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MANAGER'S PERCEPTION ABOUT INNOVATION WITHIN THE SMES IN MONTEMORELOS, NUEVO LEÓN, MÉXICO

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ABSTRACT

This research studies the perception of innovation by managers of small and medium enterprises in Montemorelos, Nuevo León. Small and Medium Enterprises (SMEs) are the engine that drives the economy in Mexico and play a fundamental role in the creation of new sources of income. Therefore, research regarding SME.s is important. Montemorelos is a municipality of Nuevo León that depends economically on SMEs. As several authors have mentioned, one of the success factors of SMEs is innovation. In this research we examine the perception of the administrator regarding innovation. We analyze our results based on gender, type of company and level of education. It is quantitative, descriptive, cross-transversal research. Sample selection was done using the convenience method to meet certain criteria. Some 80 SME managers were surveyed in their areas of work. For the data collection, an instrument was used to measure self-perceived innovation by the managers. The instrument consisted 15 items with a scale of 1 to 7 and a reliability of .919 alpha of Cronbach. The study showed no difference in the perception of innovation based on gender, type of business and level of education. It was also found that most Small Business Managers (SMBs) consider the complaints and suggestions of their customers to improve their product or service.

JEL: M13, M16, M19

KEYWORDS: Strategy, Innovation, Small and Medium Enterprise (SMES)

INTRODUCTION

The purpose of this research is to identify the perception of innovation by managers of small and medium enterprises in Montemorelos, Nuevo León. Specifically, we examine the relationship between gender, business type and education level of managers. We note that innovation is an essential element for firms because it helps increase company profitability. Basurto Gutierrez (2016) shows that innovation is a good construct to explain business development. Some authors argue that opportunities arise at any time, but only the sectors that develop innovation can take advantage of it and obtain the best benefits. It is essential to emphasize that we live in a globalized and constantly changing era, where customers frequently seek new products. This implies that SMEs must operate under the same market dynamics. Innovation is not always using technology but applying knowledge that adds value to a product or service. Hence the importance of knowing the degree of perception regarding innovation by the managers of small and medium-sized enterprises (SMEs) in Montemorelos, Nuevo León is important. Innovation helps the company evolve quickly according to the demands of customers. Increasing competition and cost reductions make innovation essential to improve the positioning of the company.

Montemorelos, Nuevo León, is located 82 km southeast of Monterrey and according to figures from the National Institute of Statistics, Geography and Information Technology (INEGI, 2015) has a population of

60,829 inhabitants. Montemorelos is known for its citrus industry. It holds the title of "citrus capital" of Mexico. It also has a variety of tourist attractions such as the General José María Morelos y Pavón monument and the Montemorelos planetarium. The planetarium is unique in its class because it has clockwork, physics and astronomy, the bioparque estrella, as well as XVIII, XIX and XX century buildings. In addition, two Franciscan missions Gildeleiba and Escobedo since 1715, established the chapel of San Mateo del Pilon in 1798. Other attractions include the majestic temple of Sagrado Corazón de Jesús, the Municipal Palace, hacienda hulls, beautiful houses and buildings with the hallmark of Northeast of Mexico (Montemorelos Municipal Government, 2016). The research is organized as follows: in the literary review section the concepts of innovation, their importance and dimensions are discussed, later we present the methodology utilized, an analysis of normality, a descriptive analysis of the demographic variables and the analysis of the hypotheses. The paper closes with some discussion and conclusions.

State of the Art

According to Schumpeter (2002) economic development is driven by innovation through a dynamic process in which new technologies replace old ones, helping companies see innovation as a tool to gain benefits and improve their competitiveness in the market. Hernández, Yescas and Domínguez (2007) comment that innovation is a critical factor to identify and efficiently take advantage of opportunities of the moment for the survival and success of companies. Likewise, the growing and sustained success of the company is always dependent upon its innovative capacity. Madrid Guijarro and García Pérez de Lema (2008) suggests that innovation and development lead to increased profitability and growth of the company. According to Chesbrough's (2004) open innovation model, the future of the company is something that is created, invented and innovated with all its stakeholders (employees, partners, customers, local communities, shareholders, suppliers). Companies are no longer able to tackle the entire innovation process themselves and must rely on external resources (intellectual property, ideas, products, people, institutions) to be integrated into their own innovation chain. At the same time, the results of their work can be useful for other companies and in other markets. This offers a way to profit from that innovation that is unsuccessful for the primary objectives of the company.

There are different ways of defining innovation; Seaden, Guolla, Doutriaux, and Nash (2003) argue that innovation is the implementation of new processes, products or management approaches to increase efficiency and effectiveness in the company. Van de Ven (1996) defines innovation as the development and implementation of new ideas, using the following four factors: new ideas, people, transactions and institutional context. Tidd (2001) examines innovation and organization. This 2001 work proposes that best practices of innovation vary according to a series of factors. Thus, it is necessary to identify organizational configurations more suitable for specific environments. On the other hand, Olson, Slater and Hult (2005) proposes a global measurement for the results of the organizational performance by means of perceived performance with respect to the company and the competitors. Through perceived performance, it is possible to obtain qualitative and quantitative results that are important for the organization.

There is no doubt that innovation is an important factor for SMEs; According to Wilson (2003), innovation is crucial for long-term economic growth of a country, since it stimulates the productivity and the competitiveness of the companies, thus allowing a reduction of prices on goods and services offered by these companies. Therefore, to compete, companies must create new products, services or processes. That is, they must adopt innovation as a way of corporate life. Lar and Mustar (2001) points out that innovation implies rupture, a predisposition favorable to change and permanent adaptation. It implies, therefore, to assume risks and responsibilities. It is necessary to create an innovation-oriented culture model that can effectively manage constant change. Innovation is important but changes for companies always produces barriers or challenges that need to be crossed in so perming improvement. Innovation management is associated with the management of different factors that influence organizational performance.

Hill and Rothaemel (2003) explain that implementation of radical innovations by overcoming organizational barriers, such as boosting absorptive capacity, eliminating inertia or routine actions, encouraging the search for ideas and exploring other market niches, are ways to overcome these types of barriers. Innovation has been measured in many ways. For Etzkowitz (2002), innovation must take into account the following factors: basic research, applied research, technological development, marketing and product launching, linking universities and public research organizations, companies and administrations. Innovation is fundamental condition of SMEs as a vital differentiator with respect to their competition. Rogers (1983) provides an adequate framework for explaining the process of innovation in organizations and describes which factors influence it. Rogers (1983) also identifies phases within the process which are: knowledge, persuasion, decision, implementation and confirmation.

Boer and During (2001) provide a more complete classification of innovation. They use different classification criteria, such as the object of innovation that includes product and process innovation, its incremental or radical impact, the effect of innovation continuist or rupturista and the scale in which it is realized, its origin and the nature of the innovation.

Águila Obra and Meléndez (2010) use the following factors to measure innovation in the company: (a) context of innovation, (b) management innovations, (c) business innovations, (d) product innovation, (e) process innovation, (f) the use of ICT in the company, (g) the purpose of using the internet in the company, (h) the level of internet adoption, (i) innovation activity, (j) the result of innovation activity and (k) public financial support for innovation. Benito-Hernández, Platero-Jiménez and Rodríguez-Duarte (2012) used seven factors to measure innovation in small and medium-sized enterprises. The factors are: (a) innovation, (b) sector innovation, (c) sector dynamics, (d) microentrepreneur profile, (e) resources (financial, cultural, organizational), (g) experiences and strategy.

METHODOLOGY

To define the methodology, we examine the following research question: Is there a significant difference in the degree of innovation perceived by the managers of SMEs in Montemorelos, Nuevo León according to different demographic variables? The hypotheses of investigation are:

> *H_1: Is there a significant difference in the degree of innovation perceived by managers of SMEs in Montemorelos, Nuevo León by gender?*

> *H_2: Is there a significant difference in the degree of innovation perceived by managers of SMEs in Montemorelos, Nuevo León according to business type?*

> *H_3: Is there a significant difference in the degree of innovation perceived by managers of SMEs in Montemorelos, Nuevo Leon according to level of education?*

This was a quantitative, descriptive, cross-transversal research (the data was collected in a determined period). Information was obtained by means of a questionnaire applied in the month of October, 2015. The sample selection was made using the convenience method to meet certain criteria. Some 80 SME managers were surveyed in their areas of work. A data collection instrument was used to measure self-perceived innovation by managers of SMEs in the center of Montemorelos, Nuevo Leon, which was elaborated by Basurto Gutiérrez (2016). This instrument helped diagnose if the SME is innovative and if the innovation influences vary according to demographic variables. The instrument consisted of 15 items with a scale of 1 to 7 and a reliability of .919 alpha of Cronbach. The research instrument was structured considering the following areas: (a) Innovation in the value chain, (b) innovative culture, (c) commitment to actions of change, (d) innovation strategies. The applicable variables of the present investigation are show in Table 1.

Table 1: Operational Definition of Research Variables

Variables	Definition	Items	Unit of Measurement
Dependent	Innovation	Take into account customer complaints for product or service improvements. Systematically take advantage of customer feedback. Designing new products or services according to the actual needs of clients. Administrative commitment to the change activities. Fostering the creativity of its workers. Systematically improve production processes. Systematically develop new products or services. Proactive in anticipation of market changes. Use new strategies as a key factor for success. Evaluate all staff ideas for the development of the company. Invest systematically in new technologies. Allocate the necessary financial resources to the exchange actions. Systematically investing in new technologies. Assigning the necessary human resources to actions of change. Assigning a responsible manager in innovative matters.	Instrument designed on the basis of 15 items
Independent	Gender Business type Level of education	Análisis descriptivo de las variables demográficas	

To measure the degree of self-perception of innovation by managers of companies of Monterrey, Nuevo Leon the average of 15 items was obtained. The variable was considered as metric. To formulate the conclusions of this study, the following equivalence was determined for the scale: 1 = Nothing innovative 2 = Very innovative 3 = Not very innovative 4 = Undecided 5 = Something innovative 6 = Very innovative 7 = Totally innovative

The Kolmogorov-Smirnov test was applied to identify the extent of innovation variable normality. The p value was found to be less than 0.05. As the distribution is not normal the distance of Mahalanobis was calculated and it was found that two of the data were extreme data so they were eliminated and the normality test was applied again, producing a *p-value* was greater or equal to 0.05. Therefore, the distribution of the innovation variable was considered normal.

RESULTS

To determine the self-perception of managers' innovation, a descriptive statistics analysis was done using SPSS version 22 software. A t-test for independent samples was performed to find the differences in self-perception of innovation between gender and company type managers. For the self-perception of innovation regarding the academic level, we used the one-way ANOVA statistical test.

Figure 1 shows the distribution according to gender of the administrative staff. Of the 78 managers who answered the survey, 53.8% are women and 46.2% are men. Figure 2 shows business type to which the administrators who participated in this research belong. Some 38.5% of the respondents have a service company and 61.5% have a commercial company.
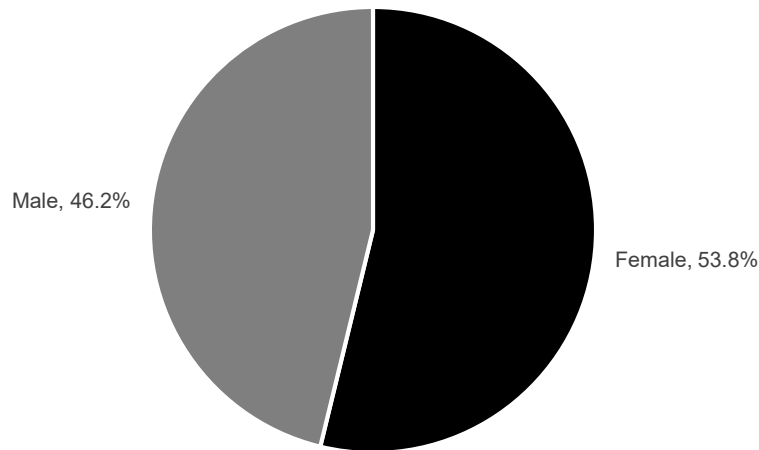
Figure 1: Respondents by Gender

Figure 1 shows the sample distribution according to the managers´ gender.
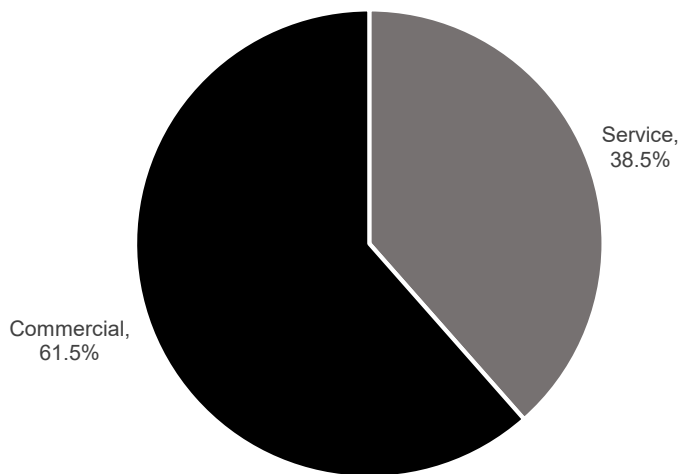
Figure 2: Respondents by Business Type

Figure 2 shows the business type of the managers that participated in the research..

The level of education is shown at Table 1. Some 17.5% of mangers that were part of this research finished high school, 32.5% finished upper secondary education, 23.8% had a technical career and 26.3% have a bachelor's degree.

Tabla 1: Level of Education

	Frecuency	**Porcentage**
Middle School	14	17.9
High school	25	32.1
Technique	18	23.1
Bachelor´s degree	21	26.9
Total	78	100.0

This table shows the managers level of education that participated in this research.

Null hypotheses

H_{01}: There is no significant difference in the degree of innovation perceived by the managers of SMEs in Montemorelos, Nuevo León according to their gender.

The independent variable considered in this hypothesis is gender. The dependent variable is the degree of innovation. To analyze this hypothesis, we used the statistical t-test for independent samples. The Levene F statistic was analyzed and a *p* value equal to 0.010 was observed, so it we assumed the population variances are not equal. Observing the population variance is not equal, we found the statistical value *t* equal to 0.270 with *df* equal to 70,887 and *p* equal to 0.788. Since *p* was higher than 0.05, we accept the null hypothesis (see Table 2). The arithmetic mean of the women was 4.14 and the arithmetic mean of men was 4.09 (see Table 3).

Table 2: T-Test for Gender

		F	Sig	T	Gl.	Sig. (Bilateral)
Innovation	Equal variances	7.020	0.010	0.262	76	0.794
	No equal variances			0.270	70.887	0.788

This table shows the results of t-tests applied to the gender variable showing that there is not a difference of perception between manager according to their gender.

Table 3: Arithmetic Mean for Gender

Gender		N	Mean	Standard Deviation	Standard Error Mean
Innovation	Female	42	4.1452	1.05396	0.16263
	Male	36	4.0917	0.67965	0.11328

This table shows the arithmetic means according to gender

H_{02}: There is no significant difference in degree of innovation perceived by managers of SMEs in Montemorelos, Nuevo León based on type of company. The independent variable considered in this hypothesis is the business nature. The dependent variable is the level of innovation. To analyze this hypothesis, we used the statistical t-test for independent samples. We analyzed the Levene F statistic which produces a *p* value equal to 0.689. We assumed that the population variances are the same. The statistical value *t* equals -0.625, *df* equals 76 and *p* equals 0.534. Given that *p* was greater than 0.05, we retain the null hypothesis of no significant difference in the business type and the innovation of SMEs in Montemorelos, Nuevo Leon (see Table 4). The arithmetic mean of the service companies was 4.04 and the arithmetic mean of the commercial companies was 4.17 (see Table 5).

Table 4: T-Test for Type of Company

		F	Sig.	T	Gl	Sig. (Bilateral)
Innovation	Equal variances	0.161	0.689	-0.625	76	0.534
	No equal variances			-0.632	64.019	0.529

This table shows the result of a t-test apply to the type of company variable showing that there is not a significant difference of perceptions of the manger according to the company type.

Table 5: Arithmetic Mean for Type of Company

Type of Company		N	Mean	Standard Deviation	Standard Error Mean
Innovation	Service	30	4.0400	0.87162	0.15914
	Commercial	48	4.1708	0.91581	0.13219

This table shows the arithmetic means according to the gender

H_{03}: There is no significant difference in the degree of innovation perceived by managers of SMEs in Montemorelos, Nuevo Leon according to education level. The independent variable is the schooling and the dependent variable is the degree of innovation. To analyze this hypothesis we used the one-way ANOVA test. We found that p is equals 0.926 with a value of F (3.74) = 0.155. The results show that the model does not significantly explain observed variation of the dependent variable degree of innovation of managers. Based on the result, we retain the null hypothesis (see Table 6). The arithmetic means were the following: secondary schooling, 4.00; Preparatory schooling, 4.10; Technical schooling, 4.13 and undergraduate schooling, 4.20 (see Table 7).

Table 6: ANOVA Results of Level of Education

	Squares Sum	Df	Quadratic Average	F	Sig.
Between Groups	0.386	3	0.129	0.155	0.926
Within Groups	61.381	74	0.829		
Total	61.767	77			

This table shows the results of the ANOVA test for level of education. The results indicate there is not a different of perception between the managers according to their education.

Table 7: Arithmetic Mean for Level of Education

Level of Education	N	Mean	Standard Deviation	Standard Error Mean
Secondary	14	4.0000	0.84671	0.22629
Preparatory	25	4.1000	0.97425	0.19485
Technical	18	4.1389	0.93440	0.22024
Under graduate (Licenciatura)	21	4.2095	0.84965	0.18541
Total	78	4.1205	0.89564	0.10141

This is the arithmetics means according to their level of education.

Table 8 shows the highest and lowest arithmetic means of the questionnaire statements. The highest means are the following: "Take into account customer complaints for product or service improvements" with 5.08, "Systematically take advantage of customer feedback" with 4.83 , "Designing new products or services according to the actual needs of clients" with 4.44, "Administrative commitment to the change activities" with 4.32 and "Fostering the creativity of its workers" with 4.28, while the lowest mean are "Assigning a responsible manager in innovative matters" with 3.18 "Assigning the necessary human resources to actions of change" with 3.29 "To systematically carry out improvements in the areas of marketing" with 3.54, "Assigning the necessary financial resources to the actions of change" with 3.81 and" Systematically investing in new technologies "with 3.88.

Table 8: Arithmetic Mean

ITEM	N	MEAN
Take into account customer complaints for product or service improvements.	78	5.08
Systematically take advantage of customer feedback.	78	4.83
Designing new products or services according to the actual needs of clients.	78	4.44
Administrative commitment to the change activities.	78	4.32
Fostering the creativity of its workers.	78	4.28
Systematically improve production processes.	78	4.24
Systematically develop new products or services.	78	4.24
Proactive in anticipation of market changes.	78	4.19
Use new strategies as a key factor for success.	78	4.17
Evaluate all staff ideas for the development of the company.	78	3.98
Invest systematically in new technologies.	78	3.88
Allocate the necessary financial resources to the exchange actions.	78	3.81
Systematically investing in new technologies.	78	3.54
Assigning the necessary human resources to actions of change	78	3.29
Assigning a responsible manager in innovative matters.	78	3.18
Innovation	78	4.12

This table shows the arithmetic means of each of the items of the survey.

DISCUSSION

Overall, we found that SMEs in Montemorelos, Nuevo León take innovation into account when they listen to their customers' complaints to improve the product or service they offer and when they systematically take advantage of the suggestions of improvement provided by their clients. The Oslo Manual defines an innovative company as one that has developed products or processes that incorporate technological improvements of a radical or incremental nature in a given time of reference. From our results, SMEs in Montemorelos are *somewhat innovative* according to the questionnaire used for this research. We found that gender, business type and education level do not make a significant difference in innovation compared to the results of Basurto Gutiérrez (2016), who analyzed the autoperception of managers from SMEs in Monterrey, Nuevo Leon. They did not find any different either. However Danilda and Thorslund (2011), found that gender is important for innovation and problem solving because they comment that teams with balanced participation of women and men duplicate the possibilities of overcoming performance expectations, compared to only male or female groups.

CONCLUSIONS

The purpose of this research is to identify perceptions of innovation by the managers of small and medium enterprises in Montemorelos, Nuevo León. We explore perception differences based on gender, business type and education level of managers. We found that gender, business type and education level are not significant for SMEs innovation and that most SMEs take into account the complaints and suggestions of their customers to improve their products or service. Managers were defined as "*somewhat innovative*". We summarize that it is necessary to promote innovation in SMEs because to compete in the market we need to improve what we do. There is a need for innovations that promotes greater productivity for the growth of SMEs. Evaluating innovation in SMEs helps identify areas of opportunity that enable them to improve their ability to offer better products to the market and efficiently use information and technology to improve processes. Finally, this research presents documentary support accounts for the importance of innovation

in the achievement of SMEs' objectives. Innovation is a way of boosting revenues, relations with stakeholders and maximizing the execution of processes. This research is limited because is missing the clients perspective of the products or services. Further research is recommended to survey the managers, employees and clients perspective to identify the extent of innovation.

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