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ANALYSIS OF THE SOCIAL ENTREPRENEURSHIP ECOSYSTEM IN GUANAJUATO, MEXICO FROM COMPLEX SOCIAL NETWORKS

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ABSTRACT

In Mexico, the interest in social enterprises has increased in the last 20 years as an alternative to the profit maximization approach of the company. They seek to solve a social problem, improve the conditions of the population they are targeting, modify the consumption habits of their clients, and seek social transformation through a social business model. The policies to promote entrepreneurship in the State of Guanajuato have focused mainly on the creation of traditional and, recently, technology-based enterprises with limited promotion of social entrepreneurship, which is sometimes confused with projects with low added value and without a clear strategy. Despite this, there are different initiatives in the educational and business sectors and at the local government level that promote the creation of social enterprises, leading to the emergence of a social entrepreneurship ecosystem. In this research, university students and young professionals, who have participated in state social volunteering programs and who have the potential to become entrepreneurs, identify the main actors in the ecosystem and the preferred connections for the development of enterprises with social impact. It is contrasted with the real links that social entrepreneurs had in their startup stage to analyze their perception of effectiveness, as well as the potential for strengthening the enterprise, innovation, and scalability. The Social Network Analysis is used with the Gephi software; its main metrics are identified such as its centrality, betweenness centrality, and modularity, which allows consideration of actors who could consolidate the Ecosystem of Social Entrepreneurship in the State of Guanajuato, Mexico.

KEYWORDS

young entrepreneurs, entrepreneurship ecosystem, social entrepreneurship, social innovation, B corporation

INTRODUCTION

This article addresses the current situation of the entrepreneurship policy in the State of Guanajuato, Mexico, and the analysis of the conditions that can create social enterprises in this region. The research seeks to identify the main actors of the social enterprise network and to identify conditions that can promote the creation of social enterprises in this region. The Social Network Analysis (SNA) was used to analyze the actors of the ecosystem that could lead to the creation of social enterprises from the perspective of potential social entrepreneurs, namely, university students and young professionals. With this, the central and peripheral actors were identified, as well as the morphology of the network. Finally, the actors of the network who could be strengthened and those who could be required to scale up the social entrepreneurship ecosystem were identified.

Current Situation of Social Entrepreneurship in Guanajuato, Mexico

In Mexico, as in the rest of the world, the interest in social enterprises has increased in the last 20 years (Mair & Martí, 2006) as an alternative to profit-oriented companies. Social enterprises seek to generate a social benefit by solving a problem, creating a change in the population's life conditions, modifying the consumption habits of their clients, and in general, seeking a social transformation (Espínola & Torres, 2020).

Mexico had the lowest level of labor productivity among the Organisation for Economic Cooperation and Development (OECD) countries in 2013, with 60% less than the average and 70% less than the United States. Total Research & Development (R&D) spending is below average with similar Gross Domestic Product (GDP) down by 0.4% in 2012. It also scored low in measures of innovation products such as patents and top-notch scientific publications. Mexican companies invest very little in R&D; the OECD indicates that there is still no strong innovation ecosystem that

supports the growth of companies and the knowledge cluster (Godin, 2012; Gudynas, 2014; OECD, 2010). According to Ashoka (2015), social enterprises present low levels of innovation in the region, often adapting innovations from other sectors for their proposals. The high barrier for access to innovation programs leads to low scalability with reduced social impacts. Technology transfer presents entry barriers for any entrepreneur, favoring medium-sized and especially large companies and transnationals, which could have sufficient resources to be able to allocate them for these purposes and which are subsidized by the State through its public policies of innovation, science, and technological development.

The problem lies in the lack of a strategy that allows the creation of enterprises with a clear social purpose during the venture creation stage. The policies to promote entrepreneurship in the State of Guanajuato have focused on the creation of traditional entrepreneurs and recently, through certain programs, those with a technological base; while the promotion of social entrepreneurship has been limited (Espínola & Torres, 2020).

Traditional enterprises have generated several impacts on the market, on society, and on the environment. In search of greater efficiency, jobs have been made more technical, leaving people with low job skills in low-paid jobs. As a result, there has been labor uncertainty and increase in informal business affecting the well-being of the population. Market dynamics has encouraged excessive consumerism, which in turn, has generated impacts on the environment. In addition, new dynamics of exclusion have been generated for those who are not within the financial system and for those who do not have access to new technologies; social inequalities and social vulnerability have increased (Esquivel, 2015). The Corporate Social Responsibility approach and even the capacity of government has not been enough. As Porter and Kramer (2011) points out, a change in business management is required but with a changing focus, in which social benefits are sought before private benefit.

The business approach in Guanajuato tends to approach business models oriented mainly to the maximization of profits, with little responsibility for the impact of their practices on society, socio-environmental effects in the region, and the disintegration of the social fabric (Espínola & Torres, 2020). This approach has been accentuated from public policies and programs for business development and from research, development, and innovation policies aimed mainly at benefiting

large companies and transnationals, thus limiting the proposals for the generation of companies with a social purpose.

Evolution of the Study of Entrepreneurship

The study of entrepreneurship has evolved in its object of study. Kantis, Angelelli, and Moori-Koenig (2004) notes that initially, studies on entrepreneurship were focused on the personal skills of the entrepreneur, later evolving towards the study of the process of enterprise creation and development.

The study of social entrepreneurship has evolved in a similar way. Definitions focused on the entrepreneur and other definitions from the process and entrepreneurship can be identified (Braunerhjelm & Hamilton, 2012; Dees, 1998; Defourny & Nyssens, 2006; Defourny & Nyssens, 2010; Guzmán Vásquez & Trujillo Dávila, 2008; Espínola & Torres, 2020). Recently, the study of social entrepreneurship has been approached from the theory of biological systems through ecosystems analysis (Kantis, Angelelli, & Moori-Koenig, 2004; Mair & Martí, 2006; Domènech & Navarro, 2011).

Seelos and Mair (2005) point out that the understanding of the social elements in the different definitions is what could help to delimit and understand social entrepreneurship. Most of these definitions coincide with the creation of social value that consists of changing the lives of individuals for the better, with its approach different from philanthropy. In these proposals, the business models themselves integrate the social value for both the market and social segments, and even affirm the social mission of the entrepreneurs.

As Braunerhjelm & Hamilton (2012) points out, the innovation element “has been put forward by all the partisans of the so-called “Social Innovation School” (Austin et al., 2006; Catford, 1998; Dearlove, 2004; Dees, 1998a; Roberts & Woods, 2005; Schuyler, 1998),” which point out that the social entrepreneurs are mainly guided by business vision and innovation. In Mexico, Ashoka (2015) has identified that the social entrepreneur is one who generates innovation, mainly adapting existing technological developments in other sectors and introducing them to generate social impacts. The best case is the adaptation of eco-technologies that have made it possible to penetrate into segments lacking in basic services and build viable business models.

The strategies to promote entrepreneurship in Mexico have been focused primarily on generating motivational activities aimed at the general population. Events are organized to encourage the public to go into entrepreneurship. However, the cost-benefit of such strategies is difficult to measure in the long term due to the diversity of elements that can influence the creation of such ventures. Especially for social enterprises, it is difficult to predict the impact on the creation of the new venture because not all efforts are consolidated and those new enterprises have a high mortality rate, i.e., the enterprises do not survive after a period of time. Within the traditional entrepreneurship support programs, there is a gap in the first stages that is the most critical, i.e., it is mainly focused on the design of the undertaking itself without adequate support to the launch and commercial consolidation, which could be generated in the initial stages where the product is tested in the market. In Mexico, a strategy called “picking the winners” has been favored, where the support and benefits of public policies aimed at entrepreneurship apply only to those who have managed to survive these early stages without support and who, due to their interpersonal capacities, contacts, or advisers, have been able to draw the attention of those who direct the programs (Terjesen et al., 2012). This situation has not been different for social entrepreneurship except in those cities where social entrepreneurship ecosystems are founded like Mexico City.

In the State of Guanajuato, there is a public strategy that supports different actors to promote conventional and technology-based entrepreneurship; however, this approach supports mainly companies with conventional purposes and structures, without inclusion of indicators of social welfare and thus exacerbating different social and environmental problems. In the State Government Plan of the State of Guanajuato 2040, it has recognized the need to promote social enterprises and other forms of social innovation; thus, objective 1.1.1 under Human and Social Dimension is "To reduce poverty in all its aspects and from its causes" where the strategy of favoring the creation of social innovation is set out and one of its commitment actions—the creation of the Laboratory for Innovation, Creativity and Social Entrepreneurship—is proposed (IPLANEG, 2018). In this way, the possibility of promoting other entrepreneurship alternatives is shown, although an integral strategy that favors the constitution of an ecosystem for its promotion and development is not envisaged. In this way, the objective of this research is to identify the actors of the social entrepreneurship ecosystem that could promote, develop, and scale up these undertakings in the State of Guanajuato.

METHODOLOGY

This research aims to analyze the main actors of the social enterprise network and to identify conditions that can promote the creation of social enterprises in this region. To achieve these objectives, an exploratory design with a mixed method was applied. The Social Network Analysis (SNA) was used. It consists of identifying the main metrics of the ecosystem (centrality, betweenness centrality, modularity) and analyzing the position and interaction of the actors according to the metrics, particularly those that could be the main actors who can scale up the ecosystem such as the university, businesspersons, incubators, entrepreneurship events, etc.

Mendieta and Schmidt (2002) states that "a social network essentially consists of two elements: a population of actors and at least one relationship that is measurable, defined for each actor."(p.6) Social actors can be actors at any level of aggregation (people or other individual organisms; collectivities such as family units). For this case, the actors of the social entrepreneurship ecosystem were defined from the approach of Domènech and Navarro (2011), who established that the ecosystem actors are made up of those who promote entrepreneurship through advice, training, linkage, and financing. The potential actors as described by Domènech and Navarro (2011) were identified, included in the survey list, and observed during the study.

Purposive sampling was used with the following inclusion criteria: 1) university students who were part of the programs of State Public Agency for Funding for Education; 2) professionals who graduated ten years ago or less. Our study was supported with a State Public Agency for Funding for Education who has territorial representation in two programs with young social leaders who were still students. These students were invited to participate in the study. The young professionals were reached through an open survey in social networks.

There is interest in this particular group because according to Ashoka (2015), the young entrepreneurs have a greater interest in starting a social venture. The study is similar to the study of Jenssen (2001), which randomly contacted entrepreneurs who had just started a new business as well as entrepreneurs who had failed to start their own business, then asked them to identify their preferred links with actors of the social entrepreneurship network.

The survey asked the respondents to check a maximum of three actors that they preferred to link with in order to support, mentor, or advise them if they went into

Actor	Description
Another Entrepreneur	Entrepreneurs in early stages of their venture
Bank	Institutions that could provide credit resources to ventures
Businessperson	An actor who has consolidated the venture after having gone through the stages of entrepreneurship
Business Chamber	Organized business institution that provides different services to businessmen, usually in economic sectors
Course/Diploma	Training activities to generate a personal entrepreneurship project
Entrepreneurship Event	Massive activities that promote entrepreneurship through conferences, forums, and panels that seek to motivate entrepreneurs
Government Agency	Public institutions that could guide entrepreneurs to access different resources of the ecosystem, or offer funding programs for entrepreneurs
Incubator	Has advisory function for processes from ideation to launching the idea
Professor	An actor who can motivate, guide, and even train young university students to undertake entrepreneurship
Research Center	Public institutions of Research & Development in the Guanajuato State
Technology Park	Institutions for technology transfer with some having an incubator as well
University	Institutions that have entrepreneurship degree programs

Table 1: Table of Preferred Actors, in response to the question: *Which actors of the Entrepreneurship Ecosystem would you prefer to link up to obtain advice, support and mentoring to carry out your social entrepreneurship? (select maximum 3)*

social entrepreneurship (Table 1). These preferences of the respondents determined the relational objects in the network, i.e., the respondents' preferred links with an ecosystem actor for the creation of their enterprise considering the information, resources, and potential linkage that the actors can provide to the venture. The relationships or the links in the graphs can include any action, activity, transaction, obligation, feeling, or other type of connections between peers, or between subgroups

of actors; and these relationships are “the key to conjecture a social network project from a real situation” (Mendieta & Schmidt, 2002, p.2).

From the definition of the actors of the social entrepreneurship ecosystem established by Domènech and Navarro (2011), they were adapted to actors present in the State of Guanajuato Ecosystem. The *Incubator* is an actor with an advisory function for processes from ideation to launching the idea. The *University*, represents institutions that have entrepreneurship degree programs. *Government Agency* refers to those public institutions that could guide entrepreneurs to access different resources of the ecosystem, or sometimes they can have funding programs for entrepreneurs. The *Bank* would be those institutions that could provide credit resources to ventures. The *Professor* is considered as an actor who can motivate, guide, and even train young university students to undertake entrepreneurship. The *Businessperson*, is an actor who already had the experience of entrepreneurship, i.e., has consolidated the venture after having gone through the stages of entrepreneurship. *Another Entrepreneur*, refers to entrepreneurs in early stages of their venture. *Entrepreneurship Event* refers to the massive activities that promote entrepreneurship through conferences, forums, and panels that seek to motivate entrepreneurs. *Course/Diploma* refers to the training activities to generate a personal entrepreneurship project. *Business Chamber* is organized business institution that provides different services to businessmen, usually in economic sectors. *Research Center* refers to the public institutions of R&D in the Guanajuato State. *Technological Park* refers to institutions for technology transfer with some having an incubator as well.

The open-source software Gephi was used for the SNA. The number of times that each of the actors of the entrepreneurship ecosystem was identified, and each connection was given the weight of 1. If there was no response or connection, those elements were not graphed. The Force Atlas 2 distribution algorithm was also applied, which favors the distribution that avoids the overlapping of nodes and edges and disperses the different groups to give space to the largest nodes. The nodes are the actors defined by preferences of the respondents while the edges refer to connections. This way, the graph shows all the interactions and all the actors, with this algorithm representing an equilibrated interaction of the actors according to its metric. For the treatment for the nodes of the networks, they were given the color in gradient tones of blue, while the darkest color means a higher degree of the metric that it is analyzing.

To analyze the structure of a network, there are two levels according to Freeman, namely, "a position is more *central* or more *peripheral* respectively, depending on how the number of points adjacent to a given position increases or decreases" (as cited in Santos, 1989: 140). The concept of *centrality* represents the contribution made by an element according to its location to the network. *Betweenness centrality*, on the other hand, is a measure that quantifies the frequency or the number of times that a node acts as a bridge along the shortest path between two other nodes. Betweenness centrality, in turn, plays a critical role in the structure of the network, the actors with high betweenness centrality can, then, be controllers or regulators of the flow of information and resources. The *modularity* identifies the possible integration of actors into communities or clusters, i.e., the social network is characterized by *transitivity*, which means that, if A and B are connected and there is also a connection between B and C, it is probable that there is also a connection between A and C (Kadushin, 2012, p. 16). Through the transitivity that the actors presented, it is possible to identify the links with other actors in their community, which could favor their access to other resources, information, management, support, or links that they could obtain in a complementary way.

The network diameter indicates how many distance hops there are between the two furthest nodes of the network, i.e., if the net is stretched, this is the distance between the two ends measured by the number of links. The degree of a node is the total sum of the number of followers that a network element has (input degree), and the number of users that it follows is the degree of exit. The average degree of a network is the average of all the nodes. Density measures how far the graph is to be complete; a complete graph has all possible edges and a density equal to 1. A very high density indicates that users know each other, that is, they follow each other a lot.

The first analysis of the networks was carried out with all the ties generated from the students and professionals, integrated in a network with the actors of the ecosystem. Subsequently, the analysis disaggregated the networks by segment because the first analysis was skewed by the bigger university population over the professionals.

RESULTS

The Ecosystem Using Preferences of All Respondents

The first analysis was between young people with entrepreneurial potential and the actors of the social entrepreneurship ecosystem. There was a total of 287 respondents, broken down into 211 university students and 76 professionals who graduated ten years ago or less. From these responses, a total of 1125 interactions were obtained.

This analysis allows us to identify the interactions for all the samples, i.e., interactions that exist with the defined actor. This allows us to analyze the main metrics of the network and to identify if there is any trend when comparing each of the studied populations (see Tables 2, 3, and 4).

In the network for the social entrepreneurship ecosystem (Figure 1, Table 2), the interactions show the centrality that exists in the defined actors. It is observed that the element with the greatest weight is the University, followed by the Incubator, Businessperson, and Research Center; constituting the actors with greater centrality; its position in turn is in the center of the graph. The nodes with the least centrality are the Bank, Business Chamber, Technology Park, and Professor. The diameter of the network, which is 5, indicates how many distance jumps there are between the two furthest nodes of the network; it measures the distance between the two ends. Its density is 0.023, which is very low density due to the little interaction of the actors with each other. The graph, which was constructed from the linkage of the population among the 12 actors, represents a network with weak ties implying in this case a high flexibility in the connections between the several actors that would be favorable for the entrepreneurs because they can move inside the ecosystem without a strong obligation to a specific actor.

To identify if there is any element of the ecosystem with the potential to connect the actors of the social entrepreneurship ecosystem, its betweenness centrality was analyzed as shown in Figure 2, being the University, Incubator, Businessperson, and Research Center actors with greater possibility to provide access to other elements of the system to information and resources available in the ecosystem. The *modularity* was also analyzed (Figure 3).

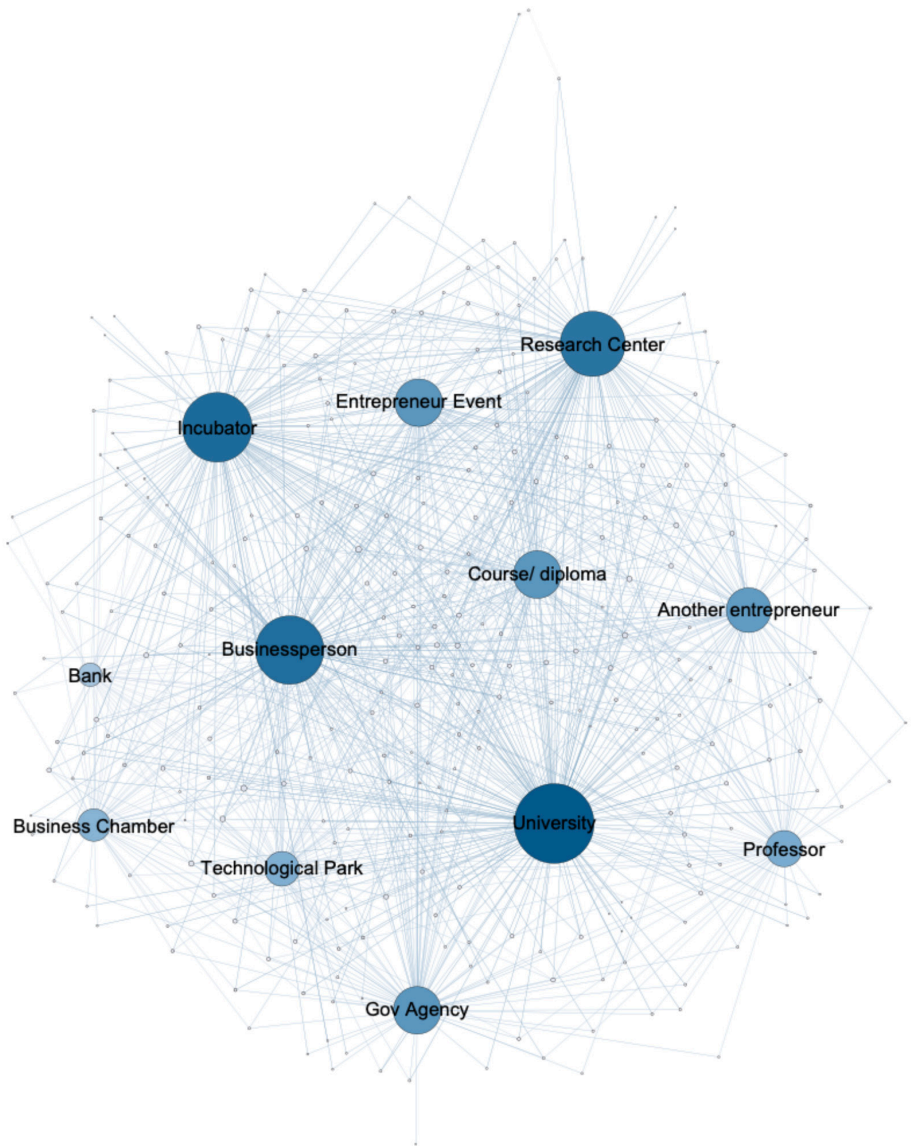


Figure 1: Centrality of the Network for the Social Entrepreneurship Ecosystem

Id	Actor	Centrality	Betweenness Centrality	Modularity
1	University	140	10806.774930	1
2	Incubator	122	8457.514195	2
4	Businessperson	120	7949.543395	0
9	Research Center	114	6836.609480	5
6	Government Agency	83	3797.971944	4
12	Course/ diploma	83	3287.020123	6
10	Another entrepreneur	78	2869.382038	3
3	Professor	63	2259.868620	3
8	Technological Park	60	1791.412219	4
5	Business Chamber	56	1597.280445	0
7	Bank	40	859.998108	1

Table 2: Social Entrepreneurship Ecosystem Network Metrics for All Segments

In Figures 2 and 3, it is observed that there is a greater preference towards the University, which confirms the life stage cycle in which the majority of the population is found. Those educational institutions that could have in their structure a Technology Park, an Incubator, that carry out Entrepreneurship Events, and training through Course/Diplomas could have a greater effect on the ecosystem, because they physically integrate several of the actors more preferably. Figure 3 shows the modularity of the network actors, where unlike the previous figures, the actors with greater centrality present less transitivity, i.e., they are more isolated, which could show the little interaction that currently exists among the actors of the entrepreneurship ecosystem towards a strategy directed for the promotion, generation, and development of social entrepreneurship in Guanajuato.

The Ecosystem Using Preferences of University Students

The analysis using preferences of all respondents is influenced by the broader participation of the university students (211) over the professionals (76). Therefore, an analysis was carried out, disaggregating the segments, and identifying differentiated preferences depending on the life cycle of the potential entrepreneur.

The first disaggregated analysis of the networks of the social entrepreneurship ecosystem uses the preferences of young university students, that is, those who

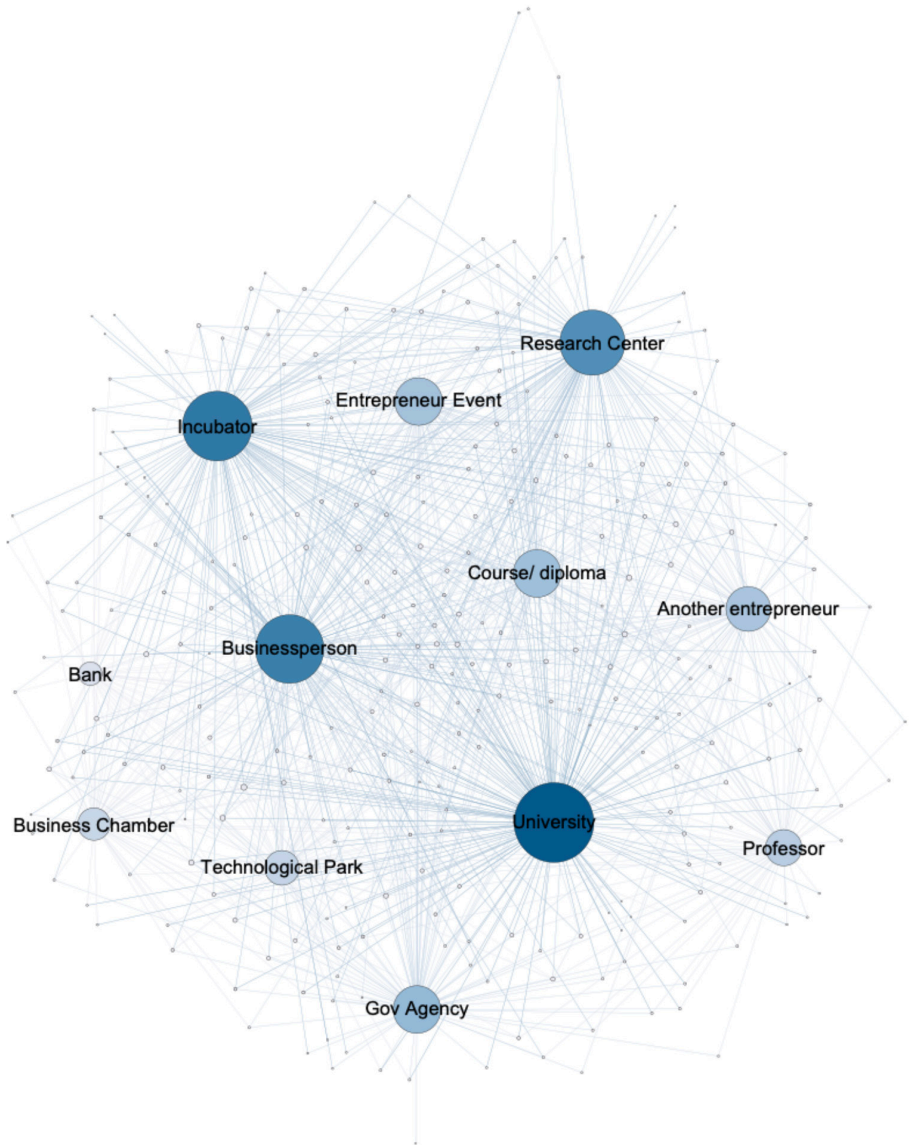


Figure 2: Betweenness Centrality of the Elements of the Social Entrepreneurship Ecosystem

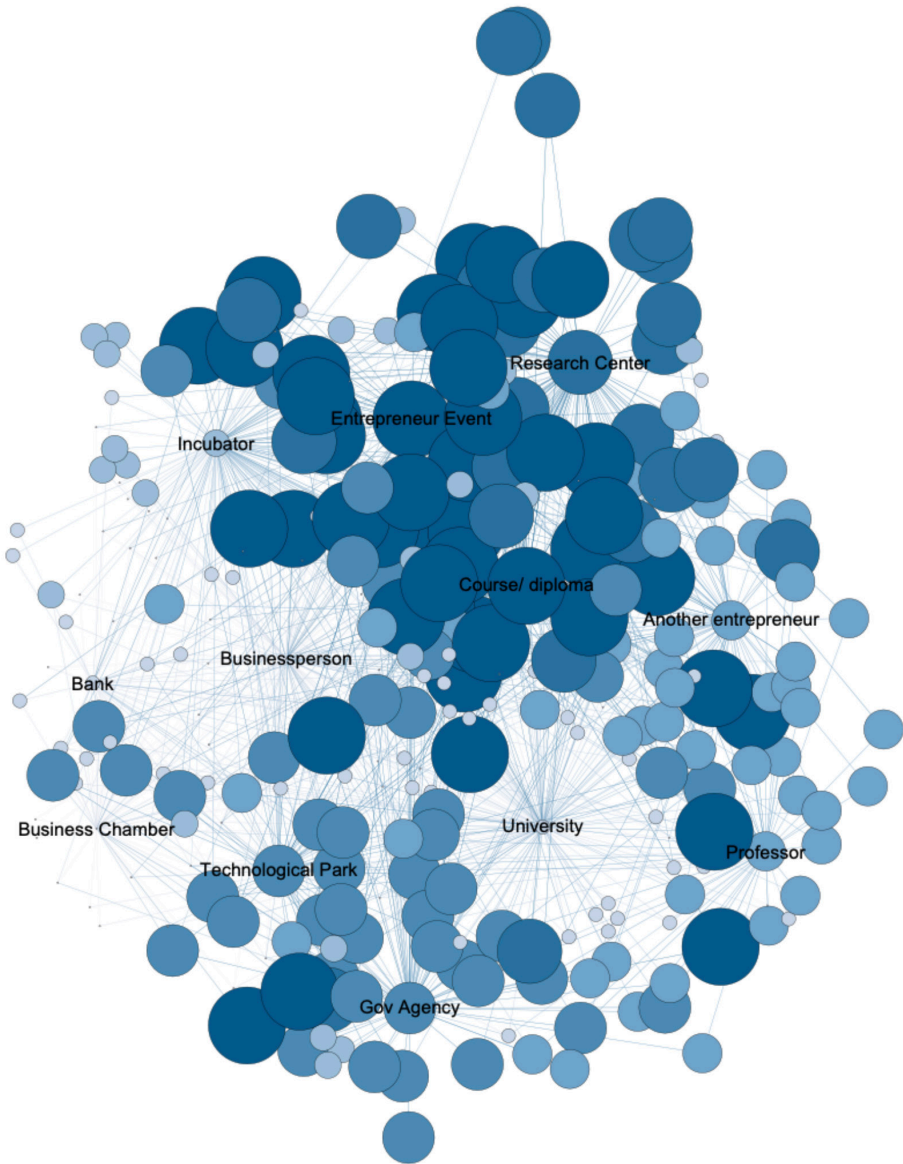


Figure 3: Modularity of the Elements of the Social Entrepreneurship Ecosystem

are still studying. In this segment, the most important actors are the University and the Research Center, followed by the Businessperson and the Incubator (See Figure 4, Table 3). Compared with the network generated from the professionals' responses (succeeding section), there are two actors that stand out among the university student population, namely, the Entrepreneurship Event and the Course/Diploma (compared with Figure 1). So, these seem to be more attractive to young university students compared to Businessperson and Training Events for the young professionals.

The network of the entrepreneurship ecosystem for the university student population presents a transitivity of nine communities. It has a low density of 0.021 (see Figure 4) with little interconnectivity between its actors. The average degree of centrality of the network is 6.07 and the diameter of the network is 5. This could indicate that the students are linked to solve their needs with at least five actors

The Betweenness Centrality and Modularity metrics were identified, generating Figures 5 and 6 respectively, for their analysis. The existence of nine communities made up by 12 actors shows that the social network of entrepreneurship is not integrated, that there is no common vision or strategy to develop the social entrepreneurship, and that the resources are not being used effectively as confirmed by the density of the network.

The elements with the greatest Betweenness Centrality are the University, Research Center, Businessperson, and Incubator (See Figure 5). This would indicate the actors with the greatest possibility to be common elements with other nodes. This network shows the close relationship that exists with the University, due to the life stage of the population studied. It highlights that some actors, such as the Research Center and the Businessperson, are not a constant part of their academic activity; the Businessperson and Another Entrepreneur are not institutions. This confirms the interpersonal networks proposed by Echeverri (2009), in which social entrepreneurs interact through their personal relationships as well as through institutions like incubators, where the process of interacting with the Businessperson, Another Entrepreneur, and Professor can be formalized.

In Figure 6, the clusters (generated by the metric Modularity in Gephi) for the network for the university students include: 1) Businessperson with Course/Diploma and Business Chamber; 2) University and the Government Department;



Figure 4: Centrality of the Social Entrepreneurship Ecosystem Network for the Population of University Students

Id	Actor	Centrality	Betweenness Centrality	Modularity
1	University	112	8902.902107	0
9	Research Center	109	8551.897212	1
4	Businessperson	93	6582.876991	6
2	Incubator	91	6538.250742	2
12	Course/ Diploma	81	4194.639088	7
11	Entrepreneurship Event	81	4917.305711	3
10	Another Entrepreneur	69	3152.683312	4
6	Government Agency	59	2805.765828	0
8	Technological Park	51	2743.645133	5
3	Professor	49	2663.058747	4
5	Business Chamber	40	1111.244299	6

Table 3: Social Entrepreneurship Ecosystem Network Metrics for University Students

3) Professor and Another Entrepreneur. The communities show the connection with common actors, related with a specific necessity for the potential social entrepreneur, e.g., the need mostly for formation and knowledge to start a venture. The Entrepreneurship Event, Technology Park, and Incubator are isolated and not integrated in communities because these three actors each have a different function, which are formation, innovation, and advisory functions, respectively. Note that the communities that are able to integrate are made between actors that appear in the boundaries of the graph, while the actors with greater centrality have few capacities to form a community. Thus, it could be thought that the ecosystem is poorly integrated as a network or ecosystem and that the actors act competitively when they promote entrepreneurship.

The Ecosystem Using Preferences of Professionals

The second analysis of the network of potential entrepreneurs was carried out taking the results of the population of Professionals, which include both recent graduates and those who graduated between 5 to 10 years. The network of the social entrepreneurship ecosystem from the professionals' point of view shows differences that could be explained by their life stage and past experiences (see Figure 7, Table 4).



Figure 5: Betweenness Centrality of the Elements of the Social Entrepreneurship Ecosystem for University Segment

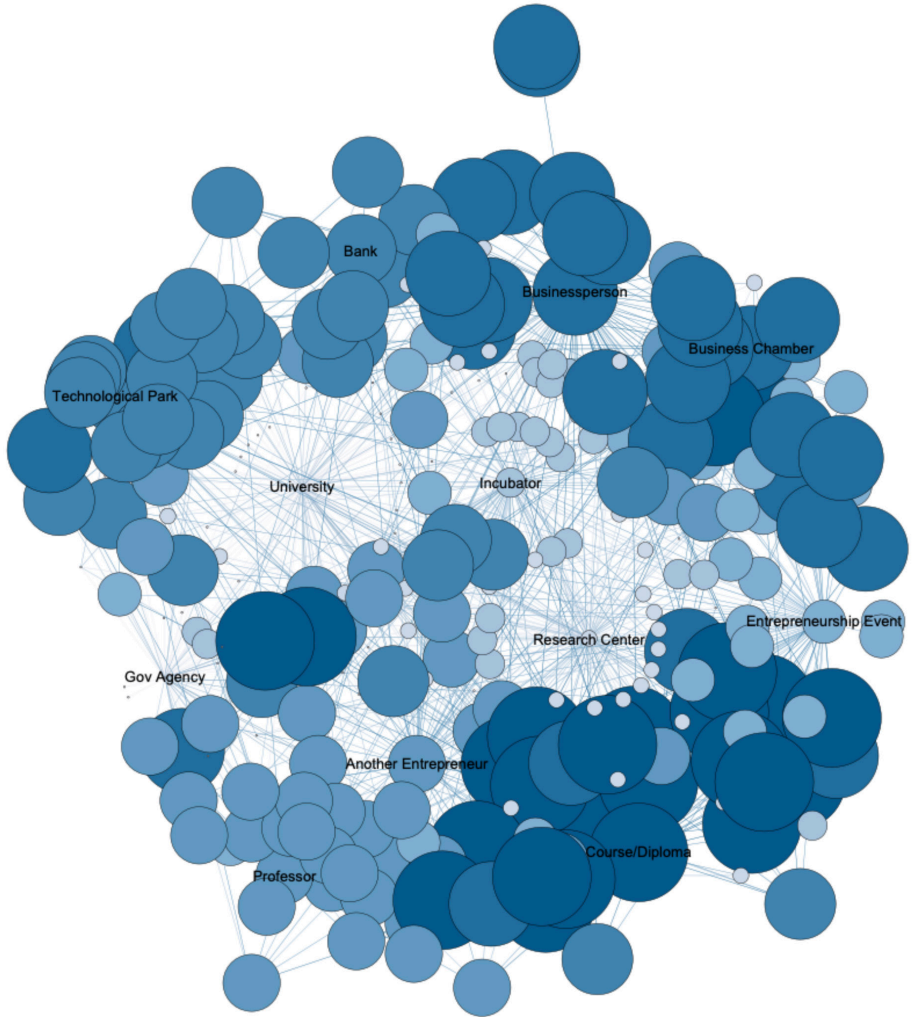


Figure 6: Modularity of the Elements of the Social Entrepreneurship Ecosystem for University Segment

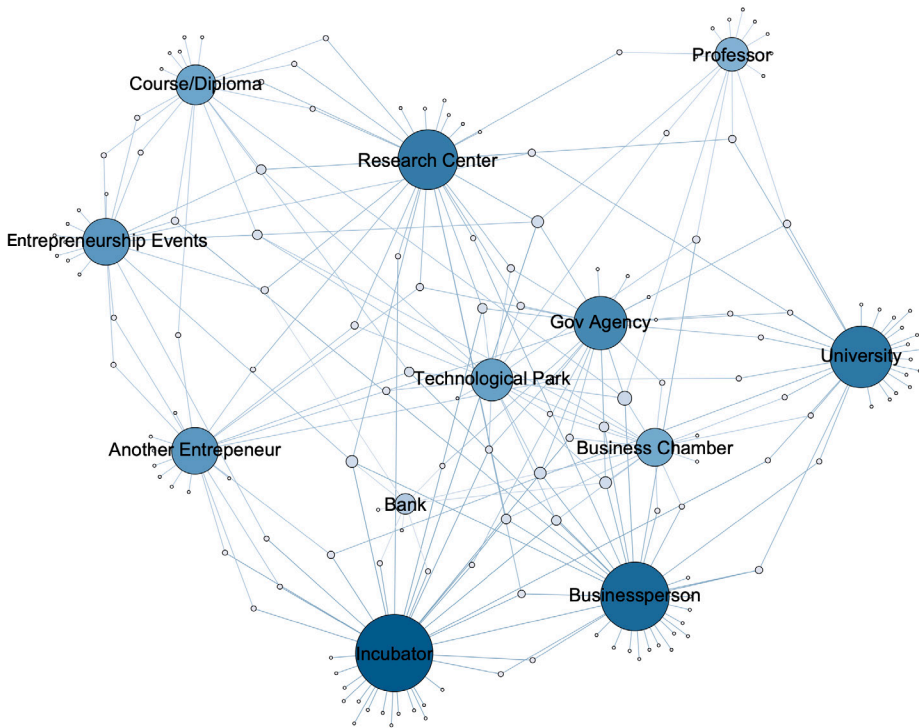


Figure 7: Ecosystem Network of Social Entrepreneurship for Professionals

Id	Actor	Centrality	Betweenness Centrality	Modularity
2	Incubator	35	0.258224	2
4	Businessperson	31	0.220252	0
1	University	28	0.211729	1
9	Research Center	27	0.178153	5
6	Government Agency	24	0.135923	7
11	Entrepreneurship event	21	0.147809	6
10	Another Entrepreneur	21	0.134961	3
8	Technological park	19	0.078519	7
12	Course/ Diploma	18	0.093906	6
5	Business Chamber	17	0.071795	4
3	Professor	15	0.108102	5
7	Bank	9	0.035021	8

Table 4: Social Entrepreneurship Ecosystem Network Metrics for Professionals

The increase in the centrality of the Incubator and Businessperson actors can be observed, while the University and Research Center decrease their weight. In this graph, the actors Another Entrepreneur and Government Agency begin to have greater relevance, as well as the Technology Park, which is not representative in the first preferences of the university network. It can be observed in the analysis that there is an inverse relationship (Figure 8) between Professor and Businessperson, i.e., for the population of young university students, the Professor can still be a point of reference, but for a professional it will cease to be proportional to the time spent outside the University and the Businessperson will move to have higher preference (Figure 8). The actor with the least centrality is the Bank, which professionals do not visualize within the relevant actors for the generation of entrepreneurship. In the case of Mexico, the loans for entrepreneurship still have the same conditions and the same interest rate for an operating enterprise and a startup. On the other hand, the actor Government Agency increases for professionals compared to the networks of university students; it could represent the opportunity perceived by professionals to join entrepreneurship promotion programs of the government before considering obtaining financing from the bank or other financial institutions. This shows that getting funding from a bank or financial institution is of low priority. This, in turn, confirms the Global Entrepreneurship Monitor (Terjesen, et al., 2012), which indicates that most of the funding for new ventures is from own resources or from the family; it shows the absence of financing in the entrepreneurship ecosystem. This would indicate that the Entrepreneurship Ecosystem presents an opportunity area to offer better financing and support proposals in the generation of entrepreneurship.

The elements with the higher Betweenness Centrality and Modularity, implying that they can be used as bridges or binding actors within the ecosystem, are: Incubator, Businessperson and University, followed by Research Center (Figure 9). Although they are peripheral actors in this graph, they still have the higher betweenness centrality, thus they can link the entrepreneurs to other actors and can distribute the different resources or information in the ecosystem in an effective way. They provide the function of advising the potential entrepreneur, which is important for the segment of professionals.

The communities or clusters of professionals (again from the Gelphi algorithm) are integrated as follows: 1) Course/Diploma and Entrepreneurship Event; 2) Professor and Research Center; 3) Technology Park and Government Agency (Figure 10). The first community indicates that the professionals who attend any of them

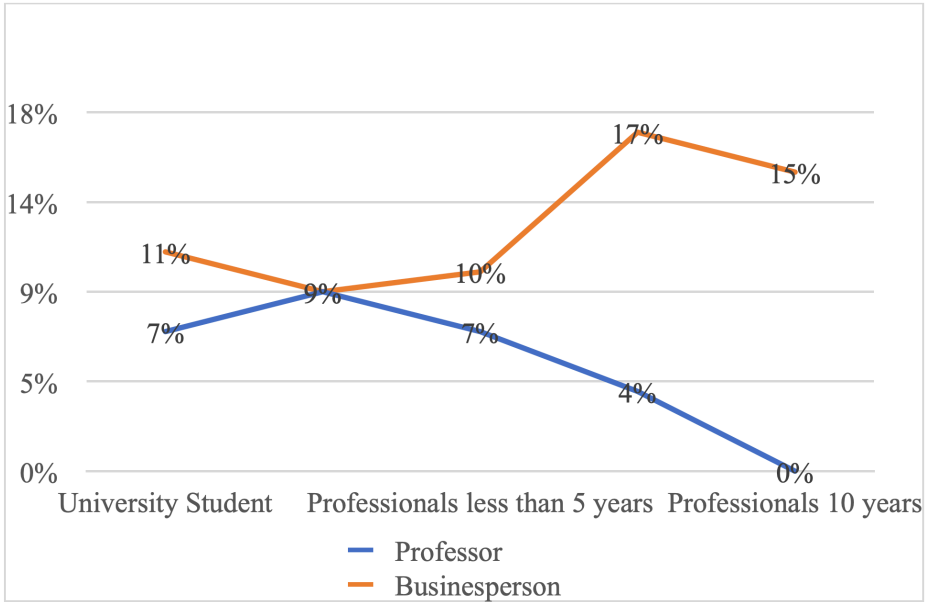


Figure 8: Preference Professor and Businessperson

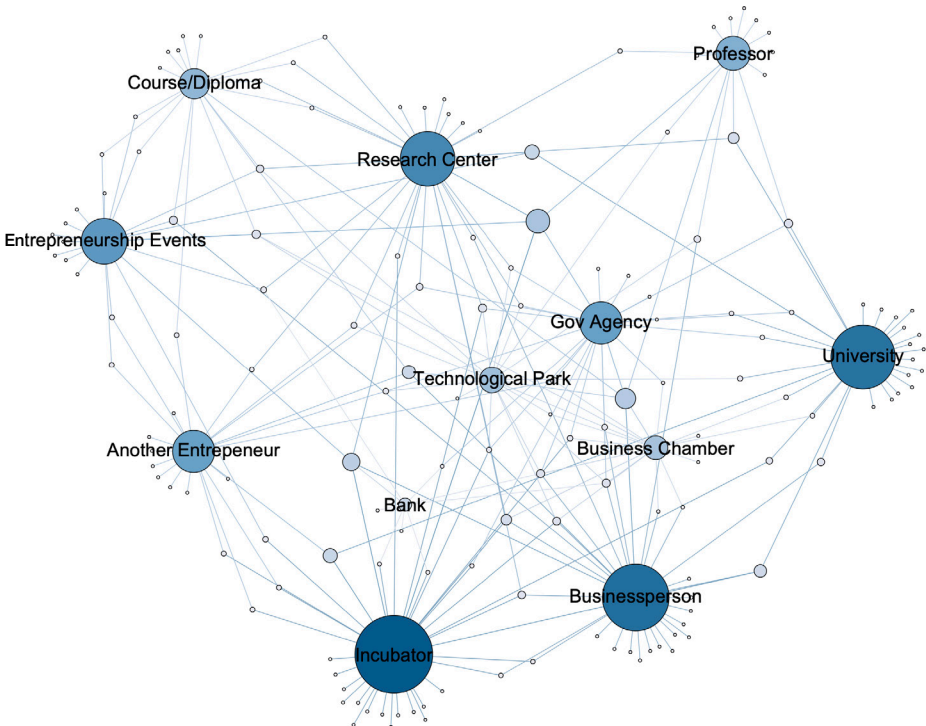


Figure 9: Betweenness Centrality of Ecosystem Actors for Professionals

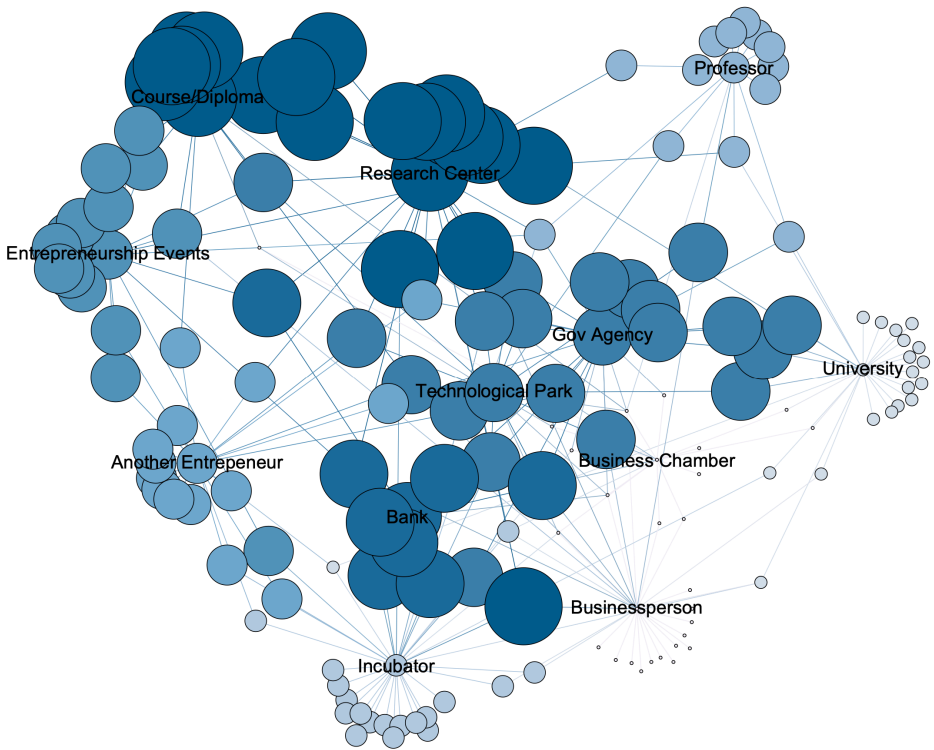


Figure 10: Ecosystem Modularity for Professionals

are more likely to be trained in both spaces. The second community, on the other hand, indicates the importance of knowledge and technology transfer. The third community shows the relationship that exists between the programs to promote entrepreneurship in Guanajuato, mostly through the actors Technology Park and Incubator. The isolated actors have higher centrality but are peripherally located and do not integrate into any community, which could reflect a poorly articulated ecosystem and the limited positions of the other actors relative to professionals to support their ventures.

DISCUSSION

Based on the analyses carried out, it allows us to reflect on the traditional schemes that have been promoted for venture creation and business development, e.g., including market analysis, organizational improvements, and the constant

search for productive efficiency. Results in this study show that the actors of traditional enterprise ecosystems such as Incubator, University, and Government Agency, are also effectively promoting and potentially creating social enterprises.

The resulting analysis of networks identified elements in common, those that stood out, and the existence of any trend and its meaning for the Guanajuato State Social Entrepreneurship Ecosystem. The University actor is preferred among the population of young university students, which is probably explained by their current life stage, i.e., in this space it is possible that through a teacher, curricular, or extracurricular program, young people become interested in the creation of a social enterprise. In the case of professionals, this preference decreases, although it remains among the three actors with the greatest centrality and betweenness centrality, remaining a relevant actor.

The Incubator is a main actor in both populations, having the highest centrality and betweenness centrality for the young professionals. These two actors (University and Incubator) could be complementary in some cases, e.g., in the State of Guanajuato there are several Universities that have Incubators. Thus, the strategy to have Incubators in the Universities could be positive, but they need to be better aligned to be more effective in helping create social enterprises.

The Businessperson actor is included in the different networks, increasing proportionally among young professionals. Although it is not an institution, it could be part of the entrepreneur's interpersonal networks. In any case, Business Chamber is the institutional actor, although it has a low centrality in the ecosystem. The Businessperson actor gives a sense of reality to entrepreneurs due to their experience in the market and in the business world. Note that the centrality is higher than it would be with the actor Another Entrepreneur, because the Businessperson has passed the first stages and his point of view could be considered more important for having had success in the early stages. Thus, this actor could be required in the processes of incubation and strengthening of entrepreneurs.

An actor with high betweenness centrality is the actor Entrepreneurship Event. Despite the fact that the OECD warns about these actions of the promotion programs because they are not effective and are not very focused (Terjesen et al., 2012), it is still perceived by young university students as a means to learn about the trends to propose their entrepreneurship. It is suggested that such events should not only

motivate actions toward entrepreneurship, but they should also generate relevant information for potential entrepreneurs.

The Technology Park actor does not present a relevant centrality or betweenness centrality in the analyzed networks; therefore, it is seen as a weak actor to favor social entrepreneurship, or even to link entrepreneurs in accessing information, funds, advice, or generating innovation processes for their projects. This situation could arise because the Incubator actor is, on several occasions, within the technology parks of the State of Guanajuato.

The actors with less centrality were the Government Agency and the Bank, which shows that the elements related to financing and obtaining support are not viewed as preferential and only professionals foresee obtaining resources for the generation of entrepreneurship. Only the Government Agency actor in the network of professionals generated greater authority. Most financing by the Bank ask for a certain time of operation of the venture in addition to requesting guarantees of the assets owned by the company or the entrepreneur. In the survey, no reference was made to angel investors or crowdfunding, or other possible financing schemes.

The clusters in the networks presented could be analyzed from the functions they cover to meet the needs of the segments. The Training cluster is made up of the actors Course/diploma and Entrepreneurship Event. The Financing cluster includes the Bank actor that is close to the cluster of Technology Park and Government Agency, with the latter sought to access public resources and economic support. The cluster involving Professor, Research Center, and Technology Park could be designated as cluster for Innovation and Knowledge generation (see Figure 10).

The actors with the greatest centrality but are not integrated into clusters are the University, Businessperson, and Incubator whose functions are advisory (not actively involved in the venture creation). By not being integrated into a cluster, they show that the preference of the respondents for these actors is to choose one or the other actor, without having mechanisms or strategies that manage to link them to take advantage of the best advice from them. However, Leydesdorff (2015) points out that some actors may not be linked with others efficiently, so that other actors have to cover the functions that the main actor has to do. Subsequently, this leads to the rise of other actors in the system.

The analysis of the social networks showed weak ties, which indicates that these occur depending on the requirements and needs of individuals. The term “weak,” in this case, indicates the flexibility that allows individuals to link to various actors in the ecosystem, i.e., “weak ties are more valuable when individuals are seeking diverse or unique information from someone outside their regular frequent contacts” (Katz, Lazer, Arrow, & Contractor, 2004. P. 309). Thus, the potential social entrepreneur would have the mobility to link with actors that have alternatives to address their needs. This mobility could be developed in the innovation and entrepreneurship networks found in the State of Guanajuato.

The clusters that were identified show that, at this time, there are links between the actors with similar functions but without a comprehensive link strategy that acts as an articulated ecosystem. The actors that showed a higher weight and betweenness centrality are the University, Businessperson, and Incubator, which could favor access to different programs, resources, and opportunities for potential social entrepreneurs.

CONCLUSIONS

The research has identified the main actors of the social enterprise network and identified the conditions that can promote the creation of social enterprises in this region.

The key actors of the social entrepreneurship ecosystem in terms of their ability to encourage potential social entrepreneurs are the University, Incubator, and actors that cover the innovation function, such as Technology Park, Research Center, based on their centrality and betweenness centrality in the different networks. There is strong preference for linking with actors experienced in the market and society, such as the Businessperson. The aforementioned actors would allow social enterprises to access the greatest amount of resources currently existing in the ecosystem and favor their generation and development. The analyzed networks have characteristics of a scale-free network, since there are different elements that are added depending on their needs.

According to the analyzed networks and their modularity, the social entrepreneurship ecosystems could be analyzed considering the functions presented

by their actors, e.g., actors that fulfill the roles for advising, training, innovation and technological development, and financing.

Depending on the context or life stage of the respondents, they will link to the actors differently. A higher relationship is shown in university students with actors who are close to them in the undergraduate stage and who can give advice toward the first steps in venture creation. Among young professionals, the relationship is preferred with actors from the business sector, which highlights the link to entrepreneurship indicated by Echeverri (2009). The link with innovation and financing actors is not considered relevant in the population of university students, while this link is perceived with higher weight in professionals who have a broader vision of the competition and the market.

Finally, weak ties in the networks presents an advantage to favor flexibility in interactions with the different actors of the ecosystem because the connections with the actors occurs according to the needs of the entrepreneurs.

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