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Investment in innovation as a driver of sustainable value generation in agri-food companies

Inversión en innovación: conductor de la generación de valor sustentable en empresas agroalimentarias

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ABSTRACT

The aim of this paper is to determine If the investment in innovation of agro-food companies listed on the Mexican Stock Exchange is a driver for the generation of sustainable value. The strategies on the adoption of sustainability in companies of the agro-food industry were reviewed, given the consequences of climate change; Afterwards, consumer trends were examined as an element of contingency for innovation in these organizations, and finally, the structural equations were applied. Among the results obtained, it was found that companies do invest in innovation. With the identification of "investment in innovation" as a critical factor, evidence is provided that when designing long-term strategies for sustainable development, the organization can generate value from comprehensively.

Key words: Generation of sustainable value; investment; innovation; resources; agro-food industry

Jel Code: L25, M14, Q01

RESUMEN

El objetivo de este artículo es determinar si la inversión en innovación de las empresas agroalimentarias que cotizan en la Bolsa Mexicana de Valores es un conductor para la generación de valor sustentable. Se analizaron las estrategias sobre la adopción de la sustentabilidad en empresas de la industria agroalimentaria, dadas las consecuencias por el cambio climático; después se examinaron las tendencias de consumo como elemento de contingencia para la innovación y finalmente, se usaron ecuaciones estructurales. Entre los resultados se encontró que las empresas sí invierten en innovación. Con la identificación de "inversión en innovación" como factor crítico se aporta evidencia que al diseñar estrategias de largo plazo para el desarrollo sustentable la organización puede generar valor de manera integral.

Palabras clave: Generación de valor sustentable; inversión; innovación; recursos; industria agroalimentaria.

Código Jel: L25, M14, Q01

INTRODUCTION

Being faced with global derived problems. due to climate change as well as the population density, some private equity firms have joined the global agreement of the United Nations. They do so for the purpose of contributing to the millennium goals, also called Sustainable Development Goals (SDG). Therefore, companies must not only create economic-financial value but also promote sustained competitive advantages (through environment-based strategies). In order for the goal of value generation to be achieved, financial, material and intellectual resources are required to create technologies that facilitate the care for environmental resources, the decrease of contamination-related costs, as well as to improve the inclusion of interested parties (*stakeholders*).

While the study of business valuation has been prolific from a financial point of view, in the area of sustainability it presents itself as an opportunity to create measuring tools. With regards to the Bonns, Baumann and Hall (2012) business valuation, the following questions were posed: How to measure the creation and destruction in the value chains of global manufacturing? The measuring of sustainability demands economic, environmental, ecological and social metrics with different uses and ways to be combined.

The Organization for Economic Cooperation and Development (OECD) and the European Commission (EUROSTAT), mentioned that maybe one of those answers is to be found in process innovation, organizational aspects and marketing (OECD, 2006). The focus on technological revolutions, financial assets and "the financial madness" of Pérez (2002) argued that with the collapse of the financial bubble, the time for defining new potential ways of wealth creation, has come.

The goal of this study is to determine whether the innovation in agri-food companies listed on the Mexican Stock Exchange is a driver for sustainable value generation. To do so, first different concepts regarding sustainability and value generation were analyzed, also the theoretical proposal was taken into consideration *"A natural-resource-based view of the firm"* of Hart (1995). Hart (1995), was one of the pioneers in studying the relationship between the company and the natural environment parting from the organization theory.

The variables considered for this study were those pointed out by Hart (2007): 1) reduction of materials, consumption and the contamination by the industrialization process; 2) transparency in operation; 3) development of new technologies and 4) satisfaction of needs of the people through the actions implemented by the studied companies.

Concerning the identification of the investment in innovation as a driver of sustainable value generation structural equations were used. This quantitative tool identifies the hypothetical causal connection between the set of variables. The measuring model was used to determine the factorial loads determining the reliability and validity of the respective constructs. The study was centered on those companies in the agro-food industry that are global, issue public records, the report they propose is comprehensive or social and they respond to more than 90% of the national market (Cruz, 2016).

LITERATURE REVIEW

Sustainable development

The environmental degradation and the breach between the rich and poor brings risks for humanity and ecosystems. For more than 40 years the United Nations Environment Program (UNEP) has promoted different strategies for the rational use of resources. The negative effects on the biosphere are attributed to human action, characterized by the indiscriminate and arbitrary use of resources. Among the effects due to climate change are the following:

1. Water shortage; due to the contamination of lakes, rivers, oceans by solid urban and hazardous waste, as well as their inefficient distribution.
2. Air pollution; due to the emission of gasses, chemical substances and pesticides.
3. Soil degradation; due to agricultural practice, wildfires, changes in the use of soils, deforestation, indiscriminate animal hunting, non-planned urbanization, habitat loss and waste burning.

In addition to the abovementioned issues, also problems of social nature are to be considered such as poverty and food insecurity [1], the CMFAO (1996) proved that millions of people all over the world especially in emerging countries do not have access to sufficient food to cover their basic nutritional needs. It was in 2015 that, faced with the challenges due to the effects of climate change and poverty, the 17 goals of the United Nations (SDG) were created.

[1] There is food insecurity when all people do not have physical and economic access at all times to sufficient non-hazardous and nutritious food to satisfy their nutritional needs and preferences in order to live and active and healthy life.

Table 1
Conceptual inputs to sustainability, a sustainable society and sustainable development (in Spanish)

Autor y año	Conceptos	Definición
Club de Roma (CMFAO, 1972).	Sustentabilidad	Es una condición del equilibro global.
Nuestro Futuro Común (Brundtland, 1987).		La perspectiva global, La conexión entre ambiente y desarrollo, y La responsabilidad social entre la generación actual y las futuras, así como entre las diversas sociedades que habitan el planeta.
Kemp y Parto (2005).*		Requiere prudencia, adaptabilidad, transparencia y compromiso para tomar decisiones para alcanzarla.
Calvente (2007).		Es un proceso para producir a un ritmo constante sin agotar los recursos que se utilizan y que se necesita para funcionar y no produce más contaminantes de los que puede absorber su entorno.
Hart (2007).		Es global y un catalizador de un nuevo asalto de destrucción creativa que ofrece oportunidades comerciales sin precedente.
Conferencia de Desarrollo Sustentable (CEPAL, 2013).		Exige un nivel de vida decoroso que no comprometa las necesidades de las futuras generaciones y se erradique la pobreza, que es el mayor problema que afronta el mundo.
Vera (2013).*		Es un proceso social de cooperación.
Balaceanu y Apostol (2014).*		Con una perspectiva fuerte, es normativa y ética en lugar de analítica y operacional, pues se centra en los aspectos relacionados con el desarrollo y la calidad de vida y no en la acumulación, el crecimiento del consumo, el crecimiento del Producto Interno Bruto.
Polanco, Ramírez y Orozco, 2016, y Marková y Lesnícová, (2015).*		Desde las corporaciones, surge con el fin de aportar a la coherencia entre la ética, la responsabilidad social empresarial y el desarrollo sustentable en el ámbito de los negocios
Meadows, Meadows y Randers (1993).	Sociedad sustentable	Es aquella que puede persistir a través de generaciones que es capaz de no perder de vista el futuro con la suficiente flexibilidad y sabiduría como para no mirar su sistema físico o social de apoyo.
Leff (2004).*		La construcción de una sociedad sustentable está guiada por la configuración de nuevas identidades y saberes que se relacionan en la revalorización y resignificación de la naturaleza (p. 86 y 167).
CMFAO (1987).	Desarrollo sustentable	Es el que satisface las necesidades del presente sin comprometer la capacidad de generaciones futuras para satisfacer sus propias necesidades.
Leff (2002).		Es un proyecto social y político que se dirige al ordenamiento ecológico y la descentralización territorial de la producción, así como de la diversificación de los estilos de vida. Es un proyecto de solidaridad intra-generacional, es una cuestión del ser y del tiempo.
Ley General del equilibrio ecológico y de la protección al ambiente art. 3º. Inciso XI (Última reforma publicada DOF 16-01-2014)* (Cámara de Diputados, 2014).		Es un proceso evaluable mediante criterios e indicadores de carácter ambiental, económico y social que tiende a mejorar la calidad de vida y productividad de las personas, que se funda en medidas apropiadas de preservación del equilibrio ecológico, protección del ambiente y aprovechamiento de recursos naturales, de manera que no se comprometa la satisfacción de las necesidades de las generaciones futuras.

Source: compilation based on authors listed in column 1 (Cruz *et al*, 2016).

Among the precedents of the SDG´s, the term sustainability[2]originated since the report of the Club of Rome[3]; a topic that has not been irrelevant within the scope of the academy and multiple studies have been carried out related to its research, contributing definitions, principles, elements, factors, indicators, evaluations and valuations. In the following a series of concepts are presented that help define sustainability, development and sustainable society (Table 1).

As can be observed in chart 1, the contributions do not only respond to a definition but also to the scope of When and Where? Year after year contributions are made as to the study of the relationship between the dimensions: society, environment and economy. The goal is to explain the how and why, questions that are the building blocks for a good theory according to Wacker (1998). This way, for the sake of this study, sustainability is understood as the capacity of the organization to align the company goals with sustainable development through a strategic process which will lead to criteria for the future without losing sight of the expected profits (Cruz, Vera & Meléndez, 2017).

As for the contributions on the company reports in the context of sustainable development, the Global Agreement of the United Nations (UN, 2000) listed 10 principles to structure the social reports with the three spheres known as *triple bottom line (TBL)*, which account for the actions that through business strategy transition or adapt sustainability into their business models. These social or comprehensive statutory reports have experienced different phases. Milne and Gray (2013) identified three phases: the first one deals with the criticism on reports and practice, the second one defines concepts of tha*t'll*, the business commitment and the incorporation of indicators used in the entities and in the third phase the indicators of the *Global Reporting Initiative (GRI)* are institutionalized as a means of communication between the company and its stakeholders, whose purposes are reflected in the accounting. It must be noted that the indicators are important for the use of different measuring models.

The vision of resources and capacities

Present study initiated with the revision of theories of resources and capacities and their contribution to *"A resource-based view of the firm*[4]" and thereafter with "*The resource-based view of the firm: ten year after*[5]" (Wernerfelt, 1984, 1995). These two studies revealed the importance of the size of the company activity in the different markets and with it, the possibility to establish commitments with the minimum required resources. While the

[2] For this study, the terms "sustentabilidad and sostenibilidad" in Spanish (sustainability in English) are treated as synonyms, taking into consideration that "sustentabilidad" implies the rationality of a triple bottom line system (the economic, environmental and social sphere)

[3] Also known as the Brundtland Commission which was created by the UN (United Nations) and is directed by the Swedish Gro Harlem Brundtland.

[4] "The resources based on the vision of the firm"

[5] "...10 years later"

proposal in "*Firm resources and sustained competitive advantage*[6]" (Barney, 1991) exposed that the resources and capacities may generate information asymmetries between companies and with time they may vary. In 1995, Hart intends to fill a void with his proposal in *A natural-resource-based view of the firm*", studying the relationship between the company and the natural environment, the strategies he proposes to interconnect are: 1. The prevention of contamination; 2 The administration of products and 3 Sustainable development (Hart, 1995).

Hart and Milstein (2003) planted the concept of sustained value for the stakeholder. In 2007, the same Hart stated that organizations must visualize opportunities for the future, contextualizing the fact that natural resources are limited and that together with poverty they gave rise to sustainability, this vision was broadened for the stakeholders in the company.

Hart (2007) emphasized the interdependence between the financial, environmental and social systems that create the greatest challenges, for example, by lowering the consumption of materials and energy, clean products and technology are developed, by reducing the contamination exhausted resources can be recuperated, by creating strategies for poverty mitigation skills are developed for the vulnerable population and relationships between stakeholders are fostered. Likewise, he differentiated the purpose of organizational factors. While internal factors are the base of the business model, the external factors provide a competitive advantage.

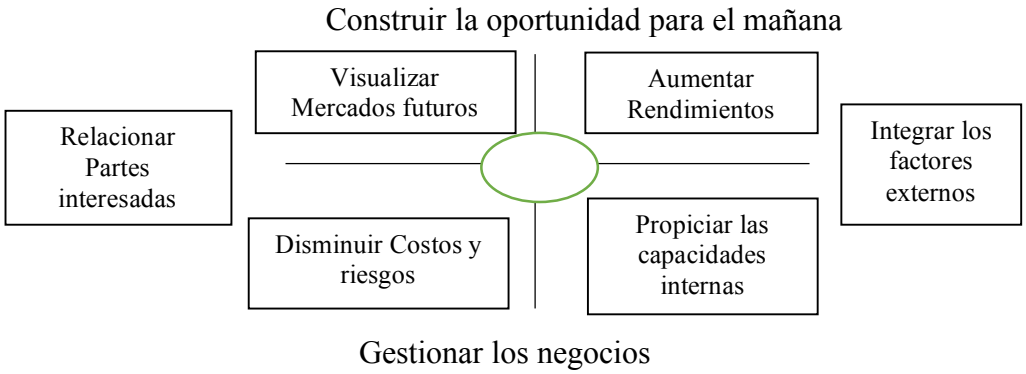
Regarding the theory of Hart (1995), it is a useful proposal that continues to seek different types of relationships between the company, the environment and the social aspect. For that matter, this study in particular emphasizes that the investment in innovation is a driver to valuate, focusing on sustainability, this perspective is not centered on the definition of the construct but rather on the impact in order to create it.

Also in the assumption that sustainability provides opportunities in businesses (Rasche, 2020; Martinuzzi & Schönherr, 2019; Schroeder, Anggraeni & Weber, 2019; Williams, Whiteman & Parker, 2019; Kubus, 2019; González, Kubus & Mascareñas, 2018; Martín & González, 2016), the innovations are a means to build the future without ceasing to manage the present, as is the case for new technologies. Hart (2007) made reference to Joseph Schumpeter (1942) when he emphasized that the economy is driven by companies that are capable of taking advantage of new technology because of scientific and technological discoveries. The author presented the fact that the environmental challenges promote the transformation towards a more responsible world (Hart, 2007; Schumpeter, 1942). Challenges can be met whenever the perspective of those who take decisions (directors or administrators) take actions towards

[6] "The resources of the company and sustained competitive advantage"

sustainability (Lindahl, Robèrt, Ny & Broman, 2014; Wittmayer & Schäpke, 2014; Epstein & Roy, 2001). The synthesized model for a company with a future-oriented vision is presented below. (Figure 1).

Figure 1
Conceptual model of sustainable value in a company (in Spanish)



Source: adapted from Hart and Milstein (2003), Hart (2007).

In Figure 1 two moments are described: the present and the future, combining the internal and external factors and business opportunities are outlined. To be specific, the proposal includes the classic focus of value by considering the reduction of costs and increase of returns but also the sustainable perspective, by including elements such as transparency and reputation, where innovation is a constant factor.

On the other hand, within the company and the environment, innovation is considered to be a distinct element for competitiveness and profitability. In the Oslo Manual the question "Why do companies innovate?" was raised. (OECD, 2006) and it was highlighted that knowledge is the main detonator for innovation despite the fact that there are others such as change *per se*, efficiency, quality, the product, the market, the competition, the distribution and marketing. The reasons to innovate, however, should not be left aside. (Cruz, Adam & Simón, 2014).

The food industry, the evolution of technology and food consumption

The agro-industry is the sector that adds value to products from primary sectors such as agriculture, forestry, livestock and fishing. Among its different stage are the production, industrialization and marketing of products (food and non-food products). In Mexico, the agro-food sector is important for the development of the country. (Shared-Risk trust fund, 2017). This investigation study was focused on the food industry, its standard of conduct is in turn considered for its leading role in process and technology innovation and for the type of supply chain and distribution governance.

In this sense, technology aimed to comply with production and consumption standards is required for the transformation of food and its marketing, since these are key elements for competitiveness. The improvements in production techniques based on innovation lead to an increase of profits and improvement of quality, mainly in that regarding the homogeneity of products and the absence of physical defects.

It is important to mention that the companies in Mexico that integrate the agro-food industry contribute to economic growth (GDP[7]) with approximately 8.0%, the processed food sector alone reached a production rate in 2013 of 137 182 million dollars and in 2015 of 111 400 million dollars, representing as of 2015 the 23.4% of the manufacturing GDP and 3.9% of the total national production (Proméxico, 2018). In 2015 the subsector of bakery and tortilla contributed with 26.9% and in 2015 it rose to 33%, grain and oilseeds with 10.0% fell to 7% in 2015 and the processed fruit and vegetable sector contributed with 3.8% in 2014 and in 2015 4%.

While in 2015 because of the size of the market this type of companies obtained 52.423 million dollars; bakery alone reached 15.718 million dollars in 2015 (Cruz, 2015; ProMexico, 2018). As of 2014 the exported food industry was valued at 8.2 billion dollars, obtaining a 10% (Rosenzweig, 2015) increase in seven years (2007-2014). A list of the main processed foods as well as destination countries, is presented below. It is important to note that the processed food industry[8] in 2016 consisted of approximately 187 thousand business entities generating almost 800 thousand jobs in the State of Mexico, Puebla, Oaxaca, Veracruz and Mexico City.

Table 2
Value of the food market in Mexico and the main destination countries

CATEGORY	MARKET 2014 (MUSA)	%	MARKET 2015 (MUSA)	DESTINATION	2014 (MUSA)	2014	2016
BAKERY	27,177	40.3	15,718	**USA.**	5,587	67.6	64.90
DAIRY PRODUCTS	13,221	19.6	11,550	**Japan**	456	5.5	---
SWEETS	4,764	7.1	4,072	**Canada**	209	2.5	2.32
SAUCES	4,046	6.0	3,209	**Hong Kong**	183	2.2	---
SNACK	3,670	5.4	3,003	**Guatemala**	177	2.1	2.53
DEHYDRATED	2,477	3.7		**Venezuela**	118	1.4	2.96
PRESERVES	2,251	3.3		**Spain**	113	1.4	---
REFRIGERATED FOODS	2,127	3.2		**United Kingdom**	105	1.3	---
OILS	2,182	3.2		**Vietnam**	78	0.9	--
CEREAL AND RICE			2,615	**South Africa**			2.57
				Netherlands			1.69
				Algeria			1.52
				Italy			1.48

Source: Rosenzweig (2015). Note: Unfortunately, a comprehensive comparative analysis could not be made due to the inconsistency of information. MUSA: Million United States Dollars

[7] GDP= Gross National Product

[8] Unfortunately, the information regarding this matter will be updated according to INEGI in December 2019 (https://www.inegi.org.mx/programas/eaim/2009/)

In accordance with Table 2, in 2014 bakery products reached an amount of 27,177 million dollars, ranking as the highest on the market and the destination with the greatest impact is the USA economy. Furthermore, as stated by the *IBIS World (Global Bakery Goods Manufacturing*, 2015) quoted by Bimbo (2016:10), the bakery industry approximately generated 406,000 million dollars, they emphasize that the factors contributing to the growth of the sector are: the quality, the brand and innovation.

Because of the GDP, the number of companies and the position on the market, the agro-food industry is strategic for the economy of a country and contributes to food security. Its responsibility does not only lie in designing strategies for the future but also the use of resources such as water and energy. According to the FAO (2013), the drivers in order to innovate with clean technologies in the agro-food industry are:

1. Safety as a crucial aspect of production.
2. Disease prevention for health and well-being.
3. Optimization of resources for sustainability.
4. Efficiency for competitiveness.
5. Regulations as the foundation for international trade.

It is important to state that safety is of primary importance and non-negotiable for food security as well as for innovation. For this matter, in order for agro-food companies to offer safe and healthy foods at accessible costs and in compliance with regulations, generating transparency towards consumers, they must innovate with sustainability, ethics and responsibility (FAO, 2013).

With regards to international trade the United Nations (UN), the Organization for Economic Cooperation and Development, the World bank, International Money Fund (IMF), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the FAO have projected the so-called global metatrends, such as:

1. health and food security;
2. the convenience, the consumption pattern and the participation of women in paid work;
3. the sophistication and use of "electrodomestic" appliances and
4. the emotional perception, flavors and colors.

Nationally, ProMexico (2018) states that the international trade trends are:

1. Health care for purchase decision,
2. A higher demand for fresh foods as opposed to processed foods,
3. The *online* purchase of foods,
4. Products based on tradition and

5. Foods that help getting better sleep and that restore the body during sleep.

This way, the abovementioned trends become the guidelines to design business strategies, and at the same time they are the answers to the needs of stakeholders. Indeed, product and process innovation can be the way towards those adjustments, aiming to improve and satisfy in the sense of Schumpeter´s theory on "creative destruction". Once a business achieves maturity but wants to maintain competitive advantage, it must re-invent itself in order to continue being an engine of growth and change. In other words, and referring to Foster and Kaplan (2001), the company is permanently restructured by its own transactions, since gaining profits, dealing with competition and maintaining a leading position in its industry or sector is part of its performance.

METHODOLOGICAL ANALYSIS

The research is descriptive-relational. The empirical study is based on three companies, the quantified financial information was analyzed *a priori,* as well as information on sustainability that includes economic, environmental and social indicators. The hypothesis raised was: the agro-food companies, being aware of the consumption trends, promote investments in the innovation of processes to minimize the use of consumables (such as raw material, water, electricity) as well as to create products seeking to achieve sustainable development.

To achieve the goal of determining whether the innovation in agri-food companies listed on the Mexican Stock Exchange is a driver of sustainable value generation, the following steps were suggested:

1. To provide a contextual framework, the importance of sustainability and the need for measuring it, was described.
2. The theoretical framework was based on the theoretic current of the resource and capacity vision. Specifically, the sustainable value model of Hart (2007) was used, who studies the relationship there is between the company and the natural environment and emphasizes that new technologies may be drivers of sustainable value.
3. A comparative analysis was carried out of drivers of value and the business factors for innovation.
4. As for the reference, the companies for the comparative analysis were selected in accordance with similarity criteria of the case studies. In this paragraph the declarations on the mission, vision and purpose of each one of them was reviewed, as well as items on financial information related to investment in innovation.

5. Finally, through the analysis of the structural equation methodology, the structural model as well as its measurement was identified; obtaining the load of the observable variable: investment for innovation which in turn, is the cause for the latent variable: the sustainable value generation.

A. *Characteristics of the companies*

In 2016 company "B" had 72 plants, 980 distribution centers, operated approximately 4500 products, 100 brands and 130, 913 employees in 2016 and it is listed on the Mexican Stock Exchange. According to the CNN Expansion globalization index, it reached 30 points in 2013 and in 2017 it rose to 30.8, it announces that its commitment is to the health and well-being of its consumers, it continuously transforms its product portfolio through innovation (it has seven innovation centers: two in the United States, one in Canada; one in Mexico, one in Latin-America and two in Europe), it uses responsible marketing and adheres to the guidelines of the World health Organization (Bimbo Group, 2017; 2019).

Company "G" has 100 plants distributed over 112 countries, it has more than 100 products and approximately 20,000 employees. It is an issuer of the BMV and its globalization index is 19.5 and 10.6 in 2013 and 2017 respectively. Its commitment is mainly focused towards consumers and stakeholders. Its innovation process is based on five strategic points: 1. Creation of new distribution channels; 2. Creation of new business strategies; 3. Investment in new clean technologies for efficiency, productivity and environment friendly; 4. The use of creative marketing strategies based on the profound understanding of the consumer and 5. Creation of efficiency in operations (GRUMA, 2017; 2019).

Company "H" has 16 plants, 22 distribution centers and seven tuna fishing boats, with over 25 brands in 40 categories and 1000 products, in 18 countries and 9,100 employees. It is listed on the BMV and its index was 2.9 for 2013 and in 2017, it sank to 0.60. It states that its commitment is based on a social responsibility strategy, its main actions are focused on: 1) improving the environmental performance through the efficient use of resources and clean energy and 2. implementing food education in order to reduce the malnutrition indices in Mexico by means of nutrition programs, its innovation process is implemented under the clear understanding of the necessities of the local market for the adaptation related to the latest global trends (Herdez Group, 2017; 2019).

B. *Comparative analysis of the criteria*[9] *for innovation and sustainability*

FAO (2013 was reviewed in order to list the drivers for innovation, Hart (2007) for those of sustainable value and ProMexico (2018) for the global trends.

[9] For this study the word criteria refers to the attributes, goals and objectives that are considered relevant in a certain decision-making problem.

Among the drivers of value and sustainable innovation, there is a correspondence of concepts between the satisfaction of needs, the safety and the prevention of illnesses, as well as between the transparent operation and the legal framework and finally between the new technologies and efficiency (Table 3). Which is why the global trends are referred to as health and food security, they are linked to the satisfaction of needs and the prevention of illnesses. Based on chart 3, Hart´s (2007) conceptual model was adapted to the agro-food industry companies (Figure 2). It is shown that the tendency is the consumption pattern and new technologies with two factors: the internal factor is focused on the transparency and normativity while the external one deals with the safety and disease prevention, the internal factors are the reduction in costs and the increase of profits.

Table 3

Drivers of value, sustainable innovation and trends for the agro-industry.

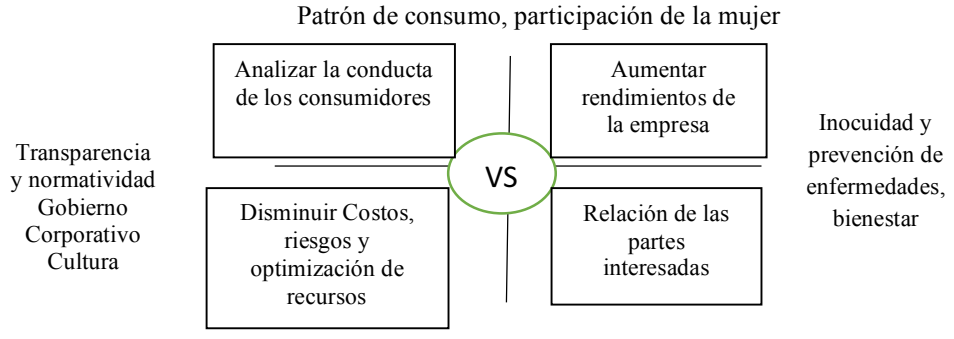
	Drivers		**Global trends Agro-industry**	**Trends of international trade (food)**
	value	**innovation**		
	Sustainable			
1	The decrease in materials and pollution	Resource optimization	Consumption pattern, participation of women *.	Based on tradition
2	New technologies	Efficiency	Health and food safety	Increased demand for fresh food
3	Operation with transparency	Regulations or legal framework.	Sophistication and use of household appliances	*Online shopping*
4	Satisfaction of needs	Disease prevention.	Emotions, flavors and colors	Health care
5		Innocuousness		sleep healthy

Source: own elaboration based on Hart (2007), FAO (2013) and ProMéxico (2018).

* As for the trends of female participation, it has been identified that for the preference of the purchase and consumption of processed foods in Mexico, the factor of influence is flavor with 38.5% above price and nutritional value (NOTE: the comprehensive survey was applied to housewives and is contained in the doctorate thesis of Cruz (2016).

Figure 2

Sustainable value (SV) model adapted for agro-food companies



Source: Own elaboration based on the conceptual model and the comparative analysis of drivers of sustainable value and innovation and meta-trends. Where SV means sustainable value.

C. *Analysis of the declaration of commitment to the innovation in the agro-food industry*

Through the company visions and business models of all companies are subject to this study, the way in which research and development activities are formalized as a part of the innovation strategy was reviewed and therefore, a comparative analysis of the vision, technology, research and development was carried out.

Table 4

Comparative analysis of the innovation strategies of "B", "G" and "H" for the years 2017 and 2019.

	INNOVATION VIEW	TECHNOLOGICAL INNOVATION	DEVELOPMENT & RESEARCH
"B" DEVELOP INNOVATIVE, HEALTHY AND HIGHEST QUALITY PRODUCTS, THROUGH THE CONSTANT SEARCH FOR NEW TECHNOLOGIES	Identify factors such as indulgence, health and wellness to create low-sugar, high-fiber formulas; adaptation of technological changes and value chain	In machinery, transport equipment and processes for the efficiency in the use of raw materials, as well as for the use of water, electricity, reduction of solid waste	Handmade product, More shelf life, Responsible products and premium brands
"G" INNOVATION AS THE ONLY WAY TO STAY COMPETITIVE	Consolidate the position as a leading global producer of basic foods and win the permanent trust of consumers, customers, employees and investors	Engineering for plant design and construction. With a view to clean practices	For corn milling and tortilla production. Almost 132 patents have been registered, three industrial designs in Mexico and one in 15 countries
"H" INNOVATE QUICKLY, STARTING FROM A CLEAR UNDERSTANDING OF THE NEEDS OF THE LOCAL MARKET AND ADAPTATION ACCORDING TO GLOBAL TRENDS, REQUIREMENTS AND TASTES OF LOCAL MARKETS	Maintain the positioning of the brands	Build infrastructure to improve customer value proposition	In products for growth through franchises and acquisitions

Source: elaborated based on Bimbo (2017; 2019); GRUMA (2017; 2019) and Herdez (2017; 2019).

Companies need to be innovative, process of which is based on the knowledge of the market and global trends, every company sets out its own strategy but they coincide in their focus on safety, the preferences of the demand, health, well-being and convenience, aspects that are aligned with the international tendency (Table 4). In the following, the investment items for innovation are briefly described based on the sustainability reports. The classification of the Oslo Manual (2006) was taken into account and cash flow data for the years 2014 and 2017 are presented as well.

The agro-food companies presented here coincide in the strategy of owning a sufficient amount of adequate facilities to carry out the production processes with efficiency, as they are assumed to be responsible for offering processed foods and at the same time causing no harm to health (Chart 5). As for communication, the companies use advertising or marketing

to inform on product strategies, principally. The investment amounts are listed below in million Pesos.

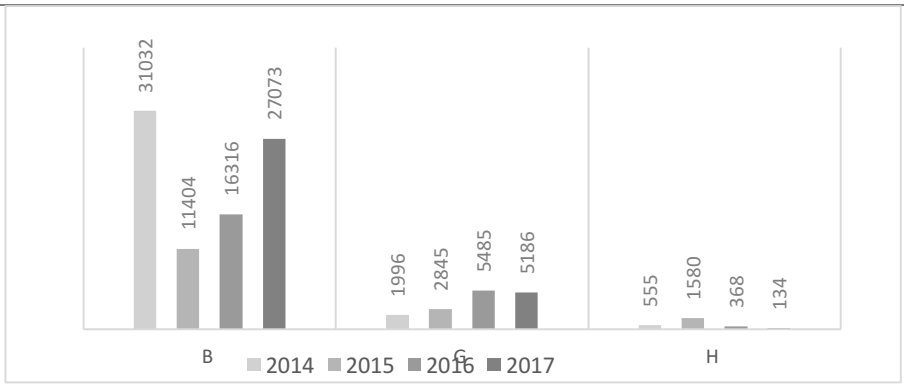
Table 5
Perspective and types of innovation in "B", "G" and "H" and investment

INNOVATION (OCDE, 2006)	STRATEGY "B"	STRATEGY "G"	E STRATEGY "H"
	Reformulation, focused on the reduction of ingredients sensitive to public health, reduction of ingredients perceived as negative and the addition of other nutrients that favor their nutritional profile	Innovation is not a luxury, but a necessity, today it is based on strategic imperatives	Innovate quickly, starting from a clear understanding of the needs of the local market and quickly adapting global cutting-edge trends to the requirements and tastes of local markets
		Investment	
PRODUCT	Product reformulation	New product	New product
PROCESS	Expansion and plants	Expansion and plants (Efficient and productive processes with clean technologies)	Expansion and machinery
ORGANIZATION	Environmental investment.	(generation of new distribution channels).	N/D
MARKETING	Promotion, publicity, and Marketing.	Marketing.	Publicity

Source: Own elaboration based on Bimbo (2017; 2019); GRUMA (2017; 2019) and Herdez (2017; 2019).

In Graph 1, company B is shown to be the one that invests most, not only based on the amount in currency units but also by relating it to items from the income statement where the average of investments represented more than four times the consolidated net units. In G, they were 1.74 times and for H, 0.5 times (*Web*, G Bimbo SAB, GRUMA SAB y G Herdez SAB, 2017).

Graph 1
Investment amount for B, G and H from 2014 to 2017.
Million Pesos



Source: own elaboration based on Bimbo (2017), GRUMA (2017) and Herdez (2017), specifically in the cash flows published in the annual reports issued to the BMV.

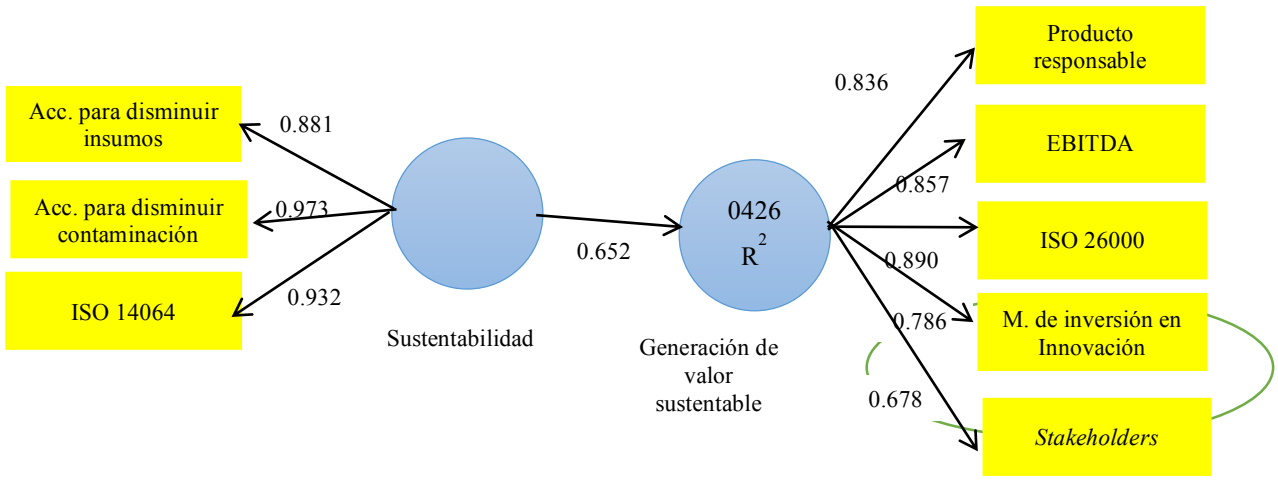
Note: unfortunately, the information published by companies does not include the amount destined for each type of innovation, they emphasize investing in products and processes for sustainability as well as to satisfy the demands of the market, as they do in the dissemination of those strategies.

A. The factor of investment in innovation for sustainable value generation.

Finally, the analysis was based on the covariance, through modeling *partial least squares* (PLS-SEM), since it is an exploratory study, an ordinal scale was used, the PLS-SEM technique is justified since estimates are used (*proxies*) to represent the construct of interest, the size of the sample is small (more than 51 observations with a level of significance of 5%) and a normal distribution was not assumed. It was intended to identify whether the investment in innovation is the cause for the "generation of sustainable value".

As for the evaluation of the model, first it was evaluated to determine the validity through the Alfa of Cronbach obtaining a 0.871 index, Rho A was 0.894 and the composite reliability obtained was of 0.906, likewise the discriminant validity was determined through cross-loadings and the *Heterotrait-Monotrait* (HTMT) ratio that reached 0.70 and represents the average of the correlations H/H relative to the average of M/M, result which allows to validate the equation given the fact that it is less than 1. The structural model is presented below. (Figure 3)

Figura 3
Structural equation - factorial load of drivers of sustainable value generation (in Spanish).



Source: own elaboration using software PLS 3.0

Note: The yellow blanks represent observable variables and the blue circles the latent variables or constructs, the arrows indicate the relation existing between variables.

In the structural model, it was observed that the sustainability variable can be explained by the factor loads: actions to reduce consumables, actions to reduce contamination and ISO[10] 14064, while the construct of sustainable value generation can be explained by the investment for innovation margin, responsible product, the EBITDA[11], ISO 26000, and the *stakeholder*.

[10] ISO, initials of *International Organization for Standardization*, ISO 14064 corresponds to the Greenhouse Gas Emission Standard and ISO 26000 to that on Social Liability.

[11] EBITDA are the initials in English for *Earnings before Interest, Taxes, Depreciation and Amortization*

Based on the above, evidence is provided that the variable of the investment for innovation margin in the companies studied obtained a load of 0.786, a direct relationship between the sustainability and the generation of a value of 0.652 and a coefficient of determination R^2 of 0.426, that indicates that the model is valid. This means, that the investment in innovation factor is indeed a driver of the valuation in a Triple Bottom Line.

CONCLUSIONS

Although the term *sustainability* emerged since 1972, multiple proposals regarding its meaning and scope are being forged, written contributions go from definitions, ways of communication and strategies up to the evaluation or design of indicators, however, the goal in most cases is still to inform and take on some challenges in order to achieve the 17 goals of the millennium. As for the scope of sustainability it is not only broad but also complex. Nowadays research studies follow the focus of the *triple bottom lin*e, for that matter the challenge is to clarify the relation between company and environment, but also the social relationships must be studied without abandoning the economic performance, as suggested by the sustainable development process when interrelating the three spheres (the financial, environmental and social).

It is important to keep working to identify factors, since these may explain whether they are critical and important in the structure of the organization based on the theory of resources and capacity. Likewise, it can be determined whether they are drivers of the sustainable value generation, understanding that this contributes to the decision-making while visualizing opportunities of growth and competitiveness in the future with responsibility to achieve sustainable development, given the fact that the issues of climate change and the eradication of poverty do not belong exclusively to one State or region but they are global, as stated by the principles of sustainability: global, interinstitutional and generational. Where the private equity firm has a leading role in achieving development that is not only financial but also sustainable.

For the theory of the "company resources and sustained competitive advantage" "the resources based on the company vision" or "a vision based on natural resources" have been useful for multiple investigations given that they seek to explain not only how competitive advantage is obtained but also because today they help identify inimitable, unique and rare abilities so that the adoption of sustainability in the organizations can also become a distinctive of the organizations because they are the principal actors in reaching the SDG and creating opportunities for the future based on the current management and this way generating value in a triple bottom line.

The agro-food industry companies were studied for their strategic condition in the growth of a country, for their context and the importance of food security. In this sense, their challenges are centered on the competition of the global markets, in the efficiency to reduce prices, increase the quality and safety of food, to innovate machinery, tools and processes, to administer systematic risks such as the interest rates, currency exchange, inflation, unemployment rate, consumable prices and the non-systematic ones such as labor conditions, production standards, labeling and marketing. A company that assumes challenges for sustainable development as the analyzed ones, must reflect on the new ways of measuring performance as proposed by the triple bottom line.

For that matter and in accordance with the results obtained, it can be said that when budgeting monetary amounts to invest in new products, technologies, processes and marketing, the transition to sustainable development is possible. The companies studied invest between 0.5 to four times their consolidated net profits. According to sustainability reports including financial information they are being transmitted to achieve sustainability; first with isolated actions, then with a focus on care and prevention, afterwards by implementing systems for environmental management, finally some companies have added the sustainability perspective to their business model, as can be observed in the mission and vision declarations.

Finally, the study based on the theoretic proposal of the "vision based on the natural resources of the company" contributes evidence to the fact that the identified driver in the structural equation "M of investment for innovation" in the agro-food companies that are listed on the Mexican Stock Exchange with the validation of the structural model given the factorial load of 0.786, with a correlation index of 0.652 between the sustainability and the generation of sustainable value, which is why the hypothesis is accepted.

This means that the investment in innovation is indeed a key factor to identify new responsible business opportunities taking into consideration the three spheres: the economic, social and environmental. Companies are leading actors for sustainable development, whose role must be played according to principles of integrity and globalism with intergenerational responsibility without losing sight of profitability and the internal and external factors to achieve competitive advantage.

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