USING BOUNDARY GAMES TO ANALYZE ACTOR INTERACTIONS

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ABSTRACT

When standard codification methods are applied to the problem of analyzing actor interactions, both the sense and direction of the conversation are lost. As a way of dealing with this problem this paper proposes the use of the boundary games method (Velez-Castiblanco, 2011, 2012a) for the analysis of interactions. This method facilitates a description of actors' actions in terms of the effects of their communicative expressions over the boundary, encompassing the assumptions considered relevant to the discussion. This method draws upon boundary critique theory and language pragmatics. Specifically, boundary games are underpinned in the Midgley and Ulrich boundary critique, Wittgenstein's language games and the Sperber and Wilson relevance theory. It is argued that this method allows the identification of interaction patterns, actor intervention approaches, points of view that fuel the debate and the pivotal proposals that mediate these views. All of these factors allow us to represent sequences of events or trajectories for interactions. The data analyzed comes from observations of a top management team (Sura TMT) responsible for the corporate strategy of a Colombian multi-business firm, Suramericana S.A. The main purpose of this research is to understand the ways in which managerial knowledge is deployed in the management of a multi-business firm. The data were first analyzed through the grounded theory codification process in order to describe the parts of the system under study. The data then feeds the boundary games interactions analysis.

Keywords: actor's interactions, boundary games, interaction analysis, boundary critique, critical systems thinking.

INTRODUCTION

The multibusiness firms have become institutions with a global influence. Most of the goods and services consumed daily are being provided by companies of this nature. Coordinate diversity and capture the synergies that characterize this type of firms, while innovating and changing along the market, constitute big challenges for the top management teams of the multibusiness firms. The increasing complexity that these companies have to face requires a managerial knowledge that goes beyond the success of their competitive strategy. Despite this, the knowledge management at the corporate level has been little explored in the fields of strategy and knowledge management.

Using Boundary Games

The thesis that underpin this paper, aims to understand and (conceptually) model the deployment process of managerial knowledge in a multibusiness firm (Rivas, 2014). This research is based on the paradigm of complexity, the constructivist epistemology and the abductive logic (P. Anderson, 1999; Blaikie, 2007; Eisenhardt & Pienzunka, 2011; Holland, 1992). The research method was the case study and data collection techniques were non-participant observation, semi-structured interviews and document review (Yin, 2009) (R. Anderson, Crabtree, Steele, & McDaniel, 2005; Guber, 2001; Patton, 2002). The subject of analysis selected was the top management team, the level of analysis was the corporate and the unit of analysis was the management committees. For the data treatment two methods of analysis were combined: grounded theory coding and boundary Games. The originality of this thesis is expressed by the deepening of the concept of managerial knowledge[1] at the corporate level as a complex adaptive system; in the implementation of complex interpretive perspective to "Suramericana S.A" as a unique study case; and, in the combination of methods of analysis. In addition to theoretical and methodological contributions described, it is considered that this thesis makes practical contributions to the multibusiness firms as: i) the characterization of managerial knowledge and its deployment process is a topic of interest for the training of managers; ii) temporary structural forms, that act as breaking mechanisms of knowledge silos, and integration mechanisms for specialized knowledge; and iii) the operationalization of synergy, their inhibitors and facilitators. Finally, it is expected that when addressing the managerial knowledge as a complex adaptive system decision-making could be decentralized.

This paper focuses specifically in the methodological contributions reached by mixing two methods of analysis: standard codification and boundary games. When standard codification methods are applied to the problem of analyzing actor interactions, both the sense and direction of the conversation are lost. As a way of dealing with this problem this paper proposes the use of the boundary games method (Velez-Castiblanco, 2011, 2012a) for the analysis of interactions. This method facilitates a description of actors' actions in terms of the effects of their communicative expressions over the boundary, encompassing the assumptions considered relevant to the discussion. This method draws upon boundary critique theory and language pragmatics. Specifically, boundary games are underpinned in the Midgley and Ulrich boundary critique, Wittgenstein's language games and the Sperber and Wilson relevance theory. It is argued that this method allows the identification of interaction patterns, actor intervention approaches, points of view that fuel the debate and the pivotal proposals that mediate these views. All of these factors allow us to represent sequences of events or trajectories for interactions. The data analyzed comes from observations of a top management team (Sura TMT) responsible for the corporate strategy of a Colombian multi-business firm, *Suramericana S.A*. The main purpose of this research is to understand the ways in which managerial knowledge is deployed in the management of a multi-business firm. The data were first analyzed through the grounded theory codification process in order to describe the parts of the system under study. The data then feeds the boundary games interactions analysis.

[1] The concept of managerial knowledge of Tanriverdi y Venkatraman (2005) was deepened as a theorethical contribution of the doctoral thesis mentioned.

The standard codification method allows to characterize the actors and the context (Suramericana S.A) while boundary games enables the understanding the of the actor´s interactions. In order to describe this methodological process, this paper is organized in three sections. The first one, conceptual development, presents what the boundary games are. In the second one, mixed methods, the methodological process is explained step by step. And, finally, findings and contributions are stated.

CONCEPTUAL DEVELOPMENT

Boundary games (BG) are based on boundary critique and a critical systems thinking branch (Gerald Midgley, 2000; Ulrich, 2003). This approach comes from the doctoral thesis of Velez-Castiblanco (2012), the main purpose of which is to identify the role played by the intentions of the actors in organizational interventions that aim to improve conditions in problematic situations. The author is interested in the central role of the actors, the decision about which tool to use for the intervention process, and how each participant uses it in this process. It takes as its research question the following: What is the relevance of intention in MS/ST (management systems/systems thinking) interventions? The author contributes to understandings of these two facets of intention: intentional actions (we do things intentionally) and intentions (we intend to do things). Table 1 shows the differences between these two sides of intention, as presented by the author above.

As is clear in the below table, the author intends to explore “the relevance of intentions to practice interventions” (Velez-Castiblanco, 2012a, p.13), which combines philosophical, theoretical and empirical discussions. Philosophical discussions are based on Wittgenstein’s language games and the notion of intention in the philosophy of action; the theoretical components are based on a review of the concept of “boundary” (G Midgley, 2000) and Wilson and Sperber’s (1995) (2002) relevance theory.

Referring to language games, Velez-Castiblanco (2011) argues that Wittgenstein states that language is a tool, that is, an instrument that lets us do things. In other words, language games comprise language and actions. It is also noteworthy that, as well as other games, language games also have rules and therefore they can work in different ways: “They can be created, eliminated, changed. They can be fixed, flexible, not clear, incomplete, and even incoherent” (Velez-Castiblanco, 2011, p.3).

Boundary Games is a proposal of rules of how to operate in relation to a boundary. Namely, it helps to understand the possibilities that a boundary offers in an intervention. As the author states: “The boundary draws a difference between what is relevant and what is not relevant to the problem situation. In other words, it points out what it is and is not the system” (Velez-Castiblanco, 2011, p.1). Having cleared the boundary means having shared a common idea about what is and what is not relevant to the organization within a given context. Interactions between team members are not only manifested in the topics proposed for discussion, but also in what emerges from the said discussion.

Table 1. The Two Faces of Intention

	Intentional Action: "we do things intentionally"	Intention: "we intend to do things"
Time Horizon	Present.	Future.
Underpinning Philosophy	Philosophy of Language.	Philosophy of Action.
Underpinning Theory	Relevance, Boundary Critique.	Complexity.
Performed Roles	Making sense of our actions and those of others. Coordinating actor´s actions	Guiding, sustaining and causing action.
Kind of Cause	Collision-like, Linear.	Redundant, Constraint.
Way of study	Effects on Boundary.	Contrast Spaces – Meaning reinforces Webs of Relations.
Intention is…	Not explicit, yet they can be recognized through behavior and effects.	Course of action produced by emergent second-order contextual constraints.
Level of Explanation	Micro explanation.	Macro explanation.
Question Answered	How the current state was reached.	Why the current state was reached.
Effect on tools	Tools used to produce a mix of six effects: setting, following, challenging, enhancing, probing and wandering.	Tools attracted and constrained by emergent courses of action and meaning.

Source: Velez-Castiblanco (2012a, p. 240)

Interactions among Sura TMT members allowed an identification of what is and is not relevant to this collective, and not only for each individual. The differences between these cognitive environments opened the possibility to changed them and negotiate new meanings. But to change the cognitive environment, as stated previously, it is essential to identify what is relevant and what is not. Velez-Castiblanco (2011) based on Midgley (2000) states that "boundaries are not really given by nature. They need to be constructed and 'unfolded' by the participants"(p. 2).This means that some rules that provide flexibility need to be present in order to allow the team to ease the process of sharing each member's individual knowledge, which in its deployment, enables the creation, modification or elimination of boundaries, and could induce the construction of a new cognitive environment or the emergence of collective knowledge.

Accordingly to Churchman (1979) there are some concepts in intervention such as boundaries, clients, purposes, that are not fixed. "The idea is not to find an answer but to foster the process of unfolding" (Churchman, 1979, p.91). Velez-Castiblanco (2011) understands this process of unfolding as a communicative inferential process based on a relevance theory perspective (Wilson and Sperber, 1995, 2002) where cognitive environments are built through every interaction.

In light of the above, a body of knowledge that has been built up throughout a lifetime influences the inferences that an individual makes. Therefore, although the textual message is received in the same way, each individual will interpret its meaning differently due to their different life paths and consequently, different background knowledge, referred by Wilson and Sperber (2002) as the cognitive environment. Such differing interpretations, to which Wilson and Sperber (2002) refer, may be related to the dominant logics of Prahalad and Bettis (1986), who reference the cognitive maps developed by managers throughout the course of their work experience. These dominant logics tend to significantly influence decision criteria when entering a new business by way of criteria that are considered relevant or successful in the main business for which they offer more experience.

The Wilson and Sperber (2002) theory of relevance focuses on the productivity or the significance of a stimulus in a communicative action under two conditions: "a. Other things being equal, the greater the positive cognitive effects achieved by processing an input, the greater the relevance of the input to the individual at that time. b. Other things being equal, the greater the processing effort expended, the lower the relevance of the input to the individual at that time" (Wilson & Sperber 2002, p. 252)

The cognitive environment encompasses all the assumptions that people use to make inferences about a communicative stimulus and therefore this affects the environment each time a new stimulus is reached. Assumptions can be strengthened or weakened by the new stimulus, which means that the cognitive environment is altered. In this sense, the communication process generates change. Such changes are important because, according to Wilson and Sperber (1995), "a change in the mutual cognitive environment of two people is a change in their possibilities of interaction (and in particular in their possibilities of further communication" (Velez-Castiblanco, 2011, p. 4)

However, the relevance of a stimulus depends on whether communication makes it possible for inferences to be made or not when it is difficult to achieve such inferences. How relevance is calculated has two consequences: a) it is a measure of the cost benefit, where cost is the effort required to resolve the issue while the benefit is the number of contextual effects obtained; b) the process of evaluating these effects is not quantitative. According to Wilson and Sperber (1995), relevance is a comparative criterion.

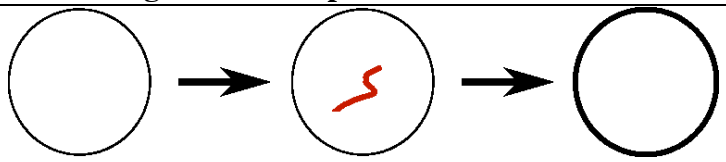
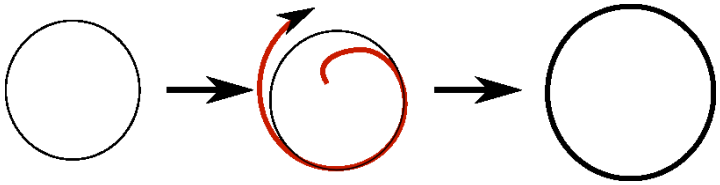
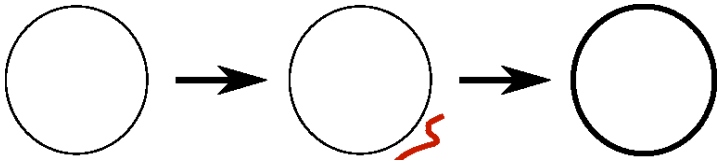
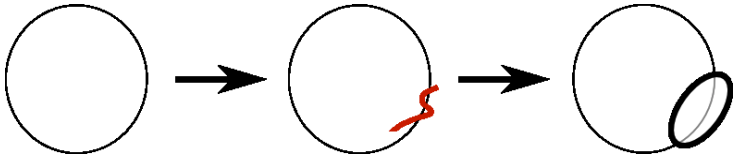
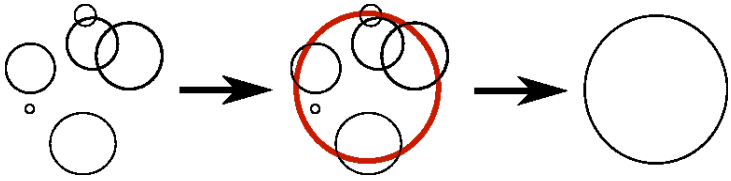
As mentioned above, boundary games emerge from the relationships established among Wittgenstein's language games, boundary critique theory and relevance theory (Velez-Castiblanco, 2011; 2012a). As Velez-Castiblanco states "The basic intuition is that intentions, according to relevance theory, can trigger some dynamics of language and actions in relation to the boundary" (2011, p.5).

Boundary changes are described through each of the games and this is understood as an expression of action language: following, enhancing, wandering, challenging, probing and

setting. Each of these games consists of three stages: the initial stage, the application of the operation and the outcome due to such an operation (Velez-Castiblanco, 2012b, p. 7).

These operations allow us to understand the ways in which managers interact in their managerial meetings. For this reason two of the observed sessions have been chosen (a planning committee and an extended primary group) in order to micro-analyze the observation field notes through the identification of boundary games. A graphic representation of each of the boundary games used as an analytical method in this research is shown in table 2 and brief description of the related meanings follows.

Table 2. Boundary Games Representation

Boundary Game	**Graphic Representation** **Initial Stage** **Operation** **Outcome**
Following	
Enhancing	
Wandering	
Challenging	
Probing	
Setting	

Source: (Velez-Castiblanco, 2012a, p. 169)

Following

As shown in table 2, a boundary exists in the first stage and a move is then made within the boundary, the effect of which is to make it clearer and stronger. The movement that occurs within the boundary may be an ability to understand and follow a rule, or to infer something that nobody has previously said based on the already present assumptions. Following decreases processing effort and strengthens the boundary, since further analysis is not needed to capture the central idea of the proposal. In other words, following operates as an endorsement or affirmation of an understanding of the subject and therefore does not have a very significant effect on the boundary. Also, sometimes it is difficult to catch the idea, so several examples will be needed to understand the underpinning rules.

This operation allows recognition of who in Sura TMT understands the boundary that was initially established and follows the statements proposed by another member of the team. It facilitates the process of identifying the "followers" that hold the position presented. The concept of followers is not presented by Velez-Castiblanco, but it is used here since the Sura TMT behavior, understood by the analysis of their interactions, showed that some of the members (especially those with a corporate role) prefer to follow when the topic debated was not directly related to their influence area.

Enhancing

Although this case is similar to the above, the change in the boundary is explained by new information added to reinforce the boundary. In other words, the central idea is strengthened with new arguments that increase the cognitive effects by way of the new connections and inferences that can be drawn. The movement of the boundary comes from outside, when dealing with arguments that are not directly related but which complement the initial idea. This operation is interesting because it makes it easier for us to see who makes the contributions that enrich the boundary and thus enrich the issue. It might even be said, in some sense, that this represents the creation of new knowledge that emerges from the complementarity of individual postures that strengthen the boundary.

Wandering

Wandering refers to taking another route, that is to say, to giving new information that is not related at first sight to the boundary. This operation by contrast clarifies what is inside the boundary with what is outside, it generates relevance for the analysis. This means that clearing out what is not relevant strengthens the boundary. For this reason, although the movement occurs outside of the boundary it is strengthened in a similar way as in the case of following, since the cognitive effect required to make inferences is reduced. At first glance wandering seems to be an operation of little use to the boundary in question, but it is possible that the effort continues to focus attention on the boundary again and actually ends up strengthening it. In terms of relevance, wandering may also generate positive effects on the boundary.

Challenging

In contrast to the previous games, here the boundary of the initial stage is questioned from within or from without, thus resulting in a weakening rather than a strengthening of the boundary. When the questioning is based on information that exists within the boundary,

generally what are sought after are any contradictions. Conversely, when it comes from outside the resultant intention is to show that there exist different perspectives through which to address the issue and that the current outlook seems problematic. The call in question generates a greater processing effort for the conclusion that the inferences are unfounded and therefore that the contribution is irrelevant or relevant at least at that particular time; or, it shows that the cognitive effect are in fact less than thought. Also, it is possible that at a later point in the conversation the boundary will resurface again.

This is an important operation for the analysis of Sura TMT since through confrontation, managers try to weaken the boundary. Their intention could be to challenge the assumptions on which this boundary is supported and to make visible any possible difficulties not previously perceived. The importance of this operation seems to be linked to that which follows, for example, by weakening the boundary a new setting can emerge and this means that the effect of the challenge helps to generate a new alternative that may be stronger than the previous one. This could reveal opponents to or supporters of the first boundary.

Probing

In this case, the operation is to explore from both within or from without the boundary. The goal is to identify the limit of the cognitive context. In this case the effect is not produced regarding the total of the boundary but instead regarding a section of it, to which the new information or argument has special relevance. In the words of Velez-Castiblanco (2012a):

> An easy way to show probing is when somebody has doubts about the relevance of something and asks about it. We do not have a way to know beforehand if what s/he asks is inside or outside of the boundary. Independently of the answer, what the question does is to focus the audience on considering the issue, and if it is very complex, a discussion can arise around this boundary "fragment". (2012, p.174)

This operation or game refers to the focusing in one of the boundary segments. If the boundary is a particular discussion topic, it means that one of the treated subtopics is strengthened from this exploring, and it helps in gaining a better understanding of the elements needed to make a decision

Setting

Within this boundary game the rules or game space are established. In other words, the game is about creating a newly shared cognitive context that differs from the one initially and individually set out. According to the author, "What identifies setting a new boundary is not the amount of cognitive effect or easiness, although if we follow in these guidelines it will be easier for others to see the relevance of the new game" (Velez-Castiblanco, 2011, p. 5). Accordingly, setting refers to the establishment of a new boundary or cognitive environment that could enable the opening or closing of a sequence of debates.

> People do not trace boundaries from emptiness. There are always other boundaries from which to draw and in the process of setting one; several of them can be synthesized. Some of the boundaries are shared. They make up part of our mutual cognitive environments. In this case private does not necessarily mean that you are the only one with a certain piece of knowledge. It only means

> that the said knowledge is not shared with the other people in the specific interaction. (Velez-Castiblanco, 2011, p. 5)

This game can be used to identify the TMT's topics of interest, which may arise spontaneously through the interactions that change the initial boundary.

As shown in the summary presented by the author in table 1, boundary games facilitate an understanding of how the current state has been reached. In order to understand the new emergent order it is necessary to look for second-order restrictions. These restrictions also allow us to understand the behavior of the boundary but from a different perspective within boundary games.

Second-order Contextual Constraints

Addressing intention as a complex adaptive system, Velez-Castiblanco (2011, p. 1) points out that complexity leads us to reconsider a mechanical method for recognizing causality in order to understand the circularity that characterizes complex systems. Consequently, in contrast with linear causality, where it is possible to separate the effects of causes in circular causality, the effects of a cause can affect the same result as expressed in terms of loops showing emergence in relation to auto-causality.

Velez-Castiblanco (2012a) asserts that in analyzing a chain of causes it is important to differentiate first-order and second-order constraints. First-order constraints appear when some action alternatives are opened up for the next action, but not all of them. In other words, the next action depends on the previous action. Second-order constraints appear when a loop is formed and the whole system restricts a chain of causes, reinforcing some while leaving out others.

In other words, a second-order contextual constraint "is formed when the whole loop system is constraining the workings of the chain. Meaning arises at this level. Second-order constraints provide a context in which actions are framed. Also, this makes possible monitoring and guidance" (Velez-Castiblanco, 2012a, p. 121) in relation to intention.

Within this research second-order contextual constraints are considered relevant for identifying aspects of managerial committees analyzed through boundary games. By analyzing the sequences of the conversation, and particularly the moments of greatest debate, it has been possible to identify the issues (or settings) discussed over and over again by the agents; reinforcement in this recurrence occurs in the interactions and constraints on the entire system.

These recurring issues can be understood in terms of Boisot's knowledge definition,[2] that is to say, as stimuli or as adaptive responses. The stimuli induce agents to find ways to cope and, at first, these responses appear to be cyclical, aimed at solving a specific problem. However, then they seem to present different adaptive responses that reinforce each other, providing greater stability. These adaptive responses begin to interact with one another, so that in some cases they appear to be reinforced, while for others adaptive responses are

[2] "As intelligent beings, we act, survive and prosper on the basis of knowledge that we deploy as an adaptive response to the diversity of phenomena we encounter and have to adapt to" (Boisot, 2011, p. 436).

excluded from the new order. This reinforcement between adaptive responses present second-order contextual constraints that give rise to what, in Boisot's words, would be a system of action.

MIXED METHODS

The whole research process took approximately 30 months to complete: the data collection process took 19 months. The data collection techniques used included non-participant observation, non-structured interviews and document review. The analysis and interpretation period overlapped the data collection period and lasted nearly 12 months. This phase was characterized by the use of mixed methods, namely codification and boundary games that helped to build the case study.

In figure 1, on the left side, the methodological research process shows that the inputs needed for the sub-processes and, on the right side, the outputs obtained from each.

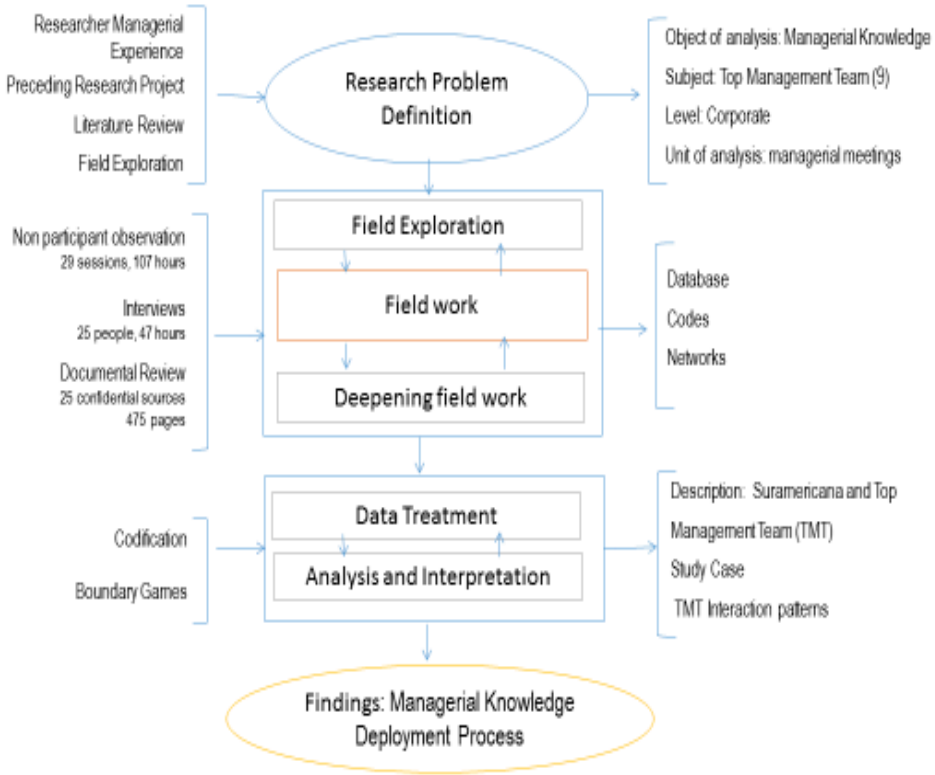


Figure 1. Methodological Research Process

This particular process was not sequential, nor did it follow a linear development, since it was necessary to go back and forth between the different phases of the data collection and analysis (Patton, 2002). Since the aim of this paper is to show the use of boundary games as an analysis method, focus is placed on the analysis and interpretation sub-process or phase.

The Analysis and Interpretation Phase

The first step in the analysis and interpretation process is referred to as that of database organization. This involved editing the observation notes, audio interviews and documents so they could be entered as primary documents into the tool for qualitative analysis, namely ATLAS ti. In addition, families of documents were created, while participants were classified as Corporate (CC) or corporate/business (CN) according to their role.

The second phase entailed encoding (Strauss, 2002), which can be divided into four sub-phases: auto-coding, open, axial and selective coding. This process allows for the identification of keywords or codes and citations for the research interest, which can then be used for the analysis of relationships that allow for the election of such codes with the largest number of relationships and citations. This encoding process facilitated a build up of information relevant to the description of the case study, with managerial knowledge constituting the object of analysis and the top management team constituting the subject of analysis.

The third phase involves the use of boundary games as a method for conversation analysis. Atypical sessions were initially selected in order to analyze the games, which were later identified in the conversation sequence. The interaction patterns of each team member, followed by the two sessions, were each compared and analyzed. Finally, loops or sequences of high-level interaction analyses were characterized. From this analysis it proved possible to extract the style of approach of the top management team, the team's behavior and the adaptive responses that emerged in order to confront the most relevant stimuli identified.

Finally, in the fourth phase the second order contextual constraints are recognized, meaning that first, recurrences between adaptive responses and second, the reinforcement of the relationships that exist between them could be identified. From this analysis it proved possible to identify the emergent action systems.

Table 3 shows step-by-step exactly how the analysis and interpretation methods were mixed.

Table 3. Analysis and Interpretation Process

Phase	Inputs	Activity	Process	Output
Phase I: **Database Organization**	Non-participant observation field notes	Encoding by name and role Word file editing	Creating hermeneutic unit in ATLAS ti	120 primary documents
	Interview audios	Transcription of selected audio fragments	Creating family documents	12 family documents
	Confidential documents	Selection of interesting documents and conversion to PDF	Creating actor families by role	Corporate role (31 participants), corporate/business (13), top management team (9), non-top management team (33)
Phase II: **Encoding**	Primary documents	By participant name	Auto encoding	633 codes
		By keyword: knowledge, management, synergy, shared services centre Identifying words in contexts related to corporate topics	Open encoding	5099 citations
		Asking questions for open-coded groups.	Axial encoding	83 *networks* Synergy (220 citations) Knowledge (170 citations)
		Identifying most cited and related codes	Selective encoding	Synergies (43 relations) Projects (30 relations)
		Operationalizing codes and super codes		CRM Program (22 relations)
Phase III: **Boundary Games (BG)**	Session observation list related to corporate topics	Identifying selection criteria of sessions for microanalysis	Selecting atypical sessions	Observation field notes from committee held on November 8, 2012 and fragments of observation notes from managerial primary group held on July 16, 2013
	Observation field notes from committee held	Line by line conversation analysis	Boundary games identification	Boundary games frequency of use by each participant

Phase	Inputs	Activity	Process	Output
	on November 8, 2012 and fragments of observation notes from managerial primary group held on July 16, 2013			
	Boundary games frequency of use by each participant on November 8, 2012	Boundary games by participant	Pattern interaction characterization	Interaction patterns
		BG for the session		Most debated moments or "knots" of the conversation
	Conversation sequence	Individual approach of the TMT members		
	Both sessions boundary games analysis	Comparing interaction patterns for each session	Contrasting sessions	Verifying team behaviors
	Both sessions boundary games analysis	Identifying most debated moments or "knots" in the conversation	Highly interactive conversation moments or knots analysis	Most relevant and interesting phenomena or stimuli
		Verifying BG Knots		Adaptive responses to such stimuli
Phase IV: **Second-order contextual constraints**	Stimuli and adaptive responses	Identifying the recurrence of adaptive responses and reinforcement relationships between adaptive responses	Identifying the emergent second-order contextual constraints	Action systems

Going Deeper in Phases III and IV

Using BG entailed the use of microanalysis for the field notes of the committee meeting of November 8, 2012 (15 pages). Once these notes had been printed the conversation was followed line by line in order to identify the initial state of the boundary, the operation made to it by an agent, and the effect achieved on the boundary that had initially been set, as it is shown on figure 2. The same process was then undertaken for a fragment of the primary group session of July 16, 2013 (8 pages). This represented a form of crafted handwork that allowed us to identify the most interactive moments, which were understood as the most debated elements or the knots of the conversation.

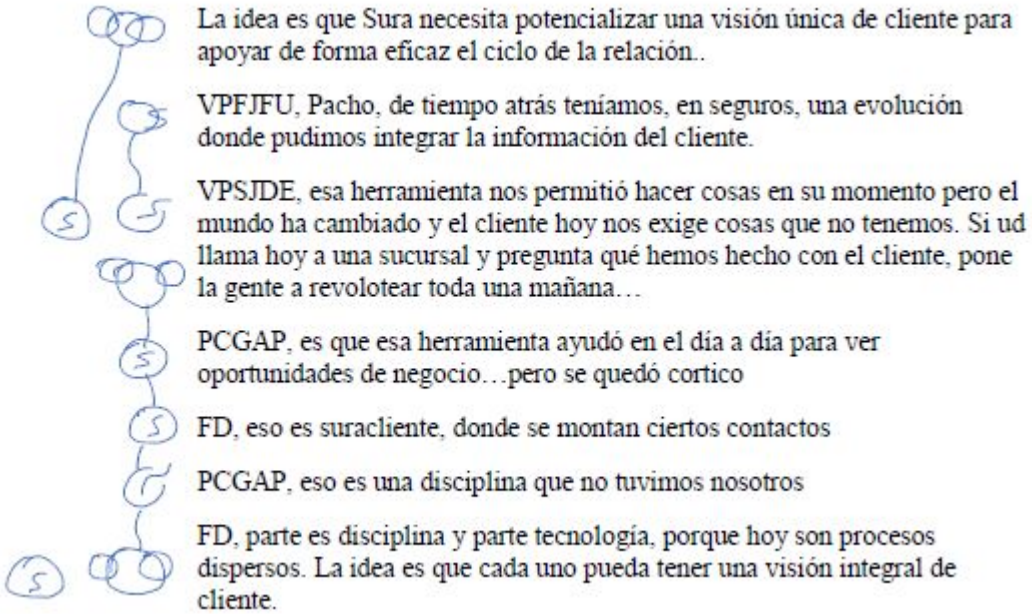


Figure 2. Boundary games identification

After identifying the BGs the sequence of the conversation microanalyses allowed for a manual classification of the agents and the BG used. This endorsed the knots sequence analysis. The outputs obtained from this process were classified again using an Excel table (see figure 3), with the BG graphic representation included in order to identify the topics debated the most.

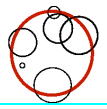
	Setting	***Challenging***	***Following***	***Wandering***	***Probing***	***Enhancing***
Secuencia de temas						
Sinergia	GAP	GAP				
Sinergia			JDE			
Estructura	JDE	JDE				
Estructura			AA			
Estructura		AA				
Sucursales integradas		AA				AA
Exigencia cliente			AA			
Exigencia cliente			JDE			

Figure 3. Identifying the most debated topics

From these analyses it proved possible to identify the most relevant stimuli, as well as some adaptive responses from the TMT. These adaptive responses were mutually reinforced and thus triggered the emergence of action systems as second-order contextual constraints. The corporate guidelines for synergy and the SURA brand strategy were identified as relevant stimuli for the top management team. Furthermore, the inhibitors and facilitators of synergy were recognized. Some of the emergent adaptive responses acknowledged were the different types of synergy, corporate and strategic projects and action systems, such as the CRM program and risk management consultancy.

Finally, to clarify the patterns of interaction found through the abovementioned analysis, a reconstruction of the meeting of November 8, 2012 was conducted through a visual representation that allowed us to see the interactions between individual agents and the number of times an operation or set of boundary games were used. From there it was possible to infer that the CEO and vice presidents with a corporate/business role were the agents who most debated the issue of synergy.

Findings

Reflections on the literature review, the construction of the theoretical framework, the collection of field data, and analysis and interpretation allowed the research questions and the research objectives to be answered, as shown in table 4.

Table 4. ***Findings***

Research question	How is managerial knowledge deployed in managing a multi-business firm?	It is deployed as a new emergent order that is triggered by the stimulus of the synergy corporate guidelines. Through the interaction of a large number of organizational agents, recurrent adaptive responses are configured as action systems
Support question	How does the managerial knowledge deployed by the corporate top management team characterize the internal management of Suramericana as a multi-business firm?	It is characterized as collective, collaborative knowledge that integrates diverse technical codified knowledge with tacit knowledge that is historically configured with the purpose of identifying and capturing the potential corporate synergies
General objective	Conceptually understand and model the deployment process of managerial knowledge in a multi-business firm	This process is characterized by a new order that emerges from the interaction between agents of corporate, corporate business and business levels

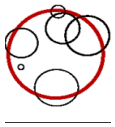
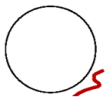
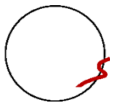
Specific objectives	Characterize the multi-business firm as a complex adaptive system	Suramericana S.A. as a case study
	Describe the knower and the knowable object of managerial knowledge	Top management team and synergy
	Identify relevant stimuli and adaptive responses that emerge in the creation of added value	Grupo Sura synergy guidelines; Sura brand strategy; joint value creation; comprehensive view of the customer; CRM technology; shared information
	Highlight action systems deployed by corporate managers in their recurrent adaptive responses to relevant stimuli	CRM program

As has been mentioned before, Sura TMT interactions were identified through the application of boundary games and second order contextual constraints. Boundary games helped to recognize some of these team behaviors. It is common, for example, that at the beginning of the meeting a *Setting* was made; the initial move comes from the first topic on the agenda. Then, the person responsible for the topic makes the respective presentation; and at the end, the debate is opened. Subsequently, the second topic of the agenda is presented and discussed; and, finally, the president reports about a diversity of issues.

From this analysis, it was perceived that once a boundary is set, some members of the team tend to follow, especially, those managers who play a corporate role while others, especially those with a corporate/business role, seemed concerned about confronting the different arguments, so that the boundary is definitely strengthened or weaken to the point that a new more relevant boundary or issue arises

The frequency of boundary games from the November 8th session is summarized in Table 5. This, plus microanalysis of the above sessions, support the conclusion that, *Setting* (frequency 89) and *Following* (frequency 73) are the operations most frequently repeated in different discussions sequences or "knots". This can be interpreted as a team pattern; it is more deliberative than decision-making. However, this also depends on the topic under discussion. For instance, when synergy topic was discussed in the extended primary group session (where in addition to the nine members of the SURA TMT were 60 managers from different business areas and level) the Challenging was more frequent than following as when the innovation topic was presented. One possible explanation for this is that the issue of synergy has become a frustration, a permanent difficulty, a myth in Sura, while other issues such as innovation have not developed such biases.

Table 5. ***Boundary Games frequency***

Sura TMT members by role	*Setting*	*Challenging*	*Following*	*Wandering*	*Probing*	*Enhancing*
						
Corporate (C) 1	31	4	13	1		21
Corporate/Business (CB) 1	8	6	1			
C2	1	5	3			
C3		1	1	1		
CB2	7	11	16	1		5
C4	23	21	18		2	4
C5	3	4	3		2	2
C6	3	1	2			
Guest	13	15	16			8
Total	89	68	73	3	4	40

The most unusual boundary games used by SURA TMT was *Probing* (frequency 4) and even less was *Wandering* (frequency 3). In addition, it was possible to see that the operation or BG most played by the president was the *Setting* but also the *Challenging*. The discussions, particularly about synergy, tend to focus on the president, vice-presidents who play a role in the corporate / business level and the guest responsible for the synergy. In contrast, vice presidents who play a corporate role tend to do more *Followings;* they seem to do so in order to be respectful about the "other´s territory". In other words, they prefer to stay aside of the debate.

The observations in 12 sessions of the SURA TMT committee and the BG analysis in the November 8, 2014 session, allowed identifying 15 issues that came again and again in the debate about innovation and CRM projects. Regarding the issue of innovation, in other words, the boundary set about the topic of innovation, was enhanced by the addition of new information such as the need to define innovation policies, how to bring innovation in the daily routines, what is the appropriate structure to facilitate innovation, how to overcome integration difficulties between different areas and businesses, how to avoid frustration at not being able to develop creative ideas and all the mechanisms to recognize the most innovative initiatives.

The topic of *CRM* project was more debated because it is directly related to synergy. Capturing synergy is the most difficult issue in corporate strategy (Eisenhardt & Galunic,

2000) and in Suramericana the situation is not different (Rivas, 2013), this is why this topic was identified as the most relevant stimuli for the Sura TMT. Synergy in Sura relates to *CRM* program because it´s technology allows detailed information about customers; this information is actually held by every business as their customers but it is not shared between the other business units. Therefore, in order to implement synergistic commercial strategies a CRM Program is needed to give unified information of a client from all the business units' perspectives.

Two points of view about synergy were also inferred from the TMT interactions BG analysis. The highly interactive conversation sequences showed two approaches to this problematic issue: a deliberate and an emergent. The deliberate one led by the guest (synergy strategy responsible) who stated that an expert synergy group and clear guidelines were urgently needed. The emergent, led by the president, stated that synergy should arise when business agents understand the benefits of this kind of strategy.

Debating from these two points of view or approaches led to a consensus about focusing in at least two pivotal proposals: *CRM Program and CGR* (Risk Management Consulting). Specifically, the *CRM Program* as pivotal proposal, was named as system of action since it emerged when synergy, as the most relevant stimuli, induced adaptive responses such as: defending Sura Brand, having a holistic customer view, sharing information, technology and creating economic value added. The recurrences through these adaptive responses give rise to the second order contextual constraint: CRM Program, as it is shown in figure 4.

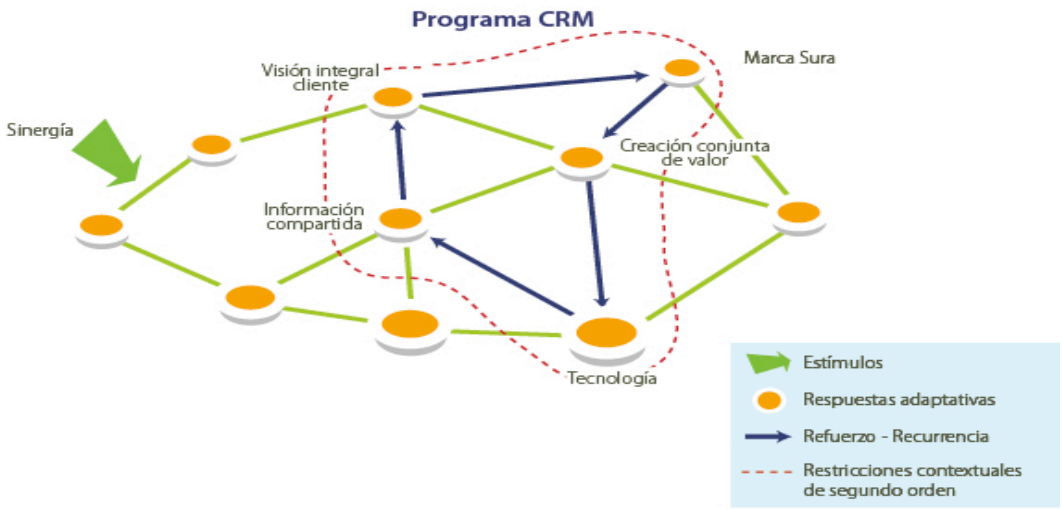


Figure 4. CRM Program as a pivotal emergent proposal

Summarizing, the actor´s interactions analysis through BG, facilitated the revealing of the deliberating pattern of the SURA TMT; the synergy as the relevant stimuli for this team; the deliberate and emergent points of view; and, the CRM Program and CGR as pivotal proposals.

CONCLUSION

Using boundary games as an analytical method proved helpful in identifying and describing agent interactions. Codification techniques allowed us to characterize parts of the managerial knowledge as a complex adaptive system: agents as knowers; synergy as the knowable object; and Suramericana as the context they share. As mentioned above, mixing these two methods made it possible for us to identify, from actor or agent interactions, the relevant stimuli and the adaptive responses that emerged which, later on, gave meaning to the CRM program as a system of action.

Indeed, if the boundary games method had not been used I would not have been able to see, for example, that the managerial committee in which the top management team interacts comprised a confrontational and debating space in contrast to a decision-making one, the latter of which it was supposed to be. Furthermore, mixing both methods allowed an understanding of top management team patterns, such as synergy debates held by the president and the corporate/business role of vice presidents; not something applicable to the whole team, as originally thought.

Going further, BGM allowed the identification of vice presidents' patterns of intervention, since they preferred not to intervene whenever the topic debated was not related to their specialized knowledge. This means they have the same pattern as Suramericana employees, such as, working by silos, for instance, separated by functional areas.

The most relevant stimuli that were identified were the synergy corporate guidelines and the Sura brand strategy. These challenged the top management team so that they had to work out how to capture potential synergies. There were two points of view that fuelled the synergy debate: deliberate and emergent. The deliberate point of view expresses the inquiries that some managers and vice presidents had about the need to designate an expert team and the importance of having a president who gives clear guidelines about how to capture synergies. In contrast, the emergent point of view relied on the idea that synergy is not a guideline but the result of daily interactions and collaborative work, which ends in synergistic proposals that, when successful, others will follow.

Regardless of this, the top management team suggested focusing on two pivotal proposals or corporate projects that mediated between these points of view. These proposals were: Risk Management Consultant Services and the Customer Relationship Manager (CRM) Program.

As a final point, the boundary games method is a flexible and useful analytical method that can be creatively used by constructivist researchers and, specifically, by those interested in systems perspectives, since it allows work on actors' conversational interactions.

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