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Agricultural business models: a Mexican case

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Abstract

Introduction: In the last decade, efforts have been made to analyze how innovation in the agricultural sector is achieved and what elements can contribute to develop inclusive agricultural businesses. However, little is known about the interrelation of elements that affect the creation and capture of economic value in this sector (i.e. agricultural business models). The **objective** of this paper is to identify elements involved in the shaping of "inclusive agricultural business models". **Methodology:** We combine management and innovation literatures for analyzing a case study: a group of jamaica flower (*hibiscus sabdariffa L*) producers in the state of Puebla, Mexico. **Results:** A new element is added into the definition of business models: government organizations. The role of these organizations as a *guide* is crucial to build technological and organizational capabilities, which would allow small producers to obtain self-sufficiency through the integration of the entire value chain of jamaica products.

Keywords: Agriculture innovation, Mexico, Business models, Government agencies, Technological capabilities, Organizational Learning.

Resumen

Introducción: En la última década se han hecho esfuerzos para analizar la innovación en el sector agrícola y los elementos que contribuyen a desarrollar negocios agrícolas inclusivos. Sin embargo, poco es sabido acerca de la interrelación de los elementos que afectan la creación y captura de valor económico en este sector (i.e. modelos de negocios agrícolas). El **objetivo** de este documento es identificar elementos que contribuyen a crear "modelos de negocios agrícolas inclusivos". **Metodología:** Combinamos literaturas de administración e innovación para analizar el caso de productores de flor de jamaica (*hibiscus sabdariffa L*) en el estado de Puebla, México. **Resultados:** Incorporamos un elemento a la definición de modelo de negocio: organizaciones gubernamentales. Éstas juegan un papel importante como *guías* para la construcción de capacidades tecnológicas y organizacionales, que podrían permitir a los pequeños agricultores ser autosuficientes a través de lograr la completa integración de la cadena de valor de productos derivados de la jamaica.

Palabras clave: Innovación agrícola, México, Modelos de negocios, Agencias gubernamentales, Capacidades tecnológicas, Aprendizaje organizacional.

1. Introduction

The adoption of new technologies, such as information and communication technologies, biotechnologies and nanotechnologies, has modified the way firms produce and deliver products and services. Most of the analyses have been focused on the incorporation of

these technologies into the manufacturing industry (e.g. pharmaceutics, automobile, computers). Authors have analyzed this adoption from different approaches within the innovation literature: building of technological capabilities (e.g. Nelson and Winter, 1982), organizational learning and knowledge (e.g. Nonaka and Takeuchi, 1995), technology and innovation policies (e.g. Nelson, 1993), and the interrelation between these elements to shape innovation systems (e.g. Niosi, 2012). However, little has been said about the adoption of new technologies into the agriculture sector, especially in developing countries.

Since the 1980s the agricultural activities in developing countries have become more diverse and complex as a result of the globalization of production and trade, natural resource degradation, climate change, and developing high-value agricultural products in developed countries (World Bank, 2006). Therefore producers have to adopt new ways to produce crops. In some cases, government institutions have been developed strategies to improve the quality of crops and the socioeconomic conditions of agriculture smallholders (World Bank, 2005).

In the last decade, efforts have been made to analyze how innovation in the agricultural sector can be achieved and what aspects can contribute to the creation and development of inclusive agricultural businesses. Authors have identified elements such as social entrepreneurship (Seelos and Mair, 2005), the degree of integration between small producers and large agribusiness companies (Vermeulen and Cotula, 2010), and the accumulation of technological capabilities and organizational learning (Ekboir et al., 2009). However, little is known about the interrelation of these elements, and how they affect the creation and capture of economic value (i.e. agricultural business models) and what other elements (e.g. type of product, location, government support) are present in these business models. The objective of this paper is to go further identifying other elements and the relationships among them that allow us to structure and develop an "inclusive agricultural business model". In order to achieve this goal, we use and combine strategy and innovation literatures analyzing a case study.

In order to illustrate interactions between elements, we present a case study of a group of jamaica flower (*hibiscus sabdariffa L*) producers in the state of Puebla, Mexico. These producers have been supported by the Produce Foundation (a government organization aimed at helping agricultural smallholders) to accumulate a variety of technological and organizational capabilities that have allowed them to collaborate with different organizations (e.g. researchers, consultants), introduce technological packages, and integrate a complete value chain of jamaica products (e.g. extract, jam, liquor) from the production of the jamaica flower to the commercialization of the products, developing an "inclusive agricultural business model".

The rest of the paper is divided as follows. After this Introduction we present the Literature Review and the Components of business models in agriculture. Then we present a Mexican Case. Finally, we present a Discussion in the last section.

2. Literature Review

2.1 Strategy and business models

The advances on science and technology and the adoption of these into the production process have affected the way to produce goods and services. Currently it is recognized that the knowledge creation and the collaboration between different agents allow firms to cope with changes in markets (e.g. customer needs), and the government's intervention is a key element to create appropriate institutional environments (e.g. regulations and organizations).

From the business perspective, scholars and managers have developed strategies that allow firms to cope with changes in demand and the adoption of technologies. In general, strategy is defined as a plan that allows organizations to obtain a competitive advantage through differentiation[1]. Diverse approaches and tools have been developed to help managers to adopt technologies and achieve differentiation[2]. In the last decades, the term 'business model' has gained relevance as a planning tool to identify the processes involved in the creation and capture of economic value. This term has several definitions: "a business model has been referred as to a statement, a description, a representation, an architecture, a conceptual tool or model, a structural template, a method, a framework, a pattern, and a set" (Zott et al., 2011: 1022). Some efforts have been made to identify the components of business models: for example, Shafer et al. (2005) suggest strategic choices, value creation and capture, and value networks, while Onetti et al. (2010) mention objectives/mission, strategy, financial aspects, and underline the importance of allocation of resources, the kind of activities performed, and the location of activities.

In addition, the term of business model involves internal and external factors that affect the process of creation and capture of economic value. The internal factors include objective, capabilities, value chain relationships, geographic location, and financial structure (Onetti, 2010; Teece, 2010), while the external factors are related to scientific and technological advances, changes in public-private interactions, changes in public policies and regulations, and changes in consumers and demand (McKelvey, 2008).

The relevance of business models in innovation relies on the fact that global competition and technological advances urge firms to look for new organizational setups and new ways to interact with their institutional environments. In this sense, business models can be seen as tools to ensure firm's competitive advantage (Davenport et al., 2006; Teece, 2010).

[1] "Strategy is about understanding what you do, what you want to become, and most importantly - focusing on how you plan to get there" (Harvard Business Review, 2005: xiv).

[2] For example, between 1950s-1960s, Planning; in the 1970s, Balancing; in the 1980s, Positioning; in the 1990s, Resources and Capabilities; and in the early 21st century, Organizational poise (Davenport et al., 2006: 170; Johnson, 2010: 96).

Table 1. Business models' components

Mission/ objectives	Value creation Innovation Corporate identity/reputation/culture
Strategy	Competitors/competitive environment Differentiation/target market
Focus	Processes/activities/value chain Resources/assets Capabilities/competences
Modus	Collaborations/partners/value networks/alliances Customer relationship/interface Information flow Functionality/supporting processes Transaction (content, governance) Infrastructure/ infrastructure management Technology
Locus	Location
Finance	Revenues Costs Profits Financial aspects

Source: Onetti et al. (2010); Teece (2010)

Table 1 shows the different components of business models (which are based on manufacturing industries, and specially for high tech industries[3]). For space reasons in this document we consider only two elements: capabilities/competences and collaborations.

Capabilities/competences

Firms differ given their resources; however, resources *per se* do not contribute to the competitiveness of the firm. Their combination is what makes them useful to improve the firms' performance (Penrose, 1995). Depending on their contributions, some specific resources become valuable assets to the firm, and therefore, they are the main components of the firm's capabilities and competences (Dosi, Coriat and Pavitt, 2000).

Knowledge is the most important asset for innovation (Nelson and Winter, 1982) and

[3] See Flores-Amador (2012) for an analysis of business models for the adoption of high technologies.

shared knowledge facilitates collaboration. Nonaka (1994) mentions that there are two main types of knowledge: tacit knowledge that is difficult to transfer, deeply rooted in action, commitment, and involved in a specific context (know-how, crafts, skills); and explicit or codified knowledge that is discrete and captured in blueprints, documents, manuals and models. Knowledge is based on the interaction among individuals; therefore, organizational knowledge can be understood as a process that "organizationally" amplifies the knowledge created and captured by individuals, and crystallizes it as a part of the knowledge network of an organization (Nonaka, 1994).

Firms develop capabilities, skills or abilities, based on knowledge. These capabilities allow firms to accomplish different tasks (such as organizational, technological and collaborative ones) (Dosi, Coriat and Pavitt, 2000; Teece 2010). When firms have the ability to solve specific organizational and technical problems, they have developed a competence (Teece 2006: 58). Competences are defined as "a typical idiosyncratic knowledge capital that allows its holder to perform activities –in particular to solve problems– in certain ways, and typically do this more efficiently than others" (Foss, 1996:1).

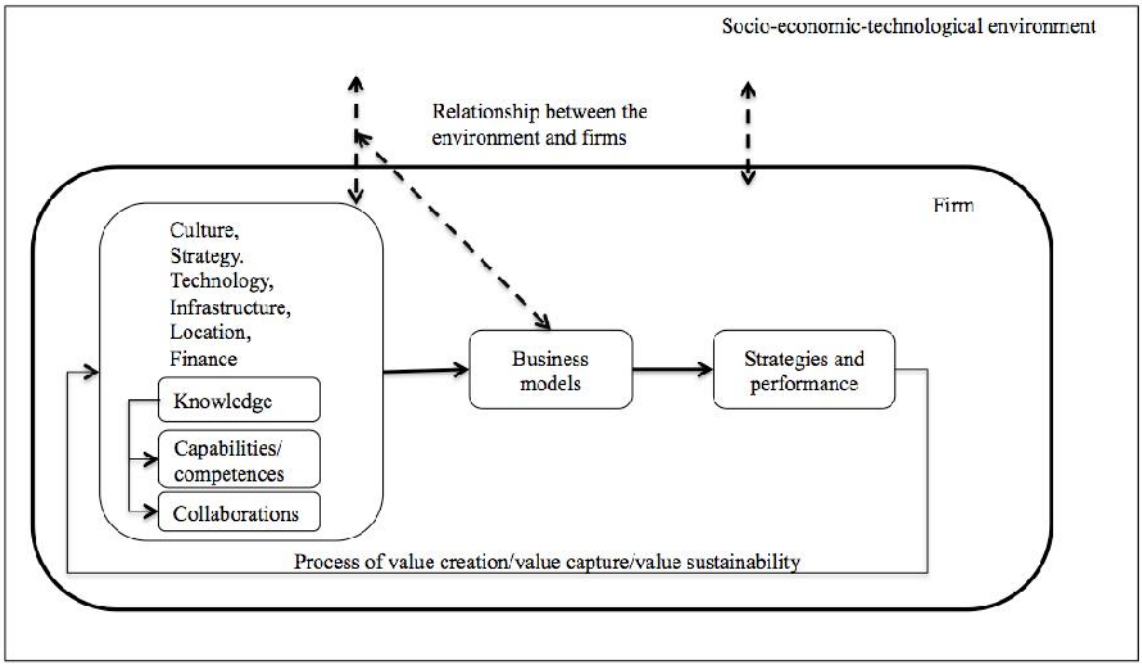
Both, capabilities and competences relies on knowledge and learning which are built through the continuous repetition of activities and remains in the firm's memory as routines (Nelson and Winter, 1982). In addition, firm's capabilities and competences are not limited to the firm's boundaries. Firms interact with other organizations, especially in environments in constant change such as those of high technologies; therefore firms have to develop abilities to integrate, build, and reconfigure internal and external competences (Cohen and Levinthal, 1990; Teece et al., 1997: 516; Helfat and Peteraf, 2003).

Collaborations

Firms can benefit from external sources to increase their competences: "a firm's value and ability as a collaborator is related to its internal assets, but at the same time, collaboration further develops and strengthens those internal competencies" (Powell et al., 1996: 119). In other words, the collaboration between different organizations allows people to be aware of other activities or other projects that could improve their performance. Therefore, the external sources of knowledge are relevant for innovation; but the firm should have absorptive capacity to benefit from external knowledge (Cohen and Levinthal, 1990)[4].

[4] Different authors have analyzed the importance of external relationships to firms, see for example, Smith-Doerr and Powell (2005); Teece (2010).

Figure 1. Internal and external components of business models



Source: Authors

Figure 1 illustrates the relationships between internal and external elements that affect business models. The large square represents the socio-economic-technological environment. The medium shape represents a firm, and the small shapes represent an internal cycle that affects firm's business models. From left to right, the first shape includes a variety of components related to strategy: culture, strategies, modus (technology, infrastructure, competences, capabilities), focus (alliances, value chain network), locus (location) and financial aspects (revenues, profits, costs). These elements impact the design of business models, which in turn affect the strategies and performance of the firm. The strategies and performance also have an impact onto the internal elements of the firm, and the cycle continues.

Although it is recognized that external elements such as number of consumers, competitors, and government policies, affect business models, few efforts have been made to document how these elements could impact business models. In the following section we present some of the elements that are considered when talking about agricultural business models.

3. Components of Business Models in Agriculture

As mentioned before, the new dynamics in production and trade have modified the way agroindustry- and smallholder- producers obtain crops. The objective of this document is to identify components of the creation and capture of economic value in the context agricultural smallholders; it means the components of an "inclusive agricultural business

models".

When analyzing business models in the agricultural sector, we found that some authors have identified some components such as social entrepreneurship (Seelos and Mair, 2005), the degree of integration between small producers and large agribusiness companies (Vermeulen and Cotula, 2010), and the accumulation of technological capabilities and organizational learning (Ekboir et al., 2009). In the following paragraphs we present in more detailed these components and how each one is integrated into an agriculture business model.

3.1 Social entrepreneurship

While most authors have focused on the components of business models to obtain revenues, some authors have focused on the importance to the social value creation. It means, business strategies that are socially acceptable and can create value to benefit vulnerable and poor people.

According to Seelos and Mair (2005: 244), "social entrepreneurship creates new models for the provision of products and services that cater directly to basic human needs that remain unsatisfied by current economic or social institutions". Therefore, social value creation is the main objective of social entrepreneurship, "while economic value creation is often a by-product that allows the organization to achieve sustainability and self-sufficiency". For example, these authors present the case of an Egyptian organization that is encouraging the use of biodynamic agriculture, a new system to diminish crop dusting. This organization also provides health and education services to poor people.

Business models that are concern with social value depend on agencies other than banks or government competitive funds. Often the source of funds to implement a social business model rely on foundations, "at least initially, until "customers" can make a contribution to the value created." (Seelos and Mair, 2005: 245).

3.2 Integration between small producers and large agribusiness companies

Large agribusinesses have re-structuring their agricultural investments given the globalization of production and trade. According to Vermeulen and Cotula (2009: 3), re-structuring includes "a wide range of more collaborative arrangements between large-scale investors and local small-scale farmers and communities, such as diverse types of contract farming schemes, joint ventures, management contracts and new supply chain relationships"[5]. Under these conditions an inclusive business models involves "close working partnerships with local landholders and operators, and if they share value among the partners".

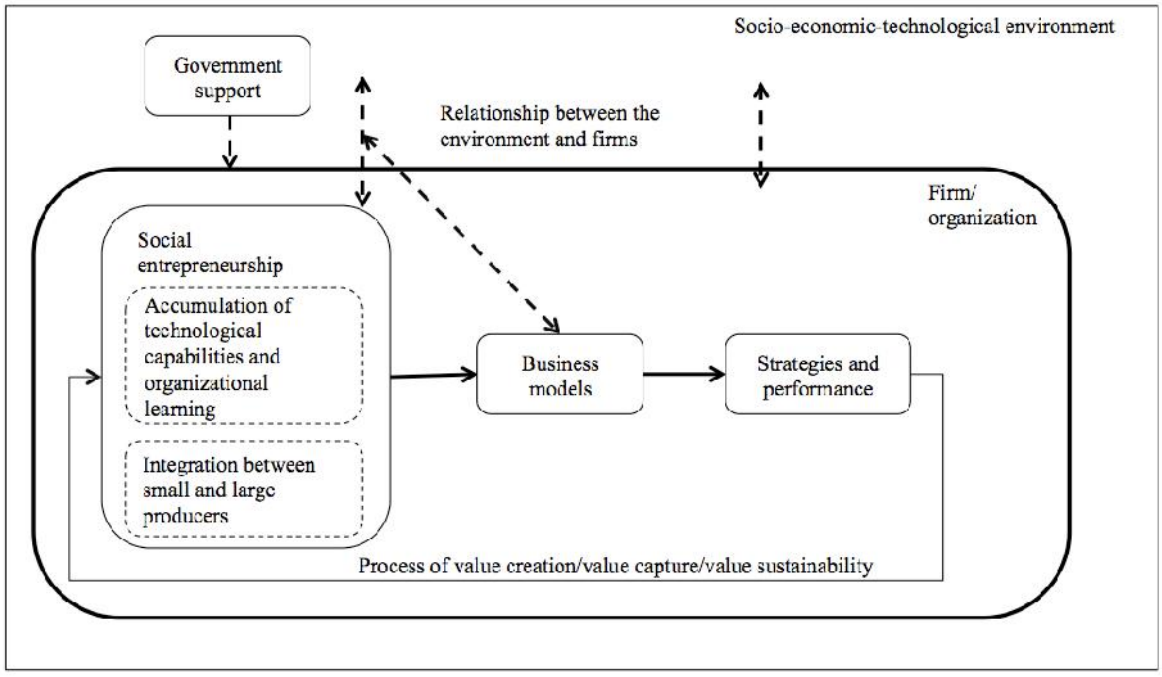
[5] Some authors have documented the experiences of small farmers becoming important suppliers. See, for example, Reardor and Flores (2006) and World Bank (2007).

In this kind of agreements, governments play a key role to promote more inclusive business models. Sometimes, small producers own cooperatives to facilitate business transactions. Thus, government can help to gain negotiation power and access to funds. In addition, smallholders' access to limited information concerning market trends, prices, royalties, and risk pose obstacles to the partnership between large and small producers (Vermeulen and Cotula, 2009). Therefore, "both governments and development agencies are actively promoting farmer-owned businesses as means for smallholders to achieve higher returns from their produce and to access opportunities for value-addition" (Vermeulen and Cotula, 2009: 78).

3.3 Accumulation of technological capabilities and organizational learning

Ekboir et al. (2009) analyze agricultural research and innovation in Mexico. The authors distinguish between technological capabilities (routines concerned with the manipulation of scientific and technological knowledge) and organizational capabilities ("shared elements of knowledge and routines concerning governance, coordination, and social interaction in the organization and with external entities (e.g. suppliers and clients)") (Ekboir et al., 2009: 30). The combination of these capabilities will allow producers be aware of innovation opportunities. They suggest "innovative capabilities can be developed in people if they are adequately stimulated and trained" (Ekboir et al., 2009: 32). Therefore, the government programs' success aiming to alleviate poverty relies on the capabilities of government organizations to support smallholders, and the absorptive capabilities of those producers.

Figure 2. Relationships between elements in agricultural business models



Source: Authors

Figure 2 presents the components of an "inclusive agricultural business models". On the left side, we can see three components found in literature: social entrepreneurship (which is related to mission/objectives), accumulation of capabilities and organizations learning to innovate (which is related to focus, "in what the firm is good"), and integration of small farmers and large producers (which is related to modus, "how to do it"). A new component is government support to help smallholder producers to create and capture economic value, for example, facilitating the transaction between small and large producers.

4. A Mexican Case

In this section, we present a case study to identify the components that affect an "inclusive agricultural business model". The unit of analysis is a group of jamaica flower (*hibiscus sabdariffa L*) producers in the state of Puebla, Mexico. These producers have been supported by the Produce Foundation (a government organization aimed at sustaining agricultural smallholders) to improve their crops and their socioeconomic conditions. This group has accumulated a variety of technological and organizational capabilities that have allowed them to collaborate with different organizations (e.g. researchers, consultants), introduce technological packages, and integrate a complete value chain of jamaica products (e.g. extract, jam, liquor): from the production of the jamaica flower to the commercialization of the manufactured products.

4.1 Sources of information[6]

The information was collected from open face-to-face interviews *in situ* with jamaica producers, technicians and the manager of the Produce Foundation Puebla and the direct observation. The interviews were carried out in 2010. Given that this research is part of a larger research project some interviews were carried out by different members of the research team including one of the authors of this document. The interviews were transcribed, and then, the content of the texts and notes were analyzed according to specific topics, for example channels of communications, conditions of meetings, organizations participating, benefits for the community, and changes in productivity. In addition, we use documents that analyze the case of jamaica producers in more detail (for example, Leyva, 2009 and Torres and Vera-Cruz, 2013 forthcoming).

4.2 Context

In Mexico, before the 1990s, the National Institue for Forestry, Agriculture and Livestock (INIFAP in Spanish) was in charge of most of the agricultural research and received most of the federal funds dedicated to research and development (Ekboir et al., 2009). However, research result sometimes were not useful for farmes, especilly for the small ones, given the lack of communication between agriculture researchers and small producers.

[6] This document is part of a larger research project.

With the implementation of the North America Free Trade Agreement (NAFTA) and the 1994 economic crisis, the Mexican government formulated the Alliance for Economic Recovery, which main objective was to formulate public policies focused on growing the economy and create jobs. In line with this objetive, the government announced the launch of the *Alianza por el Campo*[7], this alliance sought to raise the sector's productivity and streamline marketing systems, promote timely and competitive funding, and included measures to protect the environment. A key part to carry out these objectives was the technology transfer by increasing funding and training. The way to articulate the *Alianza por el Campo* was promoting the federalization[8] of the Secretariat of Agriculture, Livestock, Rural Development and Food (SAGARPA, in Spanish) and the creation of foundations for technology transfer in each state.

Produce Foundations[9]

Produce Foundations (PF) were created in 1996 as autonomous government organizations with autonomy to allocate their funds according to their projects. There are 32 Produce Foundations in the country, one in each state and the Federal District. The main objective of these organizations is to stand as an instrument to transform the agricultural research system, from one pushed by the technology supply to one pushed by technology demand (Ekboir et al., 2006: 54). Other objectives are:

- Raising levels of competitiveness, profitability and sustainability of agricultural production systems.
- Consolidate a solid model that supports the generation and transfer of technological innovations.
- Participate in the redesign of policies for the organization, marketing and financing that impact technological innovation.

COFUPRO

At the beginning, each PF organized its administration and functions in its own. Later, in 1998, some PFs grouped and created the Produce Foundations Coordination (Coordinadora de Fundaciones Produce - COFUPRO in Spanish) in order to centralize information and share experiences to improve operational efficiency. The consolidation of COFUPRO was achieved in 2000. The major functions of COFUPRO is to provide to PF representation and linkage services, coordination and liaison, strategic planning, training, special studies and counseling[10].

[7] In English, Alliance for Agriculture. See http://www.pa.gob.mx/publica/cd_estudios/Paginas/autores/varios%20alianza%20para%20el%20campo.pdf (consulted 12 August 2013)

[8] The federalization meant to transfer to the different state governments the Rural Development Districts and 85% the operational functions of the SAGARPA. The federal government would retain only policy formulation, evaluation, and supervision; plant and animal health programs and the coordination of special programs.

[9] For a detailed description of history and characteristics of Produce Foundations and COFUPRO, see Ekboir et al. (2006) and http://www.cofupro.org.mx/cofupro/nosotros.php .

[10] See http://www.cofupro.org.mx/cofupro/misionvision.php?documentweb=2&idseccion=2 (Accessed on 01 March 2013).

4.3 Jamaica producers in Chiautla de Tapia, Puebla[11]

Native roots (*Mixteca* indigenous people), high levels of poverty and migration were the main characteristics of Chiautla de Tapia in the state of Puebla, Mexico. In 2000, the project of jamaica (*hibiscus sabdariffa L*) producers started in the community. A group of producers approached to PF in order to improve their crops such as corn, peanut, and sorghum. The PF started to conduct studies to identify options to help producers. Before 2000, jamaica was a domestic crop (producers cultivate jamaica only for domestic consumption no for commercialization). At that moment, the price was 25 pesos/kilogram and the harvest was about 200 k/hectare (ha). Only three hectares were cultivated in the locality.

After the analysis of the agricultural conditions in Chiautla de Tapia, the PF defined the objectives of the project:

- To switch from a traditional system of culture (polyculture) to an intensive culture (monoculture),
- Formation of the production organization
- To decrease the costs of culture and harvest,
- To increase the interest of producers to the jamaica
- To decrease migration.

All these objectives sought to improve not only the techniques to produce crops, but to improve the socioeconomic conditions of the small farmers and their families.

According to the information collected in the interviews, at the beginning was no easy for the PF to have credibility[12]. Only three producers accepted to collaborate with the PF. However in 2001, one year later, five Societies of Rural Production joined the project increasing the number of members to 68. In 2004, the "*Integradora Chiautla de Tapia*" started activities. This *Integradora* is an association that was created to transform the jamaica flower into products such as jam and liquor, it means, to create an agroindustry within the community.

The main results of the jamaica project have been the introduction of a technology package, it means the adoption of new ways to cultivate, which includes machinery, applications of bio-insecticides and bio-fertilizers, and the establishment of an agroindustry within the community. Table 2 summarizes the changes into the creation and capture of economic value. After the support of the PF the price of jamaica reached 80 pesos/kilogram and the productivity of each hectare is about two tons.

Table 2. The creation and capture of economic value of jamaica flower and products

[11] For detailed information about this project see Leyva (2009) and Torres and Vera-Cruz (forth coming).
[12] Interview with the PF Puebla manager.

Before the support of the Produce Foundation	After the support of the Produce Foundation
Preparation of land	Preparation of land
Cultivation: polyculture	Cultivation: monoculture
Fertilization: use of chemicals	Fertilization: use of bio- fertilizer
Weed control	Weed and prune control
Pest and disease controls: use of chemicals	Pest and disease controls: use of bio-insecticides
Harvesting and drying	Harvesting, drying and selection
Flower sales to intermediaries	Transformation (industrialization) of the jamaica
	Commercialization

Source: Leyva (2009)

Technological capabilities and organizational learning have been important for the achievements of this project. Most of the small producers doubted about the support offered by the PF. They though it would be another government program for alleviate poverty through "giving money and no following". The main factor that pushes producers to trust and believe in the project was the engagement of researchers, technicians, and the manager of the PF Puebla to support them. PF Puebla helps small producers to establish collaborative agreements with universities, not only to obtain research results but also to obtain help to commercialize their products (business plan, marketing). In addition, the community has received funding from more than ten public and private organizations[13]. In fact, the PF staff has implemented a logbook where register data about the evolution of the production of crops, not only in terms of agriculture but how the community and other organizations are engaged with the project.[14]

The project started in 2000, and in 2010 the project was still alive. It means that the successful projects require commitment to go further over time and attracting more participants (smallholders or organizations). Here is important to mention that the PF Puebla, as the other PFs, only are able to provide support if there is a potential project, it means people and idea to commercialize crops or something based on crops.

5. Discussion

As mentioned in the literature review section, some authors have identified some components of business models related to strategy, capabilities, collaborations and location. These efforts have been concentrated on the manufacturing sector and high technologies (for example, information and communication technologies). The objective of

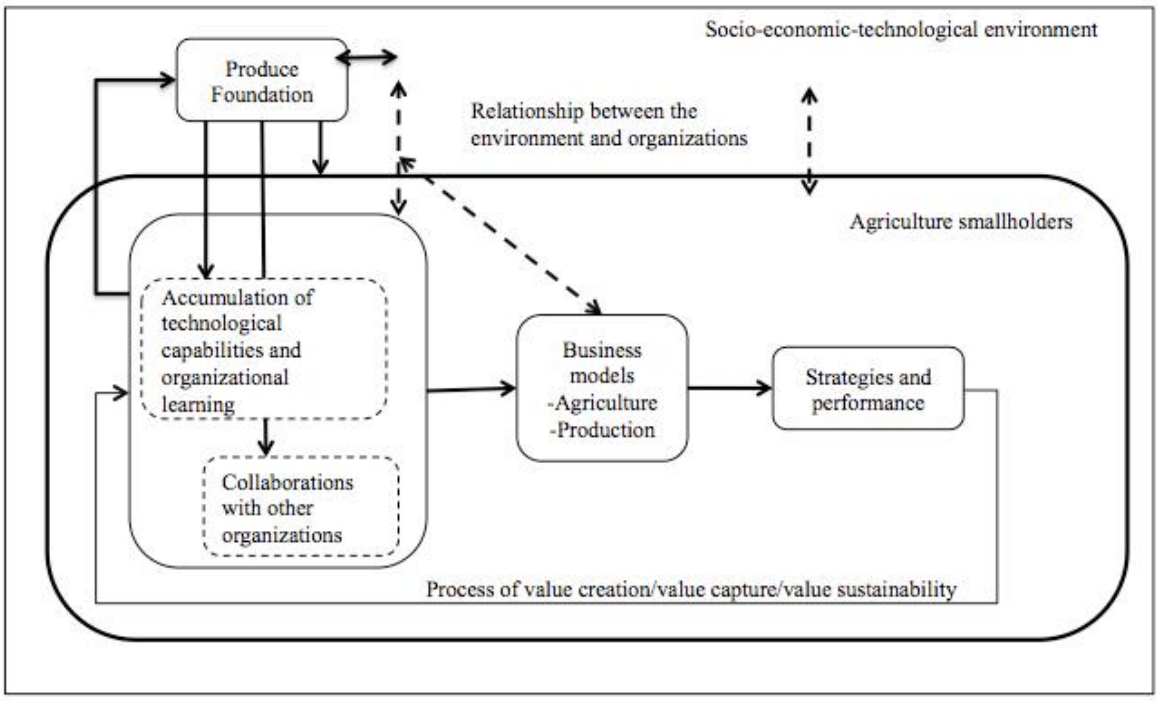
[13] Information provide from a member of the community of Chiautla de Tapia in a conference hold at Campeche, Mexico, 2010.
[14] Interviews with the PF Puebla manager and some small producers.

this document is to go further in the identification of business models components in the specific case of agriculture smallholders to achieve an "inclusive agriculture business model".

The new context in which the agriculture sector is embedded makes room for a new way to produce crops. In this document we present a case of smallholders producers in Mexico. These producers have been supported by a government organization: Produce Foundation (PF). In the particular case of jamaica producers in Chiautla de Tapia, Puebla, the support of PF has been a key element to create technological capabilities and help producers to organize themselves.

Producers testimony shows that the project following and evaluation have allow them to feel part of it, and obtain confidence to go further in the transformation of the jamaica flowers and the commercialization of products. In this case, we can see that the PF not only acts as a government organization to alleviate poverty, giving money and no-following. Contrary to this, the PF is deeply involved with the community by organizing meetings to evaluate the project advances and find solutions to the different problems the producers face about crops and production and commercialization of products.

Figure 3. Business models for agriculture smallholders



Source: Authors

Figure 3 summarizes the components of an "inclusive agricultural business model". The large square represents the socio-economic-technological environment. Here, we find the Produce Foundation as part of government support. The medium shape represents an organization (in these case a group of jamaica producers). This organization has

accumulated capabilities and learning and has developed collaborations with other organizations. Here, we can see that the PF (government support) plays an important role as component of the business model. We represent the close relationship between the PF and the agriculture smallholders with the straight rows that go from the PF to the organization and the row that goes from the organization to the PF. The feedback between these two organizations has allowed them to acquire a better understanding of the problems they are dealing with. This collaboration also has generated technological and organizational capabilities to improve their production crops and commercialization of jamaica products. These activities have had an impact into the community: creation of local jobs and sustainability.

As a conclusion of this document, we identified an important component for the design of business models: government organizations. However, the mere presence of these organizations does not ensure success. These organizations have to collaborate closely with smallholders and have to have capabilities to learn and understand the problems the small producers face. The empirical case shows that the role of the PF as a guide has been crucial to support learning and establishing collaboration with different organizations (universities, research centers, consultants) to build technological and organizational capabilities. These elements would allow small producers to obtain self-sufficiency. In this sense, the business model followed by the jamaica producers is an "inclusive agricultural business model". Future research analyzing empirical cases in other countries or other type of agricultural organization is needed to identify other components of "inclusive agricultural business models".

References

COHEN, WM and DA Levinthal. Absorptive capacity: a new perspective in learning and innovation. **Administrative Science Quarterly**, v.35, n. 1, p. 128-152, 1990

DAVENPORT, T, Leibold, M, and S Voelpel. **Strategic management in the innovation economy: strategic approaches and tools for dynamic innovation capabilities**. Weinheim; Chichester: Wiley-VCH ; John Wiley, 2005.

DOSI, G, Coriat, B, and K Pavitt. **Competences, capabilities and corporate performance**. Dynacom Working Paper Series. Pisa: Sant' Anna School of Advance Studies, Laboratory of Economics and Management, 2000.

EKBOIR, JM, G Dutrénit, G Martínez, A Torres, and A Vera-Cruz. **Successful organizational learning in the management of agricultural research and innovation.** International Food Policy Research Institute (IFPRI), 2009.

EKBOIR, JM, G Dutrénit, G Martínez, A Torres, and A Vera-Cruz. Las Fundaciones Produce a diez años de su creación: pensando en el futuro. **ISNAR Division Discussion Paper**, November 2006, International Food Policy Research Institute (IFPRI).

FLORES-AMADOR, J. **The adoption and diffusion on biotechnologies in emerging countries: the case of Mexico**. Unpublished doctoral dissertation, Université du Québec à Montréal. Dept of Technology and Management, 2012.

FOSS, NJ. "Introduction: the emerging competence perspective" in NJ Foss and C Knudsen (Eds.), **Towards a competence theory of the firm**, pp. 1-12. London; New York: Routledge, 1996.

HARVARD BUSINESS REVIEW. **Harvard business review on strategy**. Boston, MA: Harvard Business School Pub, 2005.

HELFAT, CH and MA Peteraf. The dynamic resource-based view: capability lifecycles. **Strategic Management Journal**, n. 24, p. 997-1010, 2003.

JOHNSON, MW. **Seizing the white space: business model innovation for growth and renewal.** Boston, Mass.: Harvard Business Press, 2010

LEYVA SERRALDE, M. **Aprendizaje y construccion de capacidades tecnológicas en el sector agrícola mexicano: grupos de productores de jamaica vinculados con Fundación Produce Puebla**. Unpublished master dissertation, Universidad Autónoma Metropolitana, Dept of Economics and Production (document in Spanish), 2009.

NELSON, R. R**. National innovation systems: A comparative analysis**. New York: Oxford University Press, 1993.

NELSON, RR and SG Winter. **An evolutionary theory of economic change**. Cambridge, Mass.: Belknap Press of Harvard University Press, 1982.

NIOSI, J. **Building national and regional innovation systems: Institutions for economic development.** Cheltenham: Edward Elgar, 2012.

NONAKA, I. A dynamic theory of organizational knowledge creation. **Organizational Science**, v. 5, n. 1, p. 14-37, 1994.

NONAKA, I and H Takeuchi. **The knowledge creating company: how Japanese companies create the dynamics of innovation.** New York: Oxford University Press, 1995.

ONETTI, A, A Zucchella, M Jones, and P McDougall-Covin. Internationalization,

innovation and entrepreneurship: business models for new technology-based firms**.** **Journal of Management and Governance**, DOI: 10.1007/s10997-010-9154-1, 2010.

PENROSE, ET. **The theory of the growth of the firm**. Oxford: Oxford University Press, 3rd edition, 1995.

POWELL, W, K Koput, and L Smiyth-Doerr. Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology. **Administrative Science Quarterly**, v. 41, n. 1, p. 116-145, 1996.

REARDON, T and L Flores. "Customized competitiveness" strategies for horticultural exporters: Central America focus with lessons from and for other regions. **Food Policy**, v. 31, n. 6, p. 483–503, 2006.

SEELOS, C and J Mair. Social entrepreneurship: creating new business models to serve the poor, **Business Horizons**, v. 48, p. 241-246, 2005.

SHAFER, SM, HJ Smith, and JC Linder. The power of business models. **Business Horizons**, v. 48, n. 3, p. 199-207, 2005.

TEECE, DJ. Business models, business strategy and innovation. **Long Range Planning**, v. 43, n. 2-3, p. 172-194, 2010.

TORRES, A. "Organizaciones Intermediarias para la innovación en el sector agropecuario: El caso de la Fundación Produce Nuevo León" in **Sistema de innovación del sector agropecuario en Mexico: Tendiendo puentes entre los actores de la innovación en México**. Mexico: M.A. Porrua-UAM. Forthcoming.

TORRES, A and A Vera-Cruz. "Procesos de aprendizaje en el sector agrícola y el papel de las organizaciones intermediarias de innovación" in **Sistema de innovación del sector agropecuario en Mexico: Tendiendo puentes entre los actores de la innovación en México**. Mexico: M.A. Porrua-UAM. Forthcoming.

VERMEULEN, S, L Cotula and International Institute for Environment and Development. **Making the most of agricultural investment: A survey of business models that provide opportunities for smallholders**. London: Iied, 2010.

WORLD BANK. **Pro-poor growth in the 1990s. Lessons and insights from 14 countries**. Washington, D.C., 2005

———. **Enhancing agricultural innovation: How to go beyond the strengthening of**

research systems, Washinghton, DC: World Bank, 2006.

———. **World development report 2008. Agriculture for development.** Washington, D.C., 2007.

ZOTT, C, R Amit, and L Massa (2011). The Business Model: Recent Developments and Future Research. **Journal of Management**, v. 37, n. 4, p. 1019-1042, 2011.