

Competitiveness in organic agricultural micro-enterprises in the municipalities of La Paz and Los Cabos, Baja California Sur

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ABSTRACT

Objective: to evaluate the level of competitiveness in agricultural micro-enterprises under organic production systems operating in the municipalities of La Paz and Los Cabos, Baja California Sur, Mexico.

Design/Methodology/Approach: through a non-probabilistic sampling technique of an intentional type, socioeconomic information and factors associated with competitiveness were collected in eight micro-enterprises. The level of competitiveness was determined using specific items, implementing the Likert scale in the valuation. Micro-enterprises were characterized and classified into groups through the statistical techniques of principal components analysis and cluster analysis.

Results: owners or representatives of the micro-enterprises averaged 43.8 years of age, 12.9 years of education, and 8.9 years of seniority in the activity, while the main crops produced were vegetables. Micro-enterprises varied in their competitiveness; it is necessary to strengthen aspects such as value chain, innovation management, associativity, and the implementation of public policies for agriculture. The multivariate analysis formed four groups due to their similarity in relation to the level of competitiveness.

Limitations/Implications of the study: results showed the level of competitiveness of the participating micro-enterprises and not of the total population of micro-enterprises. This is due to the lack of an official micro-enterprise registry, and to the reluctant attitude of some owners or representatives to provide information, thus sample size was limited.

Findings/Conclusions: this research was very useful in the identification of areas of opportunity and the definition of strategies intending to increase the competitiveness of those micro-enterprises dedicated to organic agriculture.

Keywords: competitiveness evaluation, Likert scale, competitiveness factors, multivariate analysis, organic agriculture.

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INTRODUCTION

Competitiveness allows a company to generate more income than the competition, this through maintaining comparative advantages, in a local or external socioeconomic environment (Saavedra, 2012). In Mexico, micro-enterprises have had a high incidence of



closures due to lack of competitiveness (Castro, 2018; Patino-Galván & Hernández, 2023). This is worrying, since in Mexico there are 4.7 million companies and 95% are classified as micro-enterprises, which generate 10 million jobs and produce an estimate 14.2% of the gross revenue of the sector (INEGI, 2019).

Despite the importance of micro-enterprises, there is a lack of theoretical and empirical studies that allow us to know their level of competitiveness, and thus design strategies that strengthen them (Kotenko *et al.*, 2021). The aforementioned situation is further complicated by the difficulty of public access to financial, accounting, and operational information of micro-enterprises (Allende *et al.*, 2020). In addition, given the lower level of resources available, it is difficult to collect, organize, and analyze information for evaluation and decision-making (Otero & Taddei, 2018). Likewise, it is necessary to understand that the competitiveness of a micro-enterprise is associated with specific cultural and economic contexts. Hence the relevance of developing particular studies, since implementing general models to improve competitiveness could lead more quickly to failure.

Competitiveness is usually evaluated through the application of specific performance perception surveys (Otero & Taddei, 2018) and using the Likert scale, *i.e.*, psychometric instruments where the respondent must indicate their agreement or disagreement on a statement (Matas, 2018). Leal *et al.* (2021) evaluated the factors that influenced the competitiveness of agricultural companies, and obtained results on managers' perception of product quality, compliance with certifications, and innovation capacity. On the other hand, Acosta *et al.* (2020) used specific questionnaires and the Likert scale to assess the factors that affected the competitiveness of agricultural firms, and identified areas of opportunity in innovation management, use of competitive advantages, associativity, implementation of agricultural public policies, as well as in the participation of irrigation districts.

Micro-enterprises dedicated to organic agriculture in Baja California Sur are relevant for their contribution to human health, the conservation of natural resources, and the economy of the state (Villa & Bracamonte, 2013). However, there is a lack of information on various aspects (Iglesias *et al.*, 2021), including the level of competitiveness. Therefore, the objective of this research was to evaluate the level of competitiveness in agricultural micro-enterprises under organic production systems operating in the municipalities of La Paz and Los Cabos (Baja California Sur), Mexico.

MATERIALS AND METHODS

The study was applied to micro-enterprises, that is, economic units that have 1 to 10 employees, with minimal or no modern technology, and a family-type business organization (INEGI, 2019). All of them located in the municipalities of La Paz (24° 08' 37.3" N; 110° 18' 04.3" W) and Los Cabos (22° 53' 41.1" N; 109° 56' 24.5" W), in Baja California Sur, Mexico. Through the intentional non-probability sampling technique (Otzen & Manterola, 2017), eight micro-enterprises were identified, whose producers, owners, or representatives were given a questionnaire to collect socioeconomic information, such as education, age, gender, established crops, seniority in the company, and cultivated area, in addition to considering items to assess competitiveness in relation to the factors described below.

- **Use of competitive advantages.** Value directed toward customers, in the form of lower prices than those offered by competitors, and through the foreseeing of differentiated products whose revenues would exceed the corresponding costs (Romero *et al.*, 2020).
- **Innovation management.** Strategies followed for the conception and implementation of significant changes in the product, process, marketing, or organization of the company (Pérez, 2018).
- **Associativity.** Business association or coalition with a common goal, in which each participant maintains their legal and managerial independence (Sánchez & Parra, 2024).
- **Implementation of public policies for agriculture.** Interaction with programs derived from a set of government decisions aimed at solving agricultural and rural society problems, within the framework of the public interest (Velázquez *et al.*, 2020).
- **Value chain.** A theoretical model that describes the activities of an organization to generate value for the end customer and for the company (Astudillo *et al.*, 2020). Table 1 lists the items considered within each of the competitiveness factors evaluated. The response to each item was evaluated through a Likert scale, using the response options 1=Never, 2=Almost never, 3=Occasionally, 4=Almost always, and 5=Always.

Table 1. Items considered within each factor used to evaluate competitiveness in organic agricultural micro-enterprises.

Factor	Items
Use of Competitive advantage	a. Does the quality of your products meet the standards demanded by the market? b. Do your products have a differentiation that allows them to have a competitive advantage? c. Does the company make a commitment to maintain market demand? d. Are there strategies implemented to reduce production costs as a comparative advantage in sowing, harvesting, or post-harvest?
Innovation management	e. Are there innovations implemented in the products generated by the company at planting, harvesting, or post-harvest? f. Are there innovations implemented in production processes at sowing, harvesting, or post-harvest? g. Are there technological innovations implemented in terms of machinery and equipment for the production of their products at sowing, harvesting, or post-harvest? h. Are there innovations (<i>e.g.</i> specialized software) implemented in terms of management strategies for administrative tasks? i. Are there innovations implemented in terms of sales, advertising, and marketing techniques?
Associativity	j. Does the company have the capacity to negotiate with suppliers? k. Does the company have the capacity to deal with customers? l. Does the company collaborate with government agencies to ensure sustainability in the market? m. Is the company committed to associate with one or more producer organizations to develop productive activities? n. Does the company work within or as part of a production chain in rural farming or native communities, thus facilitating cooperation between the companies?
Implementation of agricultural public policies	o. Has the company received technical advice from the Federal or State government? p. Has the company received training from the Federal or State government? q. Has the government supported the company with credits?
Value chain	r. Does the company meet the product specifications demanded by the market? s. Do the company's geographical limitations hinder the relationship with the market? t. Do you consider that the company has adequate means of transport to move their products? u. Are there collaboration and coordination strategies implemented among producers, thus competing fairly in the market?

Based on the interviewees' responses to the socioeconomic questionnaires, averages and standard errors were calculated. Additionally, the values provided by the interviewees to each of the items, within each of the competitiveness factors evaluated, were used to obtain the total sum of factor items (TSFI) value. This variable made it possible to identify the progress of each micro-enterprise within each competitiveness factor. Afterwards, the TSFI values of each micro-enterprise in the five factors were added together to determine the general level of competitiveness (Leal *et al.*, 2021). In addition, the TSFI values of each micro-enterprise within each factor, as well as the level of competitiveness were standardized (Mazziotta & Pareto, 2021), and were subsequently used to characterize and classify micro-enterprises through the multivariate techniques of principal components analysis and cluster analysis, using the Ward method as a grouping criterion (Diaz *et al.*, 2019). Statistical analyses were performed in SAS[®] version 9.3.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The owners or managers of the units were all male, averaging 43.8 years of age, 12.9 years of education, and 8.9 years of seniority in the company. Planted area averaged 6.9 hectares. In regard to the type of crops produced, we found mainly vegetables, aromatic herbs and fruit trees (Figure 1).

Results showed scarce opportunity for female participation in the representation of micro-enterprises, a situation that agrees with Moy (2023), who has observed this situation as something characteristic in Mexico. Limited women participation derives from factors such as the lack of a functional caregiving system, since complexities of motherhood

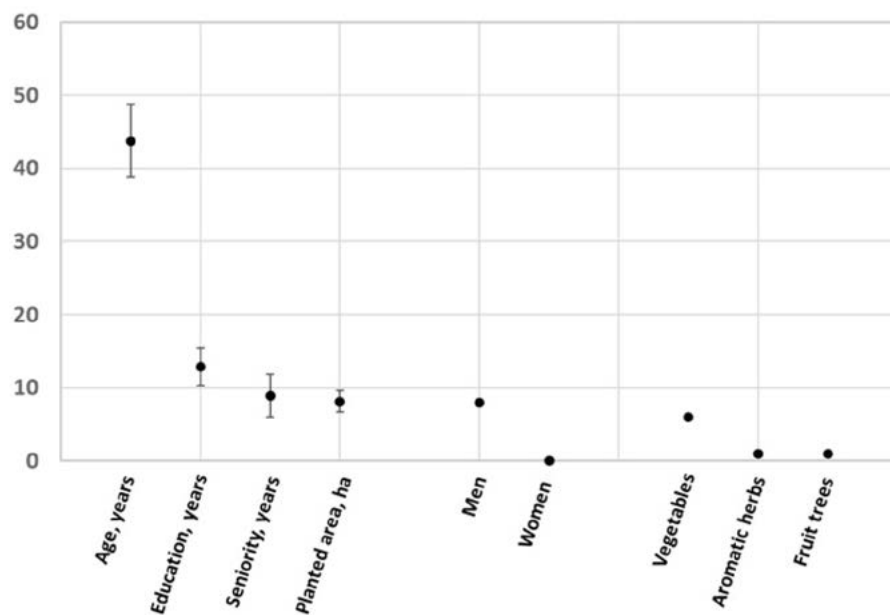


Figure 1. Socioeconomic characteristics (average \pm standard error), sex of producers or representatives, and types of crops targeted by organic agricultural production micro-enterprises in the municipalities of La Paz and Los Cabos (Baja California Sur), Mexico.

coincide with the advancement of a professional career, in addition to the lack of flexibility of schedules and resistance to change.

The average age of the owners or representatives of micro-enterprises, as well as the level of seniority, coincides with the trend reported by Alderete & Diez (2014), who stated that newer companies are generally led by young people, generally also with a high level of education. On the other hand, given that age is one of the factors that generates variability in the ways of learning, which can facilitate or hinder the processes of appropriation of technologies and innovations (Acero *et al.*, 2018). To take into account the age as a factor could contribute to the design of strategies, based on the use of andragogy techniques, for capacity building in order to strengthen competitiveness.

Regarding level of education, the value determined for owners or representatives of micro-enterprises participating in this study was below the average of 15.4 years reported for Mexico by the Organization for Economic Cooperation and Development (OECD). Moreover, it is below the average of 18 years reported by that organization, where education is highlighted as a fundamental dimension of competitiveness (Salazar *et al.*, 2023). Additionally, in the detailed analysis of the education level of the interviewees, 62.5% presented 17 years of education, which means being educated up to bachelor's level, while the remaining 37.5% informed six years of education (primary school completed). According to Otero & Taddei (2018) and Farida & Setiawan (2022), schooling is an important factor, since the level of knowledge of producers or representatives entail advantages that can increase productivity, competitiveness and innovation by positively relating to the adoption of technology.

Competitiveness valuation

The valuation of the items, within each competitiveness factor, generated a variant privileged location of micro-enterprises (Table 2). Likewise, the factor that presented the best valuation and less heterogeneity among micro-enterprises due to their average value and their lower dispersion was the use of competitive advantage (4.7 ± 0.4). That is, micro-enterprises presented a high valuation of the quality and differentiation of their products, seeking to maintain market demand and to implement strategies that reduce production costs. The competitiveness factors, successive in the valuation and ranked from highest to lowest, were the value chain (3.6 ± 1.4); innovation management (3.5 ± 1.2); and associativity (3.2 ± 1.7).

The factor with the lowest valuation was the implementation of public policies for agriculture (1.5 ± 0.8). The 'overall competitiveness' variable placed the M2 micro-enterprise as the most competitive, scoring 92 points. Results found are consistent with elements identified by Acosta *et al.* (2020), who through the use of specific questionnaires and the Likert scale, evaluated those factors that affected the competitiveness of agricultural companies. Those authors found areas of opportunity in the factors innovation management, use of competitive advantages, associativity, and the implementation of public policies for agriculture.

Based on the findings above, it is recommended that micro-enterprises implement some improvements per factor. These are, specifically, 1) Innovation management: to implement

Table 2. Valuation of factor items associated with the competitiveness of organic agricultural micro-enterprises (MIEMs).

Competitive advantage							Innovation management						
MIEM	a	b	c	d		TSFI	MIEM	e	f	g	h	i	TSFI
M7	5	5	5	5		20	M2	5	5	5	4	5	24
M5	5	5	5	5		20	M4	5	5	5	3	4	22
M6	5	5	5	5		20	M1	3	4	4	5	4	20
M4	5	5	5	4		19	M7	3	3	4	4	5	19
M8	5	5	4	5		19	M8	4	4	3	2	4	17
M3	5	5	4	5		19	M5	2	2	2	5	5	16
M2	4	5	5	5		19	M6	3	3	2	5	2	15
M1	4	3	5	5		17	M3	3	3	2	1	1	10
						4.7 ± 0.4							3.5 ± 1.2
Associativity							Implementation of public policies for agriculture						
MIEM	j	k	l	m	n	TSFI	MIEM		o	p	q		TSFI
M2	5	5	5	5	5	25	M1		3	3	3		9
M5	5	5	3	5	1	19	M2		3	3	1		7
M7	5	5	1	1	5	17	M4		1	3	1		5
M1	4	4	4	1	3	16	M7		1	1	1		3
M8	5	5	1	3	1	15	M5		1	1	1		3
M4	5	4	1	1	4	15	M6		1	1	1		3
M6	5	5	1	1	1	13	M8		1	1	1		3
M3	3	4	1	1	1	10	M3		1	1	1		3
						3.2 ± 1.7							1.5 ± 0.8
Value chain							Overall competitiveness						
MIEM		r	s	t	u	TSFI	MIEM						
M2		5	3	4	5	17	M2	92					
M1		5	1	5	5	16	M1	78					
M4		5	3	4	4	16	M4	77					
M7		5	1	5	5	16	M7	75					
M5		5	2	4	5	16	M5	74					
M6		5	1	4	5	15	M6	66					
M8		4	1	4	3	12	M8	66					
M3		3	1	3	1	8	M3	50					
						3.6 ± 1.4							

TSFI: total sum of factor items for a specific participating micro-enterprise. MIEM: micro-enterprise. Items: a to u, as described in Table 1; M1, M2...M8: participating micro-enterprises. [†] Mean \pm standard deviation.

innovations in the products generated, as well as in production processes, machinery and equipment to obtain their products, in addition to implementing innovations in terms of sales, advertising and marketing techniques; 2) Associativity: to implement strategies that increase the level of negotiation with suppliers and customers. As well as, to participate with government agencies to be sustainable in the market, associating with organizations

of producers, and working as part of a production chain; 3) Value chain: to implement strategies that contribute to compliance with the product specifications demanded by the market; also, that can reduce geographical limitations with the market, have adequate means to transport their products, and increase collaboration among producers in order to compete in the market. 4) Implementation of public policies for agriculture: it is recommended to approach government institutions in the search for technical advice, training or credits.

Thus, the valuation of competitiveness made it possible to identify aspects that require greater intervention by micro-enterprises, which has been reported as a valuable element in the implementation of this type of research (Rodríguez *et al.*, 2019; Leal *et al.*, 2021). On the other hand, even though this evaluation did not include parameters related to the measurement of the level of capabilities of the totality of human resources or the efficiency of the organizational structure of micro-enterprises, it is necessary to implement strategies that can strengthen these elements in order to increase their competitiveness (Latifah, 2021; Farida & Setiawan, 2022).

Multivariate characterization of organic agricultural micro-enterprises

The data on the valuation of factors associated with competitiveness were characterized by a principal component analysis (Table 3). The first two principal components (CP1 and CP2) were more relevant due to their eigenvalue greater than one (Allee *et al.*, 2022) for a total cumulated variance of 92.2%. CP1 was positively associated with greater competitiveness in micro-enterprises due to better innovation management, implementation of agricultural policies, associativity, and value chain. CP2 was positively associated with the competitive advantages of micro-enterprises.

Figure 2A shows the distribution of micro-enterprises between the two principal components of importance. The principal component analysis made it possible to reduce the dimensionality of data, minimizing information loss of and facilitating data

Table 3. Pearson correlation coefficients (*r*) and eigenvectors (*E*) associated with competitiveness factors in organic agricultural micro-enterprises.

Competitiveness factors	Principal components			
	PC1		PC2	
	<i>r</i>	<i>E</i>	<i>r</i>	<i>E</i>
Competitive advantage	-0.32	-0.16	0.93**	0.75
Innovation management	0.94**	0.47	0.05	0.04
Implementation of agricultural public policies	0.74**	0.37	-0.64	0.26
Associativity	0.84**	0.42	0.33	-0.51
Value chain	0.86**	0.43	0.32	0.26
Competitiveness	0.98**	0.49	0.17	0.14
Eigenvalue	3.9		1.5	
Variance proportion, %	66.5		25.7	
Accumulated variance, %	66.5		92.2	

PC1: first principal component; PC2: second principal component; ** Significant at ($p \leq 0.01$).

interpretation, thus fulfilling PCA implementation purpose (Jolliffe & Cadima, 2016). On the other hand, cluster analysis (Figure 2B) facilitated the formation of four groups based on their similarity (Everitt *et al.*, 2011) in relation to the level of competitiveness. The most competitive micro-enterprise was M2, followed by M1, as well as by the group composite of M4, M5, M6, M7 and M8; finally, the micro-enterprise with the least competitiveness was M3. The distribution of M3 and M1 based on the influence of the second principal component (Figure 2A) also denotes the relevance of both micro-enterprises working on the implementation of practices that increase their competitive advantages.

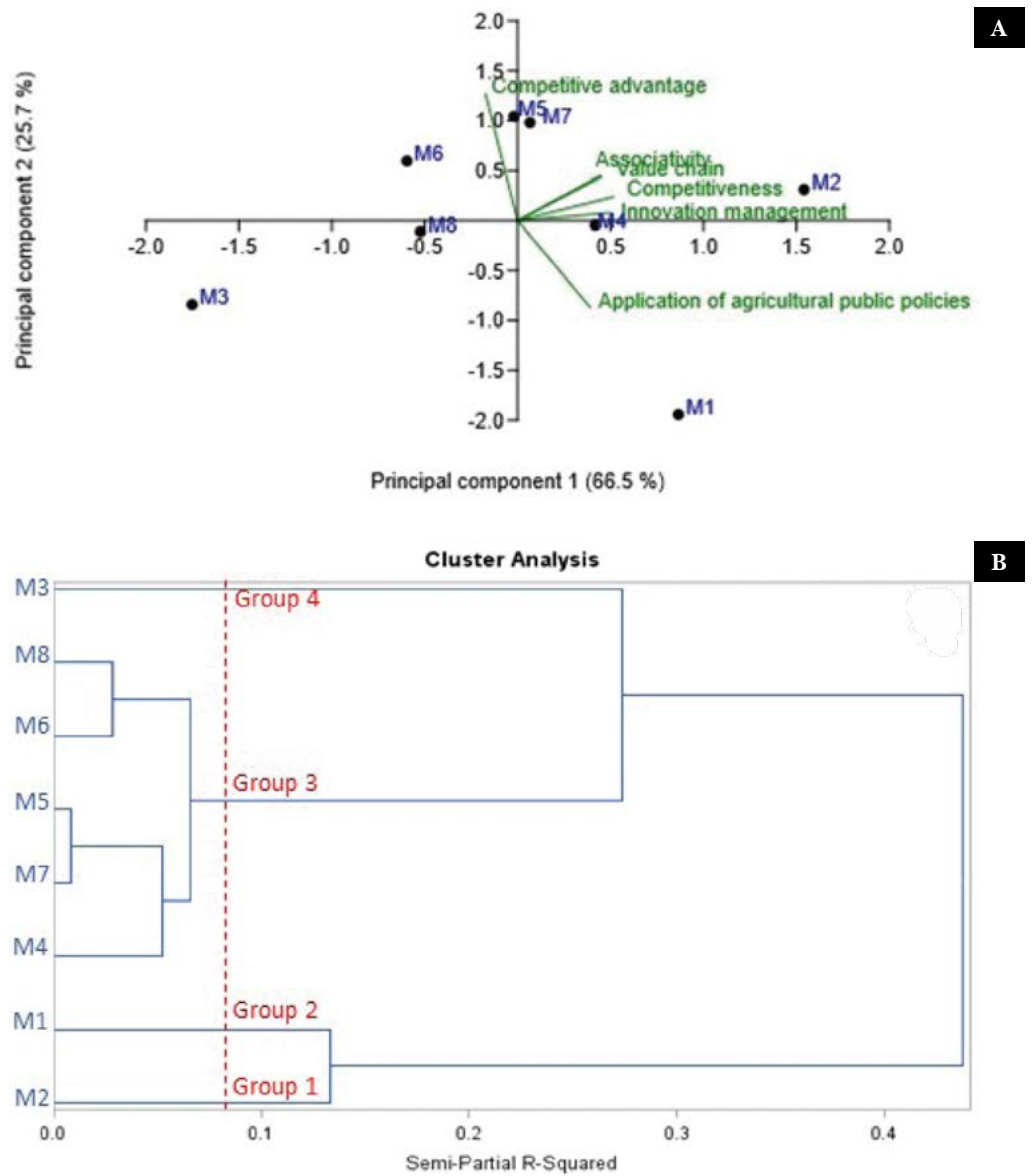


Figure 2. A: distribution of competitiveness factors and organic agricultural micro-enterprises between the two principal components of importance. B: cluster analysis applied to organic agricultural micro-enterprises.

CONCLUSIONS

The level of competitiveness was variable among organic agricultural micro-enterprises. The factor associated with competitiveness with the best valuation was competitive advantage, while with an intermediate level of improvement area, the factors value chain, innovation management and associativity were identified. The factor in which greater effort is required by micro-enterprises was the implementation of public policies for agriculture.

It is then recommended to approach government institutions in the search for technical advice, training and credits. For future evaluations of competitiveness, it is recommended to consider employees of micro-enterprises in the sampling. That is, to know the capabilities of human resources and the efficiency of the organizational structure, which can lead to the design of strategies to strengthen competitiveness.

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