The Influence of Innovation Activities and Knowledge Management on the Production Processes for a Higher Level of Competitiveness of Mexican SMEs

Héctor Cuevas-Vargas

Luis Aguilera Enríquez

Octavio Hernández Castorena

Department of Business Administration
Autonomous University of Aguascalientes
Av. Universidad #940, Ciudad Universitaria
Aguascalientes, Ags. C.P. 20131
Aguascalientes, Mexico

Abstract

This empirical study of explanatory type was aimed to identify the influence of the knowledge management and innovation activities on the production processes for a higher level of competitiveness of Manufacturing Small and Medium Enterprises (SMEs) of Aguascalientes. The instrument used was a questionnaire whose measurement scales were submitted to a First Order Confirmatory Factor Analysis (CFA) through the maximum likelihood method, which has reliability and convergent and discriminant validity; and which have been applied to the managers of 150 manufacturing SMEs, the results obtained through theMultiple Linear Regression Analysis allow us to infer that both the variable knowledge management and innovation activities have a positive and significant influence on production processes, and the production processes enable SMEs to have a higher level of competitiveness in a rapidly changing environment which currently face.

JEL: M20, O31, L60

Keywords: knowledge management, innovation activities, production processes, competitiveness, manufacturing SMEs

1. Introduction

Small and medium enterprises (SMEs) are considered as the main driver of the continued economic expansion and employment growth in most countries, likewise, these businesses are the backbone of the national economy by trade agreements that Mexico has had in recent years and also for its high impact on job creation and domestic production. Despite the importance of these businesses, one of the main problems they face is the lack of innovation. As noted by the National Chamber of the Transformation Industry (2010) according to a survey about the problems that face industrial companies, industrial companies found to have failed to adequately address the lack of competition for technological innovations, a point noted by 20% of the 472 surveyed industrial enterprises.

Nowadays, organizations increasingly give greater importance to the treatment and conversion of information, knowledge, and skills in work force, and to do knowledge management, has been identified by some researchers as a process of displacement with respect to value of firms in intangibles (Jones, 2004; Maldonado, Martinez & Garcia, 2012). For their part Cuevas, Rangel & Hernandez (2014) note that managers of SMEs should be aware of the importance of the creation and consolidation of knowledge in various functions and processes of the company, allowing motivate employees for innovations to be developed to become useful knowledge for the organization, besides transmitting it to other colleagues in ascending, descending, horizontal and diagonal direction, without neglecting the move to the new members who can provide training to their functions and their incorporation the company.

It is noteworthy that in recent years has been important to pay attention to changes that have occurred not only in the global economy, but local trends of managing an organization; especially an SME in one of the areas of special interest is to analyze the processes of production (Lipovatz *et al*., 2000, cited in Aguilera, Hernandez & Colin, 2014).

On the other hand, most of the empirical studies, presented on the current literature about the relationships between knowledge management and innovation activities on production processes, have been focused on large companies of highly developed countries, ignoring small and medium-sized enterprises (SMEs) in general, and more in countries under development, such as Mexico.

Therefore, an additional contribution of this study, apart from applying it in SMEs in a country under development, like México, is the application of a methodology which is different from previous studies and consistent in testing the theoretical model by validating the constructs through a Confirmatory Factor Analysis and proving the hypothesis through a Multiple Linear Regression Analysis.

Given this background, this research aims to analyze the influence of knowledge management and innovation activities in the production process for greater competitiveness, and it is therefore important that the researcher is challenged by one side if knowledge management and innovation activities are key to improving the level of their production processes, and secondly if the production processes allow manufacturing SMEs being more competitive. In this sense, the research was conducted in the state of Aguascalientes on a sample of 150 SMEs in the period between September and November 2012.

2. Literature Review

The development of the research model object of the present study describes the relationship between knowledge management and innovation activities with production processes, and production processes to the competitiveness of SMEs; is why in the following sections are intended to clarify the different components of the model under study, with the intention to sustain theapproaches and results.

2.1 Relationship between Knowledge Management and Production Processes

Enabling technologies for the development of knowledge are emerging. Generally no innovation projects are documented, and are connected in networks in which they can support with external actors to generate new ideas (Zapata, 2004).

The study of knowledge management in organizations is given through three aspects: knowledge-generating processes, learning processes, transmission and dissemination of knowledge and measurement of intangible assets (Estrada & Dutrénit, 2007). Companies that incorporate knowledge and innovation as an essential part of organizational management obtain a significantly higher operating profit (in statistical terms) than those that do not incorporate them (Uribe, Gaitán & Potts, 2009).

The Domain Transfer of knowledge can be considered as key for SMEs to gain competitive advantage through the acquisition of such knowledge through cooperation between companies. SMEs are generating a good source of knowledge, but do not know or cannot exploit this fact (Capó-Vicedo, Tomás-Miquel& Exposito-Langa, 2007). This competitive advantage should lie up in the endowment and development of knowledge originated and accumulated by the main asset of the company, who are the people who make (Santana, Velázquez& Martel, 2006). Therefore, all management employees caused by knowledge must serve to fulfill the objectives of the organization through adequate capture of all the good ideas that arise, regardless of where they are (Estrada & Dutrénit, 2009).

Today, knowledge management has become a key element for business competitiveness by implementing processes that produce changes in organizational culture element, information, motivation and incentives and training or staff training; for which, requires that the company must change the way to direct their productive units involved with their workers and other social factors, but ensuring that skills grow with the organization (Hernandez & Nava, 2009). Knowledge management is critical to the implementation process, and that knowledge should be administered in an environment of discontinuous change, where the ability of the company to adapt, survive and compete is essential (Páscale, 2005). That is why, from the above, the following hypothesis is proposed:

H_1: A higher level of knowledge management, the highest level in the production process in manufacturing SMEs in Aguascalientes.

2.2 Relationship between Innovation Activities andproduction Processes

Countries commonly engaged in innovation in production processes of their organizations, mainly in small and medium enterprises, show a substantial competitive advantage over innovation activities carried out in those countries with the lowest potential (Maldonado, Martinez, Hernandez & Garcia, 2012). Meanwhile, Monsalves (2002) mentions that an innovation has been implemented if it has been introduced on the market (product innovation) or used within a production process (process innovation). The realization of innovation activities exclusively to the product level or prioritizing activities related to processes, machines, or the organization of production, may denote completely different strategies (Ortiz, 2006).

The globalized world in which consumers seek greater satisfaction, affects the production of companies so that constant innovation seek to generate greater value added in production processes and innovation activities, which do not relate price-only product but with the benefits that the product gives the consumer against its competitors (Coarse, Gomez & Quintero, 2011). The management of resources for the promotion of innovation becomes central to their proper management, so it is important to check what is inside the company does and how it performs on behalf of itself and its environment (Corona, Montaño & Ramirez, 2010). Among the activities appropriate to the organization and management of business innovation are those related to access to information technology and computer networks, as well as environmental protection, risk prevention, quality control, etc. (Sancho, 2007).

It is closer to innovation rather than very concrete technology or as a process that incorporates social change as a process socially distributed, allowing view it as an arena of conflict that demands intervention by the state if you want to develop social skills innovation (López, 2004). According to Villavicencio (2000), innovation in business is essentially a matter of learning how to organize the dissemination and creation of knowledge. In short, it's a learning process. Learning encourages invention and this in turn alters the production process (Thomson, 1993).

Despite efforts to incorporate innovation as part of its organizational culture, Mexican SMEs require strong support from the government, specifically in the development of innovation, so that more and more companies join the innovation as an essential business strategy for growth and business development, and as a work culture; especially for changes or improvements to the products or services and production processes, and to a lesser extent changes or improvements in management systems (Solutions, 2014). Thus, under this perspective the following hypothesis is proposed:

H_2: A higher level of innovation, the highest level in the production process in manufacturing SMEs in Aguascalientes.

2.3 Relationship between Production Processes and Competitiveness

Within a given territorial context, the strategy to influence innovation and competitiveness of the production system is a political action aimed at increasing foreign capacity of small and medium enterprises (Tkachuk, 2004). The development of innovative activities requires as a necessary condition of the existence of a minimum threshold of written procedures and methods, both the production process and the overall management of companies (Yoguel & Boscherini, 1996). Parallel to the above will be modernized infrastructure available scientific and technological research in the various countries. It seems clear that if the invisible hand has failed to present satisfactory results in terms of productivity and international competitiveness something must be done about it (Katz & Stumpo, 2001).

In concordance with Sánchez & Bañón (2005), the company's ability to produce goods and services depends on its technological assets; therefore the technology acquired by the company or the use thereof is made will determine the position relative to the competition. Access to updated technology is another critical for small companies to improve their production processes and management and their competitive factors. However, problems of availability of information may hinder access to technology. This situation is compounded by the reluctance of smaller to hire a specialist to address these issues entrepreneurs. Moreover, the assistance of machinery and equipment vendors may be biased by their own interests, which may lead to wrong investment (IDB, 2002).

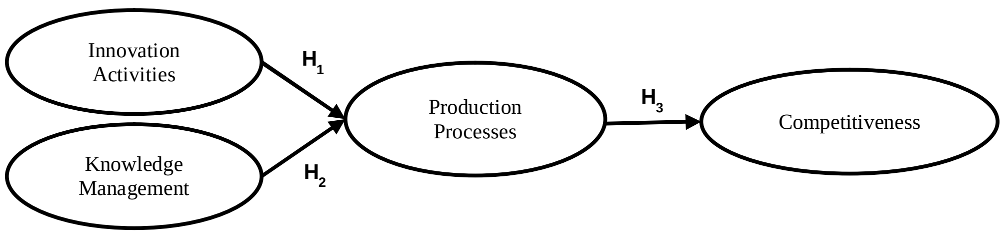
The change in consumer demand, which demand other products, impinge more on factors such as quality, personalization, commitment to the environment, etc., leading companies need to reduce their dependence on physical components of production, giving more importance to intangible assets and factors such as innovation (Capó-Vicedo, Expósito-Langa & Masiá-Buades, 2007).

A policy to support SMEs necessarily involves improving their productivity, modernization and management processes, and accelerates innovation efforts as a way to increase its competitiveness and promote its internationalization. Thus, the resulting sectorial composition will lead to higher levels of productivity and competitiveness high values (Sánchez, Pérez & Hernández, 2009). For this reason, according to Dess, Rasheed, McLaughlin & Priem (1995), it is noteworthy that the performance of the companies is commonly influenced by the stability of the production process. Thus, under this vein, the following hypothesis is proposed:

H_3: The higher the level in the production process, higher level of competitiveness in manufacturing SMEs in Aguascalientes.

Thus, in Figure 1 the theoretical model and the representation of the theoretical equation, the same that led to the formulation of the hypotheses is shown.

Figure 1: Theoretical Model



$Y1 = \beta_0 + \beta_1 * x1 + \beta_2 * x2 + e$; $Y2 = \beta_0 + \beta_1 * x1 + e$

3. Methodology

3.1 Sample Design and Data Collection

This empirical research was conducted under a quantitative approach to explaining type and a cross section through the Multiple Linear Regression Analysis. The instrument research base consists of 77 items measured on a Likert scale of 1 to 5, where concern from total disagreement to total agreement, which was applied to the managers of manufacturing SMEs in the state of Aguascalientes, Mexico.

In this study, knowledge management and innovation activities and their impact on production processes in manufacturing SMEs in Aguascalientes for enterprise competitiveness analyzed. For the development of this research was taken from reference database featuring business directory 2014 Business Information System of Mexico (SIEM) the state of Aguascalientes, which appears registered until February 26, 2014, 793 manufacturing firms, 250 of which are SMEs. A sample of 150 SMEs in the manufacturing sector in Aguascalientes that had 5 to 250 workers, whose managers were applied simple random with a confidence level of 95% and a margin of error was used based on the above, of 5.1%. For preparation of the measuring instrument, 4 blocks were used: knowledge management where the four dimensions proposed by Bozbura (2007) were considered; innovation activities in which the factors product innovation, process innovation and management innovation (Madrid-Guijarro *et al.*, 2009; Zahra & Covin, 1993) were considered; production processes measured through four dimensions adapted to Machorro, Panzi & Cabrera (2007); and competitiveness with the three factors as suggested by Buckley, Pass & Prescott (1988), and adapted by Maldonado, Martínez, López & García (2012).

3.2 Reliability and Validity

To assess the reliability and validity of the measurement scales a confirmatory factor analysis (CFA) was conducted, using the maximum likelihood method in EQS 6.1, working the four constructs as first-order factors (Bentler, 2005; Brown, 2006; Byrne, 2006). Also, the reliability of the proposed measure fourteen scales was evaluated based on the Cronbach Alpha coefficients and the Index of Compound Reliability (ICR)(Bagozzi & Yi, 1988). All scale values exceeded the recommended level of 0.7 for Cronbach's Alpha provides evidence justifies the reliability and internal reliability of the scales (Nunally & Bernstein, 1994; Hair, Anderson, Tatham & Black, 1998). They also worked with robust statistics (Satorra & Bentler, 1988) to provide better evidence of statistical adjustments.

3.3 Model Settings

The settings used in the model under study were Normed Fit Index (NFI), the Non-Normed Fit Index (NNFI), the Comparative Fit Index (CFI), and the Root Mean-Square Error of Approximation (RMSEA) (Bentler & Bonnet, 1980; Byrne, 1989; Hair *et al*., 1998). Values of NFI, NNFI and CFI between 0.80 and 0.89 represent a reasonable fit (Segars & Grover, 1993) and a value equal to or greater than 0.90 are good evidence of a good fit (Jöreskog & Sörbom, 1986; Byrne, 1989; Papke-Shields *et al*., 2002). Values of RMSEA below 0.08 are acceptable (Jöreskog & Sörbom, 1986, Hair *et al.*, 1998).

By adjusting the theoretical model, according to the results of the final application of CFA was necessary to eliminate 5 items to the scale of knowledge management; the scale of innovation will not be removed any item; four items were eliminated to the scale of production processes; and finally to the level of competitiveness was necessary to remove an item; under which they had factor loadings below 0.6 and did not meet the minimum required set Bagozzi & Yi (1988); so finally our adjusted theoretical model provides a good fit of the data based on the number of statistical adjustments (S-BX^2 = 3929.495; df = 2119; p = 0.000; NFI = 0.925; NNFI = 0.961, CFI = 0.964, and RMSEA = 0.076). As evidence of convergent validity, the results of the CFA indicate that all items related factors were significant ($p < 0.001$), the size of all the factor loadings standardized were higher than 0.60 (Bagozzi & Yi, 1988) and average standardized factor loadings of each factor exceeded without problem the value of 0.70 (Hair *et al*., 1998).

As evidence of the convergent validity, the CFA results indicate that all the related factor items are significant ($p < 0.001$), and the magnitude of all the standard factor loadings is greater than 0.60 (Bagozzi & Yi, 1988) and the average factor loading is easily above 0.70 (Hair *et al*., 1998). As can be seen in Table 1, there is high internal consistency of constructs, in each case *Cronbach's Alpha* exceeds 0.70 as recommended by Nunnally & Bernstein (1994). The compound reliability represents the extracted variance between the group of observed variables and the fundamental construct (Fornell & Larcker, 1981). Generally, a Compound Reliability Index (CRI) higher than 0.60 is considered desirable (Bagozzi & Yi, 1988); in our study this value is sufficiently high. The Average Variance Extracted (AVE) was calculated for each of the constructs, resulting in an AVE higher than 0.50 (Fornell & Larcker, 1981) in each and every factor.

Table 1: Internal Consistency and Convergent Validity of the Theoretical Model Adjusted

Construct	Factor	Indicator	Factor Loading	Robust t-value	Average Factor Loading	Cronbach's Alpha	CRI	AVE
Knowledge Management	**Training of employees (F1)**	BFT3	0.851***	1.000[a]	0.819	0.872	0.862	0.675
		BFT4	0.816***	11.170				
		BFT5	0.791***	13.295				
	KM policies and strategies (F2)	BPE1	0.708***	1.000[a]	0.709	0.913	0.910	0.504
		BPE2	0.778***	18.417				
		BPE3	0.718***	13.685				
		BPE4	0.730***	12.112				
		BPE5	0.673***	11.500				
		BPE6	0.718***	12.978				
		BPE7	0.732***	13.135				
		BPE8	0.645***	11.020				
		BPE9	0.687***	12.024				
		BPE13	0.703***	11.453				
	Creation and acquisition of external knowledge (F3)	BKO1	0.787***	1.000[a]	0.730	0.852	0.852	0.539
		BKO2	0.839***	13.305				
		BKO3	0.742***	12.083				
		BKO4	0.654***	9.041				
		BKO5	0.627***	7.772				
	Effects of organizational culture on the KM (F4)	BOC1	0.802***	1.000[a]	0.742	0.838	0.832	0.554
		BOC2	0.786***	11.932				
		BOC3	0.682***	8.050				
		BOC4	0.700***	9.235				
Innovation Activities	**Product Innovation (F5)**	AI1	0.728***	1.000[a]	0.734	0.771	0.701	0.540
		AI2	0.741***	13.546				
	Processes Innovation (F6)	AI3	0.787***	1.000[a]	0.768	0.777	0.742	0.590
		AI4	0.749***	13.715				
	Management Systems Innovation (F7)	AI5	0.737***	1.000[a]	0.727	0.783	0.771	0.529
		AI6	0.716***	11.225				
		AI7	0.729***	12.029				
Production Processes	**Automation (F8)**	PA1	0.906***	1.000[a]	0.794	0.874	0.874	0.635
		PA2	0.759***	15.095				
		PA3	0.794***	19.364				
		PA5	0.717***	15.189				
	Reliability (F9)	PCC1	0.887***	1.000[a]	0.809	0.928	0.921	0.664
		PCC2	0.899***	27.613				
		PCC3	0.872***	26.782				
		PCC6	0.626***	12.922				
		PCC7	0.785***	17.179				
		PCC8	0.786***	21.297				
	Administrative Control (F10)	PO1	0.888***	1.000[a]	0.832	0.956	0.948	0.696
		PO2	0.890***	42.324				
		PO3	0.826***	32.840				
		PO4	0.855***	43.479				
		PO5	0.836***	43.298				
		PO6	0.847***	38.982				
		PO7	0.681***	15.537				
		PO8	0.831***	31.542				
	Personnel Development (F11)	PD1	0.899***	1.000[a]	0.901	0.961	0.946	0.813
		PD2	0.913***	24.447				
		PD3	0.891***	23.722				
		PD4	0.903***	24.395				
Competitiveness	**Financial Performance (F12)**	FP1	0.834***	1.000[a]	0.791	0.916	0.911	0.631
		FP2	0.860***	24.456				
		FP3	0.851***	22.962				
		FP4	0.804***	20.381				
		FP5	0.751***	16.771				
		FP6	0.647***	9.079				
	Cost Reduction (F13)	PC2	0.830***	1.000[a]	0.790	0.902	0.894	0.628
		PC3	0.847***	22.429				
		PC4	0.814***	21.287				
		PC5	0.765***	13.594				
		PC6	0.697***	10.387				
	Use of Technology (F14)	TE1	0.867***	1.000[a]	0.815	0.932	0.923	0.667
		TE2	0.823***	29.723				
		TE3	0.850***	29.200				
		TE4	0.796***	22.476				
		TE5	0.751***	14.550				
		TE6	0.807***	19.015				
S-B X^2 (df= 2119) = 3929.495; p= 0.000; NFI= 0.925; NNFI= 0.961; CFI= 0.964; RMSEA= 0.076								

[a] = parameters constrained to this value in the identification process
*** = $p < 0.001$; ** = $p < 0.05$; * = $p < 0.1$

Source: Original production based on results of EQS V 6.1.

Regarding the evidence for discriminate validity, measurement is applied in two ways, the first, with an interval of 95% reliability, no individual element of the latent factors in the correlation matrix has a value of 1.0 (Anderson & Gerbing, 1988). Second, the extracted variance between the pair of constructs is higher than the corresponding AVE (Fornell & Larcker, 1981). Based on these criteria, it may be concluded that distinct measurements made in this study show sufficient evidence of reliability, convergent and discriminant validity of the adjusted theoretical model, as can be appreciated in Table 2.

Table 2: Discriminant Validity of Theoretical Model Measurement

Variables	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
F1	**0.675**	0.001	0.138	0.003	0.007	0.009	0.010	0.010	0.001	0.001	0.055	0.039	0.036	0.001
F2	-0.122, 0.174	**0.504**	0.031	0.098	0.101	0.127	0.092	0.132	0.061	0.072	0.034	0.085	0.128	0.198
F3	0.253, 0.489	0.035, 0.319	**0.539**	0.038	0.000	0.001	0.002	0.086	0.013	0.044	0.074	0.000	0.010	0.027
F4	-0.086, 0.202	0.211, 0.415	0.038, 0.350	**0.554**	0.059	0.085	0.049	0.075	0.025	0.040	0.013	0.061	0.047	0.107
F5	-0.229, 0.067	0.210, 0.426	-0.129, 0.131	0.117, 0.369	**0.540**	0.206	0.145	0.123	0.139	0.117	0.026	0.149	0.102	0.154
F6	-0.264, 0.072	0.254, 0.458	-0.124, 0.184	0.157, 0.425	0.348, 0.560	**0.590**	0.223	0.118	0.110	0.135	0.039	0.198	0.122	0.187
F7	-0.244, 0.048	0.195, 0.411	-0.083, 0.177	0.088, 0.356	0.269, 0.493	0.366, 0.578	**0.529**	0.072	0.051	0.073	0.012	0.135	0.087	0.146
F8	-0.072, 0.276	0.262, 0.466	0.149, 0.437	0.118, 0.430	0.231, 0.471	0.187, 0.499	0.135, 0.403	**0.635**	0.225	0.268	0.176	0.063	0.107	0.248
F9	-0.149, 0.199	0.125, 0.369	-0.027, 0.257	0.012, 0.340	0.239, 0.507	0.171, 0.491	0.088, 0.364	0.362, 0.586	**0.664**	0.308	0.138	0.080	0.059	0.106
F10	-0.142, 0.206	0.152, 0.384	0.069, 0.349	0.067, 0.331	0.218, 0.466	0.226, 0.510	0.141, 0.401	0.422, 0.614	0.467, 0.643	**0.696**	0.226	0.110	0.082	0.124
F11	0.094, 0.374	0.059, 0.311	0.144, 0.400	-0.049, 0.275	0.022, 0.298	0.024, 0.372	-0.041, 0.263	0.283, 0.555	0.253, 0.489	0.359, 0.591	**0.813**	0.012	0.029	0.030
F12	-0.341, -0.053	0.177, 0.405	-0.144, 0.132	0.110, 0.382	0.268, 0.504	0.323, 0.567	0.250, 0.486	0.099, 0.403	0.133, 0.433	0.195, 0.467	-0.052, 0.268	**0.631**	0.155	0.107
F13	-0.351, -0.031	0.240, 0.476	-0.047, 0.249	0.062, 0.370	0.203, 0.435	0.213, 0.485	0.165, 0.425	0.197, 0.457	0.101, 0.385	0.152, 0.420	0.013, 0.325	0.272, 0.516	**0.628**	0.130
F14	-0.199, 0.141	0.347, 0.543	0.016, 0.312	0.209, 0.445	0.281, 0.505	0.318, 0.546	0.266, 0.498	0.388, 0.608	0.186, 0.466	0.218, 0.486	0.012, 0.332	0.201, 0.453	0.236, 0.484	**0.667**

NOTE: The diagonal numbers (in bold) represent the Average Variance Extracted (AVE), below the diagonal is part of the variance obtained in the Reliability Interval Test, and above the diagonal, the results for the Extracted Variance Test are shown through the covariance square between each of the factors.

Source: Original production based on results of EQS V 6.1

4. Resultsand Discussion

Multivariate analysis was applied through the statistical technique of Multiple Linear Regression, under the method of successive steps through IBM SPSS Statistical Software V21, to test the research hypotheses. Next, in Table 3 the first summary of the model is presented, in which an R value of 0.617 was obtained, and R^2 of .373, indicating that joint knowledge management and innovation are correlated 61.7% with the production processes of SMEs, which together account for 37.3% of production processes in manufacturing SMEs in the state of Aguascalientes.

Table 3: Summary of the First Model[c]

Model	R	R square	Adjusted R square	Standard Error	Durbin-Watson
1	.529[a]	.280	.275	.93138	
2	**.617[b]**	.381	**.373**	.86610	1.615

a. Predictors: (Constant), KNOWLEDGE MANAGEMENT.

b. Predictors: (Constant), KNOWLEDGE MANAGEMENT, INNOVATIONACTIVITIES

c. Dependent variable: PRODUCTION PROCESS.

Also presented in Table 4, the second model summary concerning the relationship of the production processes to competitiveness, in which an R value of 0.584 was obtained, and R^2 of .336, indicating that production processes are 58.4% correlated with the competitiveness of manufacturing SMEs in Aguascalientes, and that competitiveness is explained in 33.6% of the production processes of SMEs studied.

Table 4:Summary of the Second Model

Model	R	R square	Adjusted R square	Standard Error	Durbin-Watson
1	**.584**[a]	.341	**.336**	.68908	.920

a. Predictors: (Constant), PRODUCTIONPROCESS

b. Dependent variable: COMPETITIVENESS

However, according to the results of the Multiple Linear Regression presented in Table 5, it is concluded that about 37% of the production processes is due to knowledge management, the latter significantly influence the processes production, with a t-value of 5.065, at a significance level of 0.001; innovation activities equally impact significantly in 35.7% in the production process, as its t value is 4.914 at a significance level of 0.001; and joint knowledge management and innovation activities, explain 37.3% of production processes of SMEs, with an F-value of 45.291, which is significant for being his p <0.001; and as for statistical colinearity a Variance Inflation Factor (VIF) of 1.254 was obtained, indicating that the model has no multicollinearity problems because its value is close to one (Hair *et al.*, 1998).

Table5:Results of Multiple Linear Regression Analysis

Variables	**Production Processes**	**Variables**	**Competitiveness**
Knowledge Management	**0.368*** (5.065)**	**Production Processes**	**0.584*** (8.747)**
Innovation Activities	**0.357*** (4.914)**		
Adjusted R² **F-value** **Highest VIF**	**0.373** **45.291** **1.254**	**Adjusted R²** **F-value** **Highest VIF**	**0.336** **76.505** **1.000**

***P < 0.001; **P < 0.05

The value in parentheses represents the value of "t"

Similarly it was found that 58.4% of the competitiveness of manufacturing SMEs is due to the production process, to influence them significantly in competitiveness, with a t-value of 8.747 at a significance level of 0.001, and production processes account for 33.6% in the competitiveness of SMEs, with an F-value of 76.505, which is significant for being his value <0.001, and in terms of statistical collinearity, yielded a VIF of 1.000, indicating that the model has no multicollinearity problems because its value is one (Hair *et al.*, 1998).

Therefore, with respect to the assumptions made in the present investigation, we proceed to the checkout with respect to H_1, the results ($\beta = 0.368$, $p < 0.001$) indicate that knowledge management has effects positive and significant in the production process, considering that knowledge management positively affects 36.8% in the production processes of manufacturing SMEs in Aguascalientes, therefore, H_1 is accepted; Regarding H_2, the results ($\beta = 0.357$, $p < 0.001$), indicating that innovation activities have significant effects on the production process, under which innovation activities influence positively and significantly by 35.7% in production processes of manufacturing SMEs in Aguascalientes, therefore, H_2 is accepted; and as for the H_3, the results ($\beta = 0.584$, $p < 0.001$), indicating that production processes have positive and significant impact on the competitiveness of SMEs in Aguascalientes, under which production processes positively influence 58.4% in the competitiveness of manufacturing SMEs in Aguascalientes, therefore, H_3 is accepted.

Finally, with respect to the regression equations, as the first model the value of **Y1** represents the production processes of manufacturing SMEs in Aguascalientes is presented, which indicates that according to the regression equation, the production processes are a function of the variables of knowledge management and innovation activities at an average of 2.77, with a maximum of 5.69 and a minimum of - 0.15, using 2 standard errors.

$Y1 = \beta_0 + (\beta 1 * \text{Knowledge Management}) + (\beta 2 * \text{Innovation}) \pm e$

Production Processes = - 1.016 + (.602 * 3.3718) + (.493 * 3.5686) ± 1.46

As for the second model presented below the value of **Y2** representing the competitiveness of manufacturing SMEs in Aguascalientes, which indicates that according to the regression equation, competitiveness is a function of the variable production processes in an average of 3.26, with a maximum of 5.45 to a minimum of 1.08, using 2 standard errors.

$Y2 = \beta_0 + (\beta 1 * \text{Production processes}) \pm e$

$\text{Competitiveness} = 2.016 + (.451 * 2.7715) \pm 1.093$

5. Conclusions

For the objective of this research it is concluded that both knowledge management and innovation influence positively and significantly the operations of SMEs, and production processes have a significant positive influence on the competitiveness of these kinds of companies, since based on the results obtained it was found that companies that have invested in employee training, this has been reflected in the results of their production processes to make them more efficient, as it pointing Estrada & Dutrénit (2009) that all management employees caused by knowledge, must serve to fulfill the objectives of the organization through adequate capture of all the good ideas that emerge; and appropriate managing of knowledge can implement processes properly, and that knowledge should be administered in an environment of discontinuous change, where the ability of the company to adapt, survive and compete is essential (Páscale, 2005).

Concerning knowledge management, it was found that manufacturing SMEs consistently use formal practices counseling for its workers and employees, as well as constantly used for personal gain knowledge gotten from public institutions and research centers and constantly inspire their workers and employees to continue their education and take courses related to their work, indicating that these companies have bet more to keep their skillful workers, relying on public institutions and research centers to keep their people trained and qualified in terms of their work.

Similarly it has been found that those companies that have made some innovative activity are more probable to improve its operations, to those that have not, and consequently to have processes more efficient production are more likely to succeed competitive, with companies that do not. With regard to innovation, found that according to the respondents managers of SMEs in Aguascalientes, this kind of companies have made changes or improvements in production processes, which indicates that you have chosen more to make changes or improvements to its processes, the same that has been reflected in the innovative activities carried out to improve its operations and thereby achieve competitive success, neglecting some part of innovation management systems, since SMEs do consider some important aspects of purchasing and supply and market share and sales, but to a lesser extent; so it is necessary that the managers or owners of these businesses take special care in the part of innovation management systems, and that having a better relationship with their suppliers, this will be reflected with their customers by offering products according to their needs.

In terms of production processes, the result shows that the companies under study have a training program for production personnel, so it follows that you have risked over this variable staff development as an aspect medullary production processes for competitiveness; and also it has been found that SMEs have automated production processes, however they've worked hard to have technology that most are less than ten years due to lack of financial resources to enable them to acquire new technology or develop processes robust and flexible to meet the production needs of its customers. It is therefore essential that companies invest in their production processes to have automated processes, and thereby make their processes are reliable, having administrative control of its operations and above all, have a program of training its production staff in order to get more competitiveness.

Therefore, the results obtained in this study are of great value to managers and decision makers of Mexican SMEs, as well as for designers of public policy, since managers can realize how it is influencing knowledge management and innovation in its various dimensions as are in products and processes for having a higher standard in their production processes, as well as the impact of production processes on the competitiveness of SMEs, which you can see reflected in its financial performance, to make some kind of innovation in their processes, thus making the best decisions when investing.

Within the constraints, it can be noted that the surveys were answered from the point of view of the managers of SMEs, which may lend itself to subjectivity.

In addition, it is recommended in future research work with a more representative sample, using this model with other companies, as well as a comparative analysis of the industry with other geographical areas and / or productive sectors in order to increase the validity of the theoretical model used. Finally it is suggested that new constructs with varying innovation and competitiveness to extend the results and to compare them with the conclusions set out in this article.

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