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Higher education for social entrepreneurship in the quadruple helix framework: co-construction in open innovation*

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ABSTRACT

The processes of innovation that organizations of the knowledge society need to implement are often oriented towards achieving higher levels of well-being, benefits for society, sustainable development, etc. Higher education institutions maintain a relevant role in this context because of the impact they can generate from establishing linkage projects; these can be established from paradigms such as open innovation and the quadruple helix model. Thus, the training models of higher education institutions must be aligned with the type of human capital that society requires, that is, people with innovation and entrepreneurial competencies that impact on social benefits for the community. The purpose of this document is to present the current status of a doctoral thesis research plan regarding the development of competencies for social entrepreneurship from the linkage in higher education institutions. To comprehensively understand the research problem, a literature review is presented, as well as a mixed-methods study with a sequential, concurrent design to collect qualitative and quantitative data. The results are expected to set guidelines to propose a training model for the development of social entrepreneurship competencies from linking projects. The progress of this research accounts for contributions of the theoretical framework and a first look at the method.

CCS CONCEPTS

• Social and professional topics • User characteristics • Cultural characteristics

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KEYWORDS

Social entrepreneurship competencies, linkage, quadruple helix model, open innovation, training models.

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1. Context and motivation that drives the dissertation research

Current educational systems require to transform for the training of competent human capital for the knowledge society era. Society demands an education that develops capacities for creativity, entrepreneurship, critical thinking [1, 2], and linking activities support the achievement of these competencies while having a positive and real impact in the external sector to the institution [3]. In this regard, the Tecnológico de Monterrey (Mexico) offers a social entrepreneurship ecosystem in which members of the university establish links with external agents through innovative projects to positively impact in diverse contexts; the institution is recognized as one of the 100 universities with the greatest social impact in the world [4].

This research is carried out to provide new knowledge for educational innovation, concerning the linking processes of educational institutions with external agents for the development of social entrepreneurship competencies. We seek to answer the following research question:

In what way the training models in different universities allow the development of social entrepreneurship competencies that, in turn, generate social value, higher welfare levels, and

internationalization, through innovative linkage processes of the quadruple helix: university-industry-government-civil society??

2. State of the art

2.1 Open innovation

Innovation represents an indispensable process for the stability of organizations within the knowledge society. Innovating has to do with the introduction of new combinations of products or processes to provide greater capacity within the company [5]. For years, the innovation developed by companies depended solely on internal research and development (R & D), but, at present, this model does not meet the needs of the globalized economy [6]. In this scenario, the paradigm of open innovation emerges, in which organizations use diverse sources for the development of products, services, and processes [7]. Within this paradigm, the university plays a partner role in the transfer of knowledge [8, 9], as well as in scientific publications or patent registration [10], which can contribute to the development of the regions.

Open innovation can be achieved when multidisciplinary teams are integrated [11, 12]; it is conceived as an innovative product of the collaborative work of a group of experts. It is also called innovation network [13], hybrid innovation [14], multidisciplinary innovation teams [15], different professional groups in a team [16], different disciplinary approaches [17]. Buyurgan and Meixell [18] point out that multidisciplinary innovation reflects the practice of collaboration and cooperation of different disciplines, methods, and approaches and promotes multi-institutional learning with specialists of diverse training background.

The literature review shows that open innovation is scarcely addressed in academic (educational) and cultural contexts; it also showed that there is a trend of research in the business and social fields. In this regard, Fabrizio [19] warns that more research is needed to understand the relationship between the use of university research results and industrial innovation, and the university must take place at the open science movement [20]. Also, West, Salter, Vanhaverbeke, and Chesbrough [21], indicate the need to increase collaboration with stakeholders such as universities, companies, and government, and that it is necessary to carry out studies in academic contexts that can generate valuable knowledge for the development of external and internal agents.

2.2 Linkage: open innovation and the quadruple helix model

Actions in university innovation are increasingly oriented to stop limiting to professional training, but instead, to become institutions focused on academic entrepreneurship (research, knowledge and technology transfer). Also, new teaching methods require that teachers work in groups, not only with other teachers but with other sectors outside their institution [22]. All disciplines, including social sciences and arts and humanities, are

involved in entrepreneurship activities, whether formally (patents and licenses), informally commercial (consulting and research by contract) or informally non-commercial (public conferences) [23].

Given the relevance of the university and its role on the communities' development and innovation, the processes of university linkage with external agents open possibilities for innovation in higher education training models. The transfer of knowledge and technology from the university to the exterior is a critical factor for economic [24] and social [25] development; therefore the linkage, transfer, and generation of knowledge activities point towards the quadruple helix model. This model raises the interactions between university-industry-government-civil society as the central axis of development, and from these linkages, in addition to contributing to external development, educational institutions benefit from real practical knowledge to incorporate new information into their teaching, research and dissemination processes [26].

Some studies recognize the relevant role of university linkage for economic development. Lopes, Ferrarese, and Carvalho [27] highlight the important role of the university in cooperation processes for the development of innovations in the automotive industry, under collaborative work between several companies and two universities. On the other hand, Guerrero and Urbano [28] indicate that companies in emerging economies cooperate intra-business, with other companies and with universities and research centers, which produces positive effects for the performance of innovation and is reinforced when the company has a high growth orientation. Thus, the university must be prepared so that both its academic staff and students are trained in an environment oriented to the generation of knowledge and cooperation with external agents for the development of their region.

2.3 Social entrepreneurship

Given the training possibilities through university linkage, higher education institutions have the opportunity to propose educational models that allow their students to develop entrepreneurship competencies, centered in innovation, exploration of opportunities and exploitation of profitable combinations [29]. In this regard, social entrepreneurship competencies could be developed by participating directly in projects to create, sustain, and distribute social or environmental value [30].

Social entrepreneurship is an emerging field of study that is gaining consolidation. Martínez-Rivera and Rodríguez-Díaz [31] identify four differentiating aspects of entrepreneurship: (1) creative destruction (innovative products or services), (2) creation of value (low productivity resources to a high performance one), (3) identification of opportunities (exploiting the opportunities provided by the changes), and (4) ingenuity (taking advantage of opportunities and facing challenges due to lack of resources.) Additionally, Alegre, Kislenco, and Berbegal-Mirabent [32] state

that it focuses on the combination of social and financial objectives, community ideals, and innovation towards the exploitation of opportunities to generate value.

In recent years, several studies have been published that address social entrepreneurship. Sassmannshausen and Volkmann [33] conducted a bibliometric study in which they identified that 54% of the topics addressed in this area are definitions and theoretical constructions, 17% are reviews of other researches and 8% are about education on social entrepreneurship. The academic community of different disciplines has researched this subject because the economic impact of social enterprises has attracted capital from all over the world and has generated a promising area with great potential for participation in the economy [34].

3. Hypothesis

The hypothesis for this study is the following:

Projects of university linkage with external agents oriented to innovation, generation of social value, increase of higher welfare levels and internationalization, potentiate the development of social entrepreneurship competencies in higher education students.

4. Research objectives/goals

The objective of the study is to assess the extent to which social entrepreneurship competencies are developed with training models that promote the participation of students in projects related to university-industry-government-civil society. To achieve its objective, the analysis of entrepreneur profiles, cases of linking projects and conceptualizations of entrepreneurs, employers, stakeholders, experts, professors and students in training, as well as evidence on innovation, generation of social value, higher levels of well-being and internationalization, to propose an innovative training model for the development of social entrepreneurship competencies, based on the linkage of the quadruple helix, which supports sustainable development, will be carried out.

The following are the specific objectives:

- Systematically review the literature on open innovation and social entrepreneurship and compare different innovative training models that promote linkage, the development of entrepreneurial competencies and open innovation for sustainable development.
- Identify cases of university linkage projects aimed at social innovation, to assess the dynamics that favor learning and the development of competencies in students participating within these projects.
- Analyze the perception of institutions regarding the development of students' social entrepreneurship competencies, as well as the perceptions and motivations of external sectors, such as industry, government, civil society.

- Evaluate evidence on innovation, generation of social value, higher welfare levels and internationalization promoted by external agents (government, industry, civil associations, and universities) by linking social entrepreneurship projects with educational dependencies (students and teachers).
- Propose a training model for the development of social entrepreneurship competencies in higher education, based on the link between the quadruple helix and sustainable development.

5. Research approach and methods

The research will be carried out through mixed methods [13], under a sequential concurrent design. The mixed methods are characterized by collecting qualitative and quantitative data in order to understand better a research problem [35]: they integrate, relate, and/or merge data. The work will be carried out in two phases with both types of data (QUAN -quantitative- and QUAL -qualitative-) in each phase. In phase one (QUAL-Quan) there will be a focus group, non-participant observation and interviews with professors, students and entrepreneurs (QUAL), and a survey with semantic differentiators (Quan) will be applied to members of the four sectors of the quadruple helix. In phase two, validation scales (pre and post) and Likert scale (QUAN) will be applied to students who participate in innovation projects, and, through rubrics (Qual), the social innovation products they generate will be evaluated.

5.1 Population and sample

The population consists of entrepreneurs, employers, stakeholders, experts, teachers, and students in training. For the selection of the sample, a probabilistic (in the quantitative components) and intentional (in the qualitative components) sampling will be used [36].

5.2 Variables in the study and instruments.

Seven variables have been established in the study:

- Social entrepreneurship competencies: activity developed by individuals or groups of people to create, sustain, distribute and disseminate social or environmental value in innovative ways through business operations, which can be social, non-profit, private or public institutions [16].
- University linkage processes: development of projects among four-helix agents (university-industry-government-civil society) for the generation of new products, services, development of SMEs, and technology [37].
- Training (educational) models: integration of social subjects immersed in the environment that combine teaching methods, relationships among educational actors, development of materials, the social function of the school. Its components are aims (philosophy), internal order (theory), practical orientation (policy), putting into operation (processes of educational practice) [38].

- Innovation: implementation of a significant and novel product, service or process, method, or practice, that improves the current state of things [39].
- Social value: result generated when resources, processes, and policies are combined to generate improvements in the lives of people or society as a whole [40].
- Well-being: a social approach towards quality of life, integration of well-being, or general well-being [41].
- Internationalization: the process by which a company creates the precise conditions to disembark in another international market and the fundamental role of the clusters in the promotion of international competitive advantage [42].

These variables will be analyzed based on the information provided by the following instruments:

- Focus group. To identify perspectives and experiences of students in training where links with sectors such as industry, government, and the civil society were promoted (variables: entrepreneurship competencies, linkage, training models).
- Non-participant observation guide. To understand the social meanings that occur within the social entrepreneurship ecosystems in a specific case of an incubator with students, professors, and entrepreneurs (variables: entrepreneurship competencies, linkage, training models).
- In-depth interviews. To analyze perspectives and experiences of different universities that promote links with sectors such as industry, government, and the civil society, as well as the conceptions of various agents such as entrepreneurs, employers, stakeholders, experts and professors (variables: entrepreneurship competencies, linkage, training models).
- Semantic differentiating survey. To identify the perceptions and needs of members of the four-helix sectors (university-industry-government-civil society) concerning innovation, social entrepreneurship, and linking projects (variables: entrepreneurship competencies, linkage, training models).
- Validation scales (pre and post). To compare the perception of the entrepreneurial potential of participants before and after developing linkage projects (variables: social entrepreneurship competencies, linkage).
- Likert scale survey. To know the perceptions of innovation of the students with experiences in linkage projects (variable: innovation).
- Rubric. To qualitatively evaluate the projects/products (process, entrepreneurship) of social innovation generated by students (variables: innovation, social value, welfare, and internationalization).

5.3 Information sources

Entrepreneurs, employers, stakeholders, experts, teachers, and students in training. Digital and printed material: research and dissemination articles, websites, books, e-books, videos. Innovation products: proposed/developed projects.

5.4 Data collection and analysis

For the data collection, instruments will be designed and validated, as well as the use of instruments validated in other relevant research. In phase one, four instruments will be applied to collect QUAL-Quan data. Methodological and source triangulation will be carried out [43]. The results will be analyzed to identify the categories that emerge and that contribute to the construction of a training model oriented to the development of competencies for social entrepreneurship.

In phase two, four instruments will be applied to collect QUAN-Qual data, where information is obtained from students regarding their participation in the training model proposal, as well as the qualitative assessment of their productions. Methodological triangulation will be carried out, which Pérez-Pereira [44] recommends for use in mixed methods to confirm, correlate, or corroborate the data obtained. The results will be oriented to the improvement of the training model proposal.

Ethical aspects will be taken care of regarding the institutions where the research is carried out, external organizations, agents, students, and other participants; also, rigorous processes will be carried out to guarantee quality in the research and its results.

6. Results to date and their validity

The processes of university linkage for the formation of social entrepreneurship competencies offer a field of study that is scarcely explored, according to the systematic literature reviews carried out.

7. Dissertation status

The current progress consists in the development of the theoretical framework, delimitation of the nature and dimension of the subject of study, planning of the study, and revision of the methodological proposal.

8. Current and expected contributions

The research proposal seeks to contribute to the field of educational innovation, by providing value knowledge that allows higher education institutions, and others, to find guidelines to develop the competencies required by 21st century society in their students, from the opening of its processes, productions, and developments to foreign agents in order to positively impact the communities.

The research is also expected to contribute to the field of study of social entrepreneurship because, as mentioned previously, it is not as explored as economic entrepreneurship. Finally, it is intended to create a training model for the development of social entrepreneurship competencies through the linkage with external agents of the company-government and social sectors.

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