

ROUTINES AND NETWORKS: STRENGTHENING A MISSED LINK

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Routines and Networks: Strengthening a Missed Link

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Abstract

This paper aims at understanding how and why managers can mobilize networks for creating and modifying organizational routines.

We mobilize both routines and social capital corpus associated to structuration theory to deepened understanding on how networks are deployed and further used for elaborating and modifying organizational routines.

Our research is based on a 3-year in-depth engaged study in a small firm pertaining to European biopesticide industry confronted to developing a registration capability. This process led to routine creation and modification through managerial agency.

This study brings insights on how social capital plays a role in the elaboration and modification of routines related to social structures imposed to the firm. We provide a model that articulates social structure, social system and social capital. It provides a recursive and dialogical perspective of structures and social capital as a carrier for creating and modifying routines conceptualized as a social system. Results show that the modification or creation of routines is oriented by how the manager perceives it as legitimate by specific ties. It also shows that the elaboration of a bundle of routine can be supported by external networks that are not initially part of the firm resources. These networks provide diverse kind of resources such as information, human resources, and procedures. But more important, they are also a medium for legitimating both routines and associated actions.

Introduction

Routines is a key concept in Management, it is viewed as a mean for organization to carry out much of their activities (Feldman & Pentland, 2003). Since Nelson and Winter (1982) seminal book the term 'routine' has gained its legitimacy. Over the last 30 years, 'routine' has developed as a core concepts in many fields related to management: strategy, organizational theory, technology management, information system, operation management (Felin & Foss, 2009; Pentland, 2011), and is also a notion that make sense for other disciplines such as economics, psychology, sociology (Pentland, 2011). Pentland (2011) points out that this notion is used to explain social action in various social contexts such as business, government, and health care, which implies a very diverse academic discourse.

To date, research on routines has been centered on the influence of the internal organizational environment. We note a lack of research regarding the influence of social structures external to the organization on the creation and modification of routines. Throughout an in depth longitudinal case study of a biotechnological start-up we contribute to filling this gap by undertaking an analysis of how external social structures influence the creation and modification of organizational routines. We make use of Structuration Theory (Giddens, 1979, 1984) as it allows the understanding of multiple social structures constraining and enabling agents in the creation of social systems (routines in our case). We verified that external social structures are bounded to the organization through the organization's social capital. Social capital here refers to the degree of trust, cooperative norms, networks and associations within a social group. Without the construction of social capital, organizations do not have an institutional framework that links all the involved stakeholders together around the creation and modification of routines.

Our study investigates how managerial actions participate in selecting and modifying routines with the intention of elaborating an organizational capability which is our study understood as a collection of routines. We advocate here that the selection or production of routine does not only pertain to the internal side of companies, and can also be developed through the social capital of these companies. From the perspective of organization, such an investigation involves providing an analysis in terms of both ostensive and performative routines. These notions shed crucially important light on the recursive and dialogical nature of the routine that support the "inherent capability of every organizational routine to generate change, merely by its ongoing performance" (Feldman & Pentland, 2003, p. 94). The paper is structured as follows: we first delineate the concept of routines, and briefly introduce the structuration theory and the notion of social capital in regard to routines and capability literature. We then provide a detailed explanation of the methodological design associating an engaged research perspective and ethnographic methods. Results provide an understanding of how routines are created and modified throughout the elaboration of a new network associated to the elaboration of a new capability. We show that the elaboration of both normative and ostensive routines stems from the environmental structures and the information that flow through associated networks.

What routines are?

There is a wide consensus concerning the repetitive (Feldman & Pentland, 2003; Nelson & Winter, 1982; Pentland, 2011; Winter, 2000, 2003) or recurrent (Becker, 2004) aspect of routines since as no one would call a routine "something happening only once" (2004, p. 646). Routines have been defined by various authors but it appears that four principles

characteristics are at stake (Feldman & Pentland, 2003) their repetitive nature, a particular pattern, the interdependence of actions and their collective nature. Feldman and Pentland thus propose that routine is based on collective action and defined as “repetitive, recognizable patterns of interdependent actions, carried out by multiple actors” (2003, p. 95). Other authors also emphasize the social interactions (Becker, 2004; Feldman & Pentland, 2003) and its distributive nature (Zollo & Winter, 2002) which calls for integrating the notion of agency into the study of selection, production, and use of routine in organizational context (Becker, 2004; D’Adderio, 2008, 2011).

Various discussions are at stake within the academic literature on routine: on the microfoundations of routines (Felin & Foss, 2009, 2011, 2012; Hodgson & Knudsen, 2011; Pentland, 2011; Winter, 2011), on the nature of their emergence, whether it is a mindless effort (Dosi et al., 2000) or an effortful accomplishment (Becker, 2004; Feldman & Pentland, 2003). Another well known conversations refer to the stable (Winter, 2000, 2003) versus dynamic side of routines (Becker, 2004; D’Adderio, 2008; Feldman & Pentland, 2003) or the fact that routines can be source of inertia as well as source of change (Feldman & Pentland, 2003). These conversations are not necessarily dichotomies; they can be rather seen as dialogical relationships representing two sides of the same coin. We believe that in regard to these conversations the notions of ostensive and performative routines provides a ground to better integrating these views. Ostensive routines is associated to stable patterns which require a mindless effort, store explicit knowledge and have a potential to created inertia. Performative routine can be associated to patterns-in-use that are consciously activated along with tacit knowledge, which provides local change.

In the same vein, D’adderio (2008) also distinguishes routines-as-representation, and routine-as-expression as well as rule-to-be interpreted and rules-to-be-integrated. All these notions refer to routine as dynamic rather than to an “undifferentiated monolithic object” (D’Adderio, 2011, p. 770). These interpretations of routines are consistent with routine seen as a situated process (Becker, 2004). Those views are in line with our case, where norms are interpreted as external structure belonging to the society that both participate to create and modify routines inside the organization. They provide heuristics of action (Feldman & Pentland, 2003) carried out in companies to abide by these norms and integrate them into their activity in a recursive and dialogical manner.

What routines do?

Routines are seen as a mean for coordinate by providing regularity, “by making simultaneous activities mutually consistent”, and by creating common practices (Becker, 2004, p. 654). These activities, procedures and practices correspond to a social structure that makes hierarchical control less necessary (Gulati, Nohria, & Zaheer, 2000). Notions of coordination and control are interesting in regard to the case we investigate since the question of articulating various activities consistently with norms imposed to the company is central to activities that we analyze.

Routines also act as knowledge repository and source of storing operational knowledge (Nelson & Winter, 1982), and to capture tacit knowledge as opposed to more explicit knowledge stored in documents and database. Operational and other kind of tacit knowledge “can be held by individuals and organizations” (Becker, 2004, p. 660). Becker further advocates that routines consequently capture both the “individually-held-knowledge-applied-in-the-firm” (ibid.) and collective knowledge. This assertion is in line with Salvato and Rerup’s (2011) multilevel research model for studying the articulation between skills / routines / capability.

Routines, capabilities and their levels of analysis

This study deals with another characteristic of routines. Routines as “building blocks of organizational capability” Dosi *et al* cited by becker (2004, p. 662). In other terms Winter conceptualized organizational capability as being “a collection of routines” (2000, p. 983, 2003, p. 991). He outlines that contrary to routine, capability is a larger part of activity that managers can refer to and whose outputs matter for companies. On the same token, he points out that, routines are not always perceived by managers. They can be invisible and unknown when capabilities are “necessarily known at least in the minimal sense that the control levers and their intended effects are known” (Winter, 2000, p. 983). Levinthal for instance describe routines as “critical building blocks for broader assemblages of capabilities” (Levinthal, 2000, p. 366). Last but not least, Dosi *et al.* (2000) specify that routine even if they have been conceptualized as building blocks of capabilities, they should not be reduced to that. They also remind that a smaller level of analysis is to be taken into account: the individual skills can be seen as building blocks of organizational routines which is also supported by Rothermell and Hess (2007) and Salvato and Reup 2011. Becker in his comprehensive review on routines points out the role of the interrelations between individual actors and the routines they participate to, and advocates that for the sake of organizational coordination “fine balance between individual habits and organizational routines needs to be kept” (Becker, 2004, p. 647).

This multilevel perspective is interesting since it provides a relevant framework for our study. The level of the capability is the one related to registration activity that we analyze in our case. As stated by Winter, at this level, the capability is known by both managers and workers in the company. These people are more or less aware of the process at stake within the capabilities, however they have a clear idea of expected outputs. At the lower level, various routines are related to this activity, but not only. However the development of this activity into a more professional aspect modifies and creates new routines in the firm. Eventually the way routines are modified and created within the company can be linked to individual skills to mobilize the company’s social capital.

How routines can be dynamic?

Feldman and Pentland advocate that the actions on structure can have an effect on creation, maintenance, and modification of organizational routines. However the selection of routine *per se* has been largely overlooked (Becker, 2004). Egidi (2001)(1996) showed that the emergence of routine to be at the nexus of individual rules, interest and activity. Lazaric and Denis (2001) showed that creation and articulation of knowledge have an impact on the routine in use, and Becker (2004) points out that routines are triggered by both actor-related and external cues. In this view external cues can be external to the routine but not necessarily external to the organization. Modifications and maintenance of routines thus can be associated to the evolution of knowledge sensitive to actors and to external signal, but it is not conceptualized as an open system in conversation with its overall environment. We propose to elaborate here on a rather different perspective since we analyze the impact of social structures situated outside the organization's boundaries, for instance institutional rules are seen as a source of emergence of new routine in an organization. In our case, the actions related to knowing institutional norms both lead the organization to create, and modify routines related to the registration capability. This kind of analysis calls for a theory that enables us to understand the influence of multiple social structures on the creation of routines inside an organization. As we develop further on the next section, Structuration theory provides such a point of view on this kind of analysis.

Structuration Theory

Structuration theory has been used in different fields of social sciences and has proved its robustness as a general theory for explaining social action and the creation of social systems (Pozzebbon & Pinsonneault, 2005; Sarason, Dean, & Dillard, 2006; Wendt, 1987; Whittington, 1992). The theory has demonstrated its usefulness in guiding empirical research on several different organizational contexts (Barley & Tolbert, 1997; Jarzabkowski, 2008). The utmost contribution of the structuration theory is the interrelatedness between structure and action which Giddens (1979) calls the 'duality of structure'. This refers to the reciprocal interaction between agents' actions and social structures across time and space. Social structures are both constituted by human agency, and yet at the same time are the medium of this constitution (Giddens, 1979). Therefore, the structure acts on the agents constraining and enabling their practices and, through these practices, social systems are recursively created. Epistemologically Giddens argues that agent and social systems are mutually constitutive in a dialectic relationship, whereas they do not share the same ontological status.

Following Feldman and Pentland (2003), the interactive coming together of ostensive and performative routines might be conceptualized as a dialectic relationship whereby both concepts cannot be understood independently. In our case we push forward the level of analysis of Feldman and Pentland by analyzing the routines as a social systems created by agents empowered and constrained by different social structures. This allows us to better take into account the influence of external structures on the creation and modification of routines. Feldman and Pentland propose as multiplicity of structures (Sewell, 1992) the multiple individuals introducing "... diversity in the information, interpretative schemes, and goals of the participants" (2003:104). In our case, we look at external social structures that give to the organization resources as well as rules that will participate in the dialogical processes of creation and modification of internal routines.

Social structures here are seen as patterned social arrangements. They can be bureaucratic organizations or other types of social arrangements such as social networks or policy coalitions grouping social norms and people with specific socio-economic functions. Social

structures constrain and enable social action by establishing a specific contexts of action leading to group specific shared beliefs and mental models and as a consequence to group specific formal and informal norms that constrain the interactions inside each group but also between groups. A social system on the other hand according to Giddens, ‘display structure properties but is not a structure itself’ (Giddens, 1984, p. 25). Structures are not the patterned social practices that make up social systems, but ‘the principles that pattern these practices’ (Sewell, 1992, p. 18). This justifies our analysis of routines as social systems and not as social structures.

In our study we place the multiplicity of structures analysis on the different external structures linked to the organization through its social capital. Their contribution is then analyzed through the different dimensions of social capital identified in our study: normative, structural and relational as we explain on the next section.

Capability, routines and social capital

Once we have identified and analyzed the relationship between the organization and its external social structures we need to understand the real influence of each structure on the creation and modification of internal routines. We noted that the external structures are part of the organization’s social capital and their influences on the organizational routines are dependent on different dimensions of relationships based on social capital. Although the concept of social capital is frequently used in discussions over firm performance (Dyer & Hatch, 2006; Lee, Lee, & Pennings, 2001; Zaheer & Bell, 2005) and competitive advantage (Dyer & Singh, 1998), little research is associated to routines and capability. Social capital can be seen as “features of social organization, such as trust, norms, and networks that can improve the efficiency of society” (Putnam, Leonardi, & Nanetti, 1993, p. 167). This view of social capital encompasses institutions, norms and relationships that shape the quality and quantity of an organization’s social interactions. Social capital thus comprises not only the network but also the assets mobilized through the networks (Burt, 1995; Nahapiet & Ghoshal, 1998). The source of social capital lies in the structure and content of a social group’s interactions which affect the way that resources, influences, and shared representations become available to the group (Adler & Kwon, 2002). Social capital here refers then to the degree of trust, cooperative norms, networks and associations within a social group and between social groups. Without the construction of social capital, organizations do not have an institutional framework that holds different stakeholders linked to them. By encouraging cooperation, social capital also reduces transaction costs which has also a positive effect on the net value created.

Our case study elaborates on the lack of knowledge about how environment can participate in the creation and modification of routines. We propose to better understand how routines are both selected and modified through the resources and rules brought through the social capital. Gulati (1999) showed that prior experience in creating an alliance and the embeddedness of a firm in an alliance network will increase its propensity to develop new alliances and that internal resources are not the only determinant in this process. Social capital can be thus conceptualized as key resources from a strategic point of view.

More closely to our claim, McEvily and Zaheer (1999) provide new insight to resource-based view by challenging the traditional view that capability are created internally to a firm. They refine scant works suggesting that capability were elaborated through networks or alliances (Hamel, 1991; Powell et al 1996) cited by McEvily and Zaheer (1999). Gulati Nohria and Zaheer (2000) propose an encompassing theoretical framework for studying networks in strategy. They notably advocate that networks can be conceptualized as inimitable and non-substitutable resources. As such they can be understood “as a means to access inimitable

resources and capabilities” (2000, p. 207). We argue that since capability are defined as bundle of routines, this relational view of strategic resources can also lead to the creation and modification of routines. Gulati (1999) proposes the concept of “network resources” for those obtain through relational actions. Gulati Nohria and Zaheer (2000) underscore that it “is a concept akin to the notion of social capital that has been developed for understanding individual networks” (2000, p. 207).

Further work followed this perspective. Capaldo (2007) suggests that social capital can provide resource and thus a distinctive relational capability to foster innovation. It is in line with the relational view of Dyer and Sing (1998) who argue for the interorganizational origin of competitive advantage. In a more organizational view, Möller and Svahn (2003) argue that internal capabilities management require specific strategic nets. Schmid and Schurig (2003) underscore the role of networks of both internal and external actors in developing critical capability.

Methodology

Routine can be seen as a process. Frequency of repetition is an important feature that supports the fact that routines are viewed as regularly occurring. Routines are also contextualized and situated notion since the context is highly important in the way routine are expressed. This situated feature implies that routine is hardly transferable from a context to another. This feature is interesting in regard to our case since it makes sense for why a company tries to transfer ostensive routines related to normative (institutional) pressure into a performative routine adapted to a precise context. The fact that routines can be contextually understood advocates for theory development based on in-depth studies and further theoretical generalization (Avenier 2010, Glaser and Strauss 1964).

Engaged scholarship

This action research has been carried out following the dialogical model research methodological framework (Avenier & Parmentier Cajaiba, 2012). This framework is named dialogical since it implies a dialogue between the scientific and practical knowledge and also because it “refers to the ‘dialogical principle’ conceptualized by Morin (1992) for dealing with antagonistic yet complementary stakes” (Avenier and Parmentier, 2012, p. 201). It is adapted to our research question since the routines can be divided into two expressions: ostensive and performative. The former related to a more theoretical stance and the later to an agencial view of routine. The dialogical model provides mean for both engaging with practitioners as well as theorizing dialogies for understanding how performative and ostensive routines interact in context. The dialogical model is also adapted to the action research perspective since both advocates for the elaboration of practical knowing and academic knowledge about practical problem, and in interaction with practitioners (Avenier & Parmentier Cajaiba, 2012; Reason & Bradbury, 2006).

Research setting

Case of capability creation in highly regulated biotech start up.

Agronate is a small biotechnological company created in 2002. When the research begun, the company was a very small business with only 4 persons working in the company. Its growth strategy is based on mergers and acquisitions of other small companies and on the development of partnerships with various research centers. Agronate screens, tests microorganisms, and further develops them as biopesticides. These products are still not widely used in agriculture even though their efficacy has long been proven. Biopesticide products were recently included in European Pesticides regulation. In 2006, the European

Directive 2001-26 EC was transposed into the laws of almost all European countries. From then on, compliance with the directive became a major concern for all European companies since it conditions market approvals.

At Agronate, the subject was considered strategic enough to hire a full-time researcher to work on the topic. The objective of the participatory research was to understand how to deal with the new regulatory procedures for biopesticides and to obtain product registration approval, hence the right to sell products. However, the registration taskforce was seen as a trouble-maker. Employees in the production, marketing and R&D departments felt that the demands for registration was not legitimate and tried to avoid complying.

Author 1 was hired as a full time researcher to work on the topic. She lead a participatory action research (Reason and Bradbury, 2006) and was in charge of implementing and developing the registration activity. As such she supervised the creation of a European pesticide guidance handbook and other associated registration tools. These tools were historically based on internal routines, the action carried out during the research lead to the creation of new routines.

Table 1: field/research question coherence

	Agronate	Consistency with research question
Field	Biopesticide, emerging field	Adapted to observe creation and modification of routines
Type	Start-up founded in 2002	Easiness to traced back social capital
Strategy discourse	Growth based on two pillars: commercial development and European approval of products.	Routines and capability makes sense in regard to the practical problem (approvals obtention)
Type of practitioner	- CEO (alias one of the shareholders appointed by the main fund.) - Registration, production VP -Marketing Managing Director - Experts : registration middle managers in registration department	Various level of analysis in regard to social capital mobilized
Type of structure and scope	- European Pesticides regulation : Dir 91 414 CE & Dir 2001-36 CE / ISO /ASTM - National regulation - The creation of an internal artifact (the Guidance file) aims at providing a single file listing all the requirements for biopesticide products registration	Various structures constrain the activity. These social structures are translated at different levels: european, national and local levels.

Data collection & Data set

This case is part of a wider research about capability creation that has been carried out by author 1 during her PhD (Parmentier Cajaiba, 2010). She carried out a 3-year longitudinal analysis in context. She used ethnographic methods such as interviews, research diary, observation in parallel to the action that she was coordinating within the company. This choice of multiplying the methodological perspective aimed at getting more reflexive as well as reflective insights onto the action that was at the same time carried out in the company.

The data gathered during and after the action implemented aimed at understanding how the registration related decisions were taken and actions implemented and to follow their effectiveness linked to the objectives set up at the beginning of the action research. This data set provide consistent information on the relationships that have been exploited and developed to create a deep understanding of the action to be made for achieving approvals.

Table 2: Dataset

Type of data	Agronate	Number of pages
Interviews (two sets)	27	208
E-mails	1013	500
Research Diary	3-years	70
Minutes of meetings	9	47
Mail to/from institutions	6	13
Total	N/A	828

Based on this documentary (828 pages in all), she elaborated a mapping (Langley, 1999) of the actions that were followed to deploy the firm's resources toward the elaboration of this capability. This mapping helped sequencing and characterizing the process hold within each department of Agronate. It results in understanding the elaboration of a capability through a 5-phase process.

Table 3 : The routine creation process at Agronate

Phase	Subplot	Description
Phase 1	Setting the context	Researcher-practitioner studied the institutional context and procedure to map the ground
Phase 2	Strategic implementation	Researcher-practitioner implemented action oriented toward top management
Phase 3	Tactical implementation	Action toward VPs and team to set up collaborative working phases
Phase 4	Collaboration	Intensive collaboration to internalize and change routines and achieving registration
Phase 5	Consolidation	Building upon results to achieve external and internal legitimacy.

Sequencing the process into phases allows to turn this rich data set into a more easily manageable material. It helps focusing on a particular moment in time that has been bracketed (Langley, 1999) in order to make sense of a temporal action. It helps focusing on a specific feature of the overall process by breaking it down into sub-processes.

Data analysis

The temporal bracketing of the overall process provides basis for the first part of the interpretation. It helped to get an overall perspective of how the actors act toward the elaboration of the routines.

In the first phase the action is mainly carried out by author one. The aim is to understand what the specific structures the company is confronted to. Various actions are made in order to understand what the rules are, who is responsible for their respect and what associated procedures consist of. The second phase aimed at communicating this new knowledge to top-management in order to set up a strategy that can lead to realize approval objectives. The third phase is a step of coordination. It is realized with VPs and teams and can be associated to work organization related to creation and modification of new routines. The fourth phase is highly collaborative and aims at creating new routines, and amending existing ones in consistence with the elaboration of a new capability. Eventually the fifth phase provides an overview of how the new bundle of routines is perceived as legitimate. The legitimacy of the overall action is conveyed by the look of institutional actor on the action of local actors.

We used these phases as plot and systematically traced back the evolution of the social capital of the firm and how it has been mobilized on the overall period of action and observation. We distinguished and characterized the different actors and structure that were part of the initial social capital and followed how this capital unfolds throughout the elaboration of the capability.

We then followed how actors were using this ties and how it impacted the pool of routines of the company. The ties are individual or firm related but they all have in common that they help gathering information that end in creating or modifying routines that participate in the registration capability of the firm.

We then systematically search how new information was obtained. We used Nvivo software for coding following the 5-phase process. Each piece of data has been coded in a selective way in an inductive coding (Charmaz, 2006). Based on this inductive coding we created a thematic tree that can be associated to an axial coding (Glaser & Strauss, 2009). In her these, Pamentier Cajaiba (2010) created five categories for providing an analysis of the capability creation. Those categories were:

- Basic components: it referred to internal firm abilities
- Processual components: it referred to the activities that were unfolded specifically for the elaboration of the registration activity
- Resources components: it referred to what the company had or lacked in term of resources
- Break to capability creation: this category relates to the bargaining power at stake in the organizations or outside of the organization.
- The last category was named information flow, it refers to exchanges of information that were observed in the firm. This category is composed of 4 codes: “information inbounds”, “information transmission to external ties”, “transmission of information to internal ties” and “organization of information”. After having mapped the ties related to the CEO, we will focus our data analysis on these nodes and systematically analyze how it contributes to gather information in each phase of the action research. We will also provide an interpretation of how it participated to routine creation and modification.

Results

Prologue

In this phase the company was still in its infancy and few people were working officially for the company. Observation on the field and interview revealed that Oscar the CEO of the company had particularly good interpersonal skills. He recognized that it is very important to network and actors around the company also recognize that he has this ability to create and maintain networks.

Interviewer: and, how did it evolve? Your network, it got bigger...

Oscar: Network? The principle of network is that it must always get bigger. If one's not add to its network 5 or 6 more people a month, something is going wrong. You have to shake as many hands as possible, knowing people, understanding what they are, what they can do why, how... and frequently help out people, for free, to maintain the network, it is always very useful.

Interview with Oscar - CEO & Owner - 9th of march 2006

Interviewer: What is Agronate's most valuable strength?

Cris: Oscar's indestructible drive, and his ability to create a network and to surround himself with very competent people, and also the motivation of every people, and knowing how to create nice work ambience.

Interview with Cris - Share Holder & Toxicology Expert - 22nd of March 2006

At this point on time the social capital of the owner can be summed up as follows.

Oscar studied biology in a French University, he was politically involved in the university and developed relationships in the board of the university. He used it later when he decided to create his company since he contacted the directors of research center he knew from the board. At the time of the interview, Oscar was still part of the board as representant of the civil society.

Before creating its company he developed is social capital in the French biotech network. He has been supported by an incubator and win several prized as promising innovative project. He also studied an entrepreneurship course in a Business School located in the south-east of France. During this course, he met Cris that will become share holder of his company and a valuable partner. Before teaching in this Business School, Cris was practitioner in the pesticide industry. He opened his network to Oscar, who decided to create a scientific board with many past practitioner of the pesticide industry.

On his free time Oscar is also invested into political activities. This part of this network has not been observed, but it was known by author 1 of one of its numerous activities.

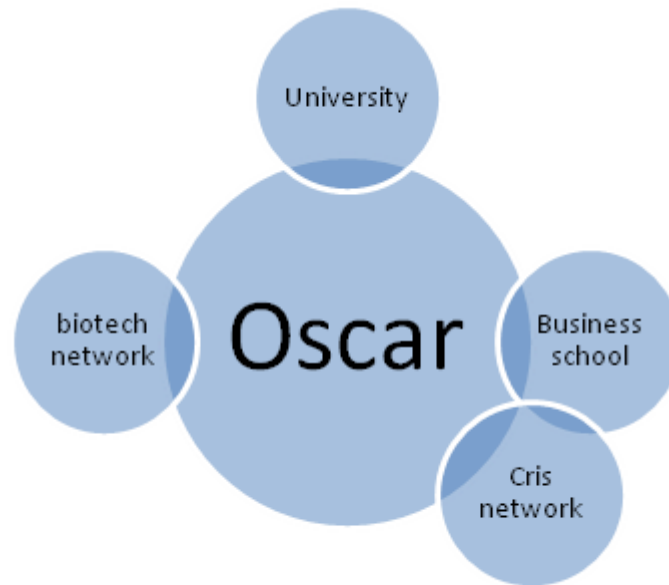


Fig. 1: Oscar's social capital when author 1 step into Agronate.

At this point on time Agronate is composed of this scientific board that work closely with Oscar. They recently decided to hire a young agronomic engineer. Shortly afterwards the board recruited a marketing manager. At the same time Oscar decided on his own to hire Author 1 to work on the registration constraint.

	Setting the context	strategic impl.	tactical impl.	collab.	consol.
information obtention	38	49	22	44	71
information organization	0	4	16	55	36
internal transmission	35	49	39	129	149
external transmission	9	20	5	29	45

Table 4: repartition of the information category's codes in each phase

The category that is more scrutinized in this study show that the codes are concentrated on the later phases (4 and 5) it is consistent since this two phase are more collaborative than the two first that concerns very few or few people. "Information inbounds" is more or less equivalent in the 5 phases, but the internal transmission drastically increases on the last two phases. We see that the level of information transmission is also rising in the last phases of consolidation.

Phase one - Setting the context

When author one arrived in the company she has been introduce to one of the scientific board member since he was the registration CO for the European region in a chemical Big Blue. She spent her time on understanding the various current registration procedures, on activating it in

context and to make sense of European registration procedures that was not yet used neither known in detail by the firm and its actors.

The repartition of the code in regard to the phase setting the context shows that author 1 is having an activity to obtain information. The information obtained is divided into two major sources.

The first one by contacting institutional structures those are not already part of the firm social capital. The information obtained concerns the procedures, structures and people that will be set up by national institution to abide by the 2001-36 EU Directive. This information is not yet transformed into knowledge but is a representation of the structure imposed to companies.

The second major source of information is obtained by the former practitioner registration CO Howard. Since he is not anymore in the action he knows the logics of registration, what has to be done and what must not be done. The kind of knowledge he shares is practical. It refers to ostensive routines. He further refines the work done and provides managerial counsels. He also accepted to meet registration administrative he knew with Agronate people. He somehow let agronate beneficiate from its legitimacy as well as showing in context how to behave with senior officer.

The other code that is important in phase 1 is the information transmitted to people within the company. It is divided into two parts.

The first consist of the strategic information. It is mainly transferred to Oscar for both providing information and also showing the legitimacy of the action carried out by Author 1 in the course of his mission. The second part of the information is clearly technical. Author 1 engages with engineers and internship to create registration procedures and write dossier. This technical information is created by author one from its analysis of institution and regulatory document. She understand how this work can be carried out and propose a routine that we can call ostensive since it is not yet put to action by practitioners. The use of this knowledge by practitioner can help create a performative side of this routine.

Phase 2 - Strategic implementation

At this point in time Agronate is about to be merged with a bigger biopesticide firm. It will change the configuration of the company since the group owned production plants and has the capacity of producing and counts 45 people in all.

In this phase the “information inbounds” is more relating to future routines. Author 1 benchmarks several possible toxicological study providers. That information is technical and its accumulation paves the ground for creating future scientific routines. It is yet not performative, but rather relates to conceptual knowledge in the context of the company i.e. ostensive side of a routine.

On the registration level we see that relationships with registration experts are getting more valuable. The perception of an expert changes overtime. From suspicious he turns to be a strong support of the firm’s action. He even provides them with confidential information.

“Hello,

I send you the commission report, something I am not allowed to do. For your ecotox testing, I will ask a colleague of mine since I am not very competent on this matter. ”

Verbatim of an email sent by the expert on 17th of May 2006

Still using the same method, Author 1 contacted various European Member States institutions to create a benchmark and provide guidance to top management. Howard, the past practitioner, was less involved in the process since the new owners are not confident enough, however Author 1 continues to ask for his opinion. She seeks elements on tacit relational

behavior and information about institutional behavior. She notably needs to know whether one institution behaves in practice as it is expressed on their websites and notices.

The “internal transmission of action” is strategic and technical. The strategic information is in this phase more oriented to help decision making. It concerns the choice of a country (Rapporteur Member State - RMS) to assess the dossiers submitted to approval. This choice is crucial since costs, procedures and legitimacy of RMS differs one from another and in regards to the kind of substance a company want the approval for. Author 1 remained concerned with the perceived legitimacy of the action she was carrying out until that point. Because the company merged, she had to redo part of the explanation to top management. She felt that the success of the process would be constrained by its perceived legitimacy.

Technical information transmitted to engineers are more precise and more numerous. This is consistent with the fact that European approval process is more complicated those carried out by the firm so far. This information will be translated into technical routines to be carried out on a regular basis by actors (ISO standard, ASTM, GLP practices...).

Some information is transmitted to registration structure to provide complementary information or to obtain other information in exchange. Those information concerns current operations.

During this two first phases author 2 used legislative information gathered to create a guideline adapted to the product developed by the company. This idea of developing a guideline has been proposed by Howard that knew its importance. Author 2 showed it at two RMS that found it legitimate. This guideline is a representation of a meta routine. It incorporates the order and pace of actions to be carried out for registration purpose. It also encompasses technical and scientific information that must be carried out routinely. It can be referred as to an overall ostensive routine. It is not yet implemented but can be used as heuristic of action (Feldman and Pentland, 2003).

Phase 3 - tactical implementation

This phase is less intense in term of information inbound. Author 1 is refining her understanding of the technical and administrative requirements. On the technical side she sets up a pool of suppliers for working with them on the long run. This suppliers' benchmark will help in routinizing future work with them. She gathers the information they need, the kind of scientific template they use, the delay for realizing the studies. Once she has all this information it is reported in the registration guideline she created and it is part of the registration routine. The information she gathers aimed at accelerating the process once the company will be ready. It is information that can help to turn from an ostensive to a performative routine. Even if the company nether practically worked with this people, the performativity of the routine has been anticipated by creating a practical template.

The “internal flow of information” is more important in this phase. It refers mainly to the coordination that is being implemented. This transmission of information is made at various levels.

To CEO and board member to provide them with an overview of the levels related to registration structures and to associated actions (both internal and external) to be carried out. This communication is important since it aimed at obtaining resources (time, people, financial resources, network...) to achieve registration dossier as quickly as possible. It is also a mean

for showing the relevance of talking about firm capability thus supporting the researcher action.

At a more technical level the information is made through various means by organizing overall kick off meetings where the work organization is proposed and debated. Smaller meetings are organized with local teams (researchers, technicians, marketing). Those meetings aim at presenting the several meta-routines, at presenting specific routines to each team as well as the links with others. The overall idea is to insufflate coordination into the process. These actions are followed on a daily basis during the next phase.

Phase 4 - collaboration

This phase is very intensive in information flow. “Incoming information” concerns mainly scientific elements that help advancing registration dossier. These information are needed for internal analysis purpose or because the consultant they pointed out a lack. Information is needed since in the existing routine -the performative routines at stake- the systematic templates of the scientific studies carried out for registration purpose (ISO or GLP-like document) were not used by RD teams. Teams think that it is time-consuming and not necessary since they have already carried out the research and stored their results in their usual own way ie. The routine as it is performed. Because she did not want to let the process worsening, Author 1 decided to obtain information and to structure it as necessary. She systematically asked to researchers to get the needed information. Once the results presented in a satisfying way it created an understanding. It created an incentive for technical teams to adopt the templates for the future studies, and therefore modify their initial routines. In this particular context the creation of templates play the role of ostensive routines. It is not immediately adopted but provides new heuristic of action.

The “transmission of information” is mainly oriented toward two groups of people: the consultant and people from registration institutions, whether it is scientific experts, senior officials or European functionaries. These latter contacts helped in checking that the ongoing process was correct or adapted to the European directive requirement. It was a way to check that what has been done could be implemented again for future registration process and thus turned into a performative routine.

Phase 5 - Consolidation

In this last phase “incoming information” are of two kinds: technical and administrative. First, information received specifies technical details and refine the information provided in the dossiers. On the administrative side less information are incoming but they are very important since it is for preparing and coordinating with registration authorities.

The information on “organization” concerns both the tuning of the registration dossier to be presented to authority and coordination with these authorities to be ready on the D-day.

Information on technical organization refers to refinement and not anymore to the rough organization of the dossier. At this moment RD actors are almost not solicited anymore, since no new information are integrated.

It is eventually overall activity organization that will be assessed. A positive assessment provides legitimacy to the process implemented internally and therefore prove local actors of the consistence of the actions implemented. It is a first step toward routinization of these practices.

In this phase the numerous internal and external information transmissions concerns the tuning of the dossier that will be submitted. Agronate registration taskforce members are exchanging many information between them and with the consultant. The relevance of this numerous transfer of information does not pertain solely to its content but also to way it must be refined. This refinement reveals the intention of providing information that satisfies

administrative criteria both on the form and the content. These information cosmetic is done after a first assessment made by authorities: it is part of the submission process and must be routinized.

We show that routine is not only firm related but, in certain context can be industry related. The pattern is given by the institution and it is practiced locally. Managerial agency plays an important role in selecting consistent knowledge that can help in carrying out local activity. This knowledge stems from different structures: whether it is regulatory, scientific, and administrative. It helps creating ostensive routine that can be used as a heuristic of action within the firm. It also lead to modify existing routines by providing new templates of action. We show that legitimacy plays an important role. Legitimacy in this context plays at two levels. First, the action to create new routines can be carried out because it is perceived as legitimate by top management. This legitimacy however is not transferred to other part of the company. The routines created keeps their ostensive aspects until regulatory institution positively acknowledged the action undertaken by the company.

After that we classified the kind of influence that external social structures had on the routines in three categories: Regulative, Normative and Relational. These categories emerged from our analysis as having social structure properties: they offer elements that will constrain and enable the social process of creation and modification of routines.

Regulative refers to institutions that constrain and regulate action, establish rules and inspect others' conformity to them. In our case the regulative power is embedded into the directives that are imposed to the firm. This norm impose that the firm with similar output to abide by registration procedures to market their product. It is the overall framework but it is not useable as such.

The normative dimension places emphasis on values, norms and roles identified in other contexts and ultimately adapted in the organization. The normative dimension is found in the various actors that are representing the regulation. They indicate and guide firms to internalize certain norms and values. The overall logics of registration come from drugs registration system that was transferred to pesticide industry and eventually adapted to biopesticides. It creates tacit and explicit rules that are almost the same in the three dimensions. In our case we refer to the systematic nature of GPL or ISO practices. These practices are widely used in the scientific analysis domain and this long standing and elaborated tradition has transferred to biopesticide firm when then enter the realm of registration approval.

Finally, the relational dimension refers to socio-cognitive elements that are brought forward by the enrichment of the organization's network. In our case the initial network of the firm was blend into those of the first owner. It evolved in various directions, the first phase has lead to understand what are the persons related to regulation and associated procedures. The second and third phase led to contact these persons. We can identify the creation of a network around institutional structure such as Rapporteur Member States and local institution. The people that are part of the network are senior officials that help industries out. Another network is related to scientific structures that help creating consistent workflow encompassing regulatory norms. These networks are more particularly developed during phase 3 "tactical implementation" and phase 4 "collaboration". At more local levels, internal network is also very important since relationships with top management participate in gaining valuable legitimacy.

Figure 2 represents a schematic representation of how routines are influenced by external structures in this process.

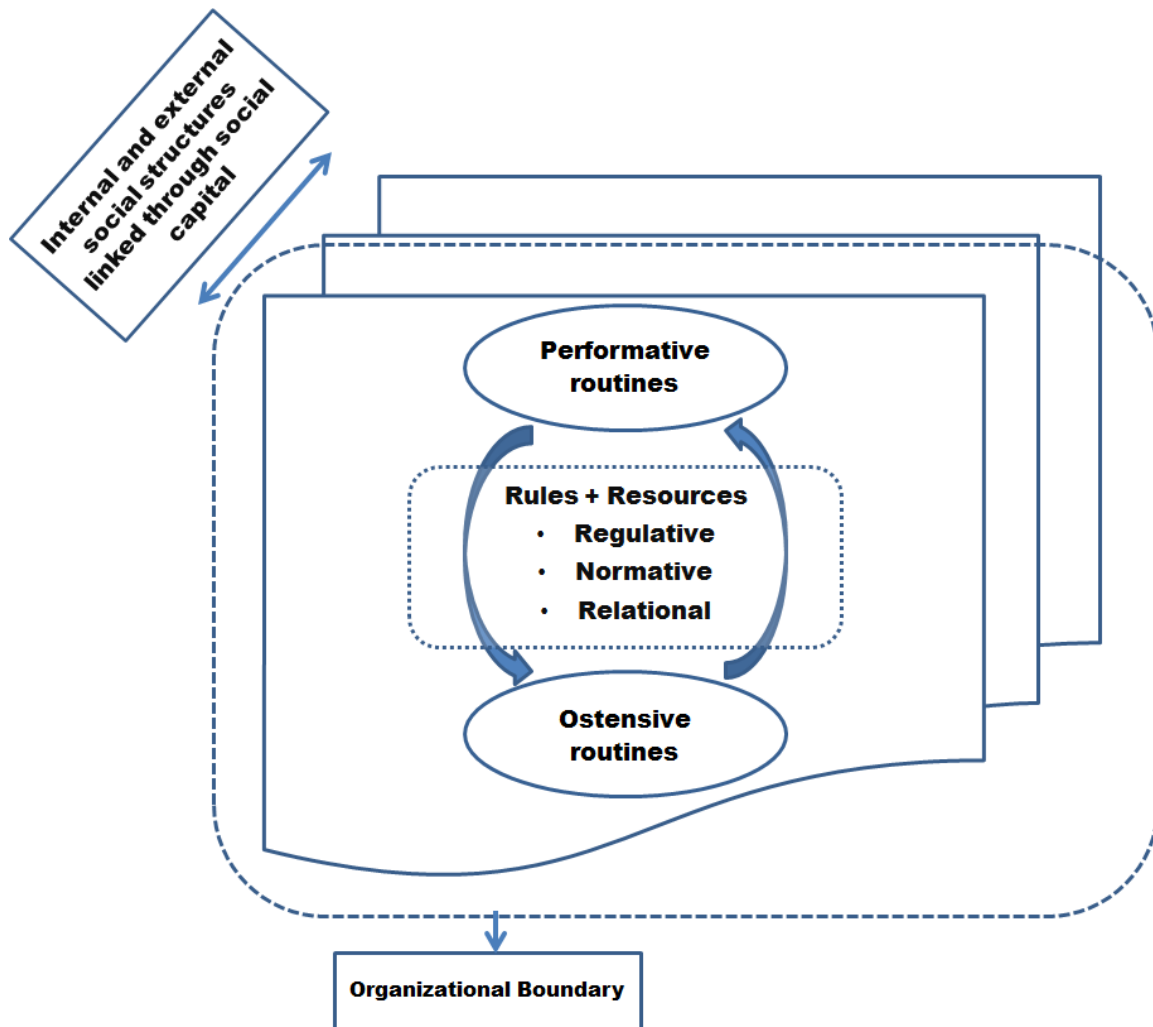


Fig. 2 Recursive dynamic between ostensive and performative routines through socio-structural network development.

Discussion

This paper investigates how managerial actions participate in selecting and modifying collection of routines with the intention of elaborating an organizational capability. It stems from a wider research on capability creation (Parmentier Cajaiba, 2010). The theoretical framework used associates a routines perspective, structuration theory and social capital.

Routine is not only path dependant but also context dependant. In the line of Pentland and Feldman (2003) we show that part of a collection of routines own by a firm is path dependant. Here, the routines relate to the biologists and chemist work which is path dependant since the creation of the company. But routines are as well context dependant. Here, new routines find their source in European directives and related procedures. We show that the action to create new routines needs to be legitimated. Because resistance arise, internal legitimacy of the action is required. It is however not sufficient. For shifting from ostensive to performative routine, external legitimacy obtained through new relational ties is crucial.

Our contribution is two-fold. We propose to understand routines as social system rather than social structures as conceptualized by Feldman and Pentland. By associating routines to social system it replace it at the center of the organization. The social structure represents the environment. This conceptualization of routines provides a solid ground for analyzing the dialogies at stake in the routine creation and modification process as well as the recursive patterns of action.

This paper contributes also to refine the routine concept. We propose a model of routine creation and modification process by conceptualizing routine as environmentally dependant. We show that the environment is not unified but rather a patchwork of social structures that interact with the organization. The social capital constitutes a link between the organizations structures and the others social structures. It can be used to interact with these structures that are more or less easily reachable.

This perspective is consistent with networks as a means of increasing capability performance. In this vein we provide a new level of analysis by investigating the role of networks on routines elaboration. This perspective can help in understanding how bundle of routine (capability) are consequently created.

From a practical perspective our research provides an interesting heuristic of action for companies that are confronting to implementing new activity related to regulation. This heuristic invites to focus on important social structure, their enabling or constraining feature and possible ties to activate.

This research is still in its infancy. One important limit of our work is that we focused more on the recursive pattern that provide change from ostensive to performative routine. We provide little evidence of the opposite dynamic. More generally the case chosen is very particular since the environment is maybe more important than in less regulated area. Our results concern highly regulated environment, and our model needs to be activated in other similar contexts for the sake of increasing theoretical generalization.

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