An organization's environment and the generation of its legitimacy: Case Study: Ingenieros Sin Fronteras Colombia

Diana Duarte
Researcher, Ingenieros Sin Fronteras Colombia, dianamariaduarte90@gmail.com, 571-0313188798755

María Catalina Ramírez
Associate Professor Engineering, Universidad de los Andes, Address, mariaram@uniandes.edu.co 571-3394949 ext 2882

Julia Díaz
Ph.D. student, Universidad de los Andes, jh.diaz84@uniandes.edu.co, 571-3394949 ext. 4890

Abstract

The name EWB- Ingenieros sin Fronteras has been adopted by organizations in various countries. They are organizations that promote collaborative work between engineer's actors and other community and government stakeholders in order to support the solution of problems in vulnerable communities. In Colombia, since 2006 is given to the home country organization called Ingenieros sin Fronteras Colombia (ISFCOL) led by two universities: Corporación Universitaria Minuto de Dios (Uniminuto) and the Universidad de los Andes (Uniandes). The organization was created in a joint effort by a group of professors from both institutions in seeking to create spaces that allow, from academia, to develop initiatives for solutions to problems affecting Colombian communities within the framework of an institutional arrangement and an informal working practice. The main proposal is centered upon the creation of autonomous spaces through which students and professionals from the two universities develop roles that allow them to be apply in real Colombian situations. Likewise, the work is developed with the community, hence its local sense and historical knowledge is the guiding principle in the development of any of the initiatives. Since its establishment, ISFCOL has won a place for participation in various activities of innovation, engineering and social spaces within the respective universities. It is important to add that the initial design was based on the basic concepts proposed by Stafford Beer in the Viable System Model.

Thanks to a study conducted in 2013 at Universidad de los Andes entitled "Diagnosing the organizational culture as a tool for the analysis of the mission of an organization with social order " it was possible to illustrate in detail the evolution of ISFCOL since its conception to its present structure by giving a clear picture about how its own organization with a social purpose and academic characteristics have had on the fulfillment of its mission and therefore its dynamic structure Based on this study and the results it yields, the question of research that arises is addressed in this article, How has ISFCOL's environment affected its legitimacy and therefore its performance and survival?

According to what has been previously mentioned, this article analyzes the case of ISFCOL, as an organization that has been structured and molded over time from a logic that does not follow the cost-benefit guidance and therefore makes evident the effects that

its environment has had on their quest for legitimacy and survival as an organization.

Keywords
Viable System Model, environment, survival, organization

1. Introduction

Inequities observed in cities and in several Colombian regions are reflected in indicators such as GINI. And major engineering works are noted, the country has large problematic situations that do not allow the Colombians have their basic needs met. To justify such a scenario is presented below a historical scenario reported by the Departamento Administrativo DANE https://www.dane.gov.co/index.php/estadisticas-sociales/necesidades-basicas-insatisfechas-nbi).

According to the paper "Spatial dimension of poverty in Colombia", there is evidence that points to a spatial dependence of poverty in the country, both regionally and locally. Evidence of this is the formation of clusters of wealth or poverty at the municipal level, which are energized by natural or anthropologic factors, or externalities [1]. The same study relates the index of Unsatisfied Basic Needs (UBN) and the index of Living Conditions (ILV) showing a close interdependence between local poverty levels, which constitutes the so-called neighborhood effect, of both first and second order. Moreover, the supply of higher education in the country is inversely proportional to the condition of poverty; as a result about 72% of professionals are located in the five major cities [2]. 22% of these professionals are engineers from different disciplines, who choose to remain in the main urban centers (167,395 professionals in the period 2001-2008) [3]. This tension between access to higher education and the spatial dimension of poverty, reinforced by the limited coverage of universities in the national territory, represents an additional challenge in the process of Education for Development (EfD).

We will understand by EfD, the educational contribution that allows the practitioner to gain a better understanding of the global world especially regarding the social inequality, in its educational effect as people, and in participatory action [4]. This new proposal requires innovative spaces where the national core issues can converge so they can be addressed from multi and pluri-disciplinarity. Spaces such as EWB become a responsible alternative and an effective tool to address this gap, creating their own dynamics with local, regional or global actors, and developing a toolbox of methods and methodologies appropriate for intervention. The construction of these formal spaces are an institutional challenge, which requires a detailed organizational design, guided by clear principles and concepts, such as cycles of learning, service learning, equity, solidarity, among others. As a result of this company has such a structure that allows the action of the various engineering within a framework of cooperative learning.

The construction of these formal spaces is an institutional challenge, which requires a detailed organizational design, guided by clear principles and concepts, such as: cycles of learning, service learning, equity, solidarity, among others. As a result of this endeavor, we have a structure that facilitates the activities of the various engineering disciplines in a framework of cooperative learning.

2. Concepts

2.1. Complexity management

The complexity is a measure of variety. Another way to define such concepts is "variety is the number of possible states of a system (that is a measure of its potential) and hence the complexity is the number of observed states (distinctions) in a system. It is a measure of its relevance. Examples of complex situations are like:

- A mayor in charge of generating opportunities for community development
- A community leader responsible for ensuring that the community has access to good quality water
- A teacher in charge of developing a class with real life impact

The complexity of the systems in which people should perform is usually greater than the complexity that is owned individually. That is why the strategy must be found to ensure good performance through the management of this complexity. To that extent it relies on the so-called Act requirement Variety of Ross Ashby "Solo absorbs complexity." Under this law, the more complex the system, the more complex must be the system controller. To that extent should design and implement mechanisms "administration" of complexity. These mechanisms are complex attenuators and amplifiers. An attenuator is a complex mechanism that reduces the number of states of a situation. Some examples for the cases mentioned earlier in this chapter are:

- Classification of the basic needs of communities
- Grouping of the community according to proximity to water sources
- Classification by type of work (practical or theoretical)

In parallel to design an amplification mechanism, for example a mechanism that increases the responsiveness of a particular situation. Some examples for the cases mentioned earlier in this chapter are:

- A community radio station
- A sub-group of community leaders who specialize in every type of water management procedure
- Internet

In conclusion, the management of the complexity must follow a systematic method to ascribe purposes associated tasks, determine what the required performance, determine which are the generators of complexity and design and implement tools, mechanisms and procedures to mitigate capacity-amplifying response

2.2. Organizations with social cope

Based on the Colombian legal position, an organization with a social purpose relates to the term "nonprofit organizations" and more specifically to foundations and associations (Major of Bogotá, 2014). In contrast, an organization with social order is also related to what is called, social enterprise, which generally is characterized by not aim to maximize profits for their investors but face problems of social nature (Yunus, 2010). Other examples that will relate to the term "organization with a social purpose" include: NGOs, third sector and voluntary organizations. That said, although there are different denominations who come mainly from the legal framework, an organization with social order is characterized by a closed network of relationships with their own identity (Espejo & Reyes, 2011) that has the purpose or rationale, contribute the resolution of an issue of social and non-profit-making (Aristizabal, 2012).

Organizations with these guidelines, when born, but follow a similar behavior having any

enterprise must create mechanisms that take into account the very complexity of a social problem and in almost all cases, the need to confront the logic of a based on the formulation and implementation of projects, understood as temporary efforts being carried out to create a product, service or result ending system when they fail to meet targets, when it determines that it is not possible to meet them or objectives that were expected are no longer needed (Project Management Institute, 2009).
In general, the birth of these organizations is giving back to the emergence of an initiative to solve a problem that is affecting the quality of life of a particular community (Aristizabal, 2012). After the existence of desire, enters a job where mechanics based on the perception of a problem, you come to a learning period that allows the emergence of several alternative solutions. After defining a model solution (or parallel) seeking resources for implementation is done. Achieved the above is implemented as a general hypothesis, is expected to generate the resolution of a problem. The process ends with the visibility and recognition of the work done by the project (McKinsey & Company, 2004). Defining this as a first step, from there the organization is ready to grow, a fact that for this particular case relates to the application of the model in other situations or with finding new social problems. The organization faces the very complexity of the problems and situations of common knowledge to any enterprise: the pursuit of sustainability. Sustainability is also related to the ability to manage the new dynamics of growth, for example increased capabilities to meet the emerging dimensions hauling situations in which the organization is faced (Rodriguez, 2010). As the organization gains greater commitments, resources, lines of action, the complexity increases and it is necessary to acquire the necessary administrative tools to define the mechanisms on which they can anchor their survival (Porter, 1987).

2.3. Organizations survival

Survival of organizations has been studied through several theoretical focuses. Three of the most important framed in organizations theory are associated to: new institutional theory (Meyer & Rowan, 1977; Dimaggio & Powell, 1983), contingency (Burns & Stalker, 1961; Lawrence & Lorsch, 1974) and resource dependence (Pfeffer & Salancick, 1978).
Survival on new institutional theory is dependent on institutional environment (Meyer & Rowan, 1977; Dimaggio & Powell, 1983), if the institutions surrounding the organization are supportive and include in their network of relationships the organization it has more possibilities of survival. Given the dependence of the organization on its relationships with other organizations or institutions the role of legitimacy is central in the survival of the organization in focus. Legitimacy is understood as the generalized perception that the organizational actions are appropriated framed in a current system of believing and values (Suchman, 1995), that means that are related with the criteria employed by the surrounding environment to make a judgment of the actions of one organization about the well doing that it make in the institutional context. Once organization´s legitimacy is shared in its environment, it receives the critical resources needed for its correct functioning, according to Greenwood et al (2008), the organizations need to have legitimacy in the field which they operate in order to survive. Scott (2003) proposes three types of legitimacy: pragmatic, moral and cognitive, the first one is related with the practices, the second one with the social rules and the last one is about the professional and learning skills consider accepted.
A second theoretical approach proposes that the organization is dependent on its environment and some organizational characteristics favor different organizational

shapes which can favor or not the survival in a given environment (Burns & Stalker, 1961; Lawrence & Lorsch, 1974), this contingency theory in that sense the organizations have a variety of roles in their environment and as consequence adopt several organizational forms, the fit between the organizational form and the environmental contingencies have an strong incidence in its survival.
A third theory is framed in the resource dependence concept, that means that the survival can be controlled from inside of the organization managing appropriately its resources and sources of power Pfeffer y Salancick (1978). This theory is based on an open system perspective where the environment is crucial in the survival of the organization, but the manager has a central role in this result. The managerial team can develop their managerial skills in order to manage the uncertainty and the power to develop internal agreements inside the organization in order to maintain the autonomy in face to the uncertainty of the environment.

3. Case study

The case that is going to be displayed is based on a study developed in the Universidad de los Andes-Colombia entitled "Diagnóstico De La Cultura Organizacional Como Herramienta Para El Análisis De La Misión De Una Organización Con Fin Social" or "Diagnostic of a the organization's culture as a tool in the understanding of social organization's cope"
This research concluded that a cultural diagnostic can be used in order to understand the reason why a social organization, that has a different behavior in terms of displaying the cop than non-social organization, has a missions drift.
The case study was the group Ingenieros Sin Fronteras Colombia (ISFCOL). To display its cultural diagnostic it was necessary to construct a methodology, with a soft systems approach, compound by different research tools as interviews and workshops. It was also essential the participation of the ISFCOL's actors that have had an important role in its development. As a result, it was possible to construct an historical register of the group.
Taking the historical register of ISFCOL, it is possible to tell that the group was born in 2007 without a clear organizational perspective but with a strong sense of the important of the university as a space to face Colombian's social and environmental problems. Nowadays ISFCOL, as a result of the research presented, can be defined as a group constitute by the Universidad de los Andes and the Corporación Universitaria Minuto de Dios that through the development of community projects and academic training looks for set up people with the abilities to generate social, sustainable and environmental changes.

Taking into a count the historical register mentioned before, it is possible to say that ISFCOL has survived as a result of the establishment of complexity management mechanisms related to its context and its resources. Following are presented these mechanisms and later an analysis in terms of its role into ISFCOL's survival.

3.1. Complexity management mechanisms of ISFCOL

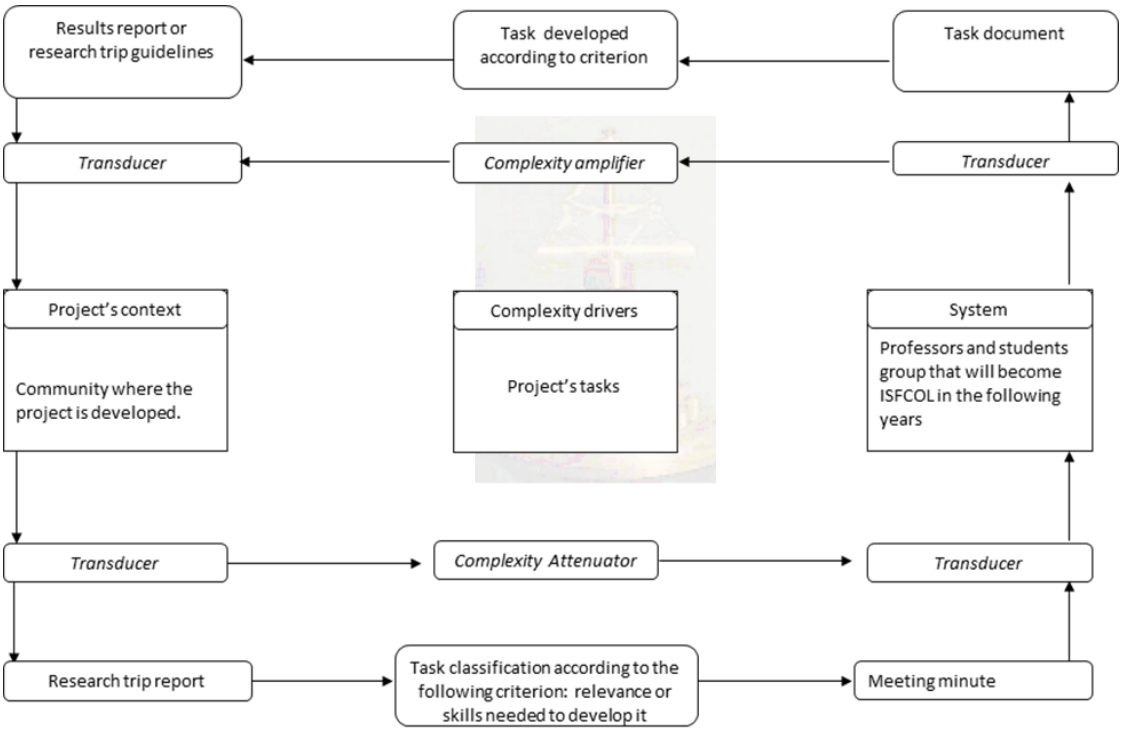
In order to understand why the complexity management mechanisms developed by ISFCOL have allowed its survival, it is necessary to establish them.
In terms of complexity management mechanism, ISFCOL's transformation can be gather in two periods: First, (from 2007 to 2009) and second, (from 2010 to the present).
This establishment is based on the fact that in the first period, all ISFCOL activities

Figure 1. First period complexity management mechanisms

revolved in to the development of only one project. As a result of the first project success, ISFCOL started to obtain, as a work space, not only the opportunities to develop more than one project, it also allowed to have academic spaces like seminars and courses. Next are presented the complexity management mechanisms that were established by ISFCOL in each period:

- First period (from 2007 to 2009)

ISFCOL activities: Project developed in Guayabal de Síquima.



As it is show in the previous image, the complexity drivers were the project's tasks. These tasks where established after the research trip and displayed all the complexity management mechanism. The systems was by then the first group of professors and students that later became ISFCOL. As attenuator, the task was organized according to some criterion and as amplifier the task was displayed with this division. As a task and criterion example: the need to development of quality water proves only could have been managed by the environment engineering professor that was participating.

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Second period (from 2010 to 2012).

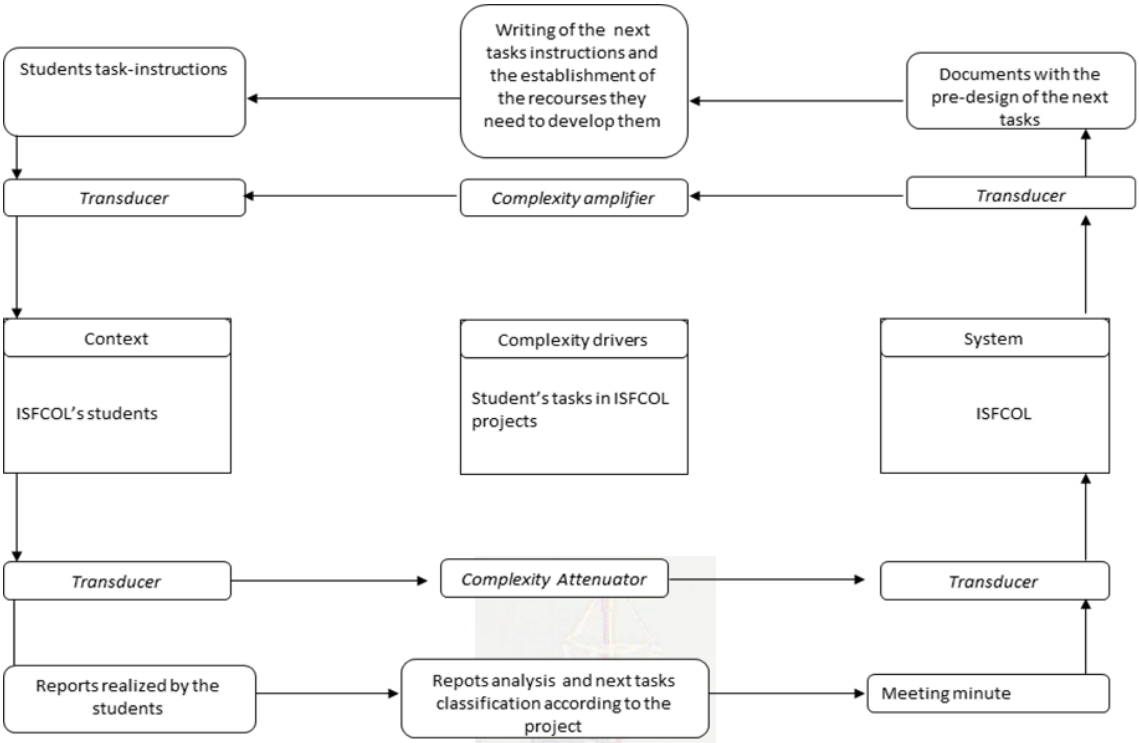

Figure 2.Second period complexity management mechanisms: complexity drivers, student's tasks

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Third period (from 2012 to present).

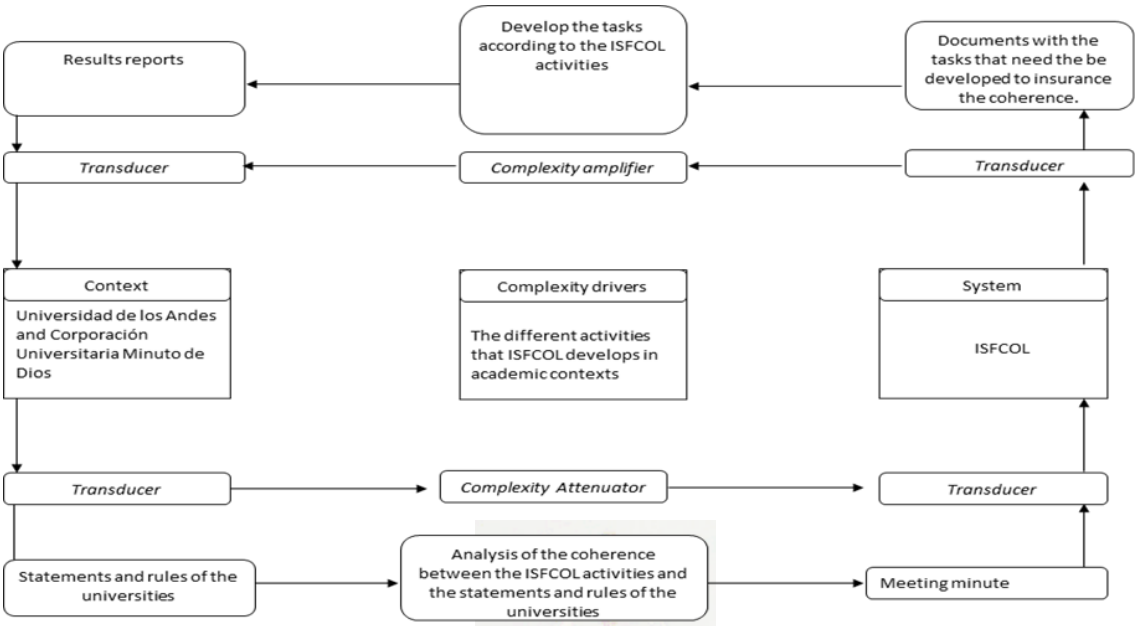

Figure 3.Second period complexity management mechanisms: complexity drivers, ISFCOL's activities developed in academic contexts

As it was told, the second period is characterized by an augmentation in the ISFCOL's complexity. After the success of the first projects, ISFCOL was able to establish the following activities:

- Class at Universidad de los Andes and in Universidad Minuto de Dios
- International seminar.
- Development of more than one project.

It is important to mention that this transformation was gradual allowing that the adaptations of the recourses group to the development of the new activities. Based on that, the principal complexity management mechanisms were related to the project's and courses development where the first was done for each project developed and the second in order to make possible the university student's participation in social and engineering projects.

The last complexity management mechanisms was established in order to structure all the ISFCOL's activities taking into account the statements and rules of the universities.

Established the complexity management mechanisms in the next section it will be analyze its role into the ISFCOL's survival.

4. Discussion

Since ISF Colombia has created to generate learning processes of engineering in real contexts. Initially it was not clear if the complexity was responding to troubleshoot was vulnerable communities or generates processes of active learning engineering. As

identified throughout the article, has been presenting a construction of group identity. Constructed mechanisms have sought to respond to learning and generate engineering solutions. However the rapid growth and the formation of alliances have created some confusion in the identity of the organization. Notwithstanding the foregoing has been successfully built, above all, a scenario of collaboration to address the complexity you want to assume.

For ISFC given the nature of their social projects and the voluntary participation of many of its members, makes the survival not obey logic of cost-benefit in economic terms but survival that allows the institutions that welcomes, in this case universities that provide the conditions for its operation and Uniminuto /Uniandes. From the above it can be said that the legitimacy, for example the recognition that organizations make the relevant environment on the work of ISFC, is a results of the management of variety that makes the organization in relation to its relevant environment.

Variety attenuators have allowed ISFC prioritize and select projects and stakeholders in each of the moments of its life cycle, making more effective control over their results and more targeted use of their resources in selected projects. This has the effect of recognition of two aspects: the organization has clear action your interests and produces a clear result with their performances.

As result of that management, the organizations in the relevant environment of ISFC recognize two aspects: the organization has well defined interests and produce concrete results with its projects.

As was mentioned in the previous sections, once established the complexity management mechanisms the probability of survival of ISFCOL increased. That can be attributed to two main elements: pertinence of its projects, and an appropriated reading of its own relevant environment. About the pertinence, it not only refers to the design and development of relevant and makeable solutions, it refers to the participatory nature of the methodology of the projects. People that participate in the projects is engaged because they feel that can contribute to real solutions, for real persons, on the other hand persons which are the beneficiaries of the projects fell that they are part of the solution.

The appropriated reading of the relevant environment, includes the projects but also the institutional environment in Uniandes and Unimiuto, and how the institutional priorities can be articulated with the purposes of ISFC, although at the beginning the role and importance of ISFC does not broadly recognize in those organizations, its role has been increasingly recognized in both institutions, as a result of a good variety management design addressed to that managerial and institutional level.

5. Conclusion

The appropriated evolution of the variety management mechanism in relation with the actors of its projects, has had as a result that the target population and population affected indirectly by the developed projects, recognize the organization as a driver of change and improvement of the local conditions. As a result of that dynamic, ISFC has presented an incremental path of recognizing as an organization for sustainability with a clear identity.

ISFC, also has played a role of institutional entrepreneur not only by its own conformation and design process, it is an institutional entrepreneur because has gave form to its own niche of actuation Uniandes and Uniminuto.

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