
Institutional entrepreneurs: decision-making, networking and collective leadership

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*Dedicated to the people, who hold and inspire my life:
To my mother and my son.*

*Dedicado a quiénes cobijan e inspiran mi vida:
A mi mamá y mi wawa.*

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“If I have seen further it is by standing on the shoulders of Giants” — Isacc Newton

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Preface

Institutions, as mechanisms of social order, evolve over long periods of time. In institutional analysis research there is divergence about what determines the course of this evolution. While some positions argue that the change of institutions respond to isomorphic forces, historical factors or inertia, institutional entrepreneurship recognize the possibility that individuals can alter the evolution of institutions by creating and transforming them.

In this sense, institutional entrepreneurship has investigated factors that influence actors to work on changing their institutional environment. Mechanisms and tactics used by these entrepreneurs have been explored, as well as, processes of institutional change and institutional entrepreneurship.

However, little is known about the management of institutional change projects, especially when institutional entrepreneurs have low resources and their projects are uncertain. Questions about the decision-making processes during these projects, or about the orientation of networking efforts, or about the emergence of leadership are still open. These questions have guided my doctoral dissertation.

Chapter 2 explores: if entrepreneurs make decisions to move forward with their initiatives based on cause-effect reasoning, or by selecting possible effects with the means they have at hand. This last option is characteristic of effectuation, a novel stream of entrepreneurship research. What I have investigated are the limits of the assumptions of effectuation in the conduction of institutional projects. My findings indicate that institutional entrepreneurs are more likely to follow an effectual logic in earlier stages of their projects. However, as long as changes on the institutional framework unfold, and as long as entrepreneurs gain expertise and learn, then, they are more likely to follow a causal logic. Likewise, I could observe that learning dynamics facilitate entrepreneurs not only to adapt and but also to exapt.

Institutional entrepreneurs do not act in isolation. When they do not have the resources to move forward with their project, they recur to different social ties. Findings of chapter 3 show that networking efforts in institutional entrepreneurship can be categorized into five types of social ties. These social ties support the institutional project in several ways. This confirms that agency in institutional entrepreneurship is distributed and relational, as institutional entrepreneurs motivate others to take action and to break with the status quo.

Due to institutional entrepreneurs act in collaboration with others and their projects usually do not have formal hierarchy, questions about the definition of the direction of their projects arise. To explore this aspect, approaches of collective leadership are integrated in chapter 4. Then, I propose a multidimensional design to explore the contribution to the emergence of the sense of direction of an institutional project from actors involved in it. The multidimensional design connects three levels of analysis: the actors and their cognitive schemes, the collaboration network, and the organizational sphere, where these actors belong. By positioning these actors in this multidimensional space through the positional approach, it was possible to assess the degree of

contribution to collective leadership of each actor, and to identify positions where entrepreneurs can influence more in the direction of the project.

Findings of this study shed light in the management of institutional entrepreneurship projects with regard to decision-making, networking and collective leadership aspects. At the same time, these findings invite to continue exploring not only the role of individuals in the change of institutions, but also the ways these individuals manage this change.

Deutsche Zusammenfassung

Als Mechanismen der sozialen Ordnung entwickeln sich Institutionen über lange Zeiträume hinweg. In der analytischen Institutionenforschung existiert eine Divergenz bezüglich der Faktoren, die den Verlauf dieser Evolution determinieren. Während einige Autoren argumentieren, dass der Wandel von Institutionen isomorphen Kräften, historischen Faktoren oder der Trägheit unterliegt, erkennt das institutionelle Unternehmertum die Möglichkeit an, dass Individuen die Evolution von Institutionen beeinflussen können, indem sie schaffen oder transformieren.

In diesem Sinne untersucht das institutionelle Unternehmertum die Faktoren, die Akteure beeinflussen und befähigen, an Initiativen zu arbeiten, deren Ziel es ist, ihr institutionelles Umfeld zu verändern. Dabei sind sowohl die Mechanismen und Taktiken analysiert worden, welche diese Unternehmer nutzen, als auch die Prozesse des institutionellen Wandels selbst sowie das institutionelle Unternehmertum.

Wenig ist jedoch über das Management institutioneller Veränderungsprojekte bekannt, insbesondere, wenn den institutionellen Unternehmern nur wenige Ressourcen zur Verfügung stehen und ihre Projekte unsicher sind. Zahlreiche Fragen bezüglich des Entscheidungsfindungsprozesses während dieser Projekte, der Orientierung von Networking-Bemühungen und des gemeinschaftlichen Leadership sind so noch unbeantwortet; sie sind grundlegend für diese Dissertation.

In einem weiteren Kapitel (Kapitel 2) wird untersucht: ob Unternehmer ihre Entscheidung, eine Initiative umzusetzen, auf der Grundlage von Ursache-und-Wirkung-Überlegungen fällen oder, indem sie mit Hilfe der ihnen zur Verfügung stehenden Mittel mögliche Effekte auswählen. Letzteres ist charakteristisch für den Effectuation-Ansatz, eine bestimmte Ausprägung der Unternehmertumsforschung. Ich habe daher die Grenzen der Annahmen bezüglich der Effectuation in der Durchführung institutioneller Projekte untersucht. Meine Ergebnisse zeigen, dass institutionelle Unternehmer in den frühen Phasen ihrer Projekte eher dazu neigen, einer Wirkungslogik zu folgen. Solange die institutionellen Rahmenbedingungen danach jedoch Änderungen unterliegen und die Unternehmer Expertise dazu gewinnen und lernen, neigen sie jedoch dazu, einer Kausallogik zu folgen. Ebenso konnte ich beobachten, dass Lerndynamik es den Unternehmern erleichtert, sich nicht nur anzupassen sondern Exaptation zu üben.

Institutionelle Unternehmer agieren nicht alleine. Wenn sie keine ausreichenden Ressourcen besitzen, um ihr Projekt weiter zu führen, bedienen sie sich unterschiedlicher sozialer Beziehungen. In Kapitel drei wird aufgezeigt, dass sich die Networking-Bemühungen innerhalb des institutionellen Unternehmertums in fünf Typen von sozialen Beziehungen kategorisieren lassen. Diese sozialen Beziehungen unterstützen das institutionelle Projekt auf mehrfache Weise. Das untermauert die Annahme, dass Handeln im institutionellen Unternehmertum gestreut und relational ist. Institutionelle Unternehmer motivieren andere, aktiv zu werden und mit dem Status Quo zu brechen.

Da institutionelle Unternehmer gemeinschaftlich mit anderen handeln und ihre Projekte gewöhnlich keine formale Hierarchie haben, stellen sich Fragen bezüglich der

Definition der Ausrichtung ihrer Projekte. Um diesen Aspekt zu beleuchten, werden im vierten Kapitel Ansätze von gemeinschaftlichem Leadership betrachtet. Deshalb schlage ich ein multidimensionales Design vor, um den Einfluss zu untersuchen, den die an einem institutionellen Projekt beteiligten Akteure auf das Entstehen von dessen Stoßrichtung ausüben. Das multidimensionale Design verbindet drei Analyseebenen: die Akteure und ihre kognitiven Schemata, das Kollaborationsnetzwerk sowie die organisationale Sphäre, zu denen diese Akteure gehören. Indem die Akteure durch den positionellen Ansatz in diesen multidimensionalen Raum gestellt wurden, war es möglich zu bestimmen, in welchem Ausmaß jeder der Akteure zum kollektiven Leadership beitrug und die Positionen zu identifizieren, auf denen institutionellen Unternehmer einen größeren Einfluss auf die Ausrichtung des Projektes ausüben können.

Die Erkenntnisse dieser Studie geben Aufschluss über das Management von Projekten institutionellen Unternehmertums insbesondere bezüglich der Aspekte Entscheidungsfindung, Networking und gemeinschaftlichem Leadership. Gleichzeitig laden die Erkenntnisse dazu ein, nicht nur die Rolle weiter zu untersuchen, die Individuen im Wandel von Institutionen spielen, sondern auch die Art und Weise, wie diese Individuen den Wandel lenken.

List of Papers

The thesis is based on the following papers:

Paper I - Decision-making in institutional entrepreneurship: between effectual and causal logics.

It is an original paper in preparation, which is presented in Chapter 2. The author is the only contributor of this paper.

Paper II - Institutional entrepreneurs and their social ties.

It is an original paper in preparation, which is presented in Chapter 3. The author is the only contributor of this paper

Paper III - A multidimensional design for collective leadership in the context of institutional entrepreneurship.

It is an original paper in preparation, which is presented in Chapter 4. The author suggested the adoption of the positional approach to explore collective leadership and has developed the proposed multi-dimensional design. The author have collected the data, worked on the measurements of the proposed dimensions and processed the data. Finally, the author performed the data analysis and drafted the manuscript

Abbreviations

ACM-ICPC	Association for Computer Machinery's International Collegiate Programming Contest
ADSIB	Agencia para el Desarrollo de la Sociedad de Información en Bolivia (Agency for the Development of the Information Society in Bolivia)
AGETIC	Agencia de Gobierno Electrónico y Tecnologías de Información y Comunicación (Agency for E-government and Information and Telecommunication Technologies)
BOSI	Bolivian Olympic School of Informatics
COPLUTIC	Comité Plurinacional de Tecnologías de la Información y Comunicación (Plurinational Committee for Information and Telecommunication Technologies)
IDE-EPB	Infraestructura de Datos Espaciales del Estado Plurinacional de Bolivia (Infrastructure of Spatial Data of the Plurinational State of Bolivia)
IOI	International Olympiad of Informatics
MNA	Multilevel Network Analysis
RTL	Relational Leadership Theory
SIM	Name of one group of institutional entrepreneurs studied in this dissertation, but only the group's founders know the meaning of SIM, and it is not shared.
SL	Software Libre refers to “free software”, and in this work, it also includes the political and social objectives of the Free Software Foundation
UMSA	Universidad Mayor de San Andrés (Major University of San Andrés)

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Chapter 1. INTRODUCTION

“The secret of change is to focus all of your energy, not on fighting the old, but in building the new” — Socrates

In 2003 Willmar Pimentel convinced Prof. Teran to start organizing programming contests at the Major University San Andrés in Bolivia. Willmar was a student of computer sciences and he wanted not only to improve programming skills at the University, but also to break with the status quo. With this purpose in mind, they invited other students to get prepared to compete in an international competition, the ACM-ICPC (Association for Computer Machinery's International Collegiate Programming Contest). Soon Alberto Suxo joined the initiative. He remembers from this time that they had to train in Internet Cafes because they did not have access to the University computer labs, that in 2004 they collected money from other students and from Prof. Teran to be able to compete for the first time in the ACM-ICPC contest in Chillan in Chile, that they had arrived just on time to this competition, and that they had solved just one problem that time. This was the modest start of the ACM-ICPC competition in Bolivia. In 2006, Willmar together with other competitor traveled to Brazil to get an authorization for organizing the regional round of this competition in Bolivia. After getting this authorization, the SIM group was founded. The same year, they started with the organization of the ACM-ICPCP regional round in Bolivia with the participation of 25 teams from 14 Universities. Four years later, in 2010 for the first time a Bolivian team classified to the World round. Currently the ACM-ICPC is an established competition in 22 Universities in Bolivia, where every year classificatory rounds are organized, and the best teams participate in the regional round with the aim for classify the World round.

In 2016, the Bolivian government has approved a plan to migrate all their computational systems to Software Libre (SL). SL is not only technology, it is a movement that promotes the access to the software source code, so that users can use the software, learn how it is built, users can modify it and distribute it again. These characteristics are considered important to foster technological sovereignty in Bolivia, and there is a timeline until 2023 to complete the SL migration. The approval of the migration plan represents a major change in the way the government administers computational and information systems. The decision in favor of SL comes from the article 77 of the Telecommunication Law approved in 2011, which states: *“the executive, legislative, judicial and electoral bodies -in all their levels- will foster and prioritize the use of software libre and open standards...”* (Bolivian Law No 164, 2011:45). Behind this article and behind the SL migration plan have worked several SL advocates, including the Bolivian SL community. This community has been founded in 2003, and ideas around the promotion of a broad adoption of SL in the government were motivated because in a country with small population the government is usually the main consumer of information technologies. The arrival of a new government in 2006, and the approval of a new political constitution in 2009 represented a clear

opportunity for the SL community to move forward. They started lobby work framing their initiative in terms that were familiar for senators and public servants. In parallel, SL advocates have worked inside the government in the development of complex technological projects using SL, and by doing so, they have demonstrated the technical viability of these technologies. All these efforts paid off and currently the migration to SL is being coordinated by the Agency for E-government and Information and Telecommunication Technologies (AGETIC). This agency is lead by some of the SL advocates, who have pursued efforts from inside and outside the government.

This dissertation is about the persons who promoted these initiatives. In the literature, they are described as institutional entrepreneurs, as actors who having the resources and motivation try to introduce changes in existing institutions (Eisenstadt, 1980; DiMaggio, 1988). Institutions broadly represent the social rules—formal (like laws) and informal (like cultural practices)—that shape knowledge, action and interaction among actors in the society (Hayek 1973:33ff). Therefore, institutional entrepreneurs foster change in their environment by building new institutions, or by transforming existing ones.

Agency is defined as the motivation and the creativity that drive actors to break away from scripted patterns of behavior (Emirbayer and Mische 1998). In this sense, institutional entrepreneurship challenges some positions of institutional analysis research that leave little room for agency. For instance, Matthews (1986) observes that institutions endure because the costs to change them are greater than the benefits, and this lead to institutional persistence due to inertia. In turn, North (1990) argues that historical factors configure the evolution of institutions, and this reduces options for altering them. At organizational level, DiMaggio and Powell (1983) discuss isomorphic processes that explain why organizations within a field tend to be similar and tend to converge together.

However, as pointed out by Greenwood et al., (2002:59) *“institutional theory neither denies nor is inconsistent with change”* and these scholars recognize that organizational fields experiment also non-isomorphic changes. Such changes challenge existing organizational inertia. In this sense, some studies of institutional entrepreneurship address the paradox of embedded agency by investigating how actors, who are shaped by the institutions that govern their environment, can recognize possible changes on these institutions and act upon this. Corresponding findings suggest that field-level factors as well as individual-level factors play a role in the likelihood to engage as institutional entrepreneurs. At the field-level, external pressures and crises influence in the emergence institutional entrepreneurship, as crisis usually introduce uncertainty in the field (Child et al., 2007). Likewise, the degree of institutionalization and degree of heterogeneity might facilitate the emergence of institutional entrepreneurship projects (Dorado, 2005; Battilana et al., 2009). At the individual level, actor's social position and changes on these positions might influence their perception of the field and the access to resources. Battilana (2006) conceptualizes social position as the combination of actor's formal and informal positions within a given organization, the tenure in a job position and the inter-organizational mobility.

Other studies have highlighted the mechanisms adopted by institutional entrepreneurs to foster change, these include: mobilization of resources, framing, and theorization. Mobilization of resources includes financial or material assets (Greenwood and Suddaby, 2006) and also intangible resources such as credibility and political access (Garud et al., 2002; Maguire et al., 2004). While framing concentrate efforts to translate the need of change in appealing terms for a wide audience and for gaining allies to achieve the vision of change (Rao, 1988; Leca and Naccache 2006), theorization

concentrate efforts to justify the vision of change by developing abstract categories of cause–effect inter-linkages (Greenwood et al., 2002: 60). Theorization initiatives might include the establishment of standards (Garud et al., 2002) or the enforcement of professional associations (Child et al. 2007), and these initiatives might also facilitate the diffusion of new practices (Strang and Meyer, 1993).

However, little is known about the management of institutional change projects, especially when institutional entrepreneurs have low resources and their initiatives are uncertain. While Fligstein (1997) presents a set of social skills used by institutional entrepreneurs to move forward with their initiatives, institutional entrepreneurship is a collective phenomenon (Hardy and Maguire, 2008; Battilana et al., 2009). Therefore, it is not clear: how institutional entrepreneurs –acting in groups– make decisions to start and to move forward with their projects? Or to what kind of social ties they recur to mobilize resources they need? Or who contributes to the leadership of institutional change projects? In this thesis, I aim to provide answer to these questions.

The first aspect is related to how institutional entrepreneurs decide to move forward with their initiatives, in other words, how they recognize opportunities. To this regard, entrepreneurship theory presents two perspectives: one is causation, which is based on a rational/economic approach, where action is calculated and can be planned (Alvarez and Barney, 2007). In contraposition to this perspective, Sarasvathy (2001) has developed the effectual approach, which highlights the ability of entrepreneurs to act within available means, by selecting between possible effects that can be originated using these means. In this case, institutional entrepreneurs might be able to move forward, without the pressure to anticipate the future by planning.

In chapter 2, I explore the limits of the assumptions proposed by the effectual approach for institutional entrepreneurship, and I concluded that institutional entrepreneurs follow both effectual and causal approaches. In earlier stages of their projects, institutional entrepreneurs are more likely to follow an effectual logic. However, in latter stages, they are more likely to follow a causal logic because over time entrepreneurs gain expertise in the field, and because over time intended changes in the institutional framework unfold. Likewise, I could observe that learning dynamics facilitate entrepreneurs not only adapt and but also to exapt.

The mobilization of tangible and intangible resources is at the heart of a successful institutional entrepreneurship project (Dimaggio 1988, Maguire et al., 2004). When entrepreneurs do not have at hand required resources, they might recur to their social ties and to possible partners. In chapter 3, I explore what social ties support institutional entrepreneurs along the process of institutional change. Then, I present the evidence of five types of social ties that have contributed in the progress of the institutional initiatives. This evidence is complementary to existing research, and provides new insights of how institutional entrepreneurs proceed with networking efforts.

Institutional entrepreneurship is a collective phenomenon, which congregates the participation of several actors (Hardy and Maguire, 2008). At the same time, projects of institutional change usually do not have formal authority and hierarchy is not established. In this scenario, it becomes relevant to understand who contributes to the collective leadership of the project. In chapter 4, I propose a multidimensional design based on the positional approach (Brandes, 2016) to assess the individual contribution of actors involved in an institutional change project. The multidimensional design connects three levels of analysis: the actors and their cognitive schemes, the collaboration network, and the organizational sphere, where these actors belong. By positioning these actors in this multidimensional space, it was possible to assess the

degree, to which each actor contributed to collective leadership, and to identify positions where entrepreneurs could have a greater influence in the direction and progress of the institutional project.

The last chapter of this dissertation present concluding remarks and discuss the contribution of this research.

Before moving to the next chapters, I introduce two aspects at the macro-level, which benefited the development of the institutional projects of this study. First, by the time the entrepreneurs of the SIM and SL projects have started, the political scenario in Bolivia welcomed Evo Morales to the presidency in 2006. The new government enjoyed a wide majority in the parliament, which facilitated the start of larger reform processes, including the new political state constitution –approved in 2008 by the Congress of the Nation–, the nationalization of key industries reaching 19 firms by 2014 (including firms in the hydrocarbons, mining, telecommunication and electricity sectors) (Acevedo et al., 2015) and the definition of *“The Patriotic Agenda: Bolivia towards 2025”*, a long-term government program. Second, the broad diffusion of ICT at the global level, especially the rapid expansion of the Internet during last two decades, contrasted with the low diffusion of information technologies in Bolivia (Guzman and Kaarst-Brown, 2012). In this scenario, several initiatives from the civil society have emerged with the aim to exploit ICT in Bolivia. Among these initiatives, the SIM and SL project were able to introduce changes in the institutional framework. These projects are explored in next regarding their decision-making processes, their networking efforts and their collective leadership.

Chapter 2. DECISION-MAKING IN INSTITUTIONAL ENTREPRENEURSHIP: BETWEEN EFFECTUAL AND CAUSAL LOGICS

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ABSTRACT

Institutional entrepreneurs aim at shaping the environments they live in by pursuing changes on the institutional framework. In turn, Sarasvathy et al. (2008) argue that the effectual logic is necessary in the design of organizations, and this has consequences in the design of the environment in which they operate. The effectual logic is suitable for environments characterized by unpredictability, by the impossibility to define goals, and by an environment that is dependent on entrepreneurs' actions. Therefore, it can be expected that institutional entrepreneurs follow the effectual logic in their initiatives. This study questions the limits of this assumption by exploring the decisions and subsequent actions of two institutional projects. A parsimonious look at these efforts shows that the effectual logic supported decision-making processes of institutional entrepreneurs in earlier stages of their institutional change projects. However, over time as changes on the institutional framework unfold, and as entrepreneurs learn and gain expertise in the field, the decisions-making processes are more likely to follow a causal logic. As a consequence, the design of environments might require combined efforts of effectual and causal logics.

KEY WORDS

Institutional change; institutional entrepreneurship; effectuation; uncertainty; small groups.

2.1 Introduction

Institutions broadly represent the social rules –formal (like laws) and informal (like cultural practices)– that shape knowledge, action and interaction among actors in the society (Hayek 1973: 33ff). Among other phenomena, economic performance, diffusion of technologies and transformations in organizations are affected by the way institutions evolve. Therefore, there is extensive practical and theoretical interest in how institutions change, evolve and transform.

Research on institutional analysis has stressed that institutions change over time (DiMaggio and Powell, 1991; Aoki, 2000) through complex and incremental processes (Mahoney and Thelen, 2010:1-2). Scholars also recognize that actors –designated as institutional entrepreneurs– can start changes that contribute to the transformation of existing institutions or to the creation of new ones (Eisenstadt, 1980; DiMaggio, 1988). In this sense, agency is introduced in institutional analysis. Research on institutional entrepreneurship has investigated the enabling conditions for the agency enacted by the entrepreneurs. This work suggests that agency may emerge due to field-level conditions (Oliver, 1992; Greenwood et al., 2002), including the level of heterogeneity of practices and norms within the field (Seo and Creed, 2002), and the magnitude to which these practices and norms are institutionalized (Dorado, 2005). Other scholars have considered individual-level conditions, and they provided evidence that an actor's social position might influence both the actor's perception of the field (Battilana, 2006; Dorado, 2005) as well as her access to the needed resources (Lawrence 1999).

At the same time, institutional entrepreneurship challenges propositions related to isomorphic processes that are governed by existing institutional forces (DiMaggio and Powell, 1983). In this sense, there are contributions about the mechanisms used by institutional entrepreneurs to promote non-isomorphic, divergent changes in existing institutional frameworks. These mechanisms include: framing (Leca and Naccache, 2006), resource mobilization (Greenwood and Suddaby, 2006; Garud et al., 2002) and theorization (Child et al., 2002).

This work has significantly enhanced our understanding about conditions that enable institutional entrepreneurship and the mechanisms that are used by actors to support institutional change. However, a lot of has remained unanswered, especially micro-foundations related with decision-making processes and strategic action under conditions of uncertainty (Dorado, 2005). To clarify these micro-foundations, this study departs from the proposal of Sarasvathy et al., (2008), which proposes that the design of organizations and design environments follows an effectual logic, where *“the future is contingent upon actions by willful agents seeking to reshape the world”* (ibid: 339). While this quote resembles the definition of institutional entrepreneur, there are limits to this assumption, which will be questioned in this study. In this sense, the research question is: Are the decisions of institutional entrepreneur more likely to be effectual along the process of institutional change? In this paper, I investigate the interplay between the actions of institutional entrepreneurs –at the micro-level–, and the subsequent changes on the on structure –i.e. the existing institutional framework–, including the temporal dimension.

The research question is examined by using an inductive, theory-building case study methodology (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). I present the findings of two groups that foster the diffusion of Information and Communication Technologies (ICT) in Bolivia. So far, these emergent processes resulted in changes of the regulatory framework to support the broad adoption of Software Libre (SL) by the government, and

the establishment of programming contests at universities and schools to foster the development of world-class technical skills for computer sciences.

This paper advances the perspective that institutional entrepreneurs are more likely to follow the effectuation logic in earlier stages of their initiatives but over time changes, which are introduced in the structure, constrain this mode. When institutional entrepreneurs are confronted with uncertain situations –associated with knowledge or resources constraints–, they are more likely to follow an effectuation mode. Once they have overcome these constraints by gaining expertise in the organizational field, institutional entrepreneurs can use this expertise to follow a causal logic, or a combination of both logics.

The paper begins with a review of the effectuation theory and institutional analysis research, the principal conceptual dimensions of this study. This is followed by an introduction into the research setting and methods. The findings are reported as a summary of the progress achieved by the projects in their institutional reform, and as the patterns of decision-making processes found during the data analysis. Then, the implications and limitations of the study are discussed, and directions for future research are presented as well.

2.2 Theoretical framework

When entrepreneurs aim to change or transform institutions, levels of uncertainty vary and ambiguity for their environment as well for themselves arises. Uncertainty in the field derives as tensions and conflicts emerge with entities that put up resistance to the new practices. According to Hargrave and Van de Ven (2006: 878): *“Conflict is the core generating mechanism of [institutional] change, power is a necessary condition for the expression of conflict, and political strategies and tactics are the means by which parties engage in conflict”*, therefore uncertainty is mediated by conflict, power relations and political strategies. As long as the process moves forward, even in cases when new practices fail in their diffusion and legitimization, uncertainty decreases; and once stability is re-established in the field, entrepreneurial initiatives might start again (Beckert, 1999).

In the case of institutional entrepreneurship, the definition of a vision of divergent change represents a driver during the process of change, as the vision represents the proposal to break with the status quo (Battilana et al., 2009). During the process of institutional change the vision supports the specification of problems, the justification of a plausible solutions, and the adoption of new practices (Greenwood et al., 2002).

However, it is not clear what mechanisms institutional entrepreneurs adopt to bring change in spite of uncertainty (Dorado, 2005), and in the literature of institutional change, it is not clear if entrepreneurs plan their actions following a causal reasoning. As Powell and Colyvas (2008: 278) notes: *“the individuals in these theories behave, but seldom choose... plan or determine”*. Therefore, to understand these mechanisms, I propose to depart from the assumptions of the effectual mode to explore the question: Are the decisions of institutional entrepreneur more likely to be effectual along the process of institutional change?

Sarasvathy et al. (2008) argue that the design of organizations follow the effectual logic. The effectual logic corresponds to transformative approaches, and it differs from predictive approaches, which tend to predict and control the future ((Wiltbank et al., 2006). The effectual logic is based on the principles described by the effectuation

framework, where available means allows for controlling desirable outcomes and for transforming environments. Effectuation has been developed in contraposition to the neo-classical micro-economic 'causal' theory of business processes (Arend et al., 2015), where means are selected to attain specific goals and prediction. Thus, following a causal logic, decisions are made based on pre-existing knowledge, identification of alternatives and selection of the alternative with highest expected return (Maine et al., 2015).

However when there is high uncertainty decisions following a causal logic are difficult. Effectuation is suitable for environments characterized by unpredictability (Knight, 1921), by the impossibility to define goals (March, 1978), and by an environment that is dependent on entrepreneurs' actions (Weick, 1979). Given this space, the effectuation approach states that decisions about the course of actions are guided by those experiments entrepreneurs could conduct with available means. In turn, possible means are identified by the questions: Who am I?, What do I know?, and Whom do I know? (Sarasvathy, 2001). Then, entrepreneurs engage in interactions with possible partners and stakeholders; these interactions can involve intense negotiation (Sarasvathy et al., 2003). Partners, who comes on board to join the venture, determines goals and future outcomes (Sarasvathy and Dew, 2005); finally further decisions are weighted by how much loss is affordable. In other words, decisions are not focused on predictable outcomes, but on the controllable aspects of the future. Once decisions are made and action is set, new means become available and new goals emerge starting new cycles of resources, and ongoing actions that over time converge into new artifacts (i.e. new products, firms and markets) (Sarasvathy, 2001; Sarasvathy et al., 2008).

In sum, effectuation has four principles: (i) Affordable lost versus expected returns, (ii) strategic alliances versus competitive analyses, (iii) exploitation of contingencies versus pre-existing knowledge, and (iv) control an unpredictable future versus prediction (Sarasvathy, 2001:252). It is for these principles that effectuation may be called a logic as *"a coherent system of principles that are inherently interrelated, internally consistent and collectively independent"* (Sarasvathy et al., 2008:345)

Effectuation has contributed to the discussion in entrepreneurship research about whether the opportunities are created by the entrepreneurs or discovered by them (Alvarez and Barney, 2007). In the case of social entrepreneurship, Corner and Ho (2010) concluded that opportunities are developed by multiple actors and found complementarities between effectual and causal logics.

2.3 Research setting and methods

2.3.1 Research setting: Bolivian institutional initiatives

The purpose of this research is to build theory, following an inductive approach based on multiple cases. For a closer conformity, emerging theoretical insights are tested and sharpened among and within the cases until closure is reached (Eisenhardt, 1989). The given cases were selected because they illuminated the decisions made by institutional entrepreneurs to influence in the change and transformation of institutions; additionally the selected institutional initiatives facilitated the development of conceptual patterns pertinent to the stages of the institutional change process (Eisenhardt and Graebner, 2007).

I conducted the empirical study with two institutional initiatives –i.e. the SIM group and the SL groups– that have undertaken different enterprises to foster micro-institutional reform towards the diffusion of ICT in Bolivia. These initiatives have benefited from the wide adoption of ICT around the World, and also from the fact that, Bolivia has been experienced difficulties to exploit ICT for a broader benefit to the country's population.

In this context, the **SIM group** fosters the development of world-class skills in computer sciences for students in Bolivia, including the Association for Computer Machinery's International Collegiate Programming Contest (ACM-ICPC), the Bolivian Olympic School of Informatics (BOSI), and three international hackathons¹. In terms of micro-institutional change, schools, universities, firms and state bodies have adopted the SIM contests as part of their own activities.

In turn, the **SL groups** have promoted the use of SL throughout the Bolivian state from inside and outside the government. As a result of the actions of these groups, the article 77 was included in the new Bolivian Telecommunications Law No. 164, and afterwards, the Decree 1793 defined a time frame of seven years to complete the migration to SL of all governmental bodies, after the approval of the migration plan. These institutional achievements will probably direct the future diffusion of ICT in Bolivia towards SL technologies.

Both initiatives can be considered instances of institutional entrepreneurship. The novel archetypes (Greenwood and Hinings, 1993) proposed by both initiatives diverge from the respective predominant organizational archetypes. More specific, the organizational archetypes related to the training for computer sciences students as fostered by SIM, run counter to the existing archetypes; for the SL project, the organizational archetypes related to the provisioning of ICT within the government contradict current archetypes. In addition, both groups have been active over the last decade, and they have learned how to engage in their micro-institutional reforms diverse actors, including governmental bodies, universities, non-governmental organizations and firms.

During the fieldwork, both groups faced challenges to expanding their activities. All these aspects provided valuable opportunities to witness those ways in which group members participated, took action, and came together to support an institutional project.

2.3.2 Collected data

I conducted the fieldwork during several visits to Bolivia between 2014 and 2016. I gathered data from participant observation, informal and formal interviews, and documents. Prior to the main fieldwork, I participated as observer in meetings, programming camps, and programming contests of the SIM group; and I attended weekly meetings of the SL communities, coordination meetings with public servants, and the national SL community congress in 2014. In addition, exploratory interviews were conducted with members of both institutional projects to obtain the contextual and historical background. During this stage, it was possible to identify the sequence of institutional achievements that facilitated the institutional reform for the SL and SIM initiatives. Table 2.1 summarizes these institutional achievements and data collected for the SIM case, and Table 2.2 for the SL case.

¹ A hackathon is a competition of a couple of days, where specialists collaborate intensively to produce software products.

As these institutional achievements represent milestones that paved the way for a larger institutional reform, I consider each of them as a single case for this study. I identified three achievements for the SIM project and five achievements for the SL project.

Table 2.1: SIM group - Institutional achievements and collected data

Achievement	Description	Data
Regional ACM-ICPC programming contest in Bolivia	Since 2006, the yearly international ACM-ICPC contest has a seat in Bolivia. About 1500 students from 22 universities competed in 2015.	Observation: Regional contests in 2014 & 2015. Documents: ACM-ICPC contest calls / printed and online training materials / contest websites and forums. Formal interviews: 3 SIM group founders / 5 university professors, who are co-organizers / 2 team coaches / 2 contest judges / 2 sponsors.
Bolivian Olympic School of Informatics (BOSI)	BOSI has started in 2011 with the support of the Education Ministry. Every year roughly 10,000 students compete in Bolivia.	Observation: One programming camp for school students in 2015. Documents: BOSI Call / Book BOSI 2015. Formal interviews: 2 civil servants responsible for the BOSI at the Education Ministry / 2 school programming coaches
Three International Hackathons in Bolivia since 2012	Global Game Jam NASA International Space Apps Challenge Developing Latin America	Observation: The Global Game Jam hackathon in 2015. Documents: Hackathon websites and Facebook pages / news in media. Formal interviews: 1 organizer / 1 sponsor

During the main fieldwork, I conducted 40 formal interviews: 22 interviews for the SIM project and 18 interviews for the SL project. These interviews had three parts. First, informants were asked about their contributions to the institutional project and their expertise. Second, about the chain of events and their interpretations of the events, people, and trends that characterized the institutional projects. I was especially interested in how decisions about the course of the project were made. Finally, respondents were asked to mention who had collaborated in the institutional project—adopting snowball sampling helped identify key actors in the process. These interviews typically lasted between one and one and a half hours and were taped and transcribed.

During the interviews, I relied on retrospective accounts that happened several years ago. To minimize recall biases during the interviews, I asked informants to evoke specific events rather than generalized information or opinions. Then, I asked the same questions to multiple informants. Finally, I validated important accounts with other sources of information, including written material that each group exchanged with the targeted audience, web sites, news in the local media and mailing lists.

Table 2.2: SL groups - Institutional achievements and collected data

Achievement	Description	Data
GeoBolivia Platform and open data for geographic information	GeoBolivia is an information geographic platform. The project started in 2006	Documents: GeoBolivia website / News in the local media. Formal interviews: 2 early pioneers of GeoBolivia, who later worked at ADSIB and AGETIC.
Article 77 in the Bolivian Telecommunication and Information Technologies Law	Article 77 states: <i>“the executive, legislative, judicial and electoral bodies -in all their levels- will foster and prioritize the use of software libre and open standards...”</i> (Bolivian Law No 164, 2011:45)	Documents: Letters sent by the Decolonization Committee / SL website / Drafts written by SL community members. Formal interviews: 6 members of the Decolonization Committee / 2 members of Parliament.
Bolivian Decree 1793	The decree implements the Telecommunication Law and defines a time frame of seven years to complete the migration to SL of all governmental bodies, after the approval of the Migration plan. The decree has been sanctioned in November, 2013	Observation: Meetings with the senator Nélida Sifuentes and SL Community in 2015 / National SL Community meeting in 2014 / Some weekly meetings of the SL community. Documents: Drafts of the Decree 1793 and the Decree 1793 / SL Community mailing list, since November 2014 / News in the local media. Formal interviews: 1 member of Senate / 2 government advisers / 3 SL community members
Digital firm framework and datacenter with open technologies	These projects are developed at ADSIB, since 2014	Documents: Digital signature website / News in the local media. Formal interviews: 2 civil servants at ADSIB.
SL Migration plan and e-government plan.	These plans are coordinated at AGETIC, since 2016	Documents: Drafts of the Migration Plan / News in the local media. Formal interviews: 2 civil servants at AGETIC.

2.3.3 Data analysis

Data analysis is based on well-established approaches for inductive theory building (Eisenhardt, 1989; Yin, 2003) and process research (Langley, 1999). I started by outlining the chronology of events that delineate progress of each institutional achievement (See Table 2.1 and Table 2.2). Then, I followed the narrative strategy of process research, to include the richness of the context during the analysis, and to set themes that allowed the understanding of the institutional reform pursued by the SIM and SL groups. Wherever possible, I cross-validated factual accounts and interpretations of events and its sequence across multiple documents or informants. Multiple data

sources supported the "triangulation" procedure (Yin, 2003) and when necessary, double-checks of specific events were made via e-mail and/or phone calls.

Following the temporal bracketing strategy for the research process (Langley, 1999), the next step was to identify break points to differentiate predictable sequences of decision-making process associated with each institutional achievement. As result of this analysis, I identified 13 decisions for the SIM project and 18 decisions for the SL project; they are listed in Table 2.3 and Table 2.4 respectively.

Having identified the decision that guided the development of the SIM and SL initiatives, I conducted within-case and across-case analyses in order to detect whether a decision was based on effectual principles or not. The literature provided a useful starting point for understanding the evolution of the institutional initiatives of the SIM and SL groups, and it supported the identification of novel theoretical insights that emerged from the data.

First, as institutional change is conceived as dependent on the action of multiple actors (Lounsbury and Crumley, 2007; Rao and Zald, 2000), I have adopted the small group as the unit of analysis (Dorado, 2013) to identify the means that might have guided the decisions of the SL and SIM groups using the questions: (i) Who we are? (ii) What we know? (iii) Whom we know? Second, Sarasvathy (2001: 259) developed four principles, which differentiate the effectual mode from the causal mode: (i) Affordable lost versus expected returns; (ii) Strategic alliances versus competitive analyses; (iii) Exploitation of contingencies versus pre-existing knowledge; (iv) Control an unpredictable future versus prediction of an uncertain future

The within-case analysis focused especially on how the institutional context influenced on the decision-making process for each decision, and on the latter consequences of each decision for the context (Langley, 1999). I pursued this analysis for both the SIM and the SL projects independently. Having identified patterns that explained the interplay between micro and macro spheres in both initiatives, I followed replication logic for the cross-case analysis to identify commonalities, and to provide an idiographic generalization. During the cross-case analysis, I adopted different strategies to identify patterns that explained the decisions made by the institutional entrepreneurs, and their efforts that paved the way of institutional reform (Eisenhardt and Graebner, 2007; Yin, 2003); these included among others: consequences for the institutional change process, the role of the vision during the decision-making, and the dynamics within the group. Then, I concentrated on patterns that fitted across all cases to integrate the within-case analysis.

The resultant patterns from the SIM and SL case studies are developed in the following section through verbal descriptions and two tables.

2.4 Findings

As institutions change over long periods of time, it was necessary to review the series of events of the SIM and SL projects in order to answer the research question. Goal was to identify when institutional entrepreneurs made decisions to progress in their initiatives. The succession of key events that led to institutional change is presented next.

SIM Group: In 2003, Willmar Pimentel was a student of Prof. Jorge Teran at UMSA University. Willmar proposed to his professor to start the programming competitions of the ACM-ICPC contests. This led to the participation of Bolivian teams in the regional round in Chile in 2004, and a year later, in Argentina. From this time, Prof. Teran

recalls: *"They [Willmar and Alberto] wanted a Bolivian team to classify in the ACM-ICPC World finals, but this was impossible with only one or two teams traveling abroad every year to compete. To have a chance to classify, Bolivia needed many teams that would learn and compete everywhere in Bolivia"* (Interview, 11 February, 2015) and this purpose became their mission. In 2006, the SIM group traveled to Brazil to petition for an official seat for Bolivia as a contest organizer of the regional round. To ensure the seat, the SIM group promised the regional coordinator that at least 15 teams from 8 different universities would participate, and they got the authorization.

After that, the SIM group promoted the contest during a yearly national meeting of students of computer sciences, and Prof. Teran committed his colleagues from other universities to support the contest. Likewise, several informative events were held to publicize the contest. These efforts paid off. In 2006, 25 teams from 14 universities in 6 different Bolivian cities participated in the first regional ACM-ICPC round. In terms of institutional change, this milestone sealed the start.

Four years later, a Bolivian team classified for the World final for the first time. In order to kick-off training at an early stage and to improve chances, the SIM group decided to bring the competition format to the schools. In 2010, they convinced the Ministry of Education to co-organize the Bolivian Olympic School of Informatics (BOSI). The experience and training materials of the ACM-ICPC competition reinforced this new initiative, as well as, the support of universities across the country. Currently, roughly 10,000 students compete at the BOSI every year.

Later the SIM group identified the need to create a competition space for competitors that had graduated from the university. In 2012, they started to organize international hackathons. When the Bolivian teams outperformed in these events, they gained media coverage in the national press. This publicity opened up new opportunities for the SIM group. In 2015, the SIM group opened a collaborative workspace named Tech-Hub Bolivia, where the SIM group conducts programming trainings and software development projects.

SL Groups: The new Political Constitution of Bolivia came into effect in 2009. Two years later, the new Telecommunications Law was being discussed in the Senate. This opened an opportunity to introduce a legislation that mandated the adoption of SL by the government. The "Decolonization Committee" was constituted with the aim to take advantage of this opportunity. Yet, the decision to insert SL considerations into the new law was uncertain. To achieve this goal, the committee started writing proposals for the law, knock doors and participate in several meetings.

These endeavors led to the inclusion of article 77 in the new Telecommunications Law No 164, which specified that SL and open standards should be fostered in governmental bodies. The law was then passed onto the Executive to draft the provisions that regulated the enforcement of the law, but to get its approval took two years. The political support gained by the SL groups proved to be not enough to either influence the text of the draft provisions or get them approved. Thus, the regulation governing the implementation of article 77 remained an open matter.

In 2013, the airplane carrying the Bolivian president was forced to land in Austria due to suspicions that the fugitive Edward Snowden might be on board (Roberts, 2013). This triggered a series of discussions in Bolivia about sovereignty. Then, SL advocates framed the adoption of SL by the government as a way to aim for state's technological sovereignty. At that time, the SL group gained an important political ally in Senator Nélida Sifuentes. She played a crucial role because she pursued the revision of the

provisions that regulate the enforcement of the Telecommunications Law. As a result of her efforts, the Decree 1793 was approved and defines a period of seven years to complete the migration of all governmental entities to SL, after the approval of the Migration plan.

These legislative achievements benefited into a great extend by the diffusion of GeoBolivia, a geographical information platform based exclusively on SL. At the same time, GeoBolivia has promoted the adoption of open standards and open data for geographic information among several government entities. In December 2013, Nicolas Laguna a SL advocator from GeoBolivia was named director of the “Agency for the Development of the Information Society of Bolivia” (ADSIB) and in that position he has led two important technological projects: (i) The certification process for digital signatures, which supports all e-government processes, and (ii) the deployment of a data center to store digital signatures. Both projects have been deployed with SL and open standards. By the time I finished the field research, the “E-government and ICT Agency” (AGETIC) had been created with the aim of coordinating e-government initiatives and the SL migration plan. Nicolas Laguna leads this entity.

2.4.1 Decisions-making in institutional entrepreneurship

The entrepreneurial decisions investigated for the SIM and SL projects paved the way for institutional achievements (See Table 2.1 and Table 2.2). In turn, over time these achievements have sealed corresponding institutional reforms. These entrepreneurial decisions are summarized in Table 2.3 for the SIM group, and in Table 2.4 for the SL groups.

Table 2.3: SIM group - Decisions to move forward

Decision	Mode	Principles	Uncertainty	Dec. Type
ACM-ICPC Contest				
1. Start internal competitions at UMSA university	Effectual	Exploit contingencies; means driven	Medium	Learning
2. Participate in ACM-ICPC regional contest in Chile and Argentina	Effectual	Means driven; exploit contingencies	Medium	Learning
3. Contact university professors, who were organizing the contest in Chile.	Effectual	Means driven	Medium	Learning
4. Travel to Brazil to obtain a seat for Bolivia to organize the ACM-ICPC regional round.	Effectual	Controlling future; Affordable loss	High	Strategic alliances
5. Promote the ACM-ICPC regional contest in the Congress of Computer Sciences in Potosí	Effectual	Means driven; strategic alliances	High	Strategic alliances

Decision	Mode	Principles	Uncertainty	Dec. Type
6. Organize the first ACM-ICPC regional contest in La Paz	Effectual	Means driven; affordable loss	High	Exposure new practice
7. Build the inter-institutional network with university professors to organize ACM-ICPC contest.	Effectual / Causal	Strategic alliances / predicting future	Medium	Institutionalization
8. Ensure sponsorship from private firms.	Causal	Expected returns	Low	Strategic alliances
OBI				
9. Propose the organization of the OBI to the Education Ministry	Effectual	Controlling future; exploiting contingencies; means driven	High	Strategic alliances
10. Adapt training materials for schools and develop an evaluation platform.	Causal	Exploiting pre-existing knowledge	High	Institutionalization / Exaptation
11. Organize the OBI with the support of the inter-institutional network and collaborators	Causal	Exploiting pre-existing knowledge	High	Institutionalization / Exaptation
HACKATHONS				
12. Organize Hackathons with the support of ONGs and private firms	Effectual / Causal	Means driven / Exploiting pre-existing knowledge	Medium	Institutionalization / Adaption.
13. Found the Tech-Hub space to concentrate initiatives.	Effectual / Causal	. Means driven / Exploiting pre-existing knowledge	Medium	Learning

As a result of the patterns identified during the data analysis, I classified the decisions as: (i) learning, if the decision has led to improve social or technical skills; (ii) strategic alliances, if the decision fostered the building of partnerships for the project; (iii) exposure of new practices, if the decision helped to evaluate the viability of the new practices that supported the further institutionalization of the project; (iv) institutionalization, if the decision facilitated the adoption of new practices; (v) adaptation, if the decision used previous experience in a similar manner; (vi) exaptation, if the decision used previous experience in a new manner, which was not intended before.

Table 2.4: SL group - Decisions to move forward

Decision	Mode	Principles	Uncertainty	Dec. Type
GeoBolivia SL platform for open data and open standards for geographic information				
1. Adopt SL to develop the GeoBolivia platform.	Effectual	Exploit contingencies; means driven	High	Learning
2. Promote open data for geographic information within the government	Effectual	Controlling future; exploit contingencies; means driven; affordable loss	High	Exposure new practice
3. Workgroups to define open data framework.	Effectual	Pre-commitments with partners; means driven	Medium	Strategic alliances
4. Promote adoption of GeoBolivia and open data	Effectual / Causal	Means driven; expected return	Medium	Institutionalization
Article 77 – Telecommunication and Information Technologies Law				
5. Constitute the De-colonization Committee.	Effectual	Exploit contingencies; means driven	Medium	Strategic alliances
6. Write proposals for the Telecommunication law.	Effectual	Exploit contingencies; means driven	Medium	Learning
7. Lobby for SL among legislators & civil servants.	Effectual	Exploit contingencies; affordable loss; means driven	High	Exposure new practice
Decree 1734, it rules the Telecommunication and Information Technologies Law				
8. Bring senator Sifuentes on-board.	Effectual	Pre-commitments with partners; means driven	High	Strategic alliances
9. Write proposals for the Decree	Effectual / Causal	Exploit contingencies; pre-existing knowledge	Low	Exposure new practice / Adaptation
10. Organize events to discuss the Decree with civil servants and civil society	Effectual	Exploit contingencies; means driven	Medium	Exposure new practice
SL for the Digital Signature Framework and Data center (ADSIB)				
11. Adopt SL for ADSIB	Causal	Pre-existing knowledge; expected returns	Low	Exposure new practice
12. Support training courses for SL at the Vice-presidency	Causal	Expected returns	Low	Institutionalization
13. Deploy digital firm framework and a datacenter with SL	Causal	Expected returns	High	Exposure new practice

Decision	Mode	Principles	Uncertainty	Dec. Type
14. Diffuse digital firms among government.	Causal	Pre-existing knowledge; Expected returns	High	Institutionalization
SL migration plan and E-government plan (AGETIC)				
15. Adopt SL for AGETIC	Causal	Pre-existing knowledge; expected returns	Low	Institutionalization / Adaptation
16. Workgroups to define e-government plan and SL migration plan.	Causal	Pre-existing knowledge; expected returns	High	Institutionalization / Adaptation
17. Deploy e-government processes with SL and adopting digital firm framework	Causal	Pre-existing knowledge; expected returns	Medium	Institutionalization / Adaptation
18. Diffuse e-government processes with SL	Causal	Pre-existing knowledge; expected returns	Low	Institutionalization / Adaptation

For each decision the analysis focused on whether the decision has been made in effectual or causal mode, and what principles guided the decision. For instance, I consider the decision number 4 presented on Table 2.3: “Travel to Brazil to obtain a seat for Bolivia to organize the ACM-ICPC regional round” as effectual, this because the decision were not made based on pre-existing knowledge, but as a way to exploit the opportunity to participate in the ACM-ICPC competition, and the entrepreneurs acted within their available means. The means were identified as follow: (i) Who we are? The best programmers at UMSA University and Prof. Teran; (ii) what we know? We have already competed in regional contests in Chile and Argentina; (iii) whom we know? Prof. Teran knew professors from other universities in different cities and enjoyed of good reputation among their colleagues.

In the case of the decision number 7 of Table 2.3: “Building the inter-institutional network with university professors to organize ACM-ICPC contest”, I consider this decision as a combination of Causal/Effectual modes because the entrepreneurs instead of doing a competitive analysis, they preferred to close strategic alliances with professors of universities across the country, which follows an effectual logic; but at the same time, the entrepreneurs could predict the benefits of this alliance, which follows a causal logic.

The analysis of the decisions shows that institutional entrepreneurs of the SL and SIM initiatives adopted an effectual mode in the earlier stages. In both projects, the outcomes of the initial endeavors were highly uncertain, entrepreneurs acted within their means, exploiting contingencies, closing pre-commitments with partners and affording loss. For instance, the decision number 13 in Table 2.4: while the decision to develop the digital firm framework and the datacenter using SL technologies were highly uncertain, it followed a causal analysis because the restrictions imposed by the new normative framework defined by the Decree 1734. This normative prioritize the adoption of SL for the government, and institutional entrepreneurs made this decision to demonstrate that

SL is suitable for complex projects. In other words the SL entrepreneurs have calculated expected returns associated with this decisions. Therefore, as long as the process of institutional change unfold, the alterations on the institutional context, which are result of previous decisions, gradually led a more causal decision-making.

During the analysis, I observed that the vision did not directly influence the decision mode of institutional entrepreneurs. While the vision guided the pursuit of institutional achievements, the entrepreneurs followed in some decisions effectual principles, in others causal analysis and in others a combination of both. What have influenced the decision mode of the entrepreneurs were the conditions of the institutional structure, and the constraints inherent of the context. Therefore, in earlier stages, as they pursue to change the existing institutional framework, the effectual mode is most likely. Later, when the institutional reform takes place and as changes on the institutional structure unfold, the entrepreneurs are more likely to act based on causal analysis because they have to keep with the conditions defined by new institutional framework.

While this conclusion is general, during the analysis a pattern emerged, that seems to influence the decision mode of institutional entrepreneurs as well. This mechanism is introduced next.

2.4.2 Learning, adaptation and exaptation in institutional entrepreneurship

Learning efforts played an important role for the SIM and SL initiatives; during the development of both projects, the group members expanded their technical capabilities and social skills -as defined by Fligstein (1997). This, in turn, supported the institutionalization of their institutional achievements. For instance, efforts to educate the competitors in programming skills with training materials, coding dojos and programing camps facilitated the theorization and further diffusion of the ACM-ICPC and BOSI contests (Strang and Meyer 1993). The GeoBolivia platform proved that the state could deploy complex and reliable systems with SL. Suchman (1995: 592) states, that technical achievements support the gaining of moral legitimacy. Then, the proliferation of the technical success of GeoBolivia helped to gain legitimacy for the SL project among authorities and government entities.

At the same time, the skills, resources and expertise accumulated in earlier stages supported decisions to pursue further institutional achievements. For example, the GeoBolivia project has organized inter-organizational workgroups to discuss the adoption of open standards and open data for geographic information among several government entities (see decision number 3 in Table 2.4). This expertise guided the decision to create inter-organizational workgroups to discuss the SL migration plan and e-government plan at AGETIC, therefore this decision followed a causal logic (see decision number 16 Table 2.4). In this case, entrepreneurs adapted the practices developed for the inter-organizational workgroups at GeoBolivia to another initiative, where the context (i.e. government entities) and the general purpose of these practices (discussion of open standards and SL) are similar.

Similarly, the SIM group relied on the ACM-ICPC inter-organizational network of university professors and the expertise gained during the ACM-ICPC project for the organization of OBI. But in this case, entrepreneurs used their expertise and resources in another context and for other purpose: while the ACM-ICPC is aimed for students at universities, and the OBI for students at schools. The context of OBI differs in several aspects of the ACM-ICPC. The OBI requires coordination with the Education Ministry

and their regional offices: these organizations did not have any expertise for organizing programming contest. Professors, who supported the ACM-ICPC, used their expertise to design strategies to bring the OBI to schools across Bolivia. This was challenging because not all schools in the country have available a computer pool, and less of them have programming teachers. Therefore, ex-competitors from the ACM-ICPC supported the training of school students in several cities. Online training materials have been developed as well, and they were distributed in cd-rooms formats through the Education Ministry and regional offices. Based on an existing online judge system, ex-competitors developed a system to collect the answers of the school students across the country. This new system supports online and offline submission, as not all schools have access to Internet. Due to these challenges, I argue that in the decision to bring the programming contests to schools has led to exaptation because the expertise accumulated in the ACM-ICPC has been exapted to another context and other purposes (See decisions number 10 and 11 in Table 2.3). Exaptation describes the possibility that features a particular purpose may be co-opted or “exapted” for new uses (Gould and Vrba, 1982).

The efforts done for the OBI paid off, every year the number of participants of the OBI increases as changes in the context unfold over time. Some schools have included programming subjects; the Education Ministry have installed several computer pools in schools of rural locations; programming courses for children are offered for private initiatives and parents aware of the OBI enroll their children in these courses. While the decision to address the Education Ministry to propose the co-organization of the OBI has been made in effectual, sub-sequent decisions associated with OBI were made doing causal analysis (see decisions number 9, 10 and 11 in Table 2.3), as entrepreneurs were able to exploit previous expertise.

Consequently, expertise in the field constitutes a moderator in the decisions of institutional entrepreneurs. When institutional entrepreneurs are confronted with uncertain situations associated with knowledge or resources constraints, they are more likely to follow an effectual mode of decision-making. Once they overcome their constraints, in other words, when they accumulate expertise in the field, institutional entrepreneurs might use this expertise to follow causal analysis for their decisions.

The findings and the connections found between learning, adaptation and exaptation have implications for effectuation research that are discussed next.

2.5 Discussion

The purpose of this article was to explore if the decisions of institutional entrepreneur are more likely to be effectual than based on planned causality. The findings of this research have implication for both effectuation theory and institutional entrepreneurship research. I start with the discussion of these implications, then I introduce a practical implication and the limitations of this study, and I finalize by discussing future research alternatives.

Previous research in strategic management associates vision with the establishment of goals to control the future (Wiltbank et al., 2006). Contrary to this position, entrepreneurs of this study have crafted a vision around their initiatives but they did not establish all their goals right at the beginning of their projects, their actions were experimental rather than carefully planned, and they did not anticipate every institutional achievement –i.e. the outcomes of their actions– in a plan. The vision entailed meanings, through words and interpretations, which reinforced their identification with the SL and SIM groups. In a similar line, Akemu et al., (2016) suggest

that material artifacts, associated with a symbolic dimension, may also influence the affective ways in which an effectual network is assembled. The evidence of this study suggests that a vision may have a similar influence for the establishment of the effectual network, and thus, that transformative approaches associated with effectuation – proposed by Wilbank et al.(2006)– can benefit from a vision as well.

Related to learning, another implication for effectuation concerns exaptation. Exaptation efforts have been associated with effectuation (da Costa and Brettel, 2011; Welter and Smallbone, 2015; Wilbank et al 2006) as a way of entrepreneurs to manage unexpected contingencies (Sarasvathy et al., 2014). The presented evidence suggests that exaptation efforts may also come from causal thinking. When institutional entrepreneurs have expertise in the organizational field -in terms of knowledge and resources-, they can exploit this expertise and set goals to maximize the available means, using them for another purposes, which were not intended before. In this sense, learning not only might facilitate adaption (Wilbank et al., 2006), but also it might foster exaptation. In sum, both findings show that the effectual and causal logics emerge over time as a continuum, and they are complementary.

Barley (1986: 81) conceives structure *“as a flow of ongoing action and [simultaneously] as a set of institutionalized traditions or forms that reflect and constrain that action”* The analysis of the decision-making processes of institutional entrepreneurs reflects this view. Decisions and consequent actions of the SL and SIM groups altered their structural environments through the institutional achievements summarized in Tables 2.1 and 2.2. In turn, these achievements configured subsequent decisions and actions. During the institutional projects, the entrepreneurs of this study have followed effectual and causal modes. Effectual principles have mainly guided the decisions in earlier stages and they shifted gradually to causal analysis, as the changes on the institutional structure unfolded. This confirms the findings of Maine et al., (2015), they also reported that changes on the environment can produce a displacement to causal analysis due constraints imposed by the structure, this in the context of biotech entrepreneurs.

But not only changes on the organizational structure have influenced the decision-making mode of the SL and SIM groups. Learning efforts facilitated the exploitation of contingencies and the accumulation of expertise, which in turn, allowed making causal calculations in some instances. In addition, the small group for the SIM and SL cases was not only a stage that motivates, inspires and enables access to support and resources (Dorado, 2013), but also the space where interactive learning takes place.

Finally, the institutional change fostered by the SIM and SL groups did not happen unleashed from the surrounding context, institutional entrepreneurs pursued changes from inside and outside of the targeted organizations. SL groups have pursued the initiative from outside the government as initiatives by an interested civil society, and from inside the government as experts on SL, especially with regard to GeoBolivia, ADSIB and AGETIC. These groups shared a common vision and were able to pursue this vision acting within their means. The SIM group has initially approached the targeted audience (i.e. universities) through their social networks, and they brought onboard professors from several universities. Later several ex-competitors, who have left universities and who shared the vision of this project, supported further institutional initiatives from outside: they trained other competitors, developed training materials and helped in the organization of the contests. Therefore, one practical implication of this study is to approach the targeted organization from inside and outside, as institutional change happens in both spheres.

The study has three main limitations. The evidence from two institutional initiatives has limited generalizability. However, the focus on two different projects was necessary to explore how complex and nested activities occurred over time, and to explore if and how effectuation logics might be a common trait in the evolution of institutional initiatives. The second limitation concerns the specificity of the projects: both are related to the diffusion of technologies. A successful diffusion of technologies usually goes along with higher levels of uncertainty and might cause diverse levels of stress or anxiety among groups of potential adopters which might block institutional initiatives or forces them to take unexpected turns. Therefore, to assess the link between effectuation and institutional change, the findings of this study should be further examined in other settings. Third, as already mentioned above, there is a methodological challenge because the categorization of logics of decision-making is not always scientifically clear-cut. This has also consequences for the identification of the break points between the different logics. Validation efforts are therefore of utmost importance but might not be able to erase every conceptual 'noise'.

Finally, the scope of the study was to focus on decision-making. This somehow left the identification and discussion of roles and interactions within the groups in the 'void'. As a consequence for this paper, it is not traceable how intra- and extra-group interactions enhanced a member's relevance for the institutional projects. Further research is needed to shed light about these mechanisms, which support decision-making processes in institutional entrepreneurship.

Chapter 3. INSTITUTIONAL ENTREPRENEURS AND THEIR SOCIAL TIES

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ABSTRACT

While the role of social ties is recognized in institutional entrepreneurship, little is known about what kind of social ties matter most for an institutional project. In this paper, I employ an inductive, theory-building case study design to explore the collaboration networks of two groups of technical experts, who are fostering institutional changes towards the diffusion of Information and Communication Technologies (ICT) in Bolivia. The analysis shows that these institutional entrepreneurs are using their personal relationships for a variety of purposes. The findings of this study classified these relationships into five categories: (i) *social ties with status/reputation*, who help to each a positive social evaluation among the targeted audience; (ii) *strategic allies*, who help to solve conflicts and overcome resistance; (iii) *knowledge supporters*, who contributes with technical and specific skills to the institutional projects and (iv) *facilitators* and (iv) *multipliers*, who play a key role during the institutionalization of new practices.

KEY WORDS

Institutional entrepreneurship; institutional change; collective action; social ties, relational agency, distributed agency.

3.1 Introduction

“That social ties are important for collective action is a commonplace observation in the literature” claim Marwell and Oliver (1993:192), at the same time, they highlight that it is unclear what kind of ties are most important for collective action (ibid). This situation is similar for institutional entrepreneurship. About three decades ago, Eisenstadt (1980) and DiMaggio (1988) proposed the notion of institutional entrepreneurs to describe the role of actors in the creation and transformation of institutions. Agency has introduced to institutional analysis by studying actors, who have the motivation and the creativity to break away from scripted patterns of behavior (Emirbayer and Mische, 1998). In this sense, institutional entrepreneurs challenge the paradox of embedded agency that questions to what extent actors could change an institutional structure by which they, as actors, are shaped.

Institutional entrepreneurship research has moved from the heroic view of the solo entrepreneur, to the view of multiple actors contributing to change the status quo (Canales, 2011; Lounsbury and Crumley, 2007; Rao et al., 2000). Institutional entrepreneurs mobilize allies behind their vision of divergent change (Battilana et al., 2009). Dorado (2013: 534), in turn, states that institutional entrepreneurs *“do not act in isolation but in the context of social groups”*. Therefore, agency arises due to the actors’ relationships and interactions with others (McGaughey et al., 2016) and institutional change progress through existing social networks (DiMaggio and Powell, 1991). In sum, social ties are important for collective action that follows institutional entrepreneurs’ initiatives. However, little is known about: what kind of social ties contributes to the success of an institutional venture? This paper explores this aspect using inductive, theory-building case study methodology

My approach is to advance our understanding of institutional processes by exploring the diversity of actors that coalesce around an institutional project. I argue that institutional entrepreneurs rely on different kinds social ties for a diversity of purposes. These include: to enhance their subject positions (Maguire et al., 2004), to get access to resources needed for their initiative (Battilana et al., 2009), to engage in negotiations to solve conflicts (Hargrave and Van de Ven, 2006), and to facilitate the connection of new practices with existing routines and values (Maguire et al., 2004).

The empirical data comes from two institutional projects that are promoting institutional changes to diffuse Information and Communication Technologies (ICT) in Bolivia. Relatively poorly “resourced” groups foster these projects. For this reason, these institutional entrepreneurs have mobilized diverse actors to support their institutional reform. The analysis concentrates on how social ties of these entrepreneurs have contributed to their institutional initiatives.

This study contributes to the conception of agency as relational and distributed, where institutional change is dependent on the coordinated and uncoordinated actions of multiple actors and their interactions. In particular, the findings of this study provide the characterization of five categories: (i) social ties with status/reputation, (ii) strategic allies, (iii) knowledge supporters, (iv) facilitators and (v) multipliers. Social ties with status/reputation and strategic allies play a relevant role in the earlier stages supporting the projects to overcome resistance and to resolve conflicts inherent of change processes. In turn, knowledge supporters contribute to demonstrate the viability of the proposed change and the theorization of the initiative. Finally, facilitators and multipliers speed up the institutionalization of new practices by interacting close with the targeted audience.

Overall, this study contributes to institutional entrepreneurship theory by offering a complementary perspective of networking as a key activity not only to reach relevant resources, but as a way to bolster collective action through the participation of several actors and collaborators.

I begin by introducing the conceptual framework. Next, I will present the research design and describe the evolution of the institutional reform in both initiatives and the collected data. Finally, I will present the main findings of the study and discuss their implications.

3.2 Conceptual framework

DiMaggio, (1988) states: “*new institutions arise when organized actors with sufficient resources (institutional entrepreneurs) see in them an opportunity to realize interests that they value highly*” (p. 14) (emphasis in the original). In this sense, the social position of institutional entrepreneurs has been investigated from different stances: As a factor that enables them access to resources for their initiatives; as a factor that allows them to recognize opportunities to promote change; and as a factor that influences them to act as institutional entrepreneur. In their study, Maguire et al. (2004) consider ‘subject positions’ as the combination of the formal position and the socially produced and legitimated identities of an organizational field. They conclude that actors with relevant ‘subject positions’ cannot only gain legitimacy in the eyes of diverse stakeholders, but also connect with those stakeholders and have access of strategic resources (Beckert, 1999). For Dorado (2005), the temporal orientation of institutional entrepreneurs and their position in social networks influence them in the perception of organizational fields, and thus, in the recognition of opportunities of change. In turn, Battilana (2006) argues that actors’ social position might influence in the likelihood to behave as institutional entrepreneurs. She conceptualizes social position as the combination of an actor’s formal and informal positions within a given organization, her tenure in a job position and her inter-organizational mobility.

Although this work has significantly enhanced our understanding about the importance of social positions for institutional entrepreneurs, it does not explore the composition of their personal networks. This paper advances this dimension by investigating: What kind of social ties contributes to the success of an institutional venture?

In order to explore this question, I take into account three considerations of the existing theory. First, Lechner and Dowling (2003; 2006) provide evidence that certain networks are more relevant in certain phases of the development of commercial entrepreneurship ventures. Therefore, we could expect that the contribution of certain social ties might be more relevant during the different stages of institutional change process. Regarding this process, Greenwood et al. (2002) identify six stages: (1) *Precipitating jolts*: when existing taken-for-granted practices are being destabilized; (2) *De-institutionalization*: when institutional entrepreneurs emerge and introduce new ideas that challenge the status quo; (3) *Pre-institutionalization*: in which organizations experiment with new alternative practices; (4) *Theorization*: in which the specification of a problem and the justification of a plausible solution are developed; (5) *Diffusion*: when new practices are widely adopted on the basis of increasing objectification and legitimacy. (6) *Re-institutionalization*: when new practices become taken-for-granted.

Second, Battilana et al. (2009: 74) point out that the degree of institutionalization and the degree of heterogeneity might enable institutional entrepreneurship projects. Likewise, Dorado (2005) recognizes that the degree of institutionalization influences the

perception of opportunities for institutional action; these opportunities can be perceived as opaque, transparent or hazy. In turn, Maguire et al. (2004) investigate institutional entrepreneurship in emergent fields and identify differences with institutional initiatives in more institutionalized fields. Therefore, the contribution of social ties of institutional entrepreneurs might be also influenced by the degree of institutionalization of the field.

Third, in their review of social movements and institutional analysis, Schneiberg and Lounsbury (2008) state that *“institutionalists have recognized movements arise within institutions or fields, mobilizing insiders and well as outsiders, using established networks and resources to diffuse alternative practices, and drawing effectively on existing institutional elements and models to craft new systems”* (p. 654). Since the work that integrates social movements into neo-institutionalism parallels the work on institutional entrepreneurship in key respects (Hardy and Maguire, 2008), institutional entrepreneurs might relay in their initiatives on social ties that are insiders as well outsiders. If we consider the targeted audience as the organizations where the proposed institutional initiative should be adopted, then insiders are actors who belong or work for the targeted audience, and outsiders are actors who do not belong or work for the targeted audience.

In sum, this study aims to understand the role played by the social ties of institutional entrepreneurs taking into account: the different stages of an institutional project, the degree of institutionalization of the organizational field, and the interplay of actors acting inside and outside of the targeted audience.

Next the research methods are presented.

3.3 Research methods

Since the research question and analytical framework require in-depth scrutiny for inductive theory building, the research is based on a multiple case study design (Eisenhardt, 1989; Yin, 2003). I conducted the empirical study with two projects of institutional change. The first project is about the Software Libre (SL) groups that have undertaken different enterprises to foster micro-institutional reforms to adopt SL throughout the Bolivian state. The second project is related with the introduction of international programming contests for students of universities and schools across Bolivia by the SIM group. During the pilot phase, I identified four instances of institutional entrepreneurship, two for each initiative. Table 3.1 summarizes the main events of the stages of institutional change promoted by the SL initiative, and Table 3.2 presents the corresponding stages for SIM initiative.

A meticulous theoretical sampling (Eisenhardt, 1989) supported the selection of the institutional projects reported in this study and they can be considered “extreme exemplar” cases (Eisenhardt and Grabner, 2007). The SIM and SL projects represent instances of institutional entrepreneurship because they present features of novel archetypes (Greenwood and Hinings, 1993), which are different from prevailing organizational archetypes: In the SL case with regard to the provisioning of ICT within the government, and in the SIM case with regard to the organization of programming contests. Likewise, these projects have been active for more than a decade ago, and they have engaged with diverse actors, including actors from governmental bodies, universities, non-government organizations and private firms.

Behind the SL and the SIM initiatives are technological experts, who became aware of opportunities opened by the revolution of information technologies. Both initiatives

have moved forward in a setting, where the government has shown policy deficits to capitalize ICT, and where the telecommunication and software industries are still incipient. At the same time, these initiatives have benefited from the broad diffusion of information technologies worldwide, and from the new political scenario at the local level, after the arrival of Evo Morales to the Bolivian presidency in 2006.

According to the Latin American Public Opinion Project (LAPOP, 2010), Bolivian citizens accept or even support changes. Among these citizens, a substantial percentage of young people has grown up with, or has at least been in loose touch with ICT. The interviews conducted by the author confirm that there is strong motivation among technology-active groups to shape their country's ICT environment, and thus their own economic and social future.

In the next section, I introduce these institutional initiatives and the data collected for this research.

3.3.1 Cases

a. *Software Libre initiative*

Since 2006 the SL project has promoted the diffusion of SL technologies within the Bolivian government. For this initiative I identified two instances of institutional entrepreneurship: The GeoBolivia project and the lobby work for a broad adoption of SL within the government. Table 3.1 presents the stages of institutional change associated with both institutional entrepreneurship instances.

One group of SL advocates has worked in the development of GeoBolivia, a complex geographic information framework. In 2006, when geographic information was required to follow up the implementation of policies in rural areas, GeoBolivia has started at the Bolivian Vice-presidency office. At that time, available geographic information in government entities was fragmented and not updated, different versions of the same information have co-existed, and the data has been managed using proprietary software that supports different formats, limiting the interoperability of this information.

To change this situation, GeoBolivia proposed to develop a platform based only on SL technologies (with no fees for licenses) and open standards to foster interoperability. This meant that, government entities could exchange data and unify efforts to maintain geographic information at country level.

However, the platform was only part of the solution. To achieve the proposed vision, government entities should not only adopt the system, but also exchange information and work together. To foster these changes at the social sphere, GeoBolivia organized events to present the project and called several government organizations to support the initiative. Over time, several committees and seven working groups have been conformed under the umbrella of the "Infrastructure of Spatial Data of the Plurinational State of Bolivia" IDE-EPB, an inter-organizational network whose members have adopted the platform. Additionally, they discuss and work not only on further platform developments, but also on the definition of data standards and legal topics.

When the new Bolivian telecommunication law was discussed in the Bolivian Senate in 2011, members of the iFARO foundation and the SL Community decided to start lobby activities to introduce an article in this law to favor a broader adoption of SL by government entities. This initiative led to the inclusion of Article 77 in the new Bolivian Telecommunications Law No. 164, which states that all government bodies should promote and prioritize the adoption of SL.

Table 3.1 - SL groups instances of institutional change

Stages	GeoBolivia project	SL adoption within the government
Precipitating the jolts	- 2006: Requirement of the Bolivian Vice-presidency for geographic information to follow-up policies in rural areas.	- 2009: Approval of the new Bolivian political constitution.
De-institutionalization	- 2007: Proposal for the GeoBolivia project: A new geographic information system based on SL and open standards.	- Since 2006: Reflections around SL political and economical aspects - 2011: Advocacy work to include article 77 in the new Telecommunication Law. - 2012 - 2013: Discussions of the Decree 1793 draft to provide a political background towards technological sovereignty.
Pre-institutionalization	- 2007-2008: Development of the first version of geographic information platform based on SL	- 2013: Approval of the Decree 1793 that rules the new Telecommunications Law. - 2014: ADSIB deploys a datacenter and the certification of digital signatures using only SL.
Theorization and Diffusion	- 2008: Diffusion events and meetings with government entities to promote the GeoBolivia project. - 2009 – 2013: Committees to discuss further developments of the platform, adoption of open data standards, legal issues, and data management. - 2011 – 2013: Government entities adopt the GeoBolivia platform and exchange geographic information.	- 2015: AGETIC is created to coordinate e-Government initiatives and the SL Migration. - 2015: Committees for the e-Government and SL migration plans are organized with representatives of several government entities. - 2016: e-Government and SL migration plans are approved.
Re-institutionalization	- 2014 Consolidation of the inter-organizational network: Infrastructure of Spatial Data of the Plurinational State of Bolivia (IDE-EPB)	Note: It did not take place during the fieldwork of this study.

The SL groups continued working behind the Decree 1793, which rules the new Telecommunication Law. This decree has been approved in 2013 and after this, members of the GeoBolivia team have assumed the direction of the Agency for Development of the Information Society of Bolivia (ADSIB). From there, these members worked in 2014 on the deployment of a data center at the Bolivian Vice-presidency office by using only open technologies and SL, and they have developed procedures based on SL technologies that support the certification of digital signatures.

In 2015, an Agency for E-government and Information and Communication Technologies (AGETIC) has been created with the aim of coordinating E-government initiatives and the SL migration of government entities. The leaders at ADSIB became in charge of this agency in 2015, and in March 2016 the SL migration plan was approved by the national government. It is expected that all government bodies will complete their SL migration by 2023.

b. Programing contests initiative

For the programing contest initiative of the SIM group I identified two instances of institutional entrepreneurship: The ACM-ICPC international competition at universities and the OBI contest for schools. Table 3.2 presents the stages of institutional change associated with both institutional entrepreneurship instances.

Table 3.2: SIM group instances of institutional change

Stages	ACM-ICPC contest	BOSI
Precipitating the jolts	<ul style="list-style-type: none"> - Contest organized in other neighbor countries. - Status quo at UMSA university perceived by students 	<ul style="list-style-type: none"> - After four years organizing the ACM-ICPC, Bolivia classifies for the first time to the World round in 2010.
De-institutionalization	<ul style="list-style-type: none"> - 2003: Initial contests among students at UMSA university 	<ul style="list-style-type: none"> 2010: Approach the Education Ministry.
Pre-institutionalization	<ul style="list-style-type: none"> - 2004-2005: Participation in the ACM-ICPC regional rounds in Chile and Argentina. - 2006: Look for a seat for Bolivia to organize the ACM-ICPC regional round. - 2006: Gain the support of university professors and students. 	<ul style="list-style-type: none"> 2010: Bring together collaborators of the ACM-ICPC including university professors to support the start of the BOSI.
Theorization and Diffusion	<ul style="list-style-type: none"> - 2006 First regional round in La Paz with the participation of 14 universities from 6 cities - 2006: Diffusion events and training initiatives. 	<ul style="list-style-type: none"> 2011: First BOSI. 2011: Development of an online platform to evaluate online and offline submission during the BOSI.
Re-institutionalization	<ul style="list-style-type: none"> - Yearly organization of the regional round of the ACM-ICPC in Bolivia. The place of the contest rotates each year. - Organization of regular training initiatives and diffusion events. - Ensure recurrent firm sponsorships. 	<ul style="list-style-type: none"> - Yearly organization of the BOSI with the support of the Education Ministry. - Training support for the winners of the BOSI to prepare them for international competitions.

The SIM group is conformed by professor Teran of the UMSA University and two of his students. In 2003, they started the organization of internal programming competitions at the UMSA with the aim to participate in the Collegiate Programming Contest of the

Association for Computer Machinery (ACM-ICPC). The ACM-ICPC is a worldwide multi-tiered competitive programming competition for student teams from universities. Members of the SIM group traveled to Chile in 2004 and to Argentina in 2005 to participate in the regional rounds of this competition.

In order to bring the competition to other Bolivian universities, in 2006 members of the SIM group traveled to Brazil to get a seat for the regional round of this contest for Bolivia. After this, the SIM group began under the coordination of the ACM-ICPC. To get started, they initially resorted to their contacts in other universities, and organized diffusion events. Later, they decided to rotate the organization of the competition in different universities and places, and over time, these universities conformed an inter-organizational network. The SIM group has also prepared and shared training materials, and has organized coding dojos and programming camps.

These efforts paid off, in 2010 for the first time one Bolivian group classified to the World final. However, in order to be able to classify to this round more often, students should start earlier with the training. Therefore, the SIM group proposed the Bolivian Ministry of Education to co-organize the Bolivian Olympic School of Informatics (BOSI). This contest started in 2012. The university professors, who collaborate with the ACM-ICPC contest, have assumed the academic organization of the BOSI. Likewise ex-competitors have helped with training activities including the development of online training materials and the organization programming camps for students at schools.

Every year roughly 10,000 students compete in the BOSI at the national level. The winners of this competition participate in a special training for one year, and the best competitors represent Bolivia at the International Olympiad of Informatics (IOI); the Education Ministry sponsors this participation. When these competitors go to the university, they are prepared to compete in the ACM-ICPC, thereby nourishing the expectation the SIM group can improve future Bolivian performance in this international competition.

c. Key dimensions of the differences between the initiatives

There are key dimensions of the differences between the two initiatives —Field conditions, ICT diffusion strategy, targeted audience, interest heterogeneity, disciplinary background of the institutional entrepreneurs and group organization—, which enrich the study and are summarized in Table 3.3.

The SIM group has pursued a well-liked change in a stable mature field, i.e. in general universities and schools welcome the possibility to improve student skills. This has eased the adoption of the initiative, which did not experienced great resistance in the targeted audience. In turn, the SL groups have also pursued a comprehensive reform regarding ICT provisioning in a mature field, which was used to changes. By the time the SL advocates started the GeoBolivia project, the Bolivian government has already introduced several changes in the political context, including a new political constitution. In this environment, SL advocates found an opportunity to frame their initiative with value propositions, which met those of the new government, especially the notion of technological sovereignty. This helped them to overcome the resistance of actors, who were against SL.

How did these differences shape the strategies to gain of required material resources and for their diffusion? Initially the SIM group promoted the adoption of contests by the universities alone, thus the universities provided the resources and supported the diffusion by engaging their students in the programming contests. As for the SL initiative,

the motivation of promoting SL across the government through a normative mandate ensured governmental resources for the initiative and its further diffusion.

Table 3.3: Differences between the SIM group and the SL groups

	SIM Group	SL Groups
Field conditions	Stable mature organizational field	Mature organizational field in change
ICT diffusion strategy	Bottom-up Promote a critical mass of participants in programming contests among students from universities and schools.	Top-down Promote the broad adoption of SL across the government.
Targeted audience (institutional setting)	Universities, the Education Ministry, schools.	Governmental bodies including the chamber of deputies, the senate, diverse ministries and regulation bodies.
Interest heterogeneity in the targeted audience	Relatively low heterogeneity: There is a common interest to improve the programming skills of students.	Relatively high heterogeneity: Within the government there are actors in favor, neutral and against SL.
Disciplinary background of the institutional entrepreneurs	Software programmers, university professors and computer science professionals.	SL activists from diverse disciplines including computer science professionals, sociologists, mathematicians, economists and others.
Group Organization	Centralized, one single core group. Coordinated activity.	De-centralized, more than one sub-group. Uncoordinated activity.

At the end of the study, the SIM group consisted by a core team of three persons and several collaborators in twelve Bolivian cities; all core team members are computer science specialists, including one university professor. The background of SL members is more diverse; besides computer science specialists, there are others, such as sociologists, economists, and political science professionals. The SL supporters do not have a core team, I identified three relevant sub-groups that contributed to the institutional change: the SL community, the iFARO foundation, and the GeoBolivia project.

3.3.2 Collected data

This article is based on an empirical study that was carried out between 2014 and 2016, and was implemented in two phases: a pilot study and the main fieldwork. The goal of the pilot phase was to obtain information about how the institutional initiatives were organized, to identify the institutional entrepreneurs and key collaborators, as well as the chronology of events, which describe the evolution of each project. Therefore, the pilot phase encompassed: Participant observation in a number of meetings and events organized by the institutional initiatives; key informants were identified and interviewed;

finally, relevant secondary data was collected, including written materials, online forums, wikis, mailing lists and newspapers.

During the pilot phase, I identified 19 persons, who actively took part in the implementation of the SL initiative, and 14 persons for the SIM project. Due to their active participation in the promotion of alternative practices (Battilana et al., 2009), these actors can be considered the institutional entrepreneurs of this study.

During the main fieldwork, I performed in-depth interviews with these institutional entrepreneurs. In the interviews, (i) I asked the entrepreneurs about their contribution to the institutional initiatives, in which they participated; about their motivations and their professional background, including information of their workplace, job position, and tenure by the time they participated in the institutional project; and about any inter-organizational mobility since then. (ii) Then, I asked them to list the names of those persons, who have collaborated in the institutional entrepreneurship instances, in which they participated (for instance, *"Would you please list the names of persons that collaborated with you in the approval of the Article 77?"*). I asked the interviewees to describe in detail the way each social tie has contributed to the project, to explain the relevance of the contribution by giving a specific example and to characterize the relationship. (iii) Additionally, I asked about the workplace and position for the time when a given social tie collaborated with the institutional project, and if the contact has changed her job since then. It is to note, that some institutional entrepreneurs have elicited other entrepreneurs as their social ties.

For the SL project 107 collaborators were elicited, and 103 collaborators for the SIM project. When a contact was elicited for more than one institutional entrepreneur, I merged the contact's information by combining the data about her contribution to the project, her workplace and position. When I was not sure about how to merge this information, I contacted the institutional entrepreneurs, who elicited this contact, to confirm with them the resultant information. The total number of contacts analyzed in this study comprises 175, of whom 87 are related to the SL project, and 88 to the SIM project.

3.4 Case analysis and results

The advancement achieved by the institutional entrepreneurs of the SL and SIM projects would not be possible without the support of their social ties. The aim of this research is to build theory by following an inductive approach, and to provide insights about the types of social ties that contributed to the progress of the institutional projects of this study.

The data analysis proceeded in two stages. First I analyzed and characterized the contributions of the social contacts elicited by the institutional entrepreneurs. The characterization of these contributions and their corresponding examples allowed identifying the patterns in which social contacts participated in each institutional project.

I started the analysis with the SIM group, as both institutional entrepreneurship instances have the same nature: The promotion of programming contexts. I continuously compared data and iterated in order to create categories of participation and contribution for the institutional projects (Miles and Huberman, 1994). In the analysis, I also included the attributes related to the job position and tenure of the social ties. This

process generated a variety of first order contributions (e.g. preparation of training materials) that resulted in dimensions of the contributions (e.g. “technical expertise”).

When I had this classification, I proceeded with the analysis of the institutional instances of the SL project. I could corroborate the dimensions with some social ties; however, the classification did not match in all cases with the contribution performed by the social ties of this project. During the analysis, the status of the social tie appeared as a new dimension for the analysis. Then, I revisited the SIM cases to validate the new dimension. Finally, I added in the analysis the time perspective by sorting the participation of the social ties according to the stages of institutional change (detailed in Table 3.1 for the SL project and in Table 3.2 for the SIM project); the majority of the social ties participated in only one stage, and only few of them participated in all six stages. I ended up with five dimensions of the contributions done by the social ties of institutional entrepreneurs.

These dimensions are political expertise, technical expertise, process expertise, job position and status/reputation. Table 3.4 summarizes them and provides examples from the institutional projects. The first three dimensions refer to a specific expertise, which the social ties have brought to the institutional project. Therefore, depending to what extend a given expertise contributed to the project, these dimensions were rated from 0 to 4. It is to note that, some social ties have improved their expertise during the progress of the projects.

The fourth dimension captures the workplace and job position, which the social tie had during her participation in the institutional project. I observed that some social ties have endorsed the project from their high job positions, especially when working in organizations of the targeted audience. For the SIM case, these organizations are the universities and the Education ministry; for the SL case, the targeted audience is composed by government entities. If the social tie held a high position in an organization of the targeted audience, then she was rated with 3, with 2 for a middle level position, with 1 for a low level position, and with 0 if she worked in an organization outside of the targeted audience.

The final dimension captured if the status or reputation of the social ties contributed to the project. The belonging to group status groups could contribute to a positive social perception of the institutional initiative, as well as, the reputation a given social tie might have. This dimension has a scale from 0 to 3, being 3 a high positive contribution with regard to this dimension.

Table 3.4: Dimensions of contribution to institutional projects

Dimension	Scale	Definition and examples
Political expertise	0-4	<p>The assessment of the political expertise was based on the contributions done and any previous expertise in politics.</p> <p>For instance Senator Nélica Sifuentes contributed to the approval of Decree 1793 not only from her position, but also from her previous political expertise. In the case of SIM, Willmar Pimentel initiated the ACM-ICPC project as a student, and during his time at the university he also participated in student-related political initiatives.</p> <p>While 0 represent no expertise at all, a social tie rated with 4 has very good political expertise, 3 good, 2 fair, and 1 poor political expertise.</p>

Dimension	Scale	Definition and examples
Technical expertise	0-4	<p>Technical expertise refers to the extend, in which a social tie have contributed with her programming skills in the case of SIM, and with her expertise in software libre in the case of the SL communities.</p> <p>Students who outperformed in the programming competition, or who collaborated in the development of training materials, or who acted as problem setters or as judge in the competitions are positively rated in this dimension. For the project SL, these are persons, who worked in the development of the SL projects at GeoBolivia and ADSIB.</p> <p>Then, a social tie, who largely supported the project with her technical expertise is rated with 4, and with 0 when she did not contribute.</p>
Process expertise	0-4	<p>The adoption of new practices in an organizational field requires expertise in the development of new processes and the adaptation of existing ones. Therefore, social ties with previous expertise at the organizational field might contribute in this area.</p> <p>In the case of SIM, some social ties contributed in the implementation of processes related with the organization of the programming contests and training initiatives at Universities and schools. In the case of SL group, some social ties contributed to the adoption of GeoBolivia through inter-organizational committees, or to the adoption of the Digital Firm framework.</p> <p>While a rate of 4 represents a great contribution for process expertise, 1 represents a low contribution and 0 no contribution.</p>
Workplace and job position	0-3	<p>Some social ties endorsed institutional initiatives from their high job position. For instance, deans at Universities authorized the organization of programming contests. Likewise, some Bolivian ministries supported the SL initiative.</p> <p>A targeted organization corresponds to organizations where the new practices should be adopted, for instance universities for the SIM project or any governmental body for the SL project.</p> <p>Therefore, if during her contribution to the institutional project a social tie have worked in a targeted organization, I rated this dimension with 3 if her job position was high in the organizational hierarchy, 2 for a medium level and 1 for a low level position. Otherwise, if the social tie did not work in a targeted organization, I rated this dimension with 0, as from this position the social tie could not contribute directly to the project.</p>
Status / Reputation	0-3	<p>Status refers to <i>“the membership of a group with distinctive practices, values, traits, capacities or inherent worth”</i> (Deephouse and Suchman, 2008:60).</p> <p>Therefore, the endorsement of social ties, who belong to recognized status groups, might contribute to the positive social perception of the institutional initiative. This is similar with social ties with recognized reputation.</p> <p>The rate of 0 means that the social tie did not contributed to the institutional project from the status/reputation dimension, 1 did a low contribution, 2 did a moderate contribution and 3 did a high contribution.</p>

In the second round of the analysis, the contribution of a given social tie was weighted in each dimension. Since some social ties have participated in different stages of the institutional project (detailed in Tables 3.1 and 3.2), the contribution for each stage was assessed independently. In this sense, I could capture changes on job positions, status/reputation, and changes on the expertise dimensions (i.e. political, technical and processes). Then, I sorted and grouped the social ties based on this assessment, and I ended up with a general classification of five types of social ties. Certain social ties have been categorized with more than one social tie type.

In order to validate the results, I used expert opinion for a qualitative validation (Lincoln and Guba 1985). For each project, I interviewed two active institutional entrepreneurs, who have participated in all the identified stages. During the interview I presented the basic findings and the classification of the five types of social ties, and invited the interviewee to make sense of the result. This validation lasted between one and two hours and generated supportive feedback, as interviewees recognized the classification of the social ties as familiar.

The resulting five types of social are described now.

3.4.1 Collaborators with status or reputation

Status groups and reputation are forms of social evaluation. While “*status reflects the relative position of social groups within a hierarchy of collective honor*” (Deephouse and Suchman, 2008: 61), reputation is associated with past and expected future behavior of individual actors or organizations (ibid). Therefore, when members of recognized status groups and/or actors with recognized reputation support institutional initiatives, they might contribute to the positive social perception of the institutional initiative (Deephouse and Suchman, 2008).

The data analysis of this study shows that this kind of support is relatively important in the early stages of an institutional initiative:

By the time the SIM group got the authorization to organize the ACM-ICPC regional contest in Bolivia, Prof. Teran invited his colleagues from other universities to a dinner, and in this meeting he convinced them to support the contest. Prof. Teran is a recognized professor with a long trajectory at the UMSA University, and his reputation positively influenced in the perception of his colleagues with regard to the ACM-ICPC contest. As a consequence, these professors motivated their students to participate in the first regional ACM-ICPC round in Bolivia, which had the participation of 25 teams from six different Bolivian cities and 14 universities (ICPC Bolivia, 2006).

The same colleagues of Prof. Teran, who supported the ACM-ICPC, played an important role for OBI. Their status as professors from universities across the country helped to get the Education Ministry on board for the OBI, and since the beginning these professors endorse the organization of this national competition.

When the SL community and the iFARO Foundation decided to start lobby activities to introduce one article in favor of SL into the new telecommunication law, they invited members of other ICT initiatives from the civil society to join the Decolonization Committee. The aim was to unify efforts around the SL lobby activities thereby conforming joint forces, and showing SL as a common goal among the different groups. The Decolonization Committee consisted of the Software Libre Community, the iFARO foundation, the Wi-Fi El Alto Project, the

Webprende Community and the Bolivia Digital Foundation. In the eyes of the targeted audience, the committee represented a status group of specialists on information technologies.

From these examples, it becomes clear that the participation of the social ties from status groups and social ties with reputation allowed the institutional initiatives of this study to move forward. These social ties held medium-level and high-level job positions, they had good process expertise, and thus they had also expertise in the organizational field.

3.4.2 Strategic allies

According to Hargrave and Van de Ven (2006: 878): *“Conflict is the core generating mechanism of [institutional] change, power is a necessary condition for the expression of conflict, and political strategies and tactics are the means by which parties engage in conflict”*. Therefore, to engage in power relations and solve inherent conflicts of change, institutional entrepreneurs needed to look for the support of contacts with strategic job positions, and over time, some of institutional entrepreneurs have been promoted to strategic job positions as well.

I designated them as strategic allies because these contacts have worked in key organizations of the targeted audience, and held job positions in which they could endorse the institutional project. Usually these contacts had great political expertise, and they had expertise in the organizational field, where the institutional change is pursued.

From the time when the SL groups started their lobby activities for the telecommunication law, the biologist Clemente recalls: *“to influence the Telecommunications Law to support SL adoption, we decided to focus our efforts on key decision-making persons and offices because we were very few people”* (interview 17 Dec 2014). In turn, Hardy, an expert on computer networks, recalls, *“our strategy was to have ready written proposals, to knock doors, to send letters and to look for contacts”* (interview 2 Sept 2014). This strategy supported the inclusion of the article 77 in the new Telecommunication law, which states: *“the executive, legislative, judicial and electoral bodies -in all their levels- will foster and prioritize the use of software libre and open standards...”* (Bolivian Law No 164, 2011:45).

From this time, the SL institutional entrepreneurs recognized the support of some public servants, including members of the Bolivian Parliament, and public servants with high and medium positions at the ministry of Communications, at the ministry of Development and Commerce, and at the Bolivian Vice-presidency Office.

After its approval, the law was passed to the Executive to draft the provisions that regulate the enforcement of the law. These provisions took about two years. At that time, the SL community approached Senator Nélida Sifuentes, and she became an important strategic ally, who pursued the revision and the modification of the law's draft provisions. Senator Sifuentes recalls: *“It was not easy, my office organized several meetings with all the involved actors to achieve agreements, we discussed the provisions, article by article. The SL community advised me, and finally we achieved our goal”* (interview 12 Mar 2014). In 2013 the Bolivian President and his ministers cabinet approved the Bolivian Decree No 1793.

By the end of 2013, two institutional entrepreneurs have been promoted to strategic job positions: Nicolas Laguna became director of the ADSIB and together with Sylvain Lesage drove relevant projects based on SL. In 2015, Nicolas became director of AGETIC, the agency in charge of the coordination of the SL migration, and Sylvain Lesage assumed the direction of ADSIB.

On the other project, the SIM group ensured the contest diffusion across the universities by rotating the place of the ACM-ICPC regional contest among the universities. For this, the support of deans and program directors at the universities were required to ensure not only required resources for the contest organization, but also to facilitate logistics and possible sponsorships.

3.4.3 Knowledge supporters

Social ties with strong software technical expertise have played an important role in the implementation of the initiatives of this study.

For instance, in the early stages of GeoBolivia project, the combination of software technical skills and geographic knowledge supported the development of the GeoBolivia frameworks and its further diffusion.

In 2008 GeoBolivia, the team worked closely with the members of the Georchestra framework located in France to develop a platform based entirely on SL. Later, GeoBolivia contacted geographers from different government entities to discuss the development of an open standard to share information. Currently Bolivia is using Georchestra at state level and by 2015 the GeoBolivia platform managed 800 layers of geo-referenced information, which were synchronized in 10 sites independently administered with 5.000 registered users (Molina, 2015).

Efforts from the SIM group to gain programming skills to be able to participate in the international contests and educate the participants in the required knowledge facilitated the theorization stage.

On this regard, Alberto recalls the initial efforts: *“After competing Chile in 2004, I started to train new teams. At that time, I had to review the problems myself, to analyze them, to solve them and to look for the best solution, and I did not have good sources of information to expand what we were learning. The interactions with members of programing contests forums were important. In this time, I meet several students who tried to come out on top with a better solution, but then I quickly found a much better solution. While we were doing this, the code and methods continue improving and changing”* (Interview, 8 November, 2014). After accumulating programing skills and developing several training materials, Prof. Teran and Alberto published two books with programing contest problems. They made these materials available to their counterparts at the other universities.

Over time, social ties with technical skills have improved their expertise and have supported further advancements of the institutional project:

When Nicolas Laguna assumed the direction of ADSIB, he decided to migrate all computers and systems to SL. As the ADSIB was in charge of the development of a framework for digital signatures, Laguna constituted a team of software specialists for this development using only SL technologies. During this development, the team at ADSIB started the deployment of a data center based

entirely in hardware and software libre. Later, when Laguna became in charge of AGETIC, the SL technical specialists, who worked with him at ADSIB, started to work at AGETIC in projects related with the implementation of e-government.

Likewise, as long as these social ties have continued participating in the institutional project, they gained expertise in the implementation of processes related with the institutionalization of the new practices, and some of them have increased their reputation for their contribution.

By the time Laguna was leading the AGETIC, he highlighted the contribution of Davis Mendoza to the development of the Digital Framework; this contribution was recognized inside the AGETIC, and David was an inspiration for others (Interview, 22 November, 2016).

Similarly, international companies including Facebook and Google have hired some ex-competitors of the ACM-ICPC contest, and they are recognized by the new generations of competitors as source of inspiration to compete and succeed in international professional careers.

In sum, knowledge supporters contributed in the de-institutionalization stage by showing that the proposed practices are viable. In subsequent stages, knowledge supporters facilitated the gaining of pragmatic legitimacy among the targeted audience, and the theorization of new practices.

3.4.4 Facilitators

New practices require that “consumers of change” understand not only the benefits of the associated change, but require them to adopt these practices. In their study, Delbridge and Edwards (2008) recognize that the consumers of change have encouraged re-institutionalization by reinforcing the understanding of the new meaning associated with the change in the design of super yachts, so that industry incumbents (shipyards and naval architects) gradually bought into the new functional form and conventions.

In a like manner, the adoption of GeoBolivia platform and the ACM-ICPC contest required the active interaction with the “consumers of change”. Facilitators supported this interaction by establishing mechanisms and processes.

At GeoBolivia these facilitators have worked on the preparation of the meetings for the committees, the redaction and publication of committee’s resolutions and their internal regulations, and the preparation of diffusion events and trainings.

Facilitators of the ACM-ICPC in every university prepare diffusion events for the competition and training initiatives for new competitors. As the seat of the regional round rotates every year, the university in charge facilitates the logistics for this national contest. Behind these activities are not only professors, but also several volunteers, and the majority of them are ex-competitors. Likewise, some volunteers over time became coaches of the new competitors, judges for the local and regional competitions, organizers of programming camps, etc.

These facilitators promoted the construction of normative networks through inter-organizational connections, these networks facilitate the adoption of new practices through peer group compliance, monitoring and evaluation (Lawrence and Suddaby, 2006). The definitions adopted in these inter-organizational networks, and the further support of the facilitators ease the development of new routines and practices in

member organizations. As noted by Maguire et al. (2004) the development of these routines support the theorization and the re-institutionalization of the institutional initiative. Facilitators of this study have either brought or gained process expertise, and they usually have held medium or low job positions in the targeted audience.

3.4.5 Multipliers

During the interviews, institutional entrepreneurs recognized the role of some social ties in the diffusion of their initiatives. These social ties have had neither political nor process expertise, the majority of them have had a fair-good level of technical expertise, and they held low-level positions. The main virtue of these social ties was their work mobility. I designated them as multipliers because these social ties have communicated the institutional projects across boundaries and brought the institutional initiatives to other organizations and spheres.

When GeoBolivia has started, the project had constrained resources. For this reason, the organization hired interns for short periods of time. Over time, these interns have started to work in other organizations of the targeted audience, and they applied the expertise gained at GeoBolivia to their new job positions, which in turn, it facilitated the diffusion of this institutional project.

In the case of the ACM-ICPC competition, several competitors brought the contest to other universities by inviting other students to participate, and by participating in the organization of training events. Also, ex-competitors of the ACM-ICPC have supported the OBI by coordinating the organization of this contest with regional offices of the Education Ministry in several cities, and by training students at schools.

3.5 Discussion

Using a multiple case study design based on four instances of institutional entrepreneurship, I was able to categorize five types of social ties that matter for institutional change: (i) Collaborators with status or reputation, (ii) strategic allies, (iii) knowledge supporters, (iv) facilitators and (iv) multipliers. In general, in earlier stages of institutional change (i.e. de-institutionalization and pre-institutionalization), social ties with status and/or reputation help to reach a positive social evaluation among the targeted audience. Strategic allies support institutional initiatives during negotiations to solve opposition and conflicts, especially in an earlier stage when the project is gaining legitimacy. Knowledge supporters contribute to demonstrate the viability of the proposed change and to the theorization of the institutional initiative. Finally, facilitators and multipliers contribute during the institutionalization stage by reinforcing the diffusion of new practices.

This classification was suitable for both groups of institutional entrepreneurs despite their differences (detailed in Table 3.3). No matter if there is one core group (SIM project with coordinated activities), or more than one subgroup (SL project with uncoordinated activities), it was possible to distinguish between these five social ties. The classification was also applicable in a way that was independent of the field context and of the heterogeneity of interests around the institutional initiative. While the SIM group worked on an institutionalized mature field with homogeneous interest around programming contests, the SL group operated in a institutionalized field in change with an

heterogeneous interest around SL. Then the SL project has confronted major resistance in their institutional instances.

The findings of this study confirm in various aspects to the results of Maguire et al. (2004), which presents an institutional initiative in an emergent field, and their analysis is focused only on two institutional entrepreneurs (*ibid*, 662). First, Maguire et al. (2004) recognized that subject positions provide institutional entrepreneurs with legitimacy in the eyes of diverse stakeholders, and with the ability to bridge those stakeholders. The social ties with recognized status/reputation in this study allowed institutional entrepreneurs of both groups to gain subject positions needed for their initiatives. Second, similar to the evidence presented by Maguire et al. (2004), the institutionalization of new practices in both projects occurred through frequent interactions with the targeted audience. In turn, facilitators and multipliers of this study have played a relevant role to connect practices with existing routines and values of the consumers of change. Third, especially for the SL initiative, strategic allies supported the development of coalitions and political tactics to overcome resistance to the SL projects. Maguire et al. (2004) highlighted this aspect as well. Due to the similarities found between Maguire et al. (2004) and the findings of this study, the proposed classification of social ties might be valid not only for institutionalized fields, but also for emergent fields. Future research on this regard might confirm this assumption.

The evidence showed that when the required resources were not available, institutional entrepreneurs resorted to their social ties, they collaborated with them, and they convinced others to contribute to the project. By doing so, they motivated others to take action and to break away from scripted patterns of behavior (Emirbayer and Mische, 1988). These findings confirm that agency is distributed and relational.

In addition, there is interplay between the actors acting from groups inside the targeted audience and the actors acting from groups outside the targeted audience. For this reason, institutional entrepreneurs ended up with social ties acting from inside and acting from outside the targeted audience. Social ties of this study have moved between both spaces over time. This situation resembles the concept of duality of persons and groups introduced by Breiger (1974), that highlight the intersection of persons within groups and of groups within the individuals. Therefore, while the tactics and modes of contestation at group level can be different as argued by Schneiberg and Lounsbury (2008), at the individual level, actors might contribute to the institutional project in both spaces. This because at the individual level, the relationship between both spaces is "porous"²

Although an institutional change project cannot be carefully planned, there are some practical implications of this study. The presented evidence suggests that there are specific social ties that matter for an institutional initiative more than others. The classification presented helps to identify what type of social ties might be helpful during the different stages of the institutional project. Thus, if entrepreneurs can get them together during the process of change, then they might be able to move forward in their project.

Additionally, the dimensions of attributes identified during the data analysis suggest that social ties and entrepreneurs are able to contribute not only from the expertise they already have, but also from the expertise and reputation they might acquire over time. As a consequence, the dimensions described in this study (see Table 3.4) might help

² The author is grateful to Sylvain Lesage, who pointed this out

institutional entrepreneurs to identify what expertise they might require for their projects, as well as, to identify possible key job positions.

Finally, it is to note that, actors can play different roles during the process of institutional change because, over time, they can acquire certain new expertise relevant for the project, change their reputation or their belonging to status groups. In sum, the dimensions of contribution to institutional projects are not static, and changes in one dimension might influence changes in another. For instance, due to the performance demonstrated in the institutional projects, some knowledge supporters have improved their reputation. Likewise, certain social ties might become over time institutional entrepreneurs, when they commit themselves to the project, and others might leave the project.

As a conclusion, this study offers a modest but substantive step to the theoretical background of institutional entrepreneurship. The social tie categories derived from the data appeared consistent with existing research, and reinforce the perspective that agency is relational and distributed, in spite of its limitations as inductive study with a limited number of cases. I further hope that, this study helps to untether the heroic view of the solo institutional entrepreneurs, who has a seemingly unlimited agency, and to contribute to the more realistic view that gets more and more rooted in institutional entrepreneurship research.

Chapter 4. A MULTIDIMENSIONAL DESIGN FOR COLLECTIVE LEADERSHIP IN THE CONTEXT OF INSTITUTIONAL ENTREPRENEURSHIP

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ABSTRACT

The study of collective forms of leadership has taken different perspectives of investigation. While the entity approach focuses on the actors' attributes and their interpersonal relationships, the relational leadership approach stresses the importance of the ongoing interactions and relations in the emergence of leadership. These approaches depart from different ontological assumptions, but we argue that they are complementary in a project of institutional entrepreneurship. In this sense, we propose to explore the dynamics of collective leadership in three consecutive stages of an institutional project using a multidimensional design, which is based on the positional approach. The multidimensional design connects three levels of analysis: (i) The actors involved in the institutional project and their cognitive schemes, (ii) the collaborative relationships between these actors, and (iii) the organizational sphere, where these actors belong. The resultant dominance positions in the multidimensional space allows for analyzing the degree of contribution to collective leadership, and this measurement allows for connecting theory, data and method. We discuss the implications of these findings for further collective leadership research adopting the positional approach.

KEY WORDS

Collective leadership; institutional entrepreneurship; positional approach.

4.1 Introduction

Collective leadership explores the engagement of several actors in the direction or leadership of an initiative, a project or an organization. At the same time, collective leadership aims to explore jointly not only the characteristics of leaders and followers, but also the processes associated with the collective creation of a sense of direction, and the interactions of several actors in these processes (Denis et al., 2012). Other umbrella terms for this research stream are plural leadership (Denis et al., 2012) and collectivistic forms of leadership (Yammarino et al., 2012).

Uhl-Bien (2006) has differentiated two perspectives for studying collective leadership: The entity perspective and the relational perspective. The former is grounded on objectivist ontological assumptions, which focuses on the leaders, i.e. the entities, their attributes and their inter-personal relations. In contrast, the second perspective is grounded on constructionist interpretive assumptions, which emphasizes the ongoing interactions among actors as the source of leadership. This relational perspective of leadership is, in turn, intrinsic of the social construction process, as Murrell (1997) states *"it is possible to see relationships other than those built from hierarchy... and to envision transformational phenomenon where the social change process occurs well outside the normal assumption of command and control"* (p.39).

As the ontological assumptions of both perspectives are different, they cannot be integrated. However, we consider the entity perspective could complement the relational perspective. For this reason, this paper aims to explore collective leadership combining both perspectives in an environment, where the sense of direction emerges through collective participation and collaboration. The context of this study is institutional entrepreneurship, which highlights the role of actors in the construction of the social order.

Institutional entrepreneurs are resourceful actors, who foster the transformation of existing institutions or the creation of new ones (Eisenstadt, 1980; DiMaggio, 1988). Dorado (2013) argues that institutional entrepreneurs act in the context of social groups and suggests the adoption of the small group as unit of analysis to examine the dynamics around institutional entrepreneurship. This view is aligned with the argument of Marwell and Oliver (1993) that states *"in most instances collective action is produced by a relatively small cadre of highly interested and resourceful individuals, rather than by the efforts of the average group member"* (p.54). Yet, while the adoption of the small group as unit of analysis might contribute to a more realistic view of institutional change, as being dependent on the actions of multiple actors, there is the risk of considering the small group as a homogeneous entity. In such an entity, actors might contribute in equal form to the institutional project. But, we argue that it is necessary to understand the leadership dynamics inside the group: Actors within the group might assume certain degree of leadership during institutional project. In this sense, we explore the question: Who contributes to collective leadership during an institutional project?

To explore this question, we propose a multidimensional design based on the positional approach (Brandes, 2016; Schoch, 2018). In the positional approach, social structure is conceptualized as the distribution of social positions in a multidimensional space, which is constituted by variables associated with individual actors (Blau, 1977). Thereby, to carry out this multidimensional approach, we assessed the individual leadership position of institutional entrepreneurs and their collaborators including three dimensions: (i) The actors involved in the institutional project and their cognitive

schemes, (ii) the collaborative relationships between these actors, and (iii) the organizational sphere, where these actors belong.

Our study is about groups of institutional entrepreneurs that are fostering the diffusion of Software Libre (SL) in Bolivia. Since 2006, one group has worked inside the government deploying complex technical innovations with SL. Other groups have acted from outside the government since 2010 by doing lobby work to introduce changes in the regulatory framework. In 2016, as a result of these efforts, a migration plan towards SL has been approved for all government entities, and it is expected that they will have migrated their information systems to SL until 2023.

By determining the dominance positions in the proposed multidimensional space, we estimated the contribution degree to collective leadership of the actors involved in the SL project. A close view of the dominance positions and their patterns facilitated the understanding of the ways actors contribute to the negotiation of a new social order. And the combination of the three dimensions of the multidimensional design supported the direction and progress of the institutional initiative. We also observed that, over time, changes on the positional dominance reflected changes on individual motivations and on the institutional framework. These findings connect theory, data and method for leadership as an outcome of the social construction, and thereby, they open new research opportunities for collective leadership.

The remainder of this document is organized as follows: The second section presents the proposed dimensions of collective leadership; research methods are described in the third section, and data analysis proceeds in the section fourth; the fifth summarizes the research findings, and the sixth section critically discusses the scientific contribution intended by this paper.

4.2 Dimensions of collective leadership

In a review of collective leadership, Uhl-bien (2006) elaborates two perspectives for this research stream. The entity perspective studies individuals, their attributes and the interpersonal relations between leaders and followers; for this perspective management is central. On the other hand, the relational perspective conceives leadership as relationships, but not as interpersonal relations, more as communicative interactions among individuals (e.g. conversations), which constitute the base of constructing the social order.

On the entity perspective, Contractor et al. (2012) propose a topology to study collective leadership using social network analysis that comprises three aspects: People (i.e. leaders, followers and their relations), roles (i.e. leadership functions such as navigator, engineer, social integrator, and liaison), and time dynamics. While the aspect of 'people' describes the structural form, intensity and direction of leadership of multiple individuals, the aspect of 'roles' refers to patterns of individual behavior resulting from context-related interactions, as well as to expected behavior of group members. Finally, the 'time' aspect illustrates the possibility that different individuals assume different leadership roles at different points of time.

In turn, Uhl-bien (2006) proposes the Relational Leadership Theory (RLT) as a framework to explore the dynamics of relational perspective. To explore these dynamics, Uhl-bien (2006) proposes two alternatives: to consider relationships as an outcome, and to consider relationships as a process of structuring. For the former alternative, she suggests that RTL can be investigated by analyzing how leadership

relationships are product of social interaction. For this aim, she recognizes that research can consider either pure entity approach and or a constructionist approach, or a combination of both (ibid.: 669-670). For the latter alternative, she proposes to focus on how social interactions contribute to the emergence of social order, and she suggests participatory methods for investigate this case, including insider/outsider research, appreciative inquiry, and action science (ibid.: 670-671)

These contributions are valuable within their own insights. Contractor et al. (2012) see role patterns among people shifting with context-related interactions, which renders leadership roles temporary instable. Uhl-bien enriches these understandings by confirming the importance of entity, but enforcing the importance of interactions that manifest themselves in communication and through the construction of a social order.

While these contributions have enhanced our understanding of how collective leadership is enacted, they still leave questions open. In their review of the collective forms of leadership, Denis et al. (2012) see RLT challenged by the following fact: If leadership is an outcome of interactions and negotiations, it remains unclear: who is a contributor to collective leadership when leadership blends into other phenomena like decision-making, problem-solving or teamwork.

On this respect, we consider that the emphasis of the RLT approach on the communicative interactions misses an important point: Like interpersonal relationships, communicative interactions are also driven by cognitive schemes and abilities of those individuals who take part in them. This might imply, that the roles identified in the entity perspectives might have an influence the relational perspective (i.e. the interactions), and in turn, this influence might change and evolve over time.

Therefore, we propose to investigate leadership relationships as product of social interaction by considering aspects from the entity approach, specifically individual cognitive schemes, and aspects from the relational approach by including collaborative relationships among individuals pursuing changes on the social order. For this, we adopt a multidimensional design based on the positional approach, which determines social positions in a multidimensional space made up of attribute and relationships dimensions (Brandes, 2016: 8). The dimensions, which we use to investigate collective leadership, therefore refer to cognitive schemes (dimension 1), collaborative relationships among actors (dimension 2) and the given organizational field context (dimension 3).

4.2.1 Cognitive dimension

As a transfer into a more holistic view, we describe the potential of leadership as being determined by an individual's cognitive schemes and abilities, which in turn support the role he or she plays in the project, initiative or organization where the contribution occurs. We adopt the term "cognitive" to stress the fact that behavioral outcomes are affected by the way actors think, perceive, remember, learn and get motivated (Burger-Menzel, 2016). We argue that these outcomes include the domain of leadership.

In institutional entrepreneurship, Fligstein (1997) considers social skills as a driver for strategic action that attempts the change institutions. He defines social skills as *"the ability to motivate cooperation in other actors by providing those actors with common meanings and identities in which actions can be undertaken and justified"* (p. 398). Thereby, he recognizes that certain actors are better at producing desired social outcomes, and these actors use their social skills in their initiatives. The cognitive dimension of our design aims to capture this aspect in our study.

4.2.2 Dimensions of collaborative relationships

The institutional entrepreneurship process includes, on the one hand, the definition of a vision of divergent change, and the mobilization of allies to support the implementation of the vision, on the other (Battilana et al., 2009). This implies that institutional change is dependent on the actions of several actors, and in turn, it requires cultivating alliances and cooperation. Contributions and interactions are at the heart of institutional projects.

In her RLT proposal, Uhl-bien (2006) following Dachler (1998) recognizes that: *“leaders are those who make especially salient contributions, and are recognized as such because participants construe their influence as compatible with the means by which they seek to satisfy their own values and interests; therefore participants act as leaders when they: (1) consistently make effective contributions to social order, and (2) are both expected and perceived to do so by fellow participants”* (Uhl-bien, 2006:667).

Therefore, contributions might be the product of repeated social interactions among actors, and over time, we can expect that these interactions may evolve in collaborative relationships. Based on this assumption, we propose to include the dimension of collaborative relationships by exploring the network of collaborators, who contributed to an institutional project. Central actors on this network might be considered leaders because their salient contributions.

4.2.3 Dimension of the organizational context

Denis et al. (2012) point out that it is relevant to consider not only interpersonal interactions as one dimension of leadership constellations, but also the external environment and the internal organizational context as well. This because in such settings issues like accountability, legitimacy with stakeholders and interpersonal tensions are weak points, which over time change and they could lead to fragile constellations, and influence changes on the leadership structure.

In the case of institutional entrepreneurship, it is recognized that the organizational context influences on the likelihood for entrepreneurs to conduct divergent organizational change (Battilana, 2006). Therefore, we include in our design the organizational context as a dimension.

Grounded on the concept of the duality of persons and groups proposed by Breiger (1973), the Multilevel Network Analysis (MNA) simultaneously analyzes two networks, which form different levels. Actors compose the first network, and the second network is constituted by those organizations, where these actors work. Lazega et al. (2008) demonstrated that more central individuals in the interpersonal network and those, who work in more central and bigger organizations, have better access to resources, and they are more likely to perform better. Following the MNA, we propose to include the dimension of the organizational context by analyzing the organizations, where the actors of the collaborators network have worked during their participation of the project.

With these considerations, in the following sections we examine the leadership positions of those actors, who have contributed to a project of institutional change and we assess the (temporary) dominance of certain actors.

4.3 Research setting and data

The proposed research makes sense in the context of groups of volunteers, who pursue an institutional project, where there is no formal hierarchy or authority but a common interest, and where volunteers collaborate to pursue the common vision. These entrepreneurs are fostering changes in an existing social order. Leadership then emerges as an evolutionary process during the whole project: through individual contributions, through collaborative interactions, and through the shifting organizational context.

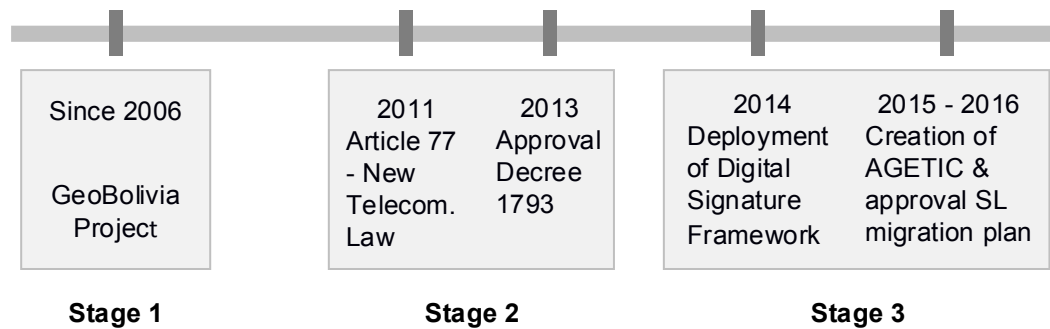
We argue that actors within the group of volunteers enact a certain degree of leadership, and that leadership can be considered collective, when these actors contribute to the institutional project in a coordinated way. The following section briefly describes the project, the collected data, and how we studied this milieu.

4.3.1 Stages of the SL project and population

We conducted the empirical study with groups that have enrolled the promotion of SL throughout the Bolivian state. We identified three consecutive stages of the SL project. They are illustrated in Figure 4.1.

Since 2006, SL advocates have been working for the GeoBolivia project at the Bolivian Vice-presidency Office. GeoBolivia is a complex geographic information framework based entirely on SL. Over time, this framework has been adopted by several government entities. Thereby, GeoBolivia has demonstrated the technical viability of SL, its advantages, and it has contributed to gain moral legitimacy for SL within the government. These achievements summarize the first stage of the SL project.

Figure 4.1: Stages of the SL project



The second stage is related with the SL lobby activities behind the new Telecommunication law and the Decree 1734. In 2011, the Bolivian SL Community and the iFARO Foundation have lobbied the Bolivian congress; they wanted to include one article in the new Telecommunication law, to speed up the adoption of SL by the government. As results of these efforts, the article 77 of the new Telecommunication law defines the prioritization of SL within the government. Over time, both groups became engaged in the elaboration of documents, which formed the foundation of Decree 1793. This decree rules the new telecommunication law and was approved in 2013. The approval of these legislative institutions represents important achievements for the SL project.

After the approval of the decree 1793, members of the GeoBolivia project were promoted to work at another government agency: the ADSIB (Agency of the Development of the Information Society in Bolivia). From there they led the development of a SL framework to validate digital signatures and the deployment of a datacenter based on hardware and software libre.

In 2015, the Agency for E-government and Information and Communication Technologies (AGETIC) was created with the aim to coordinate the implementation of electronic government and the migration to SL. Finally, in 2016 the Executive has approved the SL Migration Plan, and it defines a timeframe of seven years for the total migration to SL for all government bodies. These achievements summarize the third stage of the SL project.

4.3.2 Data

The fieldwork has been conducted by one of the authors (Cabero Tapia) in two phases between 2014 and 2017. The pilot phase included participant observation at diffusion events of the SL community, at the national SL community meeting in 2014 and during coordination meetings with public servants. In this stage, the main milestones in the evolution of the project were identified, as well as key actors, including community members, public servants, university professors and sponsors. Interviews with these actors were arranged to gain additional insights of the project, and to validate the identified milestones.

Documents and secondary data sources were collected as well, including websites, letters and documents that the SL groups exchanged with government authorities. In addition, from 2014 to 2017 the mailing list of the Bolivian SL community was regularly checked. Based on this information, we identified 19 actors, who acted as institutional entrepreneurs for the SL groups. Following the formal definition of an institutional entrepreneur by Battilana et al. (2009), we identify institutional entrepreneurs as those group members, who have actively contributed in the fulfillment of at least one institutional achievement listed in Figure 4.1.

In main fieldwork phase, one of the authors (Cabero Tapia) arranged interviews with the 19 institutional entrepreneurs to collect data for this study. These interviews consisted of three parts. First, informants were asked to discuss their participation, their contribution to the institutional project, their workplace, and their job position at the time of their involvement in the project, and any workplace changes since then. Second, respondents were asked to mention who had collaborated with them in the institutional project and the VennMaker software was used to facilitate the elicitation of these collaborators.

The respondents described in detail the contribution made by their collaborators, and provided information about the collaborator's workplace and job position by the time she collaborated with the institutional project, and if the collaborator has changed her job since then. Finally, the respondents indicated whether their collaborators know each other: Interviewees evaluated the relationship between every two collaborators as "certainly existing", "maybe existing", "certainly not existing". These interviews typically lasted between one and one and a half hours, and were taped and transcribed.

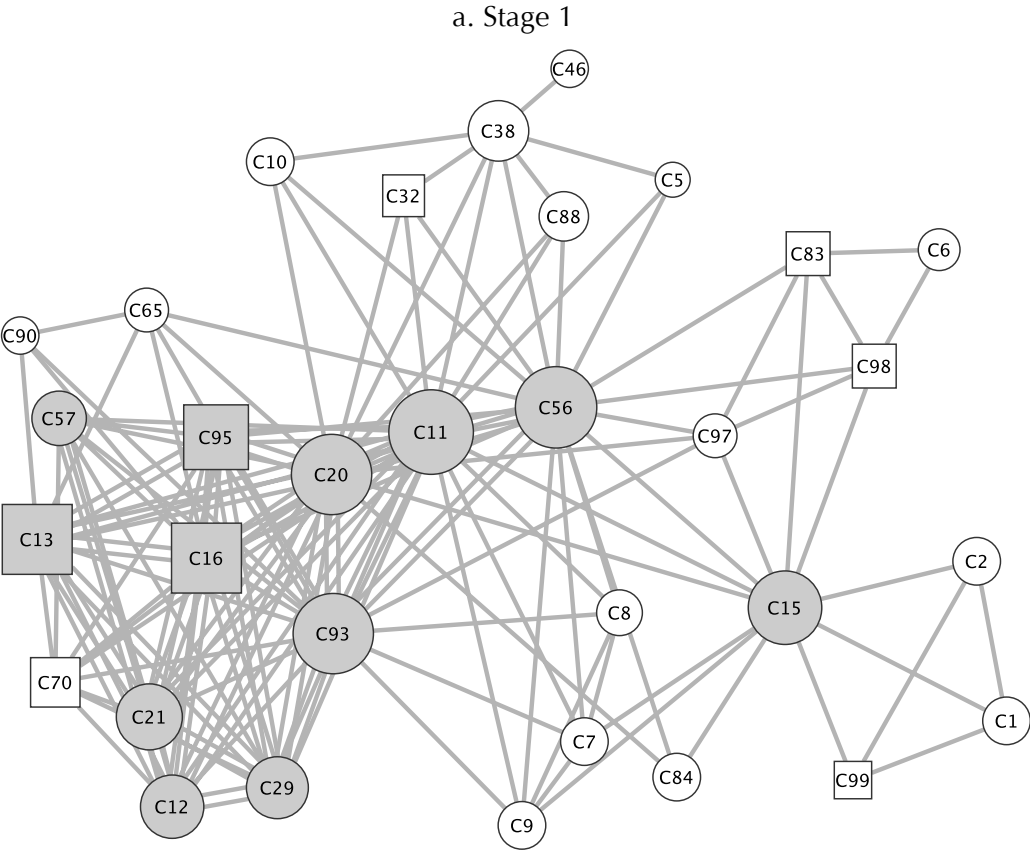
Based on this information the collaboration network of the SL project took shape. In total 107 collaborators were elicited. As for alters, who were mentioned by more than one institutional entrepreneur, the alter data was merged by combining the information about their contribution to the project, their workplace and position. The related network was merged as well. If any doubt arose during the merging process, one of us

(Cabero Tapia) contacted the institutional entrepreneurs, who elicited the alter to get the resultant information confirmed, The number of collaborators, that we were able to position in the proposed multidimensional design, is finally 87. To assess the temporal dimension, we segregated the collaborators by the stages they contributed to the project (See Figure 4.1).

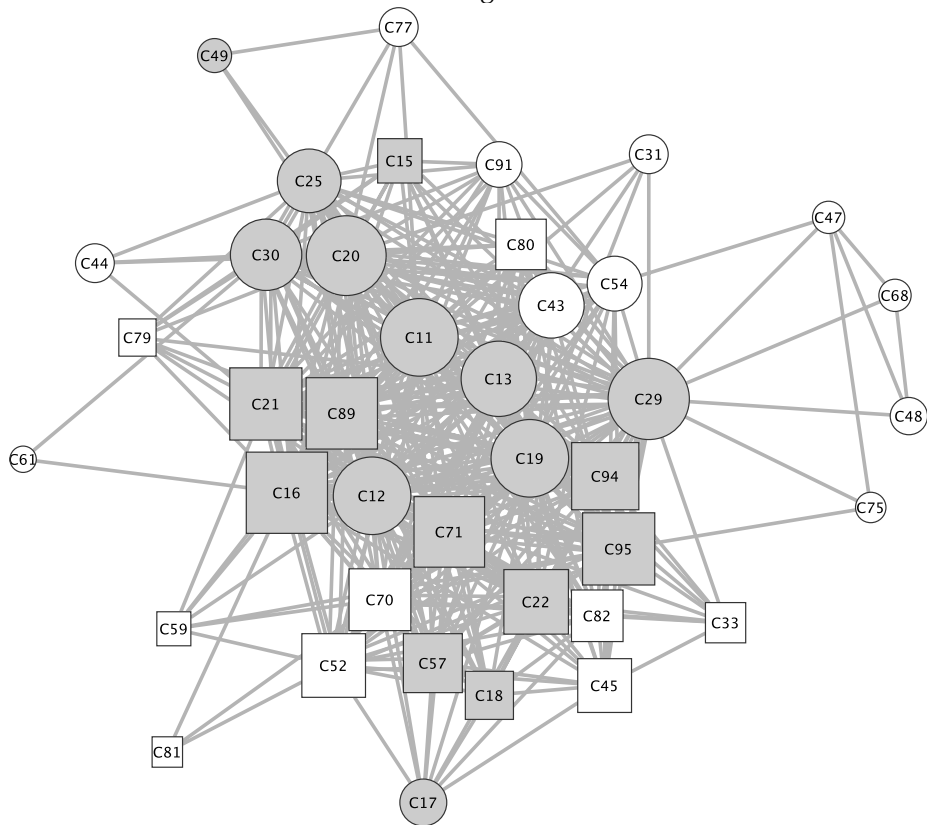
In this sense, we have three collaboration networks. The first stage network, which is constituted by 32 actors, has a density of 0.25 and an average degree of 10.06. The second stage network has 40 actors with a density 0.40 and an average degree of 21.25. In the third stage network, there are 32 actors with a density 0.26 and an average degree 8.87. These networks are presented in Figure 4.2. The gray nodes represent the institutional entrepreneurs; actors represented by circles have worked for the government, and actors represented by rectangles have not worked by the government.

Figure 4.2: Collaboration networks

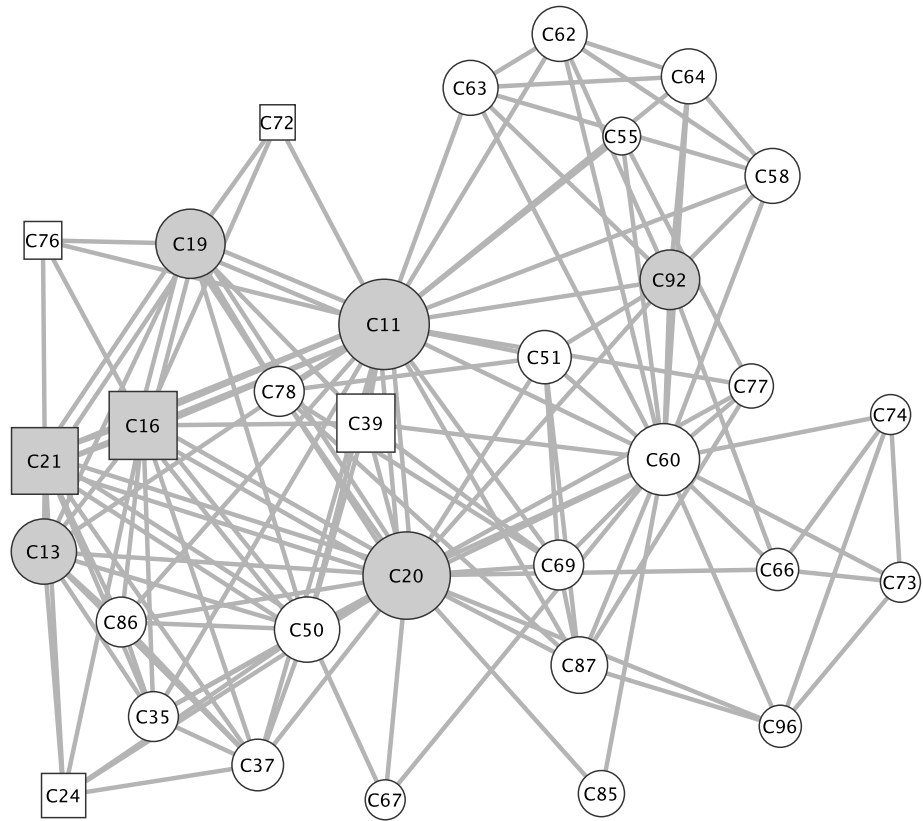
Gray nodes correspond to institutional entrepreneurs. Actors represented by circles worked for the government, and rectangles did not.



b. Stage 2



c. Stage 3



The inter-organizational network is constituted by the organizations, where the collaborators have worked during their participation in the institutional project. The criteria used to establish the relationships among these organizations was to identify collaborative relationships at organizational level related with the diffusion of SL and/ or the adoption of the SL projects developed at GeoBolivia, ADSIB and AGETIC.

In the first stage, 18 organizations were elicited but only GeoBolivia has edges on this network, therefore its density is 0.04 and the average degree is 0.78. The network of the second stage includes 23 organizations. The new Telecommunication Law led to the creation of the Plurinational Committee for Information and Telecommunication Technologies (COPLUTIC), an inter-organizational committee with the aim of supervising the definition of the e-government initiatives and the coordination of the SL migration plan. This committee consists of representatives of the Public Works Ministry, the Planning Ministry, the Education Ministry, the Communication Ministry and the ADSIB. In the second stage, several elicited collaborators have worked in these organizations.

Likewise, the iFARO foundation played an important role in the second stage. SL community members embedded their lobby activities in this organization. By this time, iFARO signed cooperation agreements on SL with two universities and supported SL-related business. Taking into account these relationships, the inter-organizational network in the second stage has a density of 0.06 with an average degree of 1.3.

When the changes on the institutional framework took place, the number of the involved organizations decreased. The inter-organizational network of the third stage has 12 organizations: Members of the COPLUTIC, other government entities involved in the implementation of SL solutions and the ADSIB and AGECTIC are included in this stage. This network with a density 0.15 and an average degree of 1.6 is more interconnected.

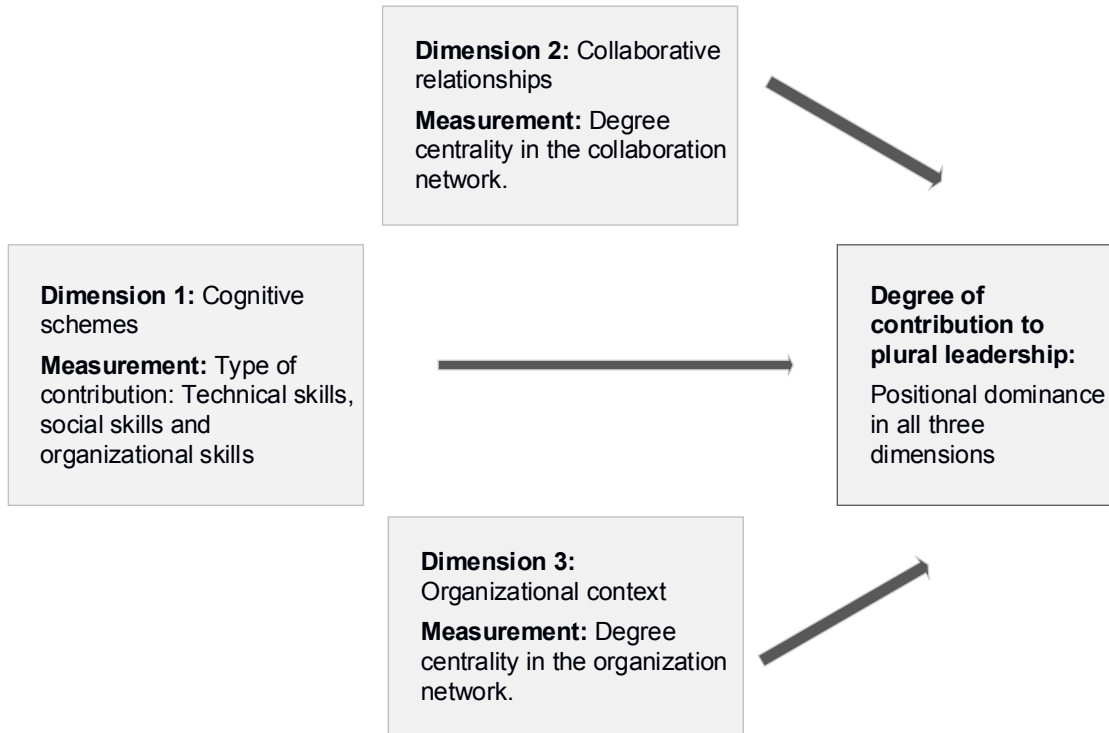
Now we describe how we positioned the actors of this project in the proposed multidimensional system.

4.4 Positioning institutional entrepreneurs in a multidimensional system

To carry out the proposed multi-dimensional approach, we measured the position of leadership of the actors involved in the institutional SL project including both attribute dimensions and relationship dimensions as shown in Figure 4.3.

On the one hand, the position of leadership of an actor depends on her cognitive schemes and skills, which in turn, support her contribution and the role that is played in the institutional project. Table 4.1 summarizes the skills analyzed in this dimension for this study. They are adapted from the troika of innovation promoters model (Hauschildt and Kirchmann, 2001). Innovation studies highlight role of promoters as *“the individuals who actively and intensively support the innovation process”* (Witte, 1973:15-16). In this sense, Kratzer (2014) discusses the influence of the role of promoters of innovation in different networks in the creativity of research teams, and he suggests that this influence change over time.

Figure 4.3: Dimensions of collective leadership



We used this model to analyze the cognitive dimension in our study because our case has a technological background. Technological innovations deployed by the institutional entrepreneurs played an important role in the progress of the SL institutional initiative. But, this choice does not represent a limitation of the proposed multidimensional system, as the cognitive dimension can be assessed differently according to nature of the studied phenomenon.

Table 4.1: Troika of promoters adapted to institutional entrepreneurship

Promoter	Skills
Strategic Promoter	<ul style="list-style-type: none"> - Social skills as described in Fligstein (1997). - Support the gaining of pragmatic legitimacy (Suchman, 1995).
Technological Promoter	<ul style="list-style-type: none"> - Technical skills that support the project (Witte, 1973); Hauschildt and Kirchmann, 2001). - Support the gaining of moral legitimacy (Suchman, 1995).
Process promoter	<ul style="list-style-type: none"> - Organizational know-how and process development skills (Hauschildt & Chakrabati.,1988)

In our study, the cognitive dimension was assessed through the information we collected about the actors' contribution to the project. This information has been collected for each stage independently.

Following the troika of promoters model (see Table 4.1), we took into account if the actor's contribution relied on her social skills (as defined by Fligstein 1997), or on her technical skills or on her organizational skills. We used a variable to assess each skill independently that varies from 0 to 5, where 0 represents the absence of a given skill, 5 represent a high degree of contribution of this skill. Then, we added up the rates for the three skills. In this way, we represented the contribution of each actor on the cognitive sphere. The variation of this value shows that an actor might have contributed in the three ways (with 15 being the highest value).

For the other two dimensions, we used degree centrality measures for the collaborators networks and for the inter-organizational networks. We assume that actors who are more central in these networks can contribute more to collective leadership by getting support of other collaborators and/or by influencing the organizational sphere, where they belong. We adopted the degree centrality because the measurements required for the positional approach should be natural numbers. Table 4.2 summarizes the descriptive statistics of the variables used in this study.

Table 4.2: Medians and totals for the variables characterizing the population of the study

Variables	Stage 1	Stage 2	Stage 3
Total of institutional entrepreneurs	12	20	7
Total of collaborators (including institutional entrepreneurs)	32	40	32
- Who have worked for government	24	21	26
- Who have not worked for government	8	19	6
- Turnover from the project	-	69.8%	82.5%
- Median cognitive dimension	5	5	1
- Median degree centrality collaboration network	6	20.5	1
Total of organizations	18	23	12
- Median degree centrality organizational network	5	6.5	3

With the rate of the three dimensions for the different stages of the institutional project, we applied the positional approach assuming total heterogeneity of the three dimensions. This implies that the dimensions are independent from each other: one actor can skill-wise contribute to collective leadership independently from her centrality in the collaboration or inter-organizational network. Vice versa, an actor can contribute to leadership from her centrality in the collaboration network independently from her centrality in the inter-organizational network or her cognitive sphere.

However, it is to note that the election of the degree centrality lead to an assumption of homogeneity with respect the dimension of collaborative relationships and for the inter-

organizational dimension as well³. This means, that the nodes in these networks are equivalent because the degree of centrality of both networks is measured only by number of ties incident to a given node. In other words, actors within the dimension of collaborative relationships have the same exact parameter and are equivalent. This is also applies for the organizations within the dimension of organizational context.

Based on the example of the positional approach presented in Brandes (2016), we consider the set of actors of the collaborators networks and their dimensions as a two-mode network, where the entries are comparable across columns (similar as in Breiger et al., 2014). In this sense, the proposed dimensions can be viewed as both attributes and affiliations because all entries are interpreted as observations for same variable: The degree of contribution to collective leadership. Therefore, the positional approach determines that:

Actor[i] has contributed more to collective leadership than actor [j], if actor[i] has a greater rate than actor [j] in all three dimensions; in this case, actor[i] dominates actor[j]

Following this logic, it is possible to identify the position of the different actors along the proposed dimensions for collective leadership. In the next section, we analyze these position and the contributions of the actors to collective leadership.

4.5 Findings

The positional dominance of the collaborators of the SL initiative for the first stage is presented in Figure 4.4, for the second stage in Figure 4.5, and for the third stage in Figure 4.6. Intuitively we can conclude that the actors on the bottom have the lowest degree of contribution to collective leadership and the actors on the top are the main contributors. But the interpretation of the findings goes beyond this implication. In order to contextualize the resultant positions, and provide additional insights about the nature of the contribution to collective leadership, we analyze the positional dominance of some actors in the different stages of the projects.

4.5.1 Un-dominated actors

The un-dominated actors represent the Pareto efficiency, and they are highlighted in the respective figures. In the first stage, they correspond to nodes C11, C15, C20, C56 and C93 (see Figure 4.5). The four of these nodes were key actors in the GeoBolivia project: C11 is a mathematician and computer specialist, C15 and C56 are geographers, and C20 is sociologist. The combination of their skills supported the development of the geographic system that has been adopted over time by several governmental entities.

Node C20 corresponds to Nicolas Laguna, who in 2013 was designated as the director of ADSIB. His political background as sociologist combined with the technological achievements at GeoBolivia, and later at ADSIB supported his promotion as director of AGETIC in 2014. He is the only actor, who is un-dominated along the three stages.

Other relevant actor is Sylvain Lesage (C11) who has a high positional dominance in stage two, and in last stage is also un-dominated. Both are advocators of SL and have collaborated with the initiatives of the SL community. Sylvain was active in the mailing list of the SL community, where he contributes not only with technical topics, but also

³ The authors are grateful to Prof. Ulrik Brandes, who pointed this out.

in political discussions around the adoption of SL by the government; he became director of the ADSIB when Nicolas moved to AGETIC. They have the greater degree of contribution to collective leadership because of their cognitive sphere and their centrality in the other two dimensions.

Figure 4.4: Positional dominance among the collaborators of stage 1

Positional dominance assuming total heterogeneity. Transitively implied relationships are omitted; vertical position corresponds to number of dominated actors. Highlighted actors are un-dominated; gray nodes correspond to the institutional entrepreneurs. Circles nodes worked for the government, and rectangles did not.

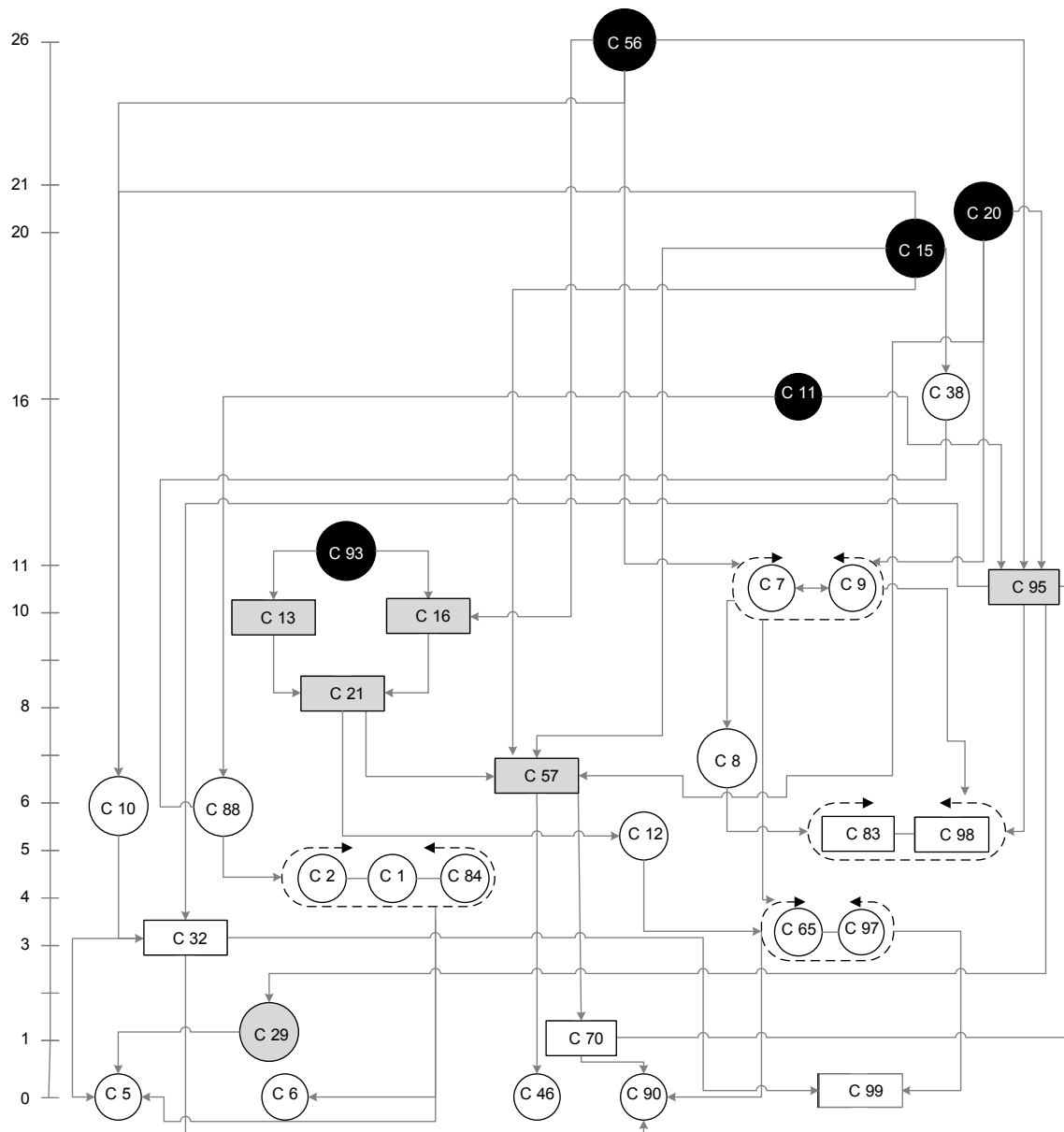


Figure 4.5: Positional dominance among the collaborators of stage 2

Positional dominance assuming total heterogeneity. Transitively implied relationships are omitted; vertical position corresponds to number of dominated actors. Highlighted actors are undominated; gray nodes correspond to the institutional entrepreneurs. Circles nodes worked for the government, and rectangles did not.

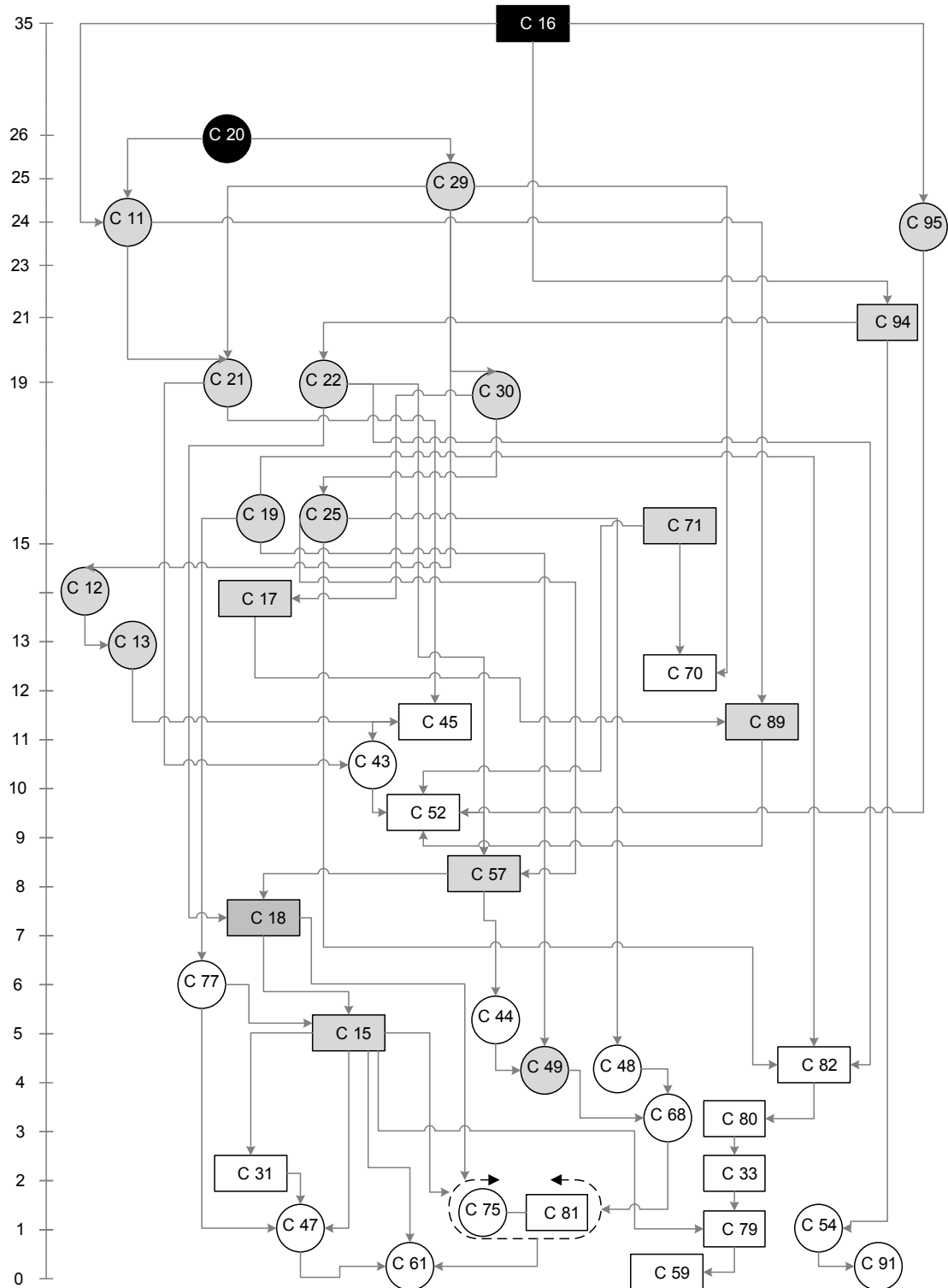
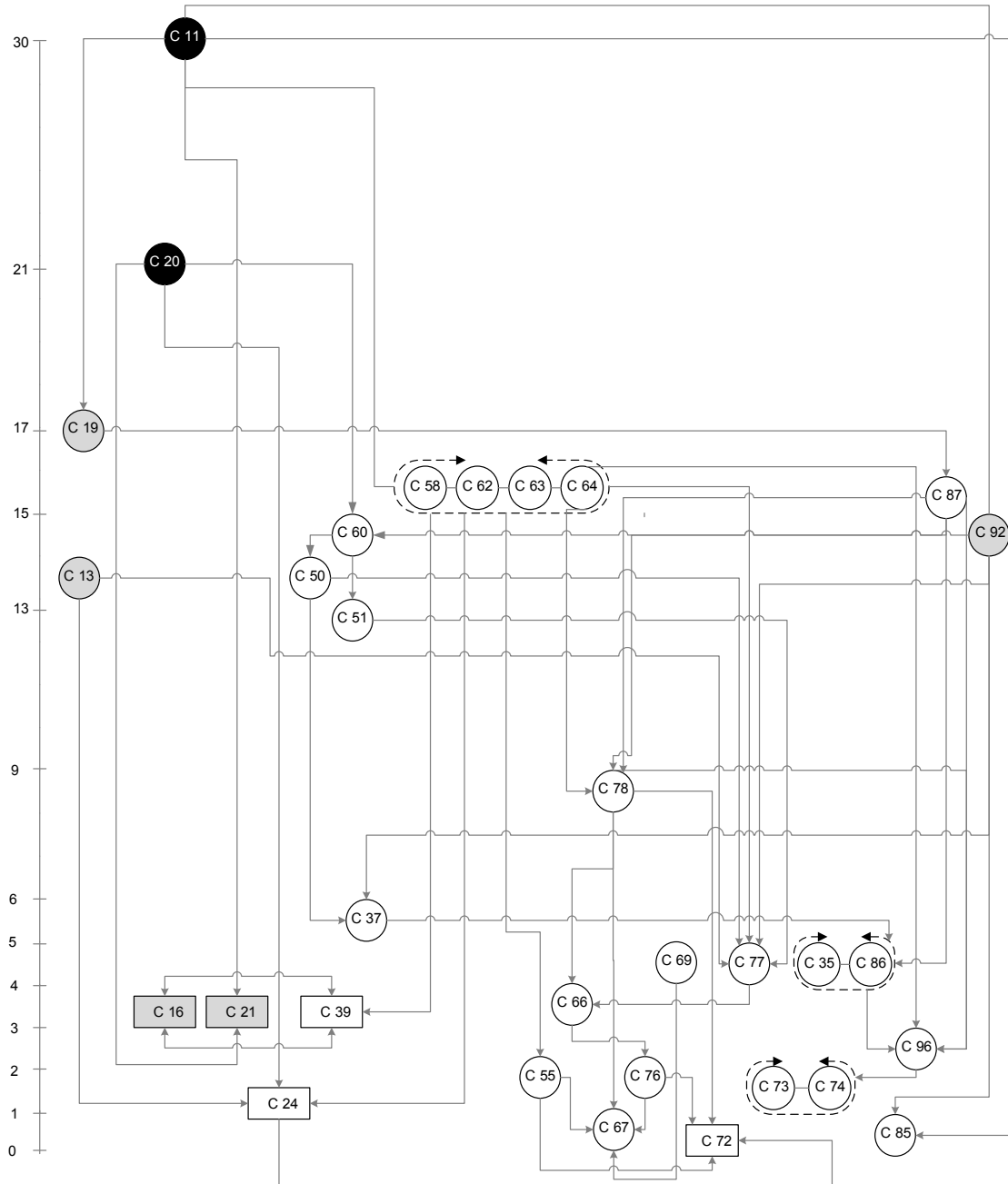


Figure 4.6: Positional dominance among the collaborators of stage 3

Positional dominance assuming total heterogeneity. Transitively implied relationships are omitted; vertical position corresponds to number of dominated actors. Highlighted actors are un-dominated; gray nodes correspond to the institutional entrepreneurs. Circles nodes worked for the government, and rectangles did not.



The other un-dominated actor in stage 1 is Daniel Viñar (C93). He is a SL advocate from Uruguay, who came to Bolivia to coordinate a project related with the dotation of computers from France to Bolivian schools. Due to their technical background, he worked in several government entities, and he supported the organization of SL diffusion events of the SL community between 2006 and 2008. During the interviews, several institutional entrepreneurs reminded Daniel as the person who introduced them to the

SL philosophy. While he does not have a greater degree of contribution (as he only dominates only 11 actors of 33), he remains un-dominated in the first stage due to his cognitive sphere and his centrality in the networks. It is to note, that in this stage he dominates other institutional entrepreneurs, who at that time did not work for the government (nodes C13, C16 and C21).

One of them is Hardy Beltran (C16), who in stage two became un-dominated (see Figure 4.5). Hardy is co-founder of the SL Community and the iFARO foundation. He is a computer specialist, who together with other community members has pursued lobby activities that resulted with the inclusion of the article 77 in the new telecommunication law and the approval of Decree 1734. These initiatives have been supported by the iFARO foundation; at that time, iFARO closed SL-related agreements with universities and firms, and this bolster its centrality in the inter-organizational network.

Other un-dominated actor in stage two is Tania Vega (C29) (See Figure 4.5). She is an activist, who was working for the government at that time she supported the SL initiative. She was one of the main collaborators of the SL community, her expertise as activist supported the decisions behind the lobby activities. Likewise, she supported the SL initiative from her position in the inter-organizational network and collaboration networks.

All un-dominated actors are institutional entrepreneurs of the project: they contributed with a high degree of collective leadership. But, other institutional entrepreneurs have relative high degrees of contribution in all three stages; as depicted with the grey nodes in Figure 4.4, Figure 4.5 and Figure 4.6.

4.5.2 Actors, who connect different paths

In the first stage, node C95 (at level 11) directly dominates nodes at different levels: C32 (level 3), C83-C96 (level 6), C29 (level 1), and C70 (level 1) (See Figure 4.4). In some way, C95 connects unrelated paths. As a consequence, the un-dominated nodes C11, C20 and C56 gain, in part, their high position because they dominate node C95.

In stage two, node C29 connects also unrelated paths (see Figure 4.5) by dominating C12, C21, C30 and C70. As we observe below, C29 dominates node C12 in all three dimensions; C21 and C30 in the dimension of collaborative relationships; and C70 in the cognitive and organizational dimensions. In turn, nodes C12, C21, C30 and C70 do not dominate between their selves.

Actor ID	Cognitive Schema	Collaborative Relationships	Organizational Context
C29	10	46	1
C12	9	43	0
C21	8	36	1
C30	10	33	1
C70	6	26	1

Node C29 corresponds to senator Nélida Sifuentes, who supported the approval of the Decree 1734 in several instances. She became aware the SL initiative in 2011 when she contacted groups from the civil society that were advocating a broad diffusion of the Internet in Bolivia. While she was not involved in the techno-political discussions around SL, she quickly understood the reasons behind the SL initiative. She sought, then, advice from the SL community to promote the revision of the Decree 1734 among several government entities and the Bolivian Senate. The contribution of senator Nélida Sifuentes during stage two was decisive for the course of SL initiative, and it is depicted by her positional dominance in Figure 4.5.

In stage three nodes [C58-C62-C63-C64] share the same positional dominance (i.e. they have the same rate on all three dimensions). As depicted in Figure 4.6, these nodes dominate nodes C24, C55, C77, C78 and C96. The positional dominance of the actors [C58-C62-C63-C64] comes from their cognitive dimension and from their position in the organizational network. These actors have contributed with their high technical skills to the technological innovations developed, first at ADSIB, and later at AGETIC. These organizations have in stage three a higher degree centrality as ADSIB participates of the COMPLUTIC, and the AGETIC is in charge of the coordination of the SL migration plan approved in 2016.

4.5.3 Actors with a low positional dominance but a short dominance path above

Another interesting positional dominance is the one of those actors, who dominate few actors (or none at all) and are dominated directly by un-dominated actors. This might imply that even having a low degree of contribution to collective leadership, the positional dominance of this type of actors (and thus, their potential contribution) is only comparable with those actors, who have a short dominance path above.

In stage three, this is the case of Karina Medinacelly, node C85 (see figure 4.6). While Karina does not dominate anybody, she is dominated by the group [C58-C62-C63-C64] (which share the same positional dominance), and by the un-dominated node C11. Karina is a lawyer who worked at ADSIB for the digital firm project. Her specialization in law and information technologies, combined with the centrality of the ADSIB in the inter-organizational network, makes her positional dominance only comparable with the group technological specialists [C58-C62-C63-C64], and with C11, the mathematician Sylvain Lesage, who worked at the ADSIB in this stage.

Other actors with this type of positional dominance in stage three are C16, C21 and C39. They are only dominated by the two un-dominated actors of this stage: C11 and C20. Hardy Beltran (C16) and Alejandro Salamanca (C39) are active members of the SL community, and Ramon Ramon (C39) is a SL advocator from Mexico who advised the government for the SL migration plan. While these actors did not work in stage three for the government, their contribution is only comparable with the un-dominated actors of this stage: with Nicolas Laguna (C20) director of AGETIC and Sylvain Lesage (C11) director of ADSIB.

4.5.4 Prevalence of the vision of change

As shown in Table 4.2, the turn over rate between the stages is relatively high (69.8% from stage 1 to stage 2, and 85.2% from stage 2 to stage 3). This denotes the changeable nature of collective action in general. Individual motivations as well changes on the

structure influence the positional dominance of the actors. While this, in turn, influences also the direction of the collective leadership during the project, we observed the prevalence of the vision of change over time.

After the approval of the new telecommunication law, the COPLUTIC was created, Organization members of this committee started to work on the implementation of the regulatory framework for the SL migration plan. For this reason, these organizations gained a relevant centrality in the inter-organizational network. Later, in stage three, AGETIC was created. These changes in the organizational field influenced the position of Hardy Beltran (C16). Hardy did not work for the government and was an active advocator of SL during the three stages. As founder of the SL community, Hardy achieved a medium degree of contribution to leadership in the first stage (a positional dominance of 9 from 32 actors). In the second stage, as a founder of the iFARO foundation, Hardy has the highest degree of contribution to collective leadership (a positional dominance of 35 from 40 actors). In the last stage, after the creation of COPLUTIC and AGETIC, Hardy has a low degree of contribution (a positional dominance of 3 from 32 actors).

On the other hand, despite of working for the government during the first stage, Tania Vega (C29) has a low degree of contribution to collective leadership (a positional dominance of 1 from 32 actors). But in the second stage, she engaged actively in SL the project, and her contribution degree to leadership became very high (a un-dominated positional dominance of 25 from 40 actors) Finally, after the Decree 1793 has been approved, she decided to left the project.

These examples illustrate the dynamics around collective leadership. However, what remained relatively unchanged along the three stages was the vision of the SL project, i.e. to promote the adoption of SL in the Bolivian government. Battilana et al. (2009) recognize that the creation of a vision of divergent change is part of the process institutional entrepreneurship. The vision of divergent change supports the mobilization of allies, the identification with the project, and the building of sustainable coalitions (Rao et al., 2000). Therefore, where no formal authority among the collaborators of the SL project existed, the vision guided their actions and their contributions to the project. In this sense, despite possible changes on actor's motivations or changes on the institutional framework, actors pursuing a vision of divergent change are able to move forward.

4.6 Discussion

Key question of this paper was: Who contributes to collective leadership during an institutional project? The exploration of this question was conducted in the context of institutional entrepreneurs, who promote the diffusion of SL in Bolivia. The adoption of a multidimensional design based on the positional approach allowed determining the degree, to which actors contribute to collective leadership in any of three consecutive stages of this project. The contribution to collective leadership was assessed with the help of three dimensions: The individual cognitive scheme, the centrality in the collaborators network and the centrality of the organizations, where the actors have worked at the time of their contribution to the project.

As we showed in the previous section, it depends on the positional dominance within the multidimensional space if actors contribute to the creation of a sense of direction for the institutional project and to its progress. For instance the combination of social/ political and technical skills of the four un-dominated members of GeoBolivia project

ensured its success, and this in turn, paved the way for further institutional achievements. When these actors changed their workplace at ADSIB and/ or AGETIC, they also changed their positional dominance, and thus, increased their influence in the emergent coordination of the social order.

At the same time, exploring collective leadership within a multidimensional space is aligned with the conception of relational dynamics of leadership as a context of action (Uhl-bien, 2006). The initial interactions and collaboration between Senator Sifuentes and the SL community led to the revision of the proposal of Decree 1734, and further collaborations by the same actors at the organizational sphere, led to the approval of this Decree. The positional dominance of Senator Sifuentes denotes these interactions (See Figure 4.5, node C29 connects several paths).

Additionally, the presented evidence supports the view of agency as relational and distributed (McGaughey et al., 2016). Actors have changed their positional dominance during the different stages of the project. This denotes that leadership was distributed, and it varied according to the emergent changes in the institutional framework, and according to individual motivations.

For a project of institutional project, this study illustrates the importance of the mission of divergent change for collective leadership. Actors have contributed to the achievement of SL vision from inside and from outside of the government. Some of them have actively participated in several stages while occupying high dominance positions; others have participated in one stage alone, and then, they have left the project. In this scenario, the sense of direction of the project has emerged from the collaborations among the participants of the SL project. And where no formal leadership was established, it was the vision that oriented and motivated the SL initiative, and reinforced the collaborative relationships, while feeding back into the vision.

Given the importance of the centrality in the inter-organizational network, institutional entrepreneurs should identify: what are the central organizations during the development of their projects, and try to engage possible collaborators, who work in these organizations. Likewise, institutional entrepreneurs should be aware that central actors in the collaboration network might influence more the direction of the project.

The adoption of the positional approach supported the analysis of collective leadership in the context of institutional entrepreneurship. While we followed an objectivist/ entity approach for this study, we also considered to some extent the assumptions of the relational approach, specifically: Where no formal authority among the collaborators of the SL project existed, the authors quantified collaborative relationships, which emerged through social interactions in the course of this institutional change project. Therefore our results suggest that there is certain complementarity between both approaches. Actors are able to contribute to the negotiation of a social order from their positional dominance, and this can be determined by their cognitive sphere and by their centrality in the dual system, which is constituted by the contributors network and the related inter-organizational network. Likewise, as shown by the findings, the positional dominance of the actors can fluctuate over time, and this not only denotes the distributed nature of collective leadership, but also reflects the concept of circularity, where *“power and authority continually shift and morph to match the situation as it evolves”* (Bathurst and Monin, 2010: 120).

In terms of methodology, the proposed multidimensional design combines the MNA with the positional approach. This expands the structural analysis of MNA to individual

attributes, and it shows the potential of the positional approach to study complex social dynamics.

However, our study and the illustration of the application of the positional approach are limited. First, we explored only three dimensions of collective leadership, but these dimensions can be adapted or expanded to explore characteristics of other streams of collective leadership (summarized by Denis et al., 2012) like intra-organizational networks, leader-team exchange, team-performance, or self-leadership. If additional dimensions of collective leadership are explored simultaneously, we could expect to disentangle tensions among the different streams by discovering their fruitful contributions to each other.

Second, due to the nature of our project, we were only able to collect data after the interactions and contributions to the project had already happened. Therefore institutional entrepreneurs described them in retrospective, which makes our results suffer from recall issues. This limits the validity of our findings and our understanding of the complementarities of the proposed dimensions for collective leadership. Longitudinal studies could address this limitation by collecting data in other settings, like single organizations, where it is possible to observe the proposed dimensions in specific, time-framed projects.

Finally our study is descriptive in nature, therefore, our multidimensional design can be expanded and complemented with multivariable analysis. These limitations open interesting opportunities for future research on collective leadership that is conceived as a multidimensional space.

Chapter 5. CONCLUSIONS

“Never doubt that a small group of thoughtful, committed, citizens can change the world. Indeed, it is the only thing that ever has.” — Margaret Mead

How do institutional entrepreneurs with low resources manage uncertain institutional projects? This general inquiry has guided this dissertation and it has been explored by focusing in two institutional projects. Bolivian groups from the civil society are fostering changes on existing institutions: The SIM group promotes the organization of international programming contests at universities and schools, and the SL groups promote the adoption in the government of open technologies and SL. The data collection and analysis were based on both qualitative and quantitative methods, and included inductive multiple-case analysis and social network analysis. The data collection consisted of a pilot phase and the main fieldwork, and it was executed between 2014 and 2016.

The main goal of this thesis was to explore three management aspects associated with the coordination of an institutional change project. Key words are decision-making, networking and collective leadership. The main theoretical results of this study are:

- As suggested by Pacheco et al. (2010), effectuation has provided valuable insights in the evolution of projects promoted by institutional entrepreneurs. The evidence presented in chapter 2 shows that institutional entrepreneurs of this study were more likely to follow effectuation principles (Sarasvathy, 2001) to identify opportunities and move forward in their initiatives in earlier stages. But as long they learned and gained expertise in the organizational field, these entrepreneurs were more likely to follow a causal mode.

Moreover, it was possible to establish a connection between exaptation and learning. What I observed in the SL and SIM cases is that the acquired expertise and skills have been used to maximize the available means, using them for other purpose not intended before, which is a key characteristic of exaptation.

The findings of this study also showed that the vision of divergent change crafted by the institutional entrepreneurs entailed meanings, through words and interpretations, which reinforced their identification with the SL and SIM groups. But the vision was not directly related with the establishment of goals to control the future, as argued by Wiltbank et al. (2006).

These findings show that the effectual and causal logics emerge over time as a continuum, and they are complementary. Therefore, while institutional entrepreneurs follow the effectual logic in the design of the environment they live in, as stated by Sarasvathy et al. (2008), they also follow the causal logic.

- The findings of this study also allow insights into relational and distributed characteristics of agency in institutional entrepreneurship. First, the evidence presented in chapter 3 suggests that institutional entrepreneurs rely on their social ties in different ways. This includes (i) collaborators with status or reputation, who support the diffusion of a positive social evaluation for the institutional initiative; (ii) strategic allies who endorse the institutional project through their high job positions and with their political expertise; (iii) knowledge supporters, who help in the gaining of pragmatic legitimacy and the theorization of the vision of change; (iv) facilitators and (v) multipliers, who facilitate the adoption and diffusion of new practices.

Therefore, institutional entrepreneurs, by collaborating and engaging with other actors, have motivated those actors to take action and break with the status quo. The networking efforts of the SIM and SL groups paved the way of the progress of their institutional projects.

Second, as discussed in chapter 4, leadership of the SL project can be considered collective. This institutional project was promoted by SL groups from outside and from inside the government. There was not one single leader or entrepreneur. Instead several collaborators and institutional entrepreneurs contributed to the emergence of the sense of direction for the project. These dynamics also support the conception of agency as relational and distributed.

- In the case of collective leadership, the study departed from the conception of leadership as the collectively creation of a sense of direction, i.e. participation and collaboration are more relevant than control and authority (Denis et al., 2012; Uhl-bien, 2006). Considering leadership as the outcome of social interactions, a multidimensional design based on the positional approach (Brandes, 2016; Schoch, 2018) was proposed in Chapter 4.

This design connects three levels of analysis: (i) The actors involved in the SL institutional project and their cognitive schemes, (ii) the collaborative relationships between these actors, and (iii) the organizational sphere, where these actors belong. The resultant positions in the multidimensional space allowed for analyzing the degree, to which actors contribute to collective leadership in any of three consecutive stages of the SL project.

- The findings of this study suggest complementarities between the entity and the relational approaches of collective leadership, which were differentiated by Uhl-Bien (2006). Likewise, despite the limitations of the application of the positional approach in this study, these findings show the potential of this methodology to disentangle tensions among the different streams of collective leadership.
- Lastly, in terms of methodology, the combination of the positional approach (Brandes, 2016) with multilevel network analysis (Lazega et al., 2006) is novel. The findings of this study demonstrate the complementarities of both methodologies. Likewise, the illustration of the applicability of them together show new approaches for studying complex social dynamics, such as institutional entrepreneurship or collective leadership.

At the same time, the findings of this research have following practical implications:

- As explained in chapter 2, for earlier stages institutional entrepreneurs are more likely to make decisions using available means by following the effectual logic (i.e. Who are we? What do we know? Whom do we know?). Later, when the

institutionalization of new practices occurs, and constraints in the institutional structure unfold, decisions tend to follow a causal mode. This situation provides institutional entrepreneurs certain room to experiment, and try to introduce changes without the necessity of having detailed plans ahead. Moreover, the findings showed that, learning efforts of institutional entrepreneurs support, over time, their initiatives in several ways.

- Networking efforts used for institutional entrepreneurs were analyzed in chapter 3. These findings showed that to support the resolution of conflicts and overcome resistance, strategic allies are relevant. These allies usually held high job positions in key organizations and had political expertise. On the other hand, social ties with recognized status and reputation in the eyes of the targeted audience play an important role as well. Therefore, institutional entrepreneurs should recognize that key partners and key organizations are required for their initiatives, and they should find ways to bring them onboard.
- For the adoption of new practices, two practical aspects emerged from the results of this research. First, at the field organizational level, the establishment of inter-organizational networks supports the interaction with the targeted audience during definition of new routines and practices. The SIM group and the GeoBolivia project have fostered the formation of inter-institutional networks around their institutional projects, and these networks have supported the institutionalization of new practices.

Second, at actor level, the role played by facilitators and multipliers –described in chapter 3– was also important in the introduction and diffusion of new practices in the targeted audience. Therefore, institutional entrepreneurs should consider fostering networks at inter-organizational level. But instead of only holding official meetings, they should consider working close with the actors in these organizations during their daily activities. This close interaction would further encourage and facilitate the development, adoption and diffusion of new routines and practices.

- Institutional change can be promoted from inside and outside of the targeted audience (Schneiberg and Lounsbury, 2008). The findings of this research suggest that acting in both spheres facilitates the process of institutional entrepreneurship. As described in chapter 3, the interaction between the SL advocates acting inside and outside the government was porous, and over time, certain actors have moved and collaborated between both spaces. This was similar for the SIM project, besides professors at the Universities several volunteers (the majority ex-competitors) have been helping in the coordination of the programming contests. In this sense, institutional entrepreneurs should notice that the duality of actors and groups from both spheres is beneficial for their initiatives
- Finally, the findings of chapter 4 demonstrate that the job positions in key organizations are important. Depending on the stage of the project of institutional change, working for central organizations increases the possibility to influence the direction of the project. Likewise, to be central in the collaborators network increase the options to influence in the direction of the institutional project.

Based on these results and practical implications, I argue that the conception of institutions as lasting structures, which are given to govern activity fields and human

behavior, neglect the potential of actors to manage initiatives, that aim for altering these structures. Friedland and Alford (1991) remind that social theory have to work at societal, organizational and individual levels. All three levels are intertwined. To neglect the individual level does not provide a full picture of the complex dynamics of social reality.

Consequently, this study shed light in the ways actors with low resources manage institutional projects with regard to decision-making, networking and collective leadership aspects. These findings invite to continue exploring not only the role of individuals in the change of institutions, but also the ways these individuals are able to manage this change.

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