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Relationship between Technology and Commercialization in the SME located in Zacatecas

Relación entre la tecnología y la comercialización en la PyME ubicada en Zacatecas

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ABSTRACT

The objective of this empirical study is to analyze from the theoretical approach of resources and capabilities the relationship between technology and commercialization in Zacatecas SME, México. The methodology used was the exploratory factorial analysis of maximum likelihood of structural equations; the variable "technology" was measured through a scale built on the literature review composed of 4 questions, the variable "commercialization" was measured by three items. The results show that technology has a significant impact on commercialization. It is concluded that companies must invest in infrastructure and improve their technological position, as well as the level of technology implementation; regarding the marketing use of social networks is relevant and companies must own a brand, name, logo and tag to be inserted in local and international markets. Both variables have an impact on business competitiveness.

Key Words: Competitiveness; technology; *commercialization*; SME.

JEL Code: D2, M1, M3

RESUMEN

El objetivo de este estudio empírico es analizar desde el enfoque teórico de recursos y capacidades la relación entre la tecnología y la comercialización en la PyME ubicada en Zacatecas, México. La metodología empleada fue el análisis factorial exploratorio de máxima verosimilitud de ecuaciones estructurales; la variable "tecnología" se midió a través de una escala construida con base en la revisión de literatura compuesta por 4 preguntas, la variable "comercialización" se midió por tres ítems. Los resultados muestran que la tecnología impacta de manera significativa en la comercialización. Se concluye que las empresas deben invertir en infraestructura y mejorar su posición tecnológica, así como el nivel de implementación de tecnología; respecto a la comercialización la utilización de redes sociales es relevante y las empresas deben de poseer una marca, nombre, logotipo y etiqueta para insertarse en los mercados locales e internacionales. Ambas variables repercuten en la competitividad empresarial.

Palabras Clave: Competitividad; Tecnología; Comercialización; PyME.

Código JEL: D2, M1, M3

INTRODUCTION

Since the beginning of the Industrial Revolution, technology has influenced the operation of companies via the application of the force of steam in production systems, developing more factories and industries (Chiavenato, 2006). The development of technology constitutes the basic tools that drive organizations, allowing them to be globally immersed. In 1975, the introduction of the personal computer transformed the business setting into a new world of organization characterized by information networks. Because of these changes and transformations, technology has become a fundamental instrument in the managing and processing of current information and still is to this day.

The relationship between technology and commercialization has been widely addressed (Sohn, Kim & Moon, 2007; Kim *et al.,* 2011; Kang, 2012; Hamdani & Wirawan, 2012; Van Hemert, Nijkamp & Masurel, 2013; Song, Park & Park, 2017); hence it is considered that the evidence, analysis and interpretation in the Mexican context have contributed differently to those expressed in other work settings.

Currently, the interest in knowing more about strategies to improve competition between micro, medium and large companies (SMEs) in Mexico is apparent, as they have a strong impact on economic and social growth, (Aragón *et al.,* 2010; Valdez & Santiago, 2014, López *et al.*, 2016), and it is clear they are driving forces in economic and social development (Salas *et al*., 2012; Ngah *et al*., 2015), since they family economies by creating employment.

An SME has a great capacity to adapt to the market, and therefore it can be very competitive. (Ramírez *et al*., 2017; Ibarra *et al*., 2017). According to Delgado and Simao (2015), it is a motor for business, therefore, fundamental for the distribution of income. Zavallos (2003) adds that Latin America SMEs are promoters of growth in local settings. Smaller Mexican companies are key elements because of their contribution to the creation of employment and riches ((Rubio & Aragón, 2008; Alcántara *et al.,* 2013); they are a crucial and invigorating element in the development of society. Notwithstanding its relevance, this SME competes within complex environments- increasingly more diverse- that demand the implementation of technology and the efficiency of commercialization of its products or services.

In Mexico, companies face a series of difficulties which put their function at risk and deter their competitiveness, as they are ill-equipped, which impacts the lack of work capital and investment; technology is limited in production processes and training and education levels are low (Alcántara, Goytortúa & Vega, 2013; Correa, 2017; Ramírez *et al.,* 2017). Financial and marketing studies are rarely conducted and many of them operate as businesses for

livelihood; they lack institutional support, and they have no control over their operation and earnings are scarce. (Alcántara *et al.,* 2013). They do not possess a defined image, which leads to difficulties in commercialization.

In Zacatecas, the problems of the SME directly impact its competitiveness levels (Valdez & Santiago, 2014). In this sense, technology is an essential tool (Peirano & Suárez, 2006; González, Ibarra & Cervantes, 2017), which allows the improvement of SME's administrative activities, especially those of micro and small businesses (Maldonado *et al.,* 2010). Another characteristic is the direct interference with the performance of the labor market by concentrating a large percentage on the employed population (Ramírez *et al.,* 2017).

In the current study, the variable of technology for SME located in Zacatecas is analyzed because it allows the modernization of company resources and it facilitates processes, which facilitates global incursion. The second variable is commercialization, which improves the search for markets, which is expected to generate income growth, hence making it more competitive. In the state of Zacatecas, no studies are conducted to understand how technology impacts commercialization; therefore, this article is intended to cover the void that exists on SME literature in Zacatecas. The objective of this investigative work is to study the impact of technology in the commercialization of the SME. The analysis was conduced via structural equations of maximum verisimilitude. The sample is made up of 229 companies belonging to ten municipalities of Zacatecas. The work is divided into four stages; the first is the development of the theory, the second contains the analysis of the method, the third is the presentation of the discussion and the final stage is the presentation of the conclusions.

DEVELOPMENT OF THE THEORY

Strategic analysis of Mexican SME

The current study is elaborated upon the basis and focus on the microeconomy, because it is vital in the strengthening of smaller companies (Montoya, Montoya & Castellanos, 2010). In the business environment, it is essential to have a strategy, because of how important it is in the development and strengthening and reaching objectives and goals (Mora, Vera & Melgarejo, 2015). According to Martinez (2006), the strategic focus came about in the sixties, presented by Igor Ansoff, and to this day its additions have become an important contribution to the strategic effort of SME (Kipley, Lewis & Jeng, 2012).

The formulation of SME strategies is a current theme and literature is extensive and growing. For example, Aguilera, González and Rodríguez (2011) defines the strategy as a plan in line with its goals, policies, and values. Alcántara and others (2013) state that it is important that

SME companies promote and select activities that allow experimenting with sustainable growth. Notable among these strategies is planning. Although it is fundamental in business development, it is uncommon for companies to carry it out because of the lack of resources and knowledge. This creates an area of opportunity for their formulation

For Lopez and others (2016), in an increasingly competitive market, the SME has to change its strategies with the goal of adapting them to the constant demand of the market. Currently, they have higher levels of uncertainty, which can be countered with the use of new technology. Aguilera, Avila and Solano (2017) point out that companies face challenges in highly competitive contexts, therefore, technology is an important strategy in conducting activities efficiently, which can lead to an improvement in modernization and facilitate operations, leading to a rise in competitiveness. The SME analysis is relevant and the strategies used by (Gómez *et al.,* 2014) are more desirable than those of other companies, not taking into account the importance of the location or size of design strategies (Salas, *et al*., 2012), enabling them to improve their performance. Hence, the success of a company is rooted in the strategies that it implements to favor its competiveness (Ibarra *et al.,* 2017).

Resource and capabilities theory

In current times, the development of companies in local and international markets is very complicated and they depend on their own resources and capabilities. The conditions in which SME perform are generally unfavorable in the majority of cases (Zevallos, 2003). In this study, Ibarra, and others (2017) show that small companies adapted easier to economic changes. Rubio and Aragon (2002) argue that company resources change with time and that the factors that determine those changes are not necessarily the same in every country.

Authors Nuryakim, Wiet and Budi (2018) point out that SME require an improvement in their access to international markets: to add value to its products to make their adapting process more efficient, and to establish strategic alliances that create mutual value. For Ramirez and others (2017), SME need to improve their commercialization resources. Munir, Lim and Knight (2011) add that small and medium companies have limited resources and do not have a connection to academic institutions.

Cano and others (2013) have another perspective, arguing that as long as SME's resources and capabilities are efficient, they will continue to be competitive. Internal company factors are those that majorly effect performance (Salas *et al.,* 2012). Mansor, Shaikh and Sabri (2015), argue that the improvement in services stems from SME's competitivity. In his study, Aragón and others (2010) find that technological resources are another internal factor related to competitiveness.

The important variable is training, because it facilitates the development and elevates competitive capacity (Romero, 2006, Ramírez *et al.,* 2017), For Tobar (2013, 2015) it is an important strength, however, SME does not train its personnel, resulting in a low survival capacity (Saavedra & Tapia, 2011). Therefore, it finds itself in an unfavorable position, lacking in growth and submerged in multiple problems which deter its development, combined with an environment of uncertainty.

Technology and commercialization in studies primarily based in Mexico

SME are currently immersed in technological changes Flores & González, 2009). Chiavenato (2006) indicates that technological development constitutes the basic platform that impulses the development of organizations, and that it is used to execute operations and carry out its duties. For Maldonado and others (2010), the implementation of technology influences performance in a positive way, because it constitutes a competitive advantage. Aldape, Abrego and Medina (2016) have another perspective. They find that 56% of micro and small companies implement technological tools and that 44% don't use them, and that the analysis of structural equations shows positive and negative results for the use of technology.

The incorporation of technology in the corporate field is a process that contributes to giving potential, arbitrating, and facilitating the activities developed by the organization. The rise in the use of technology has a positive relationship with the impact on the company's performance because it allows it to function more efficiently in internal processing (Peirano & Súarez, 2006). Because smaller companies have limited technology due to them being decapitalized, (Ramírez *et al.,* 2017; Tobar, 2013) and that which they use is basic.

The main benefit of technology is the support that it gives to decision making and acquiring higher levels of competitiveness, therefore its access stands as one of the main difficulties for companies. Zevallos (2003) states that there is an absence of adequate technology at an accessible cost and a lack of information. The study of technology is fundamental due to the great impact it has on the development of company strategies, and because its adoption and competitive improvement are directly related (Delgado & Simão, 2015).

According to Rincón and Peláez (2013), companies need support in using technology for the use of information, due to the important part it plays in decision making. Hence, if organizations wish to be more competitive they need to take advantage of these new business opportunities for the storage and transmission of information via technology (Castillo & Pérez, 2017). Cano & Baena (2017) have recently revealed the importance and favorable results in the effectiveness and efficiency that technology gives to companies and that it offers an improvement in commercialization processes. It needs to be specified that technology differs from one company to the next, depending on the surrounding circumstances, financial capacity, and their specific characteristics.

In Salas and other's (2012) studies, technology is a variable that is intimately tied to competitiveness, as it is a crucial factor in the survival of micro companies. The authors find that the level of technology used raises production, which is consistent with the theory of Ibarra and others (2017), as well as Rubio and Aragon (2008), who state that technological aspects play an important role in the level of competitiveness.

Gonzalez and others (2017) recently stated that the adoption of technology positively influences company results and that it is an important variable in the development of human capital and economic growth. Romero (2006) adds that making the most of technology can assure continuity and development for small companies. In another study, Ngah and others (2015) emphasize that technology has a tight relationship with the competitiveness of companies, even though an enormous digital divide currently exists (Montoya *et al.,* 2010).

In reference to commercialization, SME face great challenges due to the market's decreasing demand, which adds to the growing rate of competitiveness and low sales levels (Gómez *et al.,* 2014). For Ibarra and others (2017), it is a variable that effects the increase of competitiveness. Zevallos (2003) states that similarities in the commercialization between small and large companies does exist. For Rubio and Aragon (2008), it is a very important variable when attempting to understand the market, clients and mainly the differences in competition. Smaller companies have problems developing their product or service. Godas (2006) notes that the main element that allows a product to be identified is the brand- the name, logo, and label- the primary factors needed for commercialization success.

It is necessary to specify that there are qualities within businesses that favor the environment of the commercialization of SME. One of them is the advertising that it uses, however, is it not an activity that is carried out daily due to the lack of economic resources (Ramírez *et al.,* 2017). For Alcantara and others (2013), advertising is an important tool in marketing which generates better results. Some of the strategies used by micro-companies are the distribution of flyers, the creation of business cards and the creation of websites and pages on social media.

According to Mansor and others (2015), small companies are not very serious about investing in advertising activities. Although it is profitable for a company long term, advertising means creating an adequate information strategy (Flores, Trejo & Hernández, 2013). The following investigation hypothesis emerges based on the previous point.

H1: Technology impacts commercialization in SME in the state of Zacatecas, Mexico.

METHODOLOGICAL ANALYSIS

According to Anderson and Gerbing (1988), the use of structural equation methods has been rising in social sciences, and the factorial maximum credibility analysis are predominant estimation methods. Bagozzi and Yi (1988) add that the models of structural education with latent variables are used extensively in the measurement and testing of a hypothesis, and that they offer high potential for the validation of constructs. For Bentler and Yuan (1999), there are many measurement parameters, such as the estimation and evaluation of the sample and the meaning of the structural equation models.

The methodological analysis is of an exploratory kind. To test the hypothesis an empirical study was conducted in ten municipalities of Zacatecas, using the economic census of 2014 from the National Institute of Statistics and Geography (INEGI) in reference to 51,864 establishments in Zacatecas and a total of 186,220 people. The survey was applied personally at the owner's business addresses, at 229 economic units, and didn't include technological companies. The following chart summarizes the companies that were analyzed.

Table 1 shows that the municipalities of Guadalupe and Zacatecas have a higher number of companies. This is due to it being the metropolitan area of Zacatecas, and because it has greater commercial and industrial dynamism. Table 2 shows general information of entrepreneurs: age, gender, level of education and the economic sector that their companies belong to.

Table 1
Enterprises by municipality

Municipality	Number	%
Fresnillo	12	5.24
Guadalupe	98	42.80
Mazapil	1	0.44
Morelos	2	0.87
Ojocaliente	3	1.31
Río Grande	13	5.68
Villa de Cos	11	4.80
Villa Hidalgo	1	0.44
Villanueva	2	0.87
Zacatecas	86	37.55
Total	229	100%

Source: Own elaboration.

Table 2 shows that the average entrepreneur age is 40. 59% are men and 41% are women; 56% have a professional education equivalent to a degree, and 44.13% of businesses belong

to the tertiary economic sector, which includes businesses related to commerce and services.

Table 2
Data on entrepreneurs

Average age	40.58 years
Gender	40.44% women
	59.56% men
Scholarship	No schooling 5.67%
	Primary 2.18%
	High school 8.82%
	Bachelorship 27%
	University 56.33%
Economic sector	Primary 12.66%
	Service 87.34%

Source: Own elaboration.

Table 3
Operationalization of variables in Mexican studies

Variable	Items	Authors
Thecnology	TEC1- Technological position TEC2- level of technology TEC3- Infrastructure TEC4- Training	Zevallos (2003); Ramírez *et al.,* (2017); Tobar (2013); González, Ibarra and Cervantes (2017); Aragón *et al.,* (2010); Romero (2006); Flores y González (2009), Ibarra, González and Demuner (2017).
Commercialization	COM1- Marketing COM2- brand, name, logo and label COM3- Social networks	Saavedra and Tapia (2011); Ibarra, González and Demuner (2017); Godás (2006); Ramírez *et al.,* (2017); Flores, Trejo and Hernández (2013); González, Ibarra and Cervantes (2017); Alcántara, Goytortúa and Vega (2013); Mora, Vega and Melgarejo (2015)

Source: Own elaboration.

The variables subject to hypothesis tests in this investigation are technology and commercialization. Both were measured on a *Likert* scale of 5 points: 1= very low, 2= low, 3= regular, 4= high and 5= very high. Technology was shown on a scale of four items and commercialization on a scale of three, and they were built based on the authors presented in Table 3.

The reliability and validity study was performed via an exploratory factorial analysis, using the method of maximum credibility with EQS 6.1 software. The reliability of the scales was evaluated via Chronbach's alpha coefficient and the Index of Compound Reliability Rate (IFC). Both exceed the recommended level of .70 (Table 4).

Table 4
Internal consistency and convergent validity

Variable	Item	FC	T	α de Cronbach	IFC	IVE
Tehcnology	TEC1	.822***	1.000[a]	.886	.880	.646
	TEC2	.806***	13.498			
	TEC3	.823***	13.860			
	TEC4	.763***	12.586			
Commercialization	COM1	.616***	1.000[a]	.706	.709	.450
	COM2	.647***	7.358			
	COM3	.743***	7.957			
$S\text{-}BX^2(gl=21) = 770.837$; $p<0.000$; NFI=0.925; NNFI=0.903; CFI=0.940; RMSEA=0.123**						

Source: Own elaboration ** $p<0.05$. *** $p<0.001$.

As seen in Table 4, the settings NFI= .925, NNFI= 0.9.3; CFI= 0.940, show a higher level than 0.90, and the factorial charges are significant to 0.60, as well as the value of the IFC, which confirms good adjustment of the model, and with which the convergent validity referring to the Extracted Variance Rate (IVE, in spanish) shows that technology does not exceed the recommended level of 0.50. This is not the case with commercialization, however, there are scales that exist in accepted literature with lower values.

With respect to the discriminant validity, none of the factorial charges contains value 1, which indicates that they are not the same factor. In order to establish the discriminant validity, the lost variable test is applied, which compared the correlations of both factors with the IVE. The E1 IVE of each of the factors in higher than in the correlation chart (Table 5).

Tabla 5
Discriminant validity

Variable	IVE	Correlation Squared
Technology	.646	.263
Commercialization	.450	

Source: Own elaboration.

In accordance with these criteria, the IVE is higher to that of the aforementioned chart (0.263), which affirms the discriminant validity. Based on these criteria, a convergent and discriminant validity of the model is shown. Below, Table 6 exhibits the nomological validity via the squared Chi test, in reference to the investigation hypothesis ($\beta = 0.513$, $p<0.05$). The test indicates that the "technology" variable does impact commercialization, hence, there is sufficient evidence to reject the null hypothesis.

Table 6
Results

Hypohtesis	Standardized coefficient	t Value
H1: Technology impacts commercialization in SME in the state of Zacatecas, Mexico	.513**	6.357

Source: Own elaboration. $p<0.05$**

DISCUSSION

Said work analyzed the relationship between technology and commercialization of SME located in Zacatecas, Mexico. Results show that 60% of employers are male and that the average age of business owners is 40. 56% have professional education, and the organizations that were analyzed belong to the tertiary sector, that is to say, they operate by marketing products or offering services.

The model analyzed two latent variables: the first is technology measured via four observed variables. The variable observed to be most relevant statistically is represented in item TEC3, which is the study of infrastructure; followed by the TEC1 named "technological position" and the TEC2 "level of technology", and finally TEC4 named "training". In reference to the second latent variable named "commercialization", it was measured via three items: COM3 "the use of social media", COM2 named "brand, logo and label" and lastly COM1 "marketing". The results evaluate the convergent, discriminant and nomological validity of the investigation model and allow the rejection of the null hypothesis investigated (H_0).

Based on the above, it is affirmed that technology is a variable that is favorable to the commercialization of SME, located in Zacatecas, Mexico. Technology is an important tool for conducting commercialization activities efficiently, as it allows the product or service to extend to more markets. The results of Aragón and Rubio (2010) are consistent with what is presented, as they show that technology is a characteristic of success in companies, as it offers SME a reduction in operating costs and increases the possibility of contacting more clients and providers. Hence, the results of Delgado and Simao (2015), Rubio and Aragon (2008) and Maldonado and others (2010) are consistent and show that technology is fundamental in reaching higher levels of competitiveness and elevating the performance of SME.

In the case of commercialization, technology favors finding more markets for advertising products, and it can also improve the relationship between clients and providers. Results of previous studies show that the use of the internet is fundamental as a distribution channel (Gómez *et al.,* 2014). Therefore, companies need to posses a brand and logo that reflects identity, as well as labels on their products or services. The use of adequate marketing

strategies significantly contributes to improving competitiveness and is a fundamental element in the growth of companies (Mora, Vera & Melgarejo, 2015). On the other hand, Mansor and others (2015) find that the adoption of technology has only a moderate relationship on commercialization efforts.

CONCLUSIONS

Technology is a crucial variable for the commercialization levels of products or services in micro and small companies. It is essential to achieve growth and development, which translates to a broader field of sales, efficiency, and the balancing of prices, and which results in higher and better earnings. It is concluded that companies should be equipped with the technological infrastructure, such as hardware and software, to allow access to virtual markets, and increase sales and presence within the market and attract a higher number of clients. In reference to the second variable, technological positioning, it should be monitored periodically in order to identify faults and be able to invest in technological tools required within the company. Periodic evaluations of the technology level are considered necessary, at least once a year, aimed at updating the business. Another important variable is training, which should focus on teaching basic technological resources like Excel, to the proper management and interpretation of a CRM (Customer Relationship Management).

Taking advantage and investing in technology is important, as it directly impacts the commercialization of products and services. Unfortunately, in the majority of small companies, investment in technology is, in eyes of the entrepreneur, seen as an expense rather that an investment (González, Ibarra & Cervantes, 2017). Therefore, it is imperative to generate a change in the organizational culture and create awareness of the importance of technology within the business environment. It is recommended that companies be up to date in technological aspects, as this directly supports decision making and allows efficient processes and control over operations, resulting in higher competitiveness.

In reference to commercialization, the variable that most impacts technology is the use of social media, because it is the means in which the sale of the product or service can be introduced at minimum cost, and it impacts the population. Social media is an excellent tool for positioning a company in the market, as it has a great impact on consumers (Aldape *et al*., 2016). The second variable is the positioning of the brand, the company name, the logo and label of the product or service. Technology helps position the image of the company in different markets. Finally, technology opens the door to more markets and attracts a higher number of clients, which can lead to a growth in company sales.

In conclusion, SME must implement the use of technology that is within their means, above all the infrastructure and the improvement of their technological position. The use of social

media is recommended to increase sales and improve management of company identity, and it is lacking in the majority of the organizations in Zacatecas. Technology must be used to improve the access of national markets, facilitate the creation of strategic alliances and train employers and personnel on sales, image, and adequate management of social media. The limitation of this study is the test size, due to the convenience of conducting analysis with a higher level of companies and in different latitudes of the Mexican Republic. It will prove more convenient in future studies to direct the focus on medium-sized companies in order to analyze the implementation of technology and the relationship it has with other variables.

REFERENCES

Aguilera, L. González, M. & Rodríguez, R. (2011). Estrategias empresariales para la competitividad y el crecimiento de las PYMES. Una evidencia empírica. *Investigación y Ciencia, 19*(53), 39-48.

Aguilera, A., Ávila, P. & Solano, J. (2017). Las TIC en la formulación estratégica de las pymes de Santiago de Cali – Colombia. *Entramado, 13*(1), 102-111.

Alcántara, J., Goytortúa, C. & Vega A. (2013). Prácticas de mercadotecnia en las micro empresas del sector comercial de la ciudad de Pachuca, Hidalgo: Un análisis y propuesta para apoyar su crecimiento. *XVIII Congreso Internacional de Contaduría, Administración e Informática.* México: UNAM.

Aldape, A., Abrego, D. & Medina, M. (2016). Análisis de la percepción de uso de las redes sociales como herramienta de marketing en las MIPYMES de Tamaulipas, México. *Revista Ibérica de Sistemas de Tecnologías de Información*, *18*(6), 49-65. DOI:10.17013/risti.18.49-65

Anderson, C. & Gerbing, W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, *103*(3), 411-423.

Aragón, A., Rubio, A., Serna, M. & Chable, J. (2010). Estrategias y competitividad empresarial: Un estudio en las MIPyMEs de Tabasco. *Investigación y Ciencia, 47*, 4-12.

Bagozzi, P. & Yi, Y. (1988). On the Evaluation of Structural Equation Models. *Journal of the Academy of Marketing Science, 16*(1), 074-094.

Bentler, M. & Yuan, H. (1999). Structural Equation Modeling with Small Samples: Test Statics. *Multivariate Behavioral Research, 34*(2), 181-197.

Cano, A. & Baena, J. (2017). Limitaciones en el uso y apropiación de tecnologías de la información y comunicación para la negociación internacional en empresas colombianas. *Observatorio Journal, 11*, 111-133.

Cano, M., Olivera, D., Balderrabano, J. & Pérez, G. (2013). Rentabilidad y competitividad en la PYME. *Ciencia Administrativa*, *2*, 80-86.

Castillo, G. & Pérez, M. (2017). Diagnóstico de los sistemas de información en las empresas priorizadas según los requerimientos actuales. *Palabra Clave (La Plata), 6*(2), 1-11.

Correa, A. (2017). *Talleres artesanales zacatecanos. Recursos, capacidades y aspectos culturales*. Zacatecas: Texere editores.

Chiavenato, I. (2006). *Introducción a la teoría general de la Administración*. México: Mc Graw Hill.

Delgado, A. & Simão, J. (2015). Empresas y tecnologías de la información: una mirada a Bolivia y América del Sur. *Revista Iberoamericana de Ciencia, Tecnología y Sociedad, 10*(29), 147-171.

Flores, B. & González, F. (2009). La competitividad de las Pymes Morelianas. *Cuadernos de CIMBAGE*, *11*, 85-104.

Flores, L., Trejo, C. & Hernández, A. (2013). Estrategias de mercadotecnia para impulsar el crecimiento de las microempresas. *Mercados y Negocios,* (14), 63-88.

Godás, L. (2006). El producto. Identidad, innovación y ciclo de vida. *Revista OFFARM, 25* (6), 84-89.

Gómez, D., López, H., Méndez, A. & Colsa, J. (2014). Estrategias de mercadotecnia en las microempresas del sector comercial: El caso de 13 Ciudades de México. *TECSISTECATL, Revista Electrónica de Ciencias Sociales, 6*(16), 1-21.

González, A., Ibarra, A. & Cervantes, E. (2017). El impacto de las tecnologías de información y comunicación en la industria manufacturera de Baja California. *Región y Sociedad, 24*(69), 153-183.
DOI: http://dx.doi.org/10.22198/rys.2017.69.a292

Hamdani, J. & Wirawan, C. (2012). Open innovation implementation to sustain Indonesian SMEs. *Procedia Economics and Finance*, *4*, 223-233.

Ibarra, A., González, A. & Demuner, R. (2017). Competitividad empresarial de las pequeñas y medianas empresas manufactureras de Baja California. *Estudios Fronterizos, 18* (35), 107-130. DOI: https://doi.org/10.21670/ref.2017.35.a06

Kang, W. (2012). An identification of unsuccessful, failure factors of technology innovation and development in SMEs: A case study of components and material industry. *International Journal of Business and Management*, *7*(19), 16.

Kim, K., Lee, G., Park, S., & Oh, S. (2011). The effect of R&D, technology commercialization capabilities and innovation performance. *Technological and Economic Development of Economy*, *17*(4), 563-578.

Kipley, D., Lewis, O. & Jeng, L. (2012). Extending Ansoff´s Strategic Diagnosis Model: Defining the Optimal Strategic Performance Positioning Matrix. *SAGE Open*, (2), 1-14.

López, C., Maldonado, G., Pinzón, Y. & García, R. (2016). Colaboración y actividades de innovación en Pymes. *Contaduría y administración, 61*(3), 568-581. DOI: https://doi.org/10.1016/J.cya.2015.05.016

Maldonado, G., Martínez, C., García, D., Aguilera, L. & Adame, M. (2010). La influencia de las Tics en el rendimiento de la PyME de Aguascalientes. *Investigación y Ciencia*, *47*, 56-64.

Mansor, N., Shaikh, H. & Sabri, J. (2015). Sustaining SMEs Competitive Advantage: How Significant is the Role of Service Provider. *Mediterranean Journal of Social Sciences, 6*(5), 579-589. DOI: 10.5901/mjss.2015.v6n5s2p579

Martínez, I. (2006). La matriz de Ansoff ¿sigue vigente cuarenta años después? *Contabilidad y Negocios, 1(*1), 41-44.

Montoya, A., Montoya, I. & Castellanos, O. (2010). Situación de la competitividad de las Pyme en Colombia: elementos actuales y retos. *Agronomía Colombiana, 28*(1), 107-117.

Mora, H., Vera, A. & Melgarejo, A. (2015). Planificación estratégica y niveles de competitividad en las Mipymes del sector comercio en Bogotá. *Estudios gerenciales, 31*, 79-87. DOI: https://doi.org/10.1016/j.estger.2014.08.001

Munir, A., Lim, M. & Knight, L. (2011). Sustaining competitive advantage in SMEs. *Procedia-Social and Behavioral Sciences, 25,* 408-412. DOI: https://doi.org/10.1016/j.sbspro.2012.02.052

Ngah, R., Abd, I., & Salleh, Z. (2015). The Sustainable Competitive Advantage of Small and Medium Enterprises (Smes) with Intellectual Capital, Knowledge Management and Innovative Intelligence: Building a Conceptual Framework. *Advanced Science Letters, 21*(5), 1325-1328. DOI: 10.1166/asl.2015.6018

Nuryakim, N., Wiet, D. & Budi, M. (2018). Mediating effect of value creation in the relationship between relational capabilities on business performance. *Contaduría y administración, 63*(1), 1-21. DOI: http://dx.doi.org/10.22201/fca.24488410e.2018.1178

Peirano, F. & Suárez, D. (2006). Tics y empresas: Propuestas conceptuales para la generación de indicadores para la sociedad de la información. *Journal of Information Systems and Technology Management, 3*(2), 123-142.

Ramírez, N., Mungaray, A., Aguilar, G., & Inzunza R. (2017). Una explicación de la rentabilidad y poder de mercado de las microempresas marginadas. *Economía, teoría y práctica,* 46, 97-113. DOI: http://dx.doi.org/10.24275/etypuam/ne/462017/ramirez.

Rincón, R. & Peláez, G. (2013). Adquisición de tecnología: Un modelo de Gestión. *Revista ReCIBE,* 2 (3), 1-18.

Romero, E. (2006). Competitividad y productividad en empresas familiares pymes. *Revista Escuela de Administración de Negocios, 57,* 131-141.

Rubio, A. & Aragón, A. (2002). Factores explicativos del éxito competitivo. Un estudio empírico en la pyme. *Cuadernos de gestión*, 2 (1), 49-63.

Rubio, A. & Aragón, A. (2008). Recursos estratégicos en las pymes. *Revista Europea de Dirección y Economía de la Empresa, 17* (1), 103-126.

Saavedra, M., & Tapia, B. (2011). Mejores prácticas y factores de competitividad en las micro, pequeñas y medianas empresas mexicanas. *Economía, 36* (32), 11-36.

Salas, F., Valles, K., Galván, K. & Cuevas, T. (2012). Competitividad para las micro, pequeñas y medianas empresas en México, mediante las incubadoras de negocios. *European Scientific Journal, 8*(25), 267-282.

Song, M., Park, O., & Park, S. (2017). Determinants of R&D commercialization by SMEs after technology transfer. *Asian Journal of Innovation and Policy*, *6*(1), 45-57

Sohn, Y., Kim, S., & Moon, H. (2007). Predicting the financial performance index of technology fund for SME using structural equation model. *Expert Systems with Applications*, *32*(3), 890-898.

Tobar, L. (2013). Competitividad en las microempresas en Cuenca Ecuador. *Revista Internacional Administración & Finanzas, 6* (7), 121-129.

Tobar, L. (2015). Análisis competitivo de las pequeñas y medianas empresas en Cuenca, Ecuador. *Revista Internacional Administración & Finanzas, 8*(3), 79-92.

Valdez, C. & Santiago, E. (2014). La competitividad de las microempresas artesanales del estado de Morelos y el Capital Social como alternativa de solución. *Revista Iberoamericana para la Investigación y el Desarrollo Educativo, 12,* 1-25.

Van Hemert, P., Nijkamp, P., & Masurel, E. (2013). From innovation to commercialization through networks and agglomerations: analysis of sources of innovation, innovation capabilities and performance of Dutch SMEs. *The Annals of Regional Science*, *50*(2), 425-452.

Zevallos, E. (2003). Micro, pequeñas y medianas empresas en América Latina. *Revista de la CEPAL, 79,* 53-70.

Annexes, - Documents applied.

Study of companies in the state of Zacatecas.

V1. Entrepreneur age: _____ **V2.** Gender 1. M ( ) 2. F ( )
V3.- Municipality_____
V4.- Education: 1. No formal studies ( ) 2. Primary ( ) 3. Secondary ( ) 4.- High school ( )

5. Professional ( ) **V4**.- Line of business or activity: _____

1.- Technology

1.1 How do you consider your company's technological position?

Very low ___ Low ____ Regular ____ High ____ Very high ____

1.2 How do you consider the level of technology in machinery and equipment used in your business?

Very low ___ Low____ Regular ____ High ____ Very high____

1.3 Over the past year, have you improved technological infrastructure within your company?

Never_____ Almost never_____ Rarely_____ Almost always_____ Always_____

1.4 Have your or your personnel received any training?

Never_____ Almost never_____ Rarely_____ Almost always_____ Always _____

2.- Commercialization

2.1 Over the past year, have you searched for other markets in which to advertise your products?

Never_____ Almost never_____ Rarely_____ Almost always_____ Always_____

2.2 Have you attempted to improve relationships with your clients or providers?

Never_____ Almost never_____ Rarely_____ Almost always_____ Always_____

2.3 Do your products of services have a brand, name, logo, or label?

Never_____ Almost never_____ Rarely_____ Almost always_____ Always_____

2.4 Do you use social media to promote your product or service?

Never_____ Almost never_____ Rarely____ Almost always_____ Always_____