobs lower-paying and non-technologically dependent (Perez-Arrau et al. 2012; Santos, 2016). Unfortunately, this hinders the (macro- and micro-) economic growth of the companies and the country in the long term. Our research picks a Latin American country as a case study and investigates how multiple skill profiles foster the growth of supply chains and the development of companies. This research is relevant to closing the existing research gap in whether SCM professionals might enable supply chain expansion of a company through a better skillset and the relationship network they develop through their jobs. We conducted the survey at six events organized by LOGYCA, a Colombian organization that administers several international standards, such as barcode, and offers products and services in logistics for over 650,000 different companies across Latin America. These events were in five main cities of Colombia, including the largest metropolitan areas, and were attended by a total of 180 people. The profile of attendees to these events were primarily professionals in logistics, transportation, and supply chain management from service and manufacturing industries. We did not select specific industries because we wanted to guarantee heterogeneity in the results, but we did concentrate on medium and large firms to understand the effect of constructs such as the relationship orientation, as it is in these type of organization where HRM practices are more consolidated and employees have the opportunity to create stronger network of relationships (Blanco-Alcántara et al., 2018). Also, larger firms have the opportunity to employ a larger number and variety of people and to represent a less fragmented, more formal labor market.

At each event, we delivered the survey to the registration table and asked attendees to fill out the survey during the event. Clear instructions were written in the printed version of the survey, and staff from LOGYCA answered questions that the respondents had about the survey. To increase the validity of findings, we opted for a multi-city sample in Colombia. Naturally, larger cities are more oriented to SC activities because urban logistics are more complex and because they are nuclei of economic activities for Colombia. Therefore, this heterogeneity in profile also benefited the results of the survey.

In light of this, we performed the survey in 2018 and 2019, collecting data from 144 questionnaires. After removing responses with missing values on critical items, we obtained a final sample of 131 usable responses, which corresponds to a raw response rate of 73%.

Table 2 reports the relevant descriptive statistics of the sample.

Table 2. Sample descriptive

Descriptive	Freq.	%	Descriptive	Freq.	%
Organization Size			*Respondent sex*		
> 250	91	69.5	Male	77	58.8
100-250	11	8.4	Female	46	35.1
50-100	11	8.4	Missing	8	6.1
< 50	18	13.7			
			Respondent position		

Supply Chain Sector	n	%		n	%
			Country and International executive (VP, chief)	28	21.4
Logistic provider	4	3.1	Regional and local executive managers (DCs, Plants, Cross-docking platforms)	28	21.4
Manufacturing	31	23.7	Indoor Firm coordinators (Warehousing, transportation, operations, finance, logistics)	17	13
Retailer	77	58.8	Outdoor Firm coordinators (Procurement, purchases, Customer service, supplier engagement)	23	17.6
Service (Bank, ICT, Finance, Consulting)	9	6.9	Supervisor	28	21.4
Other	10	7.6	Technician	4	3.1
			Other	2	1.5
Geographical scope					
National firm with national operations	40	30.5	*Respondent experience*		
National firm with Latin American operations	44	33.6	4	9	6.9
National firm with global operations	15	11.5	3	5	3.8
International firm with operations in the country	16	12.2	2	58	44.3
Multinational firm with global operations	16	12.2	1	20	15.3
			Missing	39	29.8
Total	131	100		131	100

Bias control

Potential biases were considered in survey and protocol design and in the data analysis. To check non-response bias, we adopted the "continuum of resistance" model (Kypri et al. 2004), thus comparing early and late respondents – where a late respondent is then used as a proxy for a non-respondent. Student's t-tests were performed on early and late waves on all variables, and these tests indicated no statistically significant differences between the groups in both groups. Further, social desirability in the entire survey bias was reduced through assurance of confidentiality and through questions mixing both the behavior of the organization and its members in general and direct personal behaviors. The institutional items themselves do not relate to personal behaviors or performance and are thus less likely to be affected by a social desirability bias.

Finally, the procedure of the study was the first way to control common method bias (Podsakoff et al. 2003). First, even though the research project was labeled as a comprehensive study to understand human capital management in Latin American supply chains, no reference to the model in *Figure 1* was provided. Second, questions were organized in order to separate the different sections, to prevent respondents from developing theories about possible cause-effect relationships.

Statistical approaches for model testing

Because the objective of our research is theory testing and confirmation, the presented hypotheses were tested using covariance-based structural equation modeling (CB-SEM), which is a common method employed for this type of research (Perols et al. 2013; Hair et al. 2017).

First, to check the reliability of the hypothesized constructs, Confirmatory Factor Analysis was performed (Schreiber et al., 2006). Following indications by Byrne (2013), we also used Average Variance Explained (AVE), Composite Reliability (CR), and Cronbach alpha (CA) to assess construct validity (detailed in section 5.2 below). Acceptable values of CR and CA are above 0.7, while the AVE should be higher than 50%.

The model was then tested using the maximum likelihood (ML) estimation method (White, 1982), because ML provides more realistic indexes of overall fit and less biased parameter values for paths that overlap with the true model, compared to other methods such as generalized least squares and weighted least squares (Olsson et al. 1999; Gómez-Cedeño et al. 2015). The ML estimation assumes that the variables in the model are *conditionally* multivariate normal, which is true for our dataset according to the Doornik-Hansen (χ^2= 104.207; $p > \chi^2$ = 0.000) and Henze-Zirkler (χ^2= 224.383; $p > \chi^2$ = 0.000) tests.

To evaluate the model fit, we use a combination of the chi-square goodness-of-fit statistic and the use of other absolute or relative fit indices (Hu and Bentler, 1999). Regarding the chi-square, there is the need to check for the ratio between the chi-square value and the degrees of freedom in the model, where cut-off values range from <3 to <5, depending on the type of study (i.e., exploratory or explanatory SEM).

With regard to fit indices, they can range from 0 to 1, with values closer to 1 indicating a good fit. Some authors (e.g., Hair et al., 2017) suggest various indices presentation strategies including, among others, the comparative fit index (CFI), the Tucker Lewis index (TLI) and root mean square error of approximation (RMSEA). A satisfactory threshold for CFI and TLI is >0.90 (with a value >0.95 showing excellent fit), whereas RMSEA is supposed to be < 0.05 (Hooper et al., 2008).

Finally, to better explain the results coming from the model tested, we also performed a cluster analysis, a technique that has been largely adopted in HRM research (e.g., Lengnick-Hall et al. 2009). In order to perform the cluster analysis, a two-step clustering algorithm was selected, because it was able to determine the optimal number of clusters by minimizing the variance within each cluster (Punj and Stewart, 1983).

To perform the data analysis, we used Stata v. 15.0. We estimated the measurements, factor analyses, structural models, and cluster analyses. The main conclusion about the statistical experiments is shown below.

Descriptive statistics

Table 3 presents descriptive statistics for the construct indicators.

Table 3. Descriptive statistics for questionnaire items

Items	Mean	St. Dev.
REL 1	2.64	0.938
REL 2	3.29	1.024
REL 3	3.53	0.965
SKILL 1	4.52	0.614
SKILL 2	4.26	0.7
SKILL 3	4.48	0.601
SKILL 4	4.35	0.635
EXP 1	3.47	1.474
EXP 2	3.13	1.358
EXP 3	2.95	1.34
SAT 1	3.66	1.161
SAT 2	4.19	1.001
SAT 3	4.24	0.696

Confirmatory factor analysis

Table 4 presents the results of the confirmatory factor analysis (CFA). All the measurement model fit indicators show a good fit (χ^2/d.f. = 1.12; CFI = 0.987; TLI = 0.982; RMSEA = 0.032). In addition, convergent validity was assessed through significant loadings from all scale items on the hypothesized constructs as well as through the AVE, CR and CA.
AVE ranges were between 49% and 66% (higher or near the 0.5 threshold), and both CR and CA were higher than 0.7 for all the constructs.

Table 4. Confirmatory Factor Analysis

Construct	Factor Loadings	Average Variance Explained	Composite Reliability	Cronbach Alpha
Relationship orientation		66.09%	0.852	0.807
REL 1	0.699			
REL 2	0.914			
REL 3	0.812			
Job skills		49.15%	0.794	0.801
SKILL 1	0.656			
SKILL 2	0.672			
SKILL 3	0.752			
SKILL 4	0.720			

Personal satisfaction		51.84%	0.761	0.812
SAT 1	0.750			
SAT 2	0.789			
SAT 3	0.608			
Supply chain expansion		61.99%	0.827	0.794
EXP 1	0.611			
EXP 2	0.876			
EXP 3	0.848			

As an additional test for discriminant validity, in *Table 5* we report the squared correlation between two latent constructs to their AVE estimates (Fornell and Larcker, 1981). According to this test, the AVE for each construct should be higher than the correlation between each pair of constructs, a condition that is valid for all the constructs.

Table 5. Correlation matrix

Variables	*Mean*	*St. dev.*	1	2	3	4
1.Relationship orientation	*3.15*	*0.82*	1			
2. Job skills	*4.40*	*0.49*	0.033	1		
3. Personal satisfaction	*4.03*	*0.81*	0.009	0.089	1	
4. Supply chain expansion	*3.18*	*1.20*	0.007	0.004	-0.002	1

Finally, the common latent factor technique was applied as a further way to address common method bias (Craighead et al. 2011). We found that the common latent variable has a linear estimate of 0.598. This value indicates a variance of 0.357, which is below the threshold of 0.50. Thus, this indicates that common variance does not represent a problem in our study.

Model testing

The postulated path model produced a good fit to the data (χ^2/d.f. = 1.97; CFI = 0.979; TLI = 0.973 RMSEA = 0.039). *Figure 2* reports the results of the hypotheses testing. The structural equation model shows a highly positive and significant relationship between "*Relationship orientation*" and "*Job skills*", thus we can reject the null hypothesis in favor of H1. In turn, higher "*Job skills*" demonstrates having an impact on "*Personal satisfaction*" – thus we can reject the null hypothesis in favor of H2. However, no statistical significance is found for the relationship with "*Supply chain expansion*" – thereby failing to reject the null hypothesis in favor of H3.
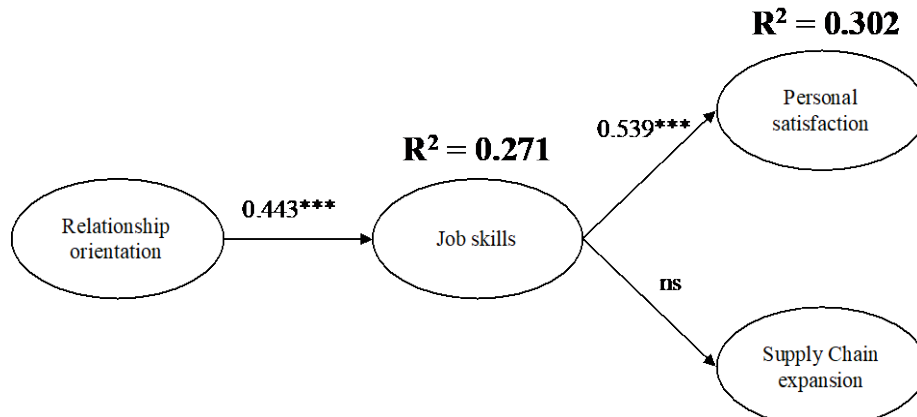
Figure 2. Resultant structural model (*p<0.05; **p<0.01; ***p<0.001)

Cluster analysis

In performing the cluster analysis we used, as classification variables, the "*Relationship orientation*" and "*Job skills*" factors. The cluster analysis results are reported in *Table 6*.

Table 6. Cluster centroids characteristics (Silhouette coefficient: 0.502; Clusters distance: 1.652)

	Cluster 1		Cluster 2		F	P value
	Mean	*St.dev.*	*Mean*	*St.dev.*		
Relationship orientation	2.41	0.50	3.51	0.71	241.5	0***
Job skills	3.93	0.43	4.62	0.33	3.43	0***
Number of cases	*41*	*32.1%*	*89*	*67.9%*		

The results of the iterative procedure shown at *Table 6* show two different and significant clusters, which can be both differentiated according to the input variables. Cluster reliability was considered acceptable considering the value of the silhouette coefficient – which should be higher than 0.5 – and the cluster distance.
Results show that in cluster 1: *individual – based group*, supply chain professionals tend to have a lower orientation toward having external relationships (below the median, on a 1-5 Likert scale), being characterized by a medium level of skills. In contrast, in cluster 2: *network – based group*, supply chain workers have a higher orientation toward external relationships and an associated higher average level of skills.

After cluster determination, we also ran a one-way analysis of variance (ANOVA) in order to verify if there were statistically significant differences between clusters for "*Personal satisfaction*" and "*Supply chain expansion.*" *Table 7* reports the results below.

Table 7. ANOVA results

	Cluster 1		Cluster 2		F	P value
	Mean	*St.dev.*	*Mean*	*St.dev.*		
Personal satisfaction	3.76	0.8	4.15	0.77	7.34	0***

Supply chain expansion	2.98	1.05	3.26	1.26	1.62	ns

ANOVA at *Table 7* shows, on one hand, that the level of "*Personal satisfaction*" is significantly higher among the network-based group. On the other hand, although the "*Supply chain expansion*" value is higher for the network-based group, it is not statistically significantly greater.

DISCUSSION OF RESULTS

This research analyzes the impact of HRM practices on SCM performance at the individual and organizational levels and confirms the importance, both theoretical and practical, that SCM professionals must establish a powerful network through a relationship orientation in order to enhance their skills. In today's market, where success depends on multiple and complex activities, it is essential for employees to contribute to the competitiveness of their companies and of their supply chains. SCM positions allow employees to interact with talented people inside and outside the company, as well as to access people with multiple hard and soft skills such as leadership and managerial responsibilities (Kiessling et al., 2014). This contact allows individuals and companies to create, through social interactions, a knowledge exchange process contributing to the individual's growth through their daily jobs (Guzzo and Noonan, 1994; Wang-Cowham, 2011).

Finding a strong link between external social relationships and job skills has important implications. At an individual level, SC professionals and managers need to be aware of the opportunities that derive from their social networking in order to boost their skills, and vice versa. Having a large, diverse network of contacts with supplementary, multidisciplinary job profiles will enhance the decision-making processes of the SCM professionals and leverage their learning processes. Thus, at a firm level, giving incentives to SCM employees to build a stronger network could become a valuable organizational practice. In fact, this is already a widespread practice in knowledge-intensive companies operating in complex and turbulent environments such as the computer software, pharmaceuticals, chemicals, and aerospace industries (Wilhelm, 2011; Huggins et al. 2012).

The results support the importance of organizational knowledge exchange as a core concept in KBV. Individuals represent a source of competitive advantage for companies when the employees possess knowledge and skills (representing human capital) that are rare, inimitable and non-substitutable (Kang et al., 2007; Hitt and Ireland, 2002). In addition, these characteristics can be gained not simply through self-development, but also by access to other professionals who already have these skills and play this role for their organization and supply chains through social interaction (i.e., social capital) (Lewin et al. 2011). Therefore, social and human capital should not be treated in isolation (Lepak and Snell, 1999). This is particularly vital for people working in supply chain positions, given the level of complexity that affects both outbound and inbound supply chains. A radical improvement of personal knowledge and skills is possible through continuous interaction with people who have already managed this complexity, and who are able to transfer this experience to other individuals and teams (Mangan and Christopher, 2005; Lengnick-Hall et al. 2013). The aforementioned evidence is also supported by our clustering analysis.

The model's results also support the idea that SCM professionals who have higher skills are also more satisfied with their jobs. Humphrey et al. (2007) found through a large meta-analytical review that motivational and social characteristics (which are closely tied with human capital and social

capital characteristics) can explain 34% and 9% of the job satisfaction outcomes of employees, respectively. That is, job satisfaction depends heavily on motivational-human capital characteristics. This evidence is also reinforced through our clustering results' analysis. If we step from the individual-based to the network-based cluster profile, we can see an increment of the level of personal satisfaction with an increase of the average level of employees' job skills.

This justifies investing in the development of skills of supply chain workers, not only to exploit their talent for a more effective SC, but also to maximize potential retention through higher job satisfaction. In the long term, this becomes a sustainable strategy for companies and supply chains that build a baseline of SCM talents that will educate new SCM professionals by training them with the right skills and assuring the transference of acquired lessons and know-how to subsequent generations (Swart et al. 2012; Wood et al. 2016).

Finally, our data was not able to confirm the existence of a positive relationship between the level of job skills and the supply chain expansion, despite the evidence provided by Antoncic and Antoncic (2011). From a theoretical point of view, it is true that some scholars have debated how skilled SCM professionals contribute to company's growth, but it is also true that, according to our definition of supply chain expansion (measured as the increase in the number of employees, products, or suppliers) that relationship is not expected to be linear.

Thus, having skilled employees on its own may not be sufficient to explain company growth, given that the growth may depend largely on the specific characteristics of the company, such as sector, products, location, and size, among others, or on other internal and external variables that arise from the complexity of current businesses practice. For example, scanning the external environment in regard to both competitors and customers from a strategic SCM perspective may serve as a source of competitive advantage (Kiessling et al., 2014). Nevertheless, we hypothesize that using a larger database may dissipate the doubts to conclude with certainty about job satisfaction influence on company growth. For this reason, we are currently running this survey to obtain more observations (at least 100 more in the next couple of months) that will shed light on this issue and determine whether the results are going to change or not.

From an empirical perspective instead, a further scrutiny of our data might better explain this trend. *Table 1, in section 5.1, reports* the descriptive statistics of the items used to measure "*Job skills*" and "*Supply Chain expansion.*" The data show that the relationship is not significant because, on average, the respondents consider the level of skills used for their jobs higher than the growth results. However, we realize that, for each item, the average rate is near or higher than three, which, according to the scale used, still means an expansion between 6-10%. Overall, this indicates that companies and their supply chains still benefit from growth in the case of higher employees' skills; even though, on a 1-5 scale, this outcome is not commeasured to the level of skills in the input.

Therefore, further research is required in that domain by creating a better metric that relates the quality of SCM professionals and their skills to the growth of their company and their supply chains. Lastly, some evidence emerges from cluster analysis: the *network-based group*, characterized by SCM workers with broader external relationships and higher skills, also have a higher average level of growth compared to the *individual-based group* (3.26 vs. 2.96, respectively), suggesting a link may exist overall, even if it is not statistically significant with the sample size of this data set.

Consequently, current research results help to broaden the understanding between HRM-related issues and supply chain outcomes. In short, individuals with higher social capital are more likely to have higher human capital, particularly their in terms of their skills. Meanwhile, job skills are strongly related with employees' satisfaction. Further research is needed, however, to evaluate the impact of external relations, skills, and satisfaction on supply chain expansion.

CONCLUSIONS AND FUTURE DEVELOPMENTS

This paper´s theoretical contribution helps to clarify the links between HRM constructs in the context of SCM. First, the results provide empirical evidence of the important link between relationship orientation (i.e., social capital) and job skills (i.e., human capital) for SC professionals and managers. The empirical findings also contribute to the existing knowledge base in multiple ways. We find that low- and high-skilled SCM professionals show a different dependence on social relationships. Actually, the individual-based group shows a lower orientation toward building external relationships and is characterized by a medium level of skills; while the network-based group heavily depend on social relationships to improve, train and diffuse knowledge.

Second, it evaluates the impact of job skills on SC outcomes at both the individual (i.e., job satisfaction) and firm level (i.e., supply chain expansion) units of analysis. In this regard, job skills were strongly associated with employees' job satisfaction but not significantly associated with supply chain expansion. By modeling job skills and satisfaction, our results suggest that SCM professionals having higher skills are also those more satisfied about their jobs. In contrast, variation in job skills was not sufficient to explain variation in supply chain expansion. This may be due to other internal and external variables that arise from the complexity of businesses practice or the need for other supply chain expansion metrics.

Our results suggest that SC managers and professionals should be increasingly aware of the impact of developing significant and positive social relationships with SC members (inside and outside the firm) on their skills and career. Furthermore, higher skills may help them access better job profiles that properly fit their expectations and increase their satisfaction. These findings are relevant because roles of supply managers have changed dramatically (and are currently changing) due to several factors such as new business opportunities, cultural and economic contexts, and a rapidly-evolving data-driven business environment (Kiessling et al., 2014; Waller and Fawcett, 2013). Adaptative capacity then becomes a requirement to update skills that are necessary to succeed in complex and constantly evolving SCM environments.

Moreover, SCM and logistics education decision makers should also be aware of these results. Despite the importance of technical knowledge and skills, soft skills (e.g., managing social relationships, leadership, goal orientation, etc.) are also essential for a satisfying career in SCM. Therefore, education programs in SCM and logistics should include material on these soft skills, which are necessary to succeed in an increasingly complex SC environment. Further research would be valuable on how education should change to promote softer skills, in addition to technical skills, in order to achieve productivity alongside professional satisfaction.

The model's results also indicate that firms must actively manage their social and human capital in order to have skilled and satisfied employees, which could support SC goals. In fact, HRM activities in SCM should reinforce the evidenced link between Relationships – Skills – Job Satisfaction to drive SCM's sustainable competitive advantage dimensions. However, further research is needed to broaden the understanding about the impact of employees' job satisfaction

on supply chain expansion and firm performance. This will require novel metrics and methodologies that properly characterize SC outcomes.

Finally, in order to offset the limitations of this study, future research may consider the evaluation of other countries, longitudinal data, broader data on each of the construct elements, and larger sample sizes. Acknowledging the implication of the model's results, the proper analysis extension might minimize cultural differences as biases and illuminate the relationship between social capital and skills level on employees' job satisfaction and companies' expansion in a supply chain context.

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