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The effect of human resource management practices and innovation: Colombian small and medium-sized enterprises

Efecto de las prácticas de gestión humana e innovación:
Pequeñas y medianas empresas colombianas

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Abstract

The need for small and medium-sized enterprises to innovate and their limited human resource management practices have led to growing research into how the organization's internal staff-focused characteristics promote a higher degree of innovation. Faced with scarce literature about this relationship in smaller companies in Colombia and the ever-present need to be competitive, this research aims to identify the effect of human resource management practices on innovation in Colombian SMEs. Four hundred and ninety-two surveys were applied to SME managers in Cali, Bogotá, and Medellín to meet such an objective. This research made it evident that human resource management practices affect innovation, but not all practices exert the same influence. Staff selection and performance evaluation affect product innovation, processes, and overall innovation, while compensation only influences product innovation. The other human resource management practices do not account for any kind of effect. This research contributes to prioritizing human resource management practices for innovation and the management thereof within small and medium-sized enterprises.

Keywords: Human resource management, Innovation, SMEs, Selection, Performance evaluation.

Resumen

La necesidad de las pequeñas y medianas empresas por innovar y las limitadas prácticas de gestión humana que estas presentan hacen que surja una creciente investigación sobre cómo las características internas de la organización, enfocadas en el personal promueven que la innovación sea mayor. Frente a la escasa literatura de esta relación en empresas de menor tamaño en Colombia y la constante necesidad de ser competitivos, esta investigación tiene como objetivo identificar el efecto de las prácticas de gestión humana sobre la innovación de las Pymes colombianas. Para cumplir con este objetivo se aplicaron 492 encuestas a gerentes de las Pymes de Cali, Bogotá y Medellín. Como resultado de esta investigación se evidencia que las prácticas de gestión humana sí tienen un efecto sobre la innovación, pero no con la misma influencia. Por su parte la selección de personal y la evaluación de desempeño tienen un efecto

sobre la innovación en productos, en procesos y sobre la innovación global, mientras que la compensación solo tiene efecto sobre la innovación en productos. El resto de prácticas de gestión humana no revelan ningún tipo de efecto. Esta investigación aporta a la priorización de prácticas de gestión humana para la innovación y su manejo dentro de las pequeñas y medianas empresas.

Palabras clave: Gestión humana, Innovación, Pymes, Selección, Evaluación de desempeño.

1. Introduction

The 2019 Global Innovation Index downgraded Colombia six positions from the previous year's World Intellectual Property Organization (WIPO) (2019), showing innovation as a critical element in the country's development, which is still lagging. Corma (2011) indicates that innovation varies according to the company size; thus, small and medium-sized enterprises (from now on SMEs) become a focus of study, as they represent over 80% of the companies in Colombia, which contribute 94% to this country's Gross Domestic Product. Cefis and Marsili (2006) point out that SMEs need to be innovative to ensure their growth over time, regarding it as a strategic factor for development. However, Corma (2011) points out that there are other alternatives for SMEs to innovate, linked to their structural elements and leaders. The Organization for Economic Cooperation and Development (OECD) (2013) has shown that Latin American SMEs' innovation faces performance and innovation problems, which can be improved through technological and organizational capabilities, connecting and networking with other companies, turning to other markets, and analyzing core capabilities.

The Organization for Economic Cooperation and Development (OECD) (2013) also notes that, compared to larger companies, informality in SMEs' innovation strategies is quite significant. Strobel and Kratzer (2017) show that improving SMEs' innovation is a complex task, mostly because of the internal obstacles they face, such as lack of knowledge, skills, clear roles, and informality in general. In this regard, several researchers (e.g., Mazur-Wierzbicka, 2019) have highlighted that overcoming internal obstacles brings more innovation to SMEs. That is the case for practices that promote

further knowledge and capacities, such as human resource management.

Stock, Totzauer, and Zacharias (2014) point out that much has been invested in infrastructure and little in personnel-oriented practices regarding innovation. As Laursen (2003) put it, up until the turn of the century, research on innovation and human resource management was minimal; however, from that moment onward, interest in these variables' relationship has grown and yielded contradictory and fragmented results (Shipton, Sparrow, Budhwar, and Brown, 2017). Most research has focused on identifying a set of human resource management practices and their impact on innovation, but few have focused on assessing each practice, especially inside SMEs.

In Colombia, few studies have been carried out on the specific type of policies and human resource management practices conducive to innovation and promote better knowledge, attitudes, and behavior among the staff. Most of these projects have focused on countries such as the United States, Denmark, the UK, China, or India. Nor has there been agreement on which human resource practices should be invested in to generate further innovation (Arvanitis, Seliger, and Stucki, 2016) and not fall into the dilemma of implementing all practices as a whole (Seeck and Diehl, 2017), especially when SMEs lack the resources to do so. Therefore, we propose to identify the effect of human resource management practices on innovation in Colombian SMEs given the scarcity of such studies in this context, the shortage of innovation and human resource management practices in SMEs, and the lack of investment policies in activities that enhance staff's knowledge, attitudes, and behavior. Four hundred and ninety-two surveys were applied to SME managers in Bogotá, Medellín, and Cali to meet the above objective.

The first portion of this research shows a review of human resource management practices and innovation concepts. Also, there will be a portion accounting for the research that links the variables under study with the corresponding hypotheses. The second portion of this document will present the methodology employed to meet the objective, as well as the validity and reliability of the

research variables. The third and final portion will present the results, whether the hypotheses are accepted or not, and the research's main findings.

2. Literature review

Human resource management practices are based on the AMO model, an acronym that represents individual skills (A), motivation (M), and the opportunity to participate (O) (Marín-García, and Martínez, 2016). This model ascertains that employee-oriented practices are conducive to performance, so the skill component includes practices that enhance employee capabilities, namely, recruitment techniques, employee selection, and formal training. The motivation component entails practices that improve motivation, which includes compensation and performance appraisal. Meanwhile, the opportunity component contemplates flexibility for employees, continued communication, and participation in different company areas.

In terms of innovation, the OECD and Eurostat Oslo Manual (2005) define it as introducing a new or improved product or process and incorporating a marketing method and new business practices. In this regard, OECD and Eurostat (2005) indicate that there are three types of innovation:

- **Products:** introduction of a new or significantly improved good or service.
- **Processes:** new or significantly improved methods for creating and delivering products.
- **Management systems:** the implementation of a new organization method in work practices.

The research about human resource management practices and innovation is diverse, and the trends in this kind of research focus on two points: The first aims at the so-called "set of human resource practices," and the second deals with assessing each related practice.

For Jimenez-Jimenez and Sanz-Valle (2005), Laursen (2003), Laursen (2003) and Foss (2012), and Mazur-Wierzbicka (2019), joint practices, or the so-called human

resource management practices packages, have a more significant impact on business innovation than if implemented in isolation. Nevertheless, authors such as Cano and Cano (2006) claim that isolated practices further promote innovation, as each impacts employees differently.

Seeck and Diehl (2017) reviewed the 1990-to-2015 body of research related to human resource management's impact on innovation. They found that "packages of human resource management practices," that is, the practices as a set, do impact innovation, while individual practices do so to a lesser extent. These authors also point out that the practices that most enhance innovation are those related to employee engagement, motivation, learning, and loyalty. For Shipton *et al.* (2017), the academic research on these variables has focused on demonstrating how employees can foster innovation and become more creative through these practices. Therefore, all research agrees that human resource management practices, whether isolated or joint, promote innovation. Nevertheless, it is imperative to acknowledge that, in one way or another, practices do affect innovation as per the research problem identified.

Those that favored workers' skills, such as training and selection, yielded highly significant findings. In the Netherlands and Denmark, Beugelsdijk (2008) and Laursen (2003), respectively, showed that internal and external training significantly favored innovation and companies' overall performance. Perdomo-Ortiz, González-Benito, and Galende (2009) ascertain that human resource management practices focused on improving quality, i.e., training and certified skills, bring about much more technological innovation in companies.

For their part, Díaz-Fernández, Bornay-Barrachina, and López-Cabrales (2015) and Stock *et al.* (2014) demonstrated that dynamic markets, well informed of their customers, host innovation, making training and employee development, and investment critical to harness it. Kianto, Saenz, and Aramburu (2017) and Natalicchio, Messeni Petruzzelli, Cardinali, and Savino (2018) identified that, in addition to training, knowledge-based selection recruits highly qualified personnel, thus assimilating and

combining knowledge, which significantly favors innovation and employees' innovative capabilities.

On the other hand, Arvanitis *et al.* (2016) pointed out that additional training only affects innovation's success and not proneness to innovation, wherefore investing in training carries issues. In the same vein, Chowhan, Pries, and Mann (2017), in their study under AMO model variables, found that motivation-improving human resource management practices do not affect innovation significantly, as companies that provide higher and continued training expect better results in innovation. However, what was invested in training and selection goes uncompensated. The arguments supporting these results show that the staff could become overqualified when highly trained, according to Meyer and Leitner (2018). The above scenario can negatively affect innovation because the employees who are bored or unmotivated by low-performing peers do not invest their time or energy in innovating.

Concerning the practices that promote motivation (such as compensation and performance appraisal), Jiménez-Jiménez and Sanz-Valle (2005) researched Spanish companies and found that the practices that most affect employee behavior such as performance appraisal, further promote innovation. For Beugelsdijk (2008), Cano and Cano (2006), and Meyer and Leitner (2018), remuneration, whether for performance, objectives, or achievements, is a practice that positively influences innovation at an incremental and general level.

Stock *et al.* (2014) concluded that employee rewards make employees more motivated to innovate and better interact with customers. Chowhan *et al.* (2017), Kianto *et al.* (2017), and Zhou, Hong, and Liu (2013) point out that engagement-oriented human resource management practices, including remuneration and performance appraisal, foster a positive relationship towards innovation since commitment brings out other attributes in employees for the development of ideas, especially if they receive feedback and compensation. However, Arvanitis *et al.* (2016) showed that payments, including incentives and rewards for achievements, have no association with the company being

more likely to innovate because a higher remuneration retains employee motivation but does not increase it.

Research that identifies the practices that promote opportunities, such as flexibility, communication, and participation, are diverse, and the cases accounting for communication are limited. For Chowhan *et al.* (2017), the set of practices that improve opportunities bears a significant positive relationship with innovation, as they involve information exchange with employees, problem-solving teams, or self-directed working groups. For Beugelsdijk (2008) and Perdomo-Ortiz *et al.* (2009), flexibility is critical to further innovation. Arvanitis *et al.* (2016) complemented the above by asserting that flexibility affects innovation as to proneness but not as to success; that is, there is more innovation but no assurance that innovation will see market success.

Regarding participation, Jiménez-Jiménez and Sanz-Valle (2005) pointed out that allowing employees to share their ideas fosters innovation, which Cano and Cano (2006) assert is entirely the opposite because teamwork and experience exchange do not foster or create a relevant, innovative performance, but a brainstorming instead. On the other hand, Colombia has seen little research linking human resource management practices and innovation. Becerra and Álvarez (2011) demonstrated that training is the only practice that promotes innovation, while Costamagna, Idrovo, Mendi, and Rodríguez (2020) only pointed to participation as a fundamental tool in the areas of research and development.

In terms of SMEs, it is necessary to mention, especially for the Colombian case, that training is isolated, scarce, or nonexistent, and there are no training programs available (Gómez, 2014; Uribe, 2003). Furthermore, selection and performance appraisal are informal, subjective, and performed empirically and non-technical, whereas compensation covers the basics and, in many cases, is incentive-free. Lastly, flexibility, participation, and communication are not regarded as strategic human resource management topics; however, there may be autonomy depending on the company type (Calderón, Naranjo Valencia, and Alvarez, 2010; Uribe,

2003). In this regard, the research linking human resource management practices and innovation are even scarcer. Most re-search (Riana, Suparna, Made, Kot, and Rajiani, 2020, for instance) suggest that the effect is similar in SMEs.

However, Reina (2016) found that human resource management practices favor product innovation, while Curado (2018) ascertains that they favor innovation in general by achieving greater confidence, knowledge, and commitment. As regards the practices taking place in-side SMEs, we found that incentive-given compensation (Adla, Gallego-Roquelaure, and Calamel, 2019), training, and compensation (Vu, Thi, Nguyen, and Hoang, 2020) are the ones that promote innovation the most. On the contrary, López- Fernández, Urquiola-Sánchez, and Capa-Benitez (2018) concluded that personnel selection practices, training and development, rewards, performance appraisals, and innovation are insufficient to improve innovation in SMEs.

In the case of Colombia, there is only one research that addresses both human resource management and innovation, which shows that human resource management and its effect on innovation could lay the foundations for companies to improve in these aspects and channel human capabilities towards not only innovation, but also competitiveness (Iglesias-Navas, Rosero Flórez, and Castañeda Villacob, 2018).

Per the foregoing, we can say that such practices as personnel selection and training amply develop workers, translating into innovation activities. At the same time, compensating and appraising performance facilitate timely error correction and aid continuous worker improvement. On the other hand, communicating, flexibility, and participating bring employee behavior changes, making them more innovative. That is due to factors of motivation, development, and participation. Based on the above statements, it is posited that:

H_{ia} : Personnel selection affects the overall innovation in small and medium-sized enterprises.

H_{ib} : Personnel training affects the overall innovation in small and medium-sized enterprises.

H_{ic} : Personnel performance appraisal affects the overall innovation in small and medium-sized enterprises.

H_{id} : Personnel compensation affects the overall innovation in small and medium-sized enterprises.

H_{ie} : Flexibility affects overall innovation in small and medium-sized enterprises.

H_{if} : Communication affects overall innovation in small and medium-sized enterprises.

H_{ig} : Personnel participation affects overall innovation in small and medium-sized enterprises.

Concerning the types of innovation, the practices' effects appear similar according to varying research attesting to the relationship between human resource management practices and each innovation type. Colombian SMEs are more innovative in products and services and, to a lesser extent, in management systems (Gálvez Albarracín, Cuellar, Restrepo, Bernal, and Cortes, 2012). For Rasool, Samma, Wang, Zhao, and Zhang (2019), human resource management practices positively affect all innovation types in the same way. Nevertheless, Lian and Kian (2019) concluded that motivational practices affect product and process innovation, but not the management systems' innovation when applying the AMO model. Furthermore, they found that opportunity-related practices do affect innovation in general but not a specific type. In the case of product innovation, Crowley and Bourke (2017), Snow, Quintana, and Osorio (2016), Okoe, Boateng, Narteh, and Boakye (2018) concluded that collaboration-associated practices, such as general autonomy and participation, are the ones that promote product innovation since they enable the flow of ideas concerning the company's core business. However, Crowley and Bourke (2017) added that incentives directly boost this type of innovation because employees feel they will receive something in return for an idea that favors the company's product or service. However, De Saá-Pérez and Díaz-Díaz (2010) concludes that human resource management practices do not influence product innovation. The above is because this type of innovation will be given

a varying degree of importance, depending on the company's sector and its operations. It is thus concluded:

H_{2a} : Personnel selection does affect product and services innovation in small and medium-sized enterprises.

H_{2b} : Personnel training does affect product and services innovation in small and medium-sized enterprises.

H_{2c} : Personnel performance appraisals do affect product and services innovation in small and medium-sized enterprises.

H_{2d} : Personnel compensation does affect product and services innovation in small and medium-sized enterprises.

H_{2e} : Flexibility does affect product and service innovation in small and medium-sized enterprises.

H_{2f} : Communication does affect product and service innovation in small and medium-sized enterprises.

H_{2g} : Personnel participation does affect product and services innovation in small and medium-sized enterprises.

Research about process innovation is scarce; however, De Saá-Pérez and Díaz-Díaz (2010) concluded that formalizing the human resource policy in a plan that encompasses all practices and work stability increase innovation in processes. On the other hand, Haneda and Ito (2018) ascertain that compensation and human resource practices negatively affect process innovation because wage differences hinder collaboration between employees, making it impossible to improve company processes. In this vein, it is posited that:

H_{3a} : Personnel selection affects product and services innovation in small and medium-sized enterprises.

H_{3b} : Personnel training affects the overall innovation in small and medium-sized enterprises.

H_{3c} : Personnel performance appraisal affects the overall innovation in small and medium-sized enterprises.

H_{3d} : Personnel compensation affects the

overall innovation in small and medium-sized enterprises.

H_{3e} : Flexibility affects overall innovation in small and medium-sized enterprises.

H_{3f} : Communication affects overall innovation in small and medium-sized enterprises.

H_{3g} : Personnel participation affects overall innovation in small and medium-sized enterprises.

Innovation in management systems shows that human resource practices, such as participation and performance appraisal, are positive and significant for this type of innovation to take place, given these practices' characteristics' effects on employees in terms of feedback and decision-making abilities towards their work (Chen and Huang, 2009). On the other hand, in the case of Brazil, Parizotto, Severo, Ferro De Guimaraes, and Rotta (2020) sustain that human resource practices that provide benefits and quality of life to employees, like those associated with motivation, favor innovation in management systems because the employee feels strongly committed to the company and less willing to quit. In this vein, it is posited that:

H_{4a} : Personnel selection affects innovation in management systems in small and medium-sized enterprises.

H_{4b} : Personnel training affects innovation in management systems in small and medium-sized enterprises.

H_{4c} : Personnel performance appraisals affect innovation in management systems in small and medium-sized enterprises.

H_{4d} : Personnel compensation affects innovation in management systems in small and medium-sized enterprises.

H_{4e} : Flexibility affects innovation in management systems in small and medium-sized enterprises.

H_{4f} : Communication affects innovation in management systems in small and medium-sized enterprises.

H_{4g} : Personnel participation affects innovation in management systems in small and medium-sized enterprises.

3. Methodology

Our methodology’s approach is quantitative and explanatory because the latter permits us to account for the determinants of a variable and explain its behavior. The sample comes from a cluster sampling focused on the three main cities in Colombia: Bogotá, Medellín, and Cali, which account for the majority (80%)¹ of the Colombian SMEs. Cities such as Bucaramanga and Barranquilla were included during the information gathering process; however, no company issued any response in these two cities, which led to their exclusion. A simple random sample was then applied to the selected clusters with a 95% confidence level, a 5% margin of error, and a 50% probability of success and failure. For Medellín and Bogotá, response rates reached 65%, while they did 85% in Cali. Hence, Cali was weighted higher in the total sample. The sample consisted of 492 SMEs made up 42.07% by Bogotá, 39.23% by Cali, and 18.7% by Medellín.

Independent Variable

Human Resource Management is divided into seven categories (Performance Appraisal, Compensation, Participation, Communication, Flexibility, Selection, and Training) as per the AMO model proposed by Bailey (1993) and adapted by Marín-García and Martínez (2016).

Dependent variable

Innovation: OECD and Eurostat (2005) variables adapted by Domingo García Pérez de Lema are used to measure innovation through products, processes, and innovation in management systems. This model is better-fitting because others based on new-product or investment volumes tend to minimize SMEs’ innovation activities.

Control Variables

- Number of workers in 2018: it is a continuous variable ranging from 10 and 200 as per the definition of SMEs in Colombia.
- Company age: it is a continuous variable that occurs over the company’s years of operation.
- Manager Gender: it is a dummy-type dichotomous variable assigned 0 when male and 1 when female.

The dependent and independent variables were constructed according to a 7-item Likert scale, where one equals disagree, and seven equals agree. Also, they result from the arithmetic means of the variables in each model. A factor analysis was carried out to confirm all variables’ validity, wherein the factor loads, the KMO coefficient, and the Bartlett sphericity test yielded acceptable results to validate the indicator. In terms of reliability, Cronbach’s alpha was employed (Table 1).

Table 1. Validity and Reliability Analysis

Variables	Items	Factorial loads per item		Cronbach’s Alpha
Performance Appraisal	1	0,83	Explained variance: 59,128%	0,75
	2	0,731	Bartlett’s Sig.: 0,00	
	3	0,738	KMO: 0,766	
	4	0,773		
Compensation	5	0,872	Explained variance: 76,093%	0,64
	6	0,872	Bartlett’s Sig.: 0,00 KMO: 0,600	
Participation	7	0,815	Explained variance: 66,378%	0,7
	8	0,815	Bartlett’s Sig.: 0,000	
			KMO: 0,60	

¹ Data as per the Chambers of Commerce of Bogotá and Cali.

Communication	9	N/A	N/A	N/A
Flexibility	10			
Selection	11	0,577	Explained variance: 52,250%	0,6
	12	0,858	Bartlett's Sig.:0,000	
	13	0,868	KMO: 0,611	
Training	14	0,47	Explained variance: 54,677%	0,6
	15	0,514	Bartlett's Sig.: 0,000	
	16	0,839	KMO: 0,500	
	17	0,773		
Product and services innovation	18	0,866	Explained variance: 74,9%	0,66
	19	0,866	Bartlett's Sig.: 0,000 KMO: 0,500	
Process innovation	20	0,849	Explained variance: 72,1%	0,6
	21	0,849	Sig.Barlett:0,000 KMO: 0,500	
Management systems innovation	22	0,833	Explained variance:57,61%	0,6
	23	0,808	Bartlett's Sig.: 0,000 KMO: 0,620	
	24	0,610		
Overall Innovation	Products/ services	0,853	Explained variance: 58,57%	0,62
	Processes	0,851	Bartlett's Sig.: 0,000	
	Management systems	0,579	KMO: 0,500	

Source: Author's own elaboration.

4. Results and Discussion

Of the sample analyzed, men run 75.3% of the companies, whereas women run 24.7%. The average number of years in operation is 30, while the average number of workers is 54. Table 2 presents the averages, standard deviations, and correlations for each of the variables in the analysis. As that table suggests, SMEs' most common human resource practices are participation, selection, and compensation, and these companies innovate mainly in management systems. Similarly, the results show a

significant relationship between human resource management practices, innovation, and demographic variables. Relationships were found mainly between company age with compensation, communication, selection, and innovation in management systems and overall innovation. Regarding the manager's gender, there is a relationship between it and process innovation. On the other hand, multivariate linear regression was carried out to determine the effect of human resource practices on innovation and innovation types. The model appears below:

Dependent variable

$$= \beta_0 + \beta_1 Selection + \beta_2 Training_i + \beta_3 PerformanceAppraisal_i + \beta_4 Compensation'_i + \beta_5 Flexibility'_i + \beta_6 Communication'_i + \beta_7 Participation + \beta_8 Company age'_i + \beta_9 Number of employees'_i + \beta_{10} Manager gender'_i + \varepsilon_i (1)$$

= $\beta_0 + \beta_1 Selection$

Table 2. Descriptive statistics and correlations

Variables	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Company age	30,14	16,50	-													
2. Number of workers	53,59	159,58	0,044	-												
3. Manager gender	0,25	0,43	0,038	-0,043	-											
4. Selection	5,10	1,06	,263***	-0,018	-0,003	-										
5. Training	4,45	1,05	,160***	0,048	0,053	,481***	-									
6. Performance Appraisal	4,95	0,99	-0,085	0,000	-0,070	,130***	,143***	-								
7. Compensation	5,10	0,97	-0,085*	-0,054	0,013	-0,019	0,018	,261***	-							
8. Flexibility	5,00	1,40	0,030	0,036	0,018	,227***	0,053	0,052	,114**	-						
9. Communication	5,11	0,88	,113**	0,045	-0,041	,281***	,160***	,152***	,149***	,507***	-					
10. Participation	5,17	1,11	-0,101**	-0,036	-0,007	-0,102**	-0,050	,162***	,651***	,110**	,151***	-				
11. Product/ services innovation	4,83	1,04	-0,054	0,027	-0,049	,226***	,154***	,218***	,123***	0,005	0,078	0,019	-			
12. Process innovations	4,94	1,17	-0,012	0,060	-0,082*	,180***	0,066	,208***	,092**	0,067	0,042	0,076	,455***	-		
13. Innovation in management systems	5,05	0,92	,202***	-0,040	0,089	0,085	0,066	-0,059	0,010	,095***	,126***	0,017	0,024	0,013	-	
14. Overall innovation	4,95	0,68	,092**	0,015	-0,007	,239***	,142***	,162***	,105**	0,086	,135***	0,054	,674***	,706***	,612***	-

†p < .10 *p < .05 **p < .01 ***p < .001.

Source: Author's own elaboration.

Table 3. Linear regression analysis

Variables	Innovation			
	Product/Services	Processes	Management systems	Overall
Control Variables				
Number of workers	0,038(0,0002)	0,069(0,0003)	-0,051(0,0002)	0,049(0,0001)
Company age	-0,1021(0,002)**	-0,033(0,0033)	0,182(0,002)***	0,049(0,001)
Manager gender	-0,033(0,1045)	-0,062(0,121)	0,074(0,095)*	0,0002(0,069)
Main Effects				
Selection	0,222(0,051)***	0,206(0,061)***	-0,002(0,047)	0,193(0,034)***
Training	0,036(0,049)	0,041(0,057)	0,028(0,044)	0,015(0,032)
Performance Appraisal	0,148(0,0482)***	0,171(0,056)***	-0,061(0,043)	0,111(0,031)**
Compensation	0,132(0,062)**	0,024(0,072)	0,003(0,056)	0,072(0,041)
Flexibility	-0,070(0,037)	0,048(0,045)	0,042(0,035)	0,003(0,025)
Communication	0,022(0,061)	-0,062(0,073)	0,090(0,056)	0,041(0,040)
Participation	-0,071(0,053)	0,064(0,063)	0,025(0,49)	0,008(0,035)
Adjusted R2	0,094	0,067	0,047	0,0659
R2	0,112	0,087	0,066	0,0852
$\Delta R2$	0,0119***	0,009***	0,038***	0,002***
F Value	6,0436***	4,4193***	3,4050***	4,433***
Note: Errors are in parentheses n=492 SMEs				
†p < .10 *p < .05 **p < .01 ***p < .001				
Source: Author's own elaboration.				

The dependent variable is innovation, either global or any type (products and services, processes, and management systems). $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ are the parameters associated with the human resource management practices variable, while $\beta_8, \beta_9, \beta_{10}$ are the control variables and the model's random error. In general, it is evident that human resource practices do affect innovation, a recurring event in most research concerning any kind of organization (Laursen, 2003; Laursen and Foss, 2012). In the case of SMEs, the same happens (e.g., Riana *et al.*, 2020).

Based on the proposed model, Table 3 shows that there are practices positively and significantly associated with overall innovation, such as selection ($P = 0,193, p < ,001$) and performance appraisal ($P = 0,111, p < ,05$). In the case of product or services innovation, selection ($P = 0,222, p < ,001$),

performance appraisal ($P = 0,148, P < ,001$) and compensation ($P = 0,132, p < ,05$) are in a positive and significant relationship. In the case of process innovation, the results are equal to global innovation's (selection and performance appraisal). Nevertheless, the results of innovation in management systems did not display any effect from human resource practices.

Therefore, hypotheses $H_{1a}, H^{1c}, H_{2a}, H_{2c}, H_{2d}, H_{3a}$, and H_{3c} are accepted, while the rest of the hypotheses related to other human resource practices are not, as they failed to yield statistically significant results. As such, selection and performance appraisal become the par-excellence practices for Colombian SMEs to improve on innovation. Regarding selection, these results match the findings by Kianto *et al.* (2017) and Natalicchio *et al.* (2018), who sustain that these processes ensure

staff knowledgeable in improving company products. Furthermore, this exercise showed that it is essential that SMEs select personnel according to their traits, competencies, skills, and the position's characteristics, instead of informally and subjectively, as most of these companies do it. In terms of performance appraisal, these results match Jiménez-Jiménez and Sanz-Valle (2005), who found out that when people receive feedback for their work, they improve performance and innovate.

However, this result is a contribution to further research, for this exercise is not that broad-scoped. Non-significant results in terms of training and compensation are related to the findings of Arvanitis *et al.* (2016), Chowhan *et al.* (2017), and Meyer and Leitner (2018). They argued that high training can lead to over-qualified personnel, which will not ensure better results, and that an additional performance- or achievement-based reward will not necessarily drive employees to innovate more. In terms of flexibility, communication, and participation, the results coincide with Arvanitis *et al.* (2016), and Cano and Cano (2006) in that giving opportunities to employees does not entail innovative performance since these are each company's characteristics and do not generate further knowledge for the worker.

Also, in general terms, Lian and Kian's (2019) research model found the same results of this research through the AMO, where practices influence product and process innovation but not an innovation in management systems. In that regard, the conclusions of López-Fernández *et al.* (2018) become questionable in that they pointed out that, in general, human resource practices are insufficient to generate innovation. These results attest to the importance of three of them.

5. Conclusion

This research revealed that SMEs in the cities studied have human resource management practices in place and innovate. Notwithstanding, practices, and innovations vary by type, mainly involving participation, selection and compensation practices, and

innovation in management systems. As for the effect of the study variables, it can thus be concluded that the practices that affect innovation are selection and performance appraisal, which does not happen in innovation in management systems and is the one that SMEs were most engaged in at the time of the study.

As for product innovation, it is also evident that compensation has a positive effect. From the above results, it can be concluded that working through external capabilities, formalizing or aligning practices to position and performance would allow the company to innovate. However, it should be borne in mind that isolated practices, such as selection and performance appraisal, may be more conducive to SMEs' innovation, a behavior unobserved in larger companies.

It can also be concluded that selection and performance appraisal are the practices that ensure the right staff for each position and that they receive feedback on their work, which contributes to work-employee aligning in the case of SMEs. In this vein, SMEs should be careful to think that compensation and training are the tools to generate knowledge and, therefore, innovate. There are external motivation-related elements that are fundamental to product or process change or development. Thus, practices that generate knowledge and not those that generate motivation are regarded as the base unit.

Among this research's practical implications and main contribution is to provide Colombian SMEs with guidance and aid in prioritizing practices to achieve their goals. As these organizations lack the resources and interest in having formalized, objective practices, there is now an incentive and a fundamental course for SMEs to improve their competitiveness and perhaps be strengthened through the people and practices geared to them. Also, since there has not been prior research of this kind in Colombia, these results are the theoretical baseline for building a more robust model that allows SMEs to innovate and include human resource management as a component that enhances superior performance in innovation.

Within this research's limitations, at the methodological level, is the selection of the

three main cities of Colombia since there were no responses from the other two and there was a higher degree of concentration in one of them in order to obtain a representative sample. Despite having a reasonably representative number of SMEs, future research should also include other cities in the country in a probabilistic manner so as to reach these very conclusions with the weighted weight concentration thereof.

On the other hand, this research results should not be generalized, as some components went unassessed, namely, knowledge management and personnel capacity appraisal. Therefore, future research should include these variables as mediating elements to find other types of results. Likewise, future research should include employee performance since this research failed to learn how these practices affect worker performance and motivation that ensure high degrees of innovation.

6. Conflict of Interest

The author declares no conflict of interest.

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