



HAL
open science

Environmental Strategy and Competitive Advantage in Mezcal Businesses in Oaxaca, Mexico

Ileana García-Román, Patricia Sánchez-Medina, René Díaz-Pichardo,
Magdaleno Caballero-Caballero

► **To cite this version:**

Ileana García-Román, Patricia Sánchez-Medina, René Díaz-Pichardo, Magdaleno Caballero-Caballero. Environmental Strategy and Competitive Advantage in Mezcal Businesses in Oaxaca, Mexico. International Journal of Management and Marketing Research, 2018, 11 (1), pp.41-54. hal-03109726

HAL Id: hal-03109726

<https://hal.science/hal-03109726>

Submitted on 4 Feb 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

ENVIRONMENTAL STRATEGY AND COMPETITIVE ADVANTAGE IN MEZCAL BUSINESSES IN OAXACA, MEXICO

Ileana García-Román, Instituto Politécnico Nacional Oaxaca, México

Patricia S. Sánchez-Medina, Instituto Politécnico Nacional Oaxaca, México

René Díaz-Pichardo, South Champagne Business School, France & Université de Technologie de Troyes

Magdaleno Caballero-Caballero, Instituto Politécnico Nacional Oaxaca, México

ABSTRACT

In this article we examine the relationship between environmental strategy and competitive advantage using natural-resource-based theory. We did a transverse-cut quantitative analysis on a sample of 80 small mezcal (distilled alcoholic beverage made from agave angustifolia haw) businesses in Oaxaca, Mexico. We used structural equations modeling for hypothesis testing; our results reveal a direct and positive relationship between environmental strategy and future positioning, and between environmental strategy and business partnerships. This implies that environmental strategies implemented by the palenquero (the owner or manager of a mezcal business) can generate competitive advantages in future positioning and partnerships, which improve business productivity and help preserve the natural environment.

JEL: M1, M14

KEYWORDS: Small Businesses, Mezcal, Environmental Strategy, Competitive Advantage

INTRODUCTION

Micro, small, and middle-sized enterprises (MSMEs) are of great importance for the Mexican economy. They contribute 52% to the GDP, generate 64% of employment, and represent 95% of formally registered firms (INEGI, 2009). In the State of Oaxaca, MSMEs represent 99.8% of the total number of firms. Mezcal businesses are part of this percentage (DENUE, 2016), and even though they contribute 197.97 million pesos to the Oaxaca's GDP (INEGI, 2012), there are few studies on this sector. Studies mainly cover the optimization of maguey production in some of its stages (Pérez, Caballero, Hernández and Montes, 2013); or the way mezcal businesses conduct their marketing activities to achieve the observed productivity level (Hernández and Domínguez, 2003). At an international level, the relationship between environmental strategy and competitive advantage has been studied since the 1980s, when management theorists debated the importance of internal capabilities in firms when compared to environmental factors in the generation of competitive advantages, as well as the traits businesses must have in order to become sustainable in the future (Hart, 1995).

In the present competitive context, the environmental variable plays an important role in the potential to alter the competitive position of businesses in a determinate economic sector (Armas-Cruz, 2011); thus, management of the environmental variable is a strategy in the creation of competitive advantages. According to Freel (2005), this factor (in combination with innovation) can reduce the uncertainty faced by companies since care of the environment can be present in each area of a company and is a very important factor when talking about strategies that look for sustainable competitive advantages. The relationship

between environmental strategy and competitive advantage has been studied from multiple perspectives. Some have identified environmental regulation as a challenge and introduced it as an environmental strategy in order to achieve competitive advantages (Barrett, 1991). Others have found that sustainable development is possible through readjusting energy and technology use from an ecological perspective (Shrivastava, 1995). Business production has also been analyzed in terms of implementation of environmental strategies, from which an improved reputation, competitiveness, and competitive advantages can be obtained (Miles and Covin, 2000). In this way, environmental strategy can be a key factor at the organizational level (Hernández, De Jesus and Aguilar, 2013).

There are studies that analyze the dynamic capabilities of businesses in implementing environmental strategies with the purpose of creating competitive advantages in an environment of increasing uncertainty (Aragón-Correa and Sharma, 2003). Likewise, environmental strategy and competitive advantage have been studied through better practices within firms, which allows for improved organizational capability and greater employee experience (Claver, López, Molina and Tarí, 2007). The relationship between environmental strategy and competitive advantage has also been studied through the incorporation of innovation as an element that positively influences the general and environmental strategies of a business, generating competitive advantages (Wagner, 2009). This same relationship has been analyzed from the standpoint of environmental improvement, considering that environmental strategies lead to the development of competitive advantages (Marchi, Maria and Micelli, 2013).

It is worth noticing that the studies mentioned above were done on large firms in industrialized economies like those of the United States and European countries and consequently, there is a gap in the literature regarding micro and small businesses in developing countries; added to this, it is often thought that micro and small businesses lack resources to implement environmental strategies because they are focused on subsistence in most cases (Toledo, Díaz-Pichardo, Jiménez and Sánchez-Medina, 2012). According to Hart (1995), competitive advantages are based on assumptions of heterogeneity and immobility of resources within Barney's (1991) resource-based view (RBV). These resources must be able to generate value by exploiting opportunities or neutralizing existing threats in the business environment; they must stand out among actual and potential business competitors, be difficult or impossible to copycat by competitors, and must not have strategically equivalent substitutes. Furthermore, the natural-resource-based view (NRBV) illustrates the challenge of incorporating the environment into business strategies by way of three interconnected strategic capabilities: pollution prevention, cost reduction of a product during its lifetime, and sustainable development. According to Hart and Dowell (2011), the latter strategic capability, sustainable development, is divided into clean energy strategic capability and strategic capability for the base of the pyramid. In a larger sense these capabilities refer to an environmental strategy implemented by the firm. The objective of our research is to analyze the relationship between environmental strategy and competitive advantage using Hart's NRBV (1995). It empirically contributes to the literature by studying micro and small businesses in developing countries, which are usually themselves in a context of subsistence within the base of the pyramid; such is the case of mezcal businesses in Oaxaca.

From the strategic capabilities proposed by the NRBV, the strategic capability of product management is increasingly being studied. The study of mezcal businesses helps to consolidate research on the creation of partnerships between the *palenqueros* and other stakeholders like the government, the local community, the suppliers, and non-profit organizations, which contribute to the improvement of the product's life cycle, in both economic and environmental terms. In the literature, clean energy strategic capability has been poorly studied in recent years. Disruptive changes implemented by some *palenqueros* can be an interesting aspect for research on this specific capability. From these changes we can see that investment in technology and implementation of new techniques that allow for improved use of raw materials, energy, and water, thus reducing waste and costs, provides better positioning for the future.

The following research question arises: does environmental strategy generate competitive advantages in Oaxacan mezcal businesses within the NRBV framework? The rest of the paper explains briefly the Natural-Resource-Based View, followed by a description of the context in which mezcal businesses develop, after which we propose our research hypotheses. Later, we explain the methodology used to test our hypotheses, discuss research results, and present our conclusions.

LITERATURE REVIEW

The Natural-Resource-Based View (NRBV) stems from the Resource-Based View (RBV) proposed by Barney (1991). The view suggests that the optimum combination of a firm's resources and capabilities can be key to developing a sustainable competitive advantage. However, RBV leaves aside the environmental aspect and ignores ecological problems such as air and water pollution, global warming, and toxic emissions. Hart (1995) noticed that if firms continue to practice the same strategies, irreversible damage upon the basic ecological systems of the planet will take place. He proposes new challenges for the firm's strategic management, which must be environmentally sustainable. Hart (1995) argues that economic activity, business strategies, and competitive advantages must ease environmental sustainability. Fifteen years later, Hart and Dowell (2011) revise the NRBV and redefine sustainable development, which can be explained through clean technologies and the base of the pyramid. The revision suggest four strategic capabilities included in the NRBV as shown in Table 1.

Table 1: A Natural Resource Based View: Fifteen Years After

Strategic Capability	Driving Force	Key Resource	Competitive Advantage	State of Developed Research
Pollution Prevention	Minimization of emissions, sewage waters, and waste	Constant improvement	Reduced costs	Solid empirical evidence in favor of NRBV
Product Management	Minimization of the costs of product life cycles	Stakeholder integration	Reputation and legitimacy	Increasing areas of research, but still much to achieve
Clean Technology	Make improvements to quantum leap	Disruptive change	Future positioning	Scarce research up to now
Base of Pyramid	Satisfy unsatisfied needs of people in poverty	Implementation of innovation	Long-term growth	Growing body of practice and orientation, need of academic attention

This table shows the strategic capabilities derived from the vision based on natural resources. Each strategic capability entails a particular competitive advantage, as well as key resources in which each capability is focused and particular areas of action that are its driving force, finally showing the state in which the research development is located for each developed strategic capacity. Source: Hart S., & Dowell, G. (2011). A natural resource based view of the firm: Fifteen Years After. Journal of Management, 35(5), p.1472.

Pollution prevention can be achieved by controlling polluting emissions, either by catching, storing, or eliminating them; by using control equipment; or by preventing emissions, reducing them by improved cleaning, substitution of materials, recycling, or process innovation (Cairncross, 1991; Frosch and Gallopoulos, 1989; Willig, 1994). This strategic capability requires active participation from employees and continuous improvement of emissions reduction, contrary to what is thought of as expensive technological equipment to control pollution. By preventing pollution, not only can savings in installation and operation of control devices be achieved, but also productivity and efficiency are increased because inputs are being better used, therefore reducing costs of raw materials and waste elimination (Young, 1991). Pollution prevention reduces overall costs and improves the firm's cash flow and profitability (Hart and Dowell, 2011). This capability is not procured by the artisanal mezcal sector because the *palenqueros* are not concerned with preventing pollution; they are more concerned with focusing on positioning or maintaining themselves in the market. Product management is concerned with every activity along the value chain, from the entry of raw materials to the use of the product. There is environmental impact at each stage

of the value chain; environmental concerns must be integrated into each stage. Reducing the environmental costs of product management requires minimizing the use of non-renewable materials, avoiding toxic materials, using renewable or low-environmental-impact resources in product elaboration, and ease of reuse or recycling at the end of its useful life (Kleiner, 1991; Shrivastava, 1995; Hart, 1995).

Firms can eliminate or modify activities in their product management processes that deteriorate the natural environment; for instance, redesigning existing products, and developing environmentally-friendly products and packages. This strategy suggests that, in order to minimize environmental impact, the firm must take a proactive stance towards environmental protection in its use of raw materials, as well as in the components used from suppliers (Smart, 1992). Product management can lead to the development of competitive advantages if privileged relations are created by having exclusive access to certain products or by the establishment of certain rules that generate advantages for the firm (Hart and Dowell, 2011). In the context of mezcal businesses, partnerships between *palenqueros* and the government have generated the possibility of access to new technology and knowledge that encourages a better use of resources; competitive advantages can be generated that allow mezcal businesses to have greater possibilities in future positioning. From Hart and Dowell's contribution (2011), strategic capability of sustainable development can be subdivided into clean technology and base of pyramid (BOP) strategic capabilities. Clean technology strategic capability emphasizes that firms should build new skills that put them in an advantageous position in the market (Hart, 1995; Hart and Dowell, 2011; Sánchez-Medina, Díaz-Pichardo and Jiménez, 2015). Among mezcal businesses, by implementing different forms of technology that allow water and energy savings at different stages of production, different environmental strategies have been generated within the clean technology strategic capability.

Some mezcal firms, with the purpose of improving maguey use, have implemented technology such as maguey mills that grind the already baked maguey *piñas* (or hearts) in a more homogeneous manner; mills obtain more and better sugars during the baking stage; the construction of closed rooms maintains an adequate temperature in the fermenting tubs; and during the distillation stage, cooling towers allow for reuse of water. With all the changes that have occurred in the mezcal business, *palenqueros* could achieve a more competitive market position and better resource utilization, which in turn increases their possibilities for future positioning. Strategic capability at the base of the pyramid focuses on people's poverty in developing countries (Hart and Dowell, 2011). The poverty and marginalization context in which mezcal businesses develop fits into this capability. By improving the living conditions of *palenqueros*, improvements on the quality of life of mezcal business owners and workers alike are encouraged.

These strategic capabilities relate to each other in the following manner: in pollution prevention, polluting emissions, sewage waters, and waste are minimized, which leads to cost reductions; product management minimizes costs during the product's life cycle, and the firm obtains greater prestige; outpacing competitors and sustainable development both allow for future positioning. The NRBV suggests a relation between environment and business activities: considering the natural aspect in the firm's strategies, sustainable competitive advantages can be obtained. Pollution prevention strategies focus on continually improving production processes and involving employees in "green" teams; likewise, these strategies are related to the objectives of total quality management since they seek to reduce material waste, effort, and time, achieving a competitive advantage in costs. Product management strategy displays a functional management of the firm, affecting production, design, and employee coordination and involving several stakeholders inside and outside the firm; competitive advantage in terms of prestige is achieved.

Finally, strategic capability at the base of the pyramid proposes that development should be inclusive by taking into account economic aspects and the environment in the firm's activities, and by involving social aspects when considering marginalization of less developed countries. Considering that the NRBV starts from the strategic capabilities a firm is able to develop, including environmental concerns that lead to competitive advantage, it is possible that mezcal businesses can find an alternative for future positioning

through improved production processes that reduce their negative impact on the environment. Greater environmental care during the whole product life cycle leads to competitive advantages and a fair market that allows for sustainable businesses.

Context of Mezcal Businesses

The State of Oaxaca is one of the states that has appellation of origin for mezcal production. Sola de Vega, Mihuatlán, Yautepec, Tlacolula, Ocotlán, Ejutla, and Zimatlán are some of the producer districts in the region; they are located in the Valles Centrales and Sierra Sur regions. These districts contribute 85% of local mezcal production. Mezcal production in Oaxaca is done in a traditional manner; it is relevant to know the characteristics of the producers and the climate conditions—the quality of mezcal depends on climate conditions. The Valles Centrales region in the State of Oaxaca is characterized by high levels of marginalization and extreme poverty. Mezcal producers often have low wages, minimal education, and are malnourished, with multiple health issues. Low income and precarious housing conditions lead to low levels of production, unemployment, underemployment, and migration. There is a wide gap between existing technology and its use. According to Bautista and Ramírez (2008), agroclimatic conditions are relevant to *mezcalero* agave production. Temperature and rainfall significantly influence the development period and quality of crops. Practically speaking, this is a rainfed agroindustry because it lacks irrigation infrastructure as well as other conditions that might improve the quality of agave.

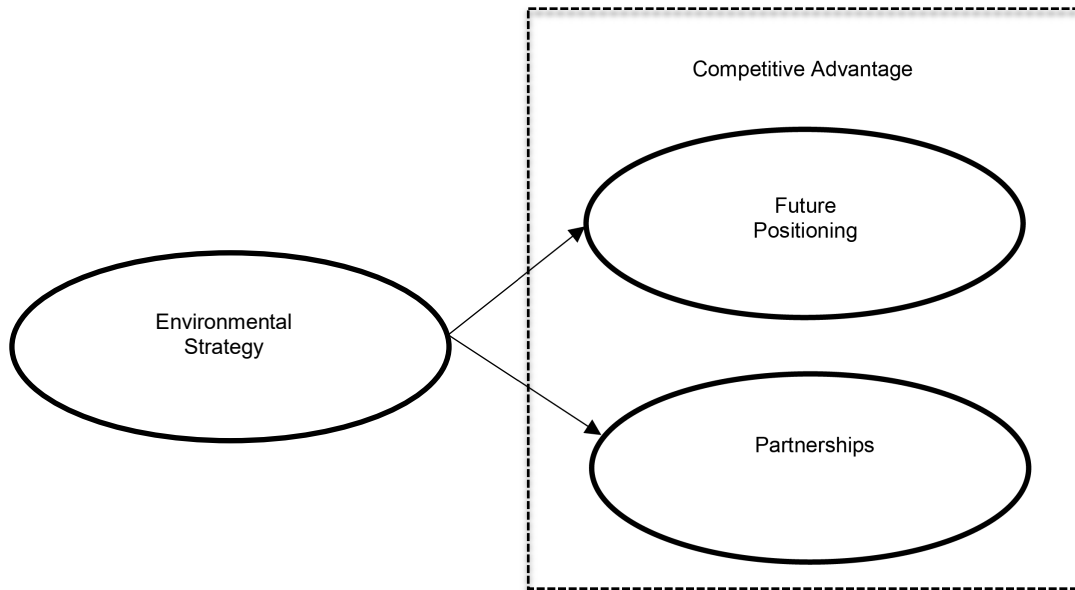
Traditional production is based on knowledge transmitted from generation to generation. New elements have been incorporated to improve the preparation of agave distillate, but retain the system learned from previous generations. The preparation process of mezcal involves four stages: the baking stage, the grinding stage, the fermentation stage, and the distillation stage. In the baking stage, agave hearts are placed in a natural oven consisting of a circular excavation that forms a large bowl covered with stones previously heated with firewood until they are red hot; the process lasts four days. In the grinding stage, the baked hearts are cut into homogeneous pieces and ground in Egyptian traditional mills, with a large round stone using animal traction. In the fermentation stage, the resulting must or juice is poured into wooden tubs where it ferments naturally for four or five days, depending on the average temperature. Finally, in the distillation stage, double distillation is done to obtain a more natural, homogeneous, and high-quality alcohol. The importance of studying environmental strategy implementation in Oaxacan mezcal businesses and the generation of competitive advantages lies in promoting environmental concern in these businesses. Furthermore, by implementing these strategies, alternatives can be reached that improve the quality of life of *palenqueros*. Considering the above arguments, we have formulated the following research hypotheses:

H1: There is a direct and positive relationship between environmental strategy and future positioning of mezcal businesses.

H2: There is a direct and positive relationship between environmental strategy and partnerships between palenqueros in mezcal businesses.

We propose the following research model (Fig. 1). Environmental strategy implemented by mezcal businesses leads to the generation of competitive advantages; i.e., future positioning and formation of partnerships.

Figure 1: Proposed Research Model for Mezcal Businesses



This figure shows the graphical representation of the theoretical research model, which indicates the direct and positive relationship between environmental strategy and future positioning and between environmental strategy and partnerships. The direction of each arrow indicates the relationship and the hypothesis raised in the model. Source, own elaboration derived from the review of the literature.

DATA AND METHOD

Sample and Unit of Analysis

A representative random sample of 100 mezcal businesses from municipalities with higher production and easier access was selected from 221 mezcal businesses in the state of Oaxaca, according to the National Statistical Directory of Economic Units (DENUE, 2015). Of the 100 questionnaires obtained, 80 included complete information from respondents, representing a response rate of 80%. A survey was applied for data collection, this survey was administered in April and May 2015 to owners or managers of selected mezcal businesses. It was administered via a face-to-face interview guide in an average time span of thirty minutes. The questionnaire consisted of a total of 57 questions divided into sections such as general data, environmental strategies implemented, and competitive advantages generated as a consequence of these strategies. The municipalities are shown in Table 2.

Table 2: Characteristics of the Sample

Municipality	Number of Businesses
Tlacolula de Matamoros	40
Santa Catarina Minas	6
San Antonio Huitepec	3
Villa Sola de Vega	13
Zimatlán de Álvarez	9
Miahuatlán de Porfirio Díaz	4
Asunción Nochixtlán	5
Total	80

This table shows the number of businesses per municipality included in the sample. The selected municipalities correspond to those of greater mezcal production at the state level, also taking into consideration those of easier access for the collection of the information. Source: Elaborated by the authors based on DENEUE, 2015.

The unit of analysis is the mezcal-producing business. The response units are the *palenqueros*, and mezcal business owners and managers.

Variables and Measures Used

The *environmental strategy* variable is defined as those actions done—even involuntarily—by the *palenqueros* in benefit of the environment during the processing and commercialization of mezcal; actions that improve the life cycle of the product and/or sustainable development—clean technology and base of pyramid. Sustainable development is achieved by the implementation of clean technology. Dimensions and indicators used to measure this variable were chosen according to our observations and conversations held with *palenqueros* during the interviews. Scales developed by Sharma and Vredenburg (1998) and Sharma (2000; 2001) were useful as guides to build a scale relevant to the traditional mezcal context. Questions that worked properly in the structural equations model are those related to water use in the production process and improvement of electrical installations. We used a 5-point Likert-type scale, asking *palenqueros* about the reduction of water use in the last year. Answers go from 1 (nothing) to 5 (very much).

Competitive advantage is identified with the set of two dimensions associated with greater benefits for the *palenquero*: future positioning and improvement of electrical installation. Future positioning is defined as the *palenquero*'s vision of entry to new markets, increase in productivity, and adoption of performance-enhancing technology, in the next two years. Partnerships are defined as the importance the *palenquero* attributes to working with other *palenqueros* or with the government. We used a 5-point Likert-type scale, asking *palenqueros* about the extent to which they will do certain things or consider important the relationships with other *palenqueros* and with the government. Answers go from 1 (nothing) to 5 (very much). The questionnaire is included in the Appendix. Factor loadings for each item are shown in Table 3 as evidence of discriminant validity of our measures.

The level of education of *palenqueros* was classified into four groups, according to the National Institute of Statistics and Geography (2010): no education (group 1), elementary education (group 2), secondary education (group 3), and higher education (group 4). Levels of education are related to specific characteristics that are linked to the improvement of business performance (Van Praag and Versloot, 2007) and the quality of life of the *palenqueros* and their families. In our research, level of education was used as an instrumental variable to solve potential problems of endogeneity in the relations proposed in our research model. Table 4 shows basic descriptive statistics for variables used in our research model, with their corresponding Pearson's bivariate correlation.

Table 3: Factor Loadings

Question	Environmental Strategy	Future Positioning	Partnerships	Communality
EA1. Water use during the baking stage	0.8816	0.2330	0.1585	0.857
EA2. Improvement of electrical installation	0.8528	0.3103	0.0068	0.824
EA3. Water use during fermentation	0.8822	0.2597	0.1583	0.869
PF1. Entry to new markets	0.2607	0.9011	0.1759	0.911
PF2. Increase in productivity	0.3059	0.8143	0.2097	0.801
PF3. Acquisition of technology	0.2307	0.8341	0.0431	0.751
A1. Partnerships with other <i>palenqueros</i>	-0.0422	0.2392	0.8856	0.843
A2. Partnerships with the government	0.2830	0.0456	0.8609	0.823
Explained Variance	2.579	1.651	2.448	
Cronbach's Alpha	0.910	0.887	0.737	

This table shows the factor loadings of the items used to measure the variables in the research model, which has been adapted to the context of the mezcals business. Loadings greater than 0.5 indicate the factor in which load each item. The reliability of the variables was determined by Cronbach's alpha and was considered appropriate with a value greater than 0.7.

Table 4: Pearson's Correlation Matrix

	Average	Standard Deviation	EA	PF	A	NE
Environmental Strategy (EA)	2.375	0.933	1.000			
Future Positioning (PF)	2.271	0.867	0.565***	1.000		
Partnerships (A)	3.219	0.702	0.273**	0.345***	1.000	
Level of Education (NE)	2.288	0.750	0.719***	0.450***	0.372***	1.000

This table shows the bivariate Pearson correlation coefficients, with *** indicating that the correlation is significant at the 0.01 level, and coefficients with ** indicating that the correlation is significant at the 0.05 level.

RESULTS AND DISCUSSION

We performed a two-step structural equations model to test our hypotheses. We first tested the measurement model using observable variables (items) to measure latent variables. Then we tested the suggested effects on our hypotheses simultaneously by integrating the structural equations that corresponded to our model. In this second model, we test the effect of the environmental strategy on the variables future positioning and partnerships. Level of education is used as an instrumental variable to eradicate possible endogeneity problems. In both models we used the maximum verisimilitude method with robust adjustment as an answer to a relatively high multivariate kurtosis on the data (Standardized Mardia coefficient = 8.6). Testing was done using EQS 6.2. Our measurement model showed good fit, with a Satorra-Bentler scaled chi-squared value of 18.4; 17 degrees of freedom; *p-value* = 0.36, CFI = 0.994; and RMSEA = 0.33 with a 90% confidence interval of 0.000 – 0.109. Our structural model showed good fit as well, with a Satorra-Bentler scaled chi-squared value of 24; 23 degrees of freedom; *p-value* = 0.49, CFI = 1.000; and RMSEA = 0.000 with a 90% confidence interval of 0.000 – 0.090. Figure 2 shows the standardized regression coefficients and their statistical significance, and r-squared values for each endogenous variable. Regression equations are as follows:

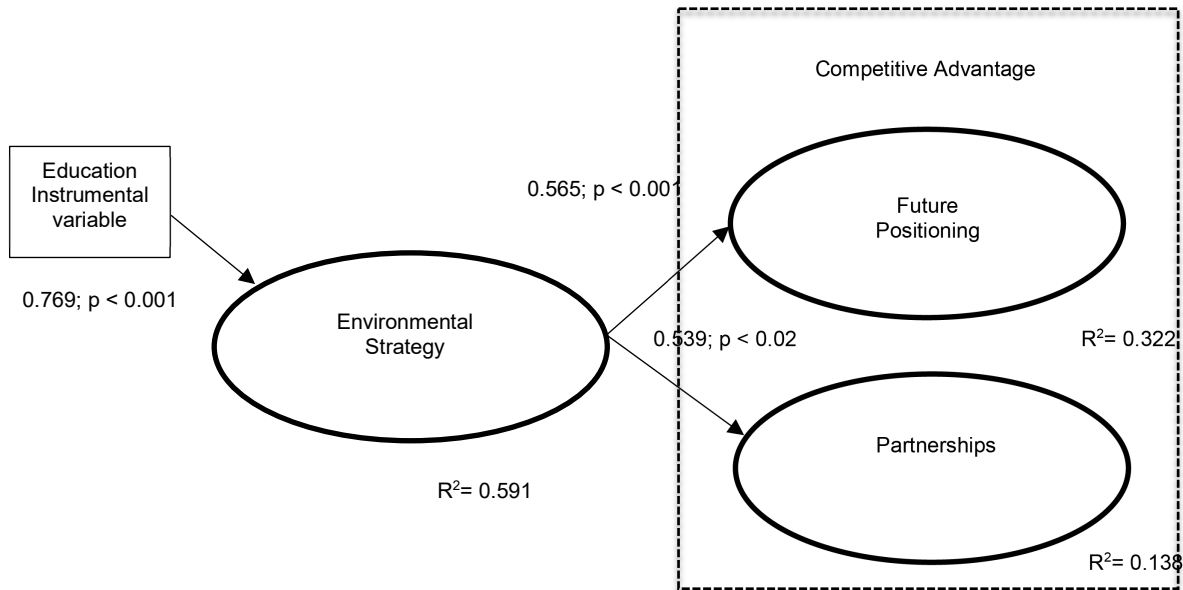
$$future\ positioning = b1 * environmental\ strategy + disturbance\ of\ future\ positioning \quad (1)$$

$$partnerships = b2 * environmental\ strategy + disturbance\ of\ partnerships \quad (2)$$

$$environmental\ strategy = b3 * education + disturbance\ of\ environmental\ strategy \quad (3)$$

Note: Derived from the use of an instrumental variable, disturbance of future positioning and disturbance of environmental strategy, as well as disturbance of partnerships and disturbance of environmental strategy are allowed to correlate in order to obtain consistent estimates, according to Antonakis et al. (2010).

Figure 2: Research Model with Standardized Regression Coefficients



This figure shows the graphical representation of the theoretical research model with standardized regression coefficients and their significance (two tails). R² is reported for each independent variable in the model. The use of education as an instrumental variable allows us to obtain consistent estimates in case of potential endogeneity derived from different sources, such as common-method bias or non-measured variables. Source, own elaboration.

Table 5: Non-Standardized Regression Coefficients for Structural Model

Independent Variable	Dependent Variable	Non Standardized Coefficient	t	R²
Level of Education (Instrumental Variable)	Environmental Strategy	0.893***	8.346	0.591
Environmental Strategy	Future Positioning	0.663***	4.342	0.322
	Partnerships	0.344**	2.522	0.138

This table shows the non-standardized regression coefficients for the structural paths on the research model, as well as the corresponding t value and the R² for all the dependent variables. Coefficients with *** are significant at the 0.01 level, and coefficients with ** are significant at the 0.05 level. Being all coefficients significant, the model is not rejected. The use of education as an instrumental variable allows us to obtain consistent estimates in case of potential endogeneity.

Environmental strategy has a positive and significant impact on competitive advantages corresponding to future positioning and partnerships. Our hypotheses are supported, suggesting that environmental strategy can effectively lead to competitive advantages for mezcal producers in Oaxaca. Our results coincide with those found by Delmas, Hoffmann and Kuss (2011), and Atkin, Gilinsky and Newton (2012). These authors have studied the effect of the implementation of environmental strategies on competitive advantages, finding that environmental strategy leads to competitive advantages inside the firm.

CONCLUDING COMMENTS

The main objective of this paper is to analyze the relationship between environmental strategy and competitive advantages in mezcal businesses in Oaxaca, Mexico, using Hart's NRBV. Mezcal businesses have not been widely studied in environmental topics. We did a transverse-cut quantitative analysis on a sample of 80 small mezcal businesses; the data were obtained through a structured questionnaire. This study is exploratory due to the scarcity of empirical studies that analyze environmental issues in subsistence businesses. We used structural equations modeling for hypotheses testing and found that environmental strategies implemented (either voluntary or involuntarily) by the *palenqueros* and oriented towards product management and sustainable development (clean technology and base of the pyramid) allow mezcal businesses to gain competitive advantages in terms of future positioning and partnerships. Our findings contribute to the study of sustainable development capability that subdivides itself into clean technology and base of the pyramid. Few works have explained this capability, and even fewer have explained it in the context of subsistence, as in the case of the mezcal sector. Evidence shows that environment-oriented technology allows mezcal businesses to position themselves in the future and to offer growth opportunities to *palenqueros* that are at the base of the pyramid. With these arguments the NRBV is supported, because the findings show that strategic capabilities lead to competitive advantage, specifically, product management and sustainable development environmental strategies.

Our research makes a proposal for the measurement of environmental strategy based on a traditional mezcal-producer context. We identified that the *palenqueros* take involuntary or voluntary actions that benefit the natural environment. This finding is of significant importance; mezcal businesses have been poorly studied from an environmental perspective, and they develop in a context of poverty and environmental degradation. Our findings also show that even when it comes to small businesses with serious limitations, they are becoming aware of the importance of protecting the natural environment. Finally, we must point out some limitations and future lines of research. First, because the studied strategic capacities were product management and sustainable development from the NRVB, future investigations could add other strategic capacities, such as the prevention of contamination, something that is complicated in mezcal businesses. We also recommend covering other aspects linked to the environmental strategies of mezcal producers, such as the use of copper stills –highly toxic equipment– in the production of mezcal. Second, it would be interesting to study environmental strategies in other states with a larger sample, since the results may vary accordingly to the environmental awareness generated in each context. Third, the use of one sole data collection instrument in the measurement of perception of mezcal businesses owners or managers is a limitation in our study; however, the introduction of level of education as an instrumental variable accounts for the potential bias derived from this fact. Fourth, further research could also investigate the variables or factors that determine environmental strategy in mezcal businesses. Finally, similar investigations can be performed in other sectors composed of small businesses in emerging economies in order to confirm the importance of environmental strategies in the achievement of competitive advantages.

APPENDIX. QUESTIONNAIRE

Considering a scale from 1 to 5, where 1 is nothing, 2 is little, 3 is regular, 4 is much, and 5 is very much, describe your opinion on each of the following aspects of the business:

Variable	Reactivo	Content
Environmental Strategy	EA1	During the last year, how have improvements been made in the use of water to clean workspaces and tools used during the baking stage?
	EA2	During the last year, how have improvements been made in electrical installations used during the grinding stage?
	EA3	During the last year, how has water use during the fermentation stage been reduced?
Future Positioning	PF1	To what extent will you be entering a new market in the next two years?
	PF2	To what extent will you be increasing your productivity in the next two years?
	PF3	To what extent will you be buying technology to increase performance in the next two years?
Partnerships	A1	Do you consider partnerships with other <i>palenqueros</i> to be important for the improvement of the business?
	A2	Do you consider partnerships with the government to be important for the improvement of the business?

REFERENCES

- Antonakis, J., Bendahan, S., & Jacquart, R. L. (2010). On making causal claims: A review and recommendations. *The Leadership Quarterly*, 21, 1086-1120.
- Aragón-Correa, J. A., & Sharma, S. (2003). A contingent resource-based view of proactive corporate environmental strategy. *Academy of Management Review*, 28(1), 71-88.
<http://dx.doi.org/10.1080/09640568.2010.549401> <http://www.jstor.org/stable/30040690>
- Armas-Cruz, Y. (2011). Determinants of environmental management and implications for firms' economic performance. *Journal of Environmental Planning and Management*, 54(8), 1077-1106.
<http://dx.doi.org/10.1080/09640568.2010.549401>
- Atkin, T., Gilinsky, A., & Newton, S. (2012) Environmental strategy: does it lead to competitive advantage in the US wine industry? *International Journal of Wine Business Research*, 24(2), 115-133.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Barrett, S. (1991). Environmental regulation for competitive advantage. *Business strategy review*, 2(1). 1-15.
- Bautista, J.A. & Ramírez, J. J. (2008). Agriculture and diversification of productive activities or small producers in the agave region of mezcal, Oaxaca, Mexico. *Agric. Téc. Méx* vol.34 no.4 México oct./dic. 2008.
<https://www.researchgate.net/publication/317478920>
- Cairncross, F. 1991. *Costing the earth*. Boston: Harvard Business School Press.

Claver, E., López, M.D., Molina, J.F., & Tarí, J.J. (2007). Environmental management and firm performance: A case study. *Journal of Environmental Management*, 84(4), 606-619.
<https://doi.org/10.1016/j.jenvman.2006.09.012>

Delmas, M., Hoffmann, V., & Kuss, M. (2011). Under the tip of the iceberg: absorptive capability, environmental strategy, and competitive advantage. *Business & Society*, 50(1), 116-154.
https://www.researchgate.net/profile/Magali_Delmas2

DENUE (2015; 2016). Directorio Estadístico Nacional de Unidades Económicas. Available in <http://www.inegi.org.mx/app/mapa/denue/default.aspx>

Freel, M.S. (2005). Perceived environmental uncertainty and innovation in small firms. *Small Business Economics*, 25(1), 49–64

Frosch, R., & Gallopoulos, N. 1989. Strategies for manufacturing. *Scientific American*, September: 144-152.

Hart, S. (1995). A natural resource based view of the firm. *The Academy of Management Review*, 20(4), 986-1014.

Hart, S., & Dowell, G. (2011). A natural resource based view of the firm: Fifteen Years After. *Journal of Management*, 37(5), 1464-1479.

Hernández, J., & Domínguez, M. (2003). Estrategias de mercadotecnia y los negocios de mezcal. *Revista de Ciencias Sociales*, 10(31), 187-203.

Hernández, P.J., De Jesus, E.J., & Aguilar, A.M. (2013). Implementation of lean business strategies: Evidence from Mexico. *International Journal of Management and Marketing Research*, 6(2), 67-78.

INEGI (2009; 2012). Censo Económico. Available in <http://www.inegi.org.mx>

Kleiner, A., 1991. What does it mean to be green? *Harvard business review*, July–August, 38–47.
<https://hbr.org/1991/07/what-does-it-mean-to-be-green>

Marchi, V.D., Maria, E.D., & Micelli, S. (2013). Environment strategies, upgrading and competitive advantage in global value chains. *Business strategy and the environment*, 22(1), 62-72.

Miles, M.P., & Covin, J.G. (2000). Environmental marketing: A source of reputational, competitive and financial advantage. *Journal of Business Ethics*, 23(3), 299-311.

Pérez, R., Caballero, M., Hernández, H., & Montes, L. (2013). Diseño y construcción de una desfibradora de hojas de agave angustifolia. *Revista Ciencias Técnicas Agropecuarias*, 22(4), 5-14.

Sánchez-Medina, P.S., Díaz-Pichardo, R., & Jiménez, J. (2015). Innovación ambiental y desempeño financiero en negocios de alfarería en México. *Temas de Ciencia y Tecnología*, 19(56), 29-38.

Sharma, S. (2000). Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy. *The Academy of Management Journal*, 43(4), 681 – 697

Dr. Sanjay Sharma, School of Business and Economics, Wilfrid Laurier University, 75 University Avenue W, Waterloo, Ontario N2L 3C5, Canada

Sharma, S. (2001). Different strokes: regulatory styles and environmental strategy in the North-American oil and gas industry. *Business Strategy and the Environment*, 10(6), 344 – 364.

Dr. Sanjay Sharma, School of Business and Economics, Wilfrid Laurier University, 75 University Avenue W, Waterloo, Ontario N2L 3C5, Canada

Sharma, S., & Vredenburg, H. (1998). Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. *Strategic Management Journal*, 1(8), 729-753.

Dr. Sanjay Sharma, School of Business and Economics, Wilfrid Laurier University, 75 University Avenue W, Waterloo, Ontario N2L 3C5, Canada

Shrivastava, P. (1995). Environmental technologies and competitive advantage. *Strategic Management Journal*, 16(S1), 183-200.

Smart, B. (ed.) (1992). *Beyond Compliance: A New Industry View of the Environment*. World Resources Institute, Washington, DC.

Toledo, A., Díaz-Pichardo, R., Jiménez, J., & Sánchez-Medina, P. S. (2012). Defining success in subsistence businesses. *Journal of Business Research*, 65, 1658-1664.

Van Praag, M. C., & Versloot, P.H. (2007). What Is the Value of Entrepreneurship? A Review of Recent Research. *Small Business Economics*, 29(4), 351-382.

Wagner, M. (2009). Innovation and competitive advantages from the integration of strategic aspects with social and environmental management in European firms. *Business Strategy and the Environment*, 18(5), 291-306.

Willig, J. (Ed.). (1994). *Environmental TQM*. New York: McGraw-Hill.

Young, R.C., & Francis, J.D. (1991). Entrepreneurship and Innovation in Small Manufacturing Firms. *Social Science Quarterly*, 72(1), 149-162.

ACKNOWLEDGEMENT

We are grateful to the National Polytechnic Institute (Instituto Politécnico Nacional - IPN) for financing the project SIP20170705.

BIOGRAPHY

Ileana García-Román, PhD student at National Polytechnic Institute- CIIDIR, Oaxaca, Mexico. Her research interests include the environment, as well as the competitive behavior of small and medium-sized enterprises (SMEs) in subsistence markets.

Patricia S. Sánchez Medina, PhD, is professor in the Management Department at National Polytechnic Institute –CIIDIR Oaxaca, Mexico. Her research interests are environmental management in subsistence business and fragmented industries. Within this research area she has development and participated in several research projects. Her recent research is in the field of sustainability in family businesses.

René Díaz-Pichardo, Doctor in Philosophy in Management. Professor and researcher at South Champagne Business School, France, and associate researcher at Université de Technologie de Troyes, ICD-HETIC-CREIDD, UMR 6281, CNRS, Troyes, France. His research interests are environmental management and social issues in subsistence businesses and fragmented industries.

Magdaleno Caballero Caballero, has specialized in the innovation and development of technologies suitable for crafts processes and products such as pottery and mezcal production. His research includes the integral management of *Agave angustifolia* Haw for industrial purposes in the state of Oaxaca, Mexico.