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Knowledge Visualization for Strategic Change: Mapping Knowledge for Discovering Business Renewal

Filippo Zanin¹ and Carlo Bagnoli²

¹University of Udine, Italy

²Ca Foscari University of Venice, Italy

filippo.zanin@uniud.it

bagnoli@unive.it

Abstract: Based on an in-depth case study of a strategic decision-making within a professional service firm, this paper explores how the knowledge visualization tools facilitate a holistic and rational understanding of the business process renewal. There is a pressing need to draw attention to how knowledge is developed and evolved within changing activities and how visual representations can help managers to have a more comprehensive picture of the multiple and reciprocal connections between strategic and knowledge processes. Based on the approach that views knowledge as a social accomplishment situated in actions, our work highlights the power of the symbolic interactions between managers and visual representations for the development of new meanings for actions and situations for the firm's strategic renewal. We approached our data with the following question: are the visual representations of knowledge in action useful in capturing and stimulating the dynamic nature of the strategic change? The case we study highlights that visual representations in the forms of strategy maps provide a powerful tools for making the multiple interrelations between knowledge and strategy evident and for helping managers to explore promising patterns of business renewal.

Keywords: strategic change, strategy maps, visualization, knowledge

1. Introduction

The positivist perspective to knowledge management in organizations views knowledge as a thing that can be captured, formalized and shared among people and different organizational levels (Steinmueller, 2000). The main assumption that informs this approach is the objectified view of knowledge and the application of models and tools guiding formal and uncomplicated representations of the direct relationship between knowledge management and the achievement of a sustainable competitive advantage (Kogut et al., 1992). However this approach places emphasis on tools and techniques for managing knowledge contents and processes without enriching our understanding of the messy nature of the deployment of knowledge in strategy formation (Whittington, 2003). The practice-based view is an alternative approach to the knowledge and strategy content analysis that tends to examine in more fine details the micro-activities that constitute knowing and strategizing as social and situated practices (Johnson et al. 2003). Our paper builds on this latter approach, focusing on the roles that visual representations play in the strategic planning through a detailed qualitative study of strategic change in a professional service firm. The main purpose of our research is to deepen our understanding of how knowledge is enacted within strategic change processes and how that new generated knowledge allows managers to better understand the complex and unfolding character of strategy formation.

The next section describes the knowing-in-practice perspective as a framework for explaining the mediating and epistemic roles of visual representations in knowledge development during strategy formation. The following section outlines the literature on strategy visualization with special emphasis on the potential uses of the visual artifacts to gain insights into the active role of the strategic maps in practice. Then, we present the research's field and methodology and we explain our findings, as emerging from the case of the use of strategy maps in a professional service firm.

2. Knowing in practice perspective

The adoption of the practice-based approach to knowledge implies radical consequences for rethinking knowledge and the processes for managing it. Instead of the traditional emphasis on knowledge as an object that can be fully captured, formalized and shared among people and the organizational levels, what is highlighted is the complex and unfolding nature of the knowledge processes in action. From this perspective, knowledge is deeply grounded in practical activities, situated in interactions between people and objects and continuously in transformation. New knowledge arises from the multiple and ongoing interactions among people, meanings, actions, situations and objects. The latter have a performative character (Nicolini, 2011) and, thus, are considered to be the focal points around which knowing-in-practice arises. The objects assume the

status of artifacts as they provide people with a frame for the analysis, as well as a common ground for a comprehensive explanations of situations, for the negotiation of meanings and for enabling knowledge creation. (Whyte et al., 2008). Material objects assume diverse functions in the unfolding of the knowledge process. They act as “technical objects” (Ewenstein et al, 2009) when they facilitate the elicitation and synthesis of information and provide managers with a stable and accessible representation of the ongoing knowledge process. They function as “epistemic objects” (Rheinberger, 1997) when they stimulate a never-ending generation of new knowledge by the systematic interaction between people and artifacts. This “objectual practice” (Knorr-Cetina, 2001) is made up of a web of activities taking place in particular fields when people engage with various artifacts, each with their own cognitive frames and interests. Thus, knowledge is an evolving and dynamic process, that is developed in idiosyncratic ways by an exploratory practice characterized by an “unfolding ontology” (Knorr-Cetina, 2001, p.182). Finally, objects can act as “boundary objects” (Star and Greisemer, 1989) when they are meaningfully incorporated into practices of different fields and enable or constrain knowledge sharing across boundaries. Star and Greisemer defined boundary object as «flexible epistemic artifacts that inhabit several intersecting social worlds and satisfy the information requirements of each of them» (Star and Greisemer, 1989, p.393). They carry a symbolic structure that assure a common identity that will be used for the spreading of meanings and for the sense-making process by the different people involved. Literature recognizes three different types of boundary objects: syntactic, semantic and pragmatic (Carlile, 2004). Each of them presents different attitudes for facilitating knowledge sharing across boundaries but all can support the transfer, translation and transformation of knowledge.

3. Strategic change in a practice perspective

According to a cognitive approach to strategy-making, the strategy activities are largely influenced by the different perceptual filters of each strategist. The perceptual filters are unique, as they were formed through specific ways of engaging with the world, and they are dynamic because they tend to incorporate the new knowledge generated by learning processes (Jacobs et al, 2006). Thus, strategy formation is a process that integrates conflicting mental models of individuals, allowing the development of a coherent strategic direction (Walsh, 1995). The activities that qualify strategy-making include a more or less deliberate and routinized decision-making process and the conscious or unconscious exploration of emerging patterns (Vaara et al, 2012). Within the field of the practice-based perspective, strategy formation is viewed as a knowledge-production process that takes place within the multiple interrelations of socio-material practices, where agency is developed by the mediating role of artifacts that allow multiple actors to integrate different strategic flows and to elaborate on avenues for change (Cabantous et al., 2010). Recent studies demonstrate that organizational transformation occurs in a dynamic way as a process of continuity and change (Malhotra et al, 2015). More specifically, the process that enable firms to change is the result of a cognitive reorientation that occurs with complex interdependencies between human actors and material actors (Kaplan, 2011). This view of strategic change as an undergoing process where multiple cognitive dynamics emerge simultaneously in discursive and materially mediated practice is proposed to develop a deep understanding of the determining factors that explain the epistemic nature of the strategic change processes. Thus, by using the framework on the different roles that object can play in the realm of knowing in practice, we are able to show the multifaceted nature of the knowledge and strategy process and especially the interlacing between knowledge structure configurations and new knowledge generation.

4. Visualizing knowledge for strategic change

The unfolding/dynamic character of the strategic change can be better understood by the adoption of a knowing in practice perspective. This way, strategy change is intended as a knowledge-producing process that arises from the reciprocal interactions of practical activities when human actors negotiate meanings through the mediation of objects. In strategic management literature, the tools for the visual representation of strategic change are considered more than just repositories of knowledge, as they can lead to a more holistic understanding of the dynamic interaction between internal tensions and external pressures, enabling knowledge generation and its concrete transformation in new ideas (Hendry et al, 2003). Visual artifacts are used for the representation of knowledge in different contexts (Eppler et al., 2014; Comi et al., 2013). The potential benefits of the visual representations are typically bundled in three categories: cognitive, social and emotional (Eppler et al, 2009). According to a rational approach to strategy-making, visual tools are used to provide a static, objective and structured representation of the process by supporting a convergent development from the analysis phase to the implementation phase. Representations are symbols of an abstract thought process where business inputs and outputs are organized and patterns are identified (Jacobs et al, 2007). The problem with this approach is

that it ignores the epistemic nature of representations and the transformational capacity of the visualization, leaving the knowledge-generative mechanisms in the dark. The adoption of the practice perspective demonstrates that visual representations are much more than an effective means for strategists to provide structure to strategic problems, because they facilitate knowledge sharing and creation, making strategic change a social and epistemic practice (Kaplan, 2011). From this perspective, the interaction between human beings and objects guide the advancements in strategy-making, mobilizing knowledge bases between internal and external boundaries and prompting strategists to step between exploitation and exploration of knowledge.

5. Research setting

The study explores processes of strategic change in a small Italian accounting firm, adopting the knowing in practice perspective. The professional service firm has 25 employees and performs basic accounting and advisory services as key accountancy practices. During the last 3 years, the firm has been exposed to an increased intensity of competition in response to competitors price reduction and the economic downturn of some pivotal clients. In order to make the process of service creation and delivery more efficient, effective and competitive, efforts were made to conceptualize a business process renewal targeted at diversifying the firm's business portfolio. The strategic process was undertaken to address the two existing different lines of business: standard accountancy services and business advisory services. The former are delivered in accordance with prevailing laws and regulations and derive from the development of standardized practices, where technical and formalized knowledge contents result from performing activities restricted within a regulatory framework. The latter are additional services, as clients are under no obligation to purchase them (they are free of statutory restrictions) and are more heterogeneous, embracing a larger scope of service typologies (e.g., tax planning, financial budgeting, strategic planning, generation transfer, remuneration schemes). The integration and recombination of knowledge content is critical for the management of the firm's services diversification and requires a fine-grained analysis of the existing knowledge sources and their attitude to dynamism. The diversification of the business portfolio is a typical strategic choice that must be accompanied by a deliberate strategic decision-making process, able to take into consideration the emergent and provisional nature of the process of business renewal. Edwards et al. (2005) argued that visual representations support the strategic decision-making, as they help individuals to understand causal linkages, share ideas and improve managerial judgments. In terms of helping managers to make sense of business renewal, we put a strong emphasis on the structural, social and epistemic roles of visual representations as knowledge generating tools.

6. Data collection

Data was collected in 2014, from three main sources over six months.

First, we directly observed managers engaging in planning activities. Participant observation (Easterby-Smith et al., 2012) was carried out by the first author; he took on-site field notes, observations and interpretations. The observer was introduced as a researcher to all participants in the study and did not intervene directly in meetings. Second, we conducted a double interview session with the participants: the two Managing Partners and the three directors of the main functional areas (respectively, tax area, client support and administration). We started by talking to the two Managing Partners, one of which is the founder of the professional service firm, who were central to the strategic change initiatives. They connected us to the three directors of the main functional areas. Table 1 below summarizes the development of the interview process for collecting data.

Table 1: A summary of interview process and data

Interviewee	Interviews	Time	Strategic contents for change initiatives	Knowledge items for supporting strategic change initiatives
Managing partner 01 (the founder)	4	11h and 45 minutes	Strong emphasis on diversification strategy with the broadening of standard services and the introduction of well-identified new advisory services The key for success is the firm's growth	Renovation of the existing competencies Reinforcement of the firm's reputation within the market Lack of technical knowledge
Managing partner 02 (the co-founder)	2	09h and 25 minutes	Great attention to the reassessment of the advisory services	Variation in terms of capabilities required Introduction of new and specialized competencies not

Interviewee	Interviews	Time	Strategic contents for change initiatives	Knowledge items for supporting strategic change initiatives
			The key for success is the shift towards the delivery of a broader portfolio of advisory services	generally learned in basic accounting training Lack of heterogeneity of human capital
Director of the tax area	1	2 h	Renovation of the tax area by the introduction of tax planning	Reinforcement of the existing competencies and linkage with knowledge sources outside the firm
Director of the client support area	1	2 h	Development of a broad range of services	Reinforcement of the existing competencies and linkage with knowledge sources outside the firm
Director of the administrative area	1	2 h	Improvement of the firm's economic and financial numbers by increasing the firm's size	Reinforcement of the existing competencies and linkage with knowledge sources outside the firm

All the interviews were recorded and transcribed in order to enrich the detail notes regularly taken by us from interviews and formal and informal meetings. The first interview session of approximately three hours was accomplished by conducting a semi-structured interview that was articulated around the strategic dimensions of the Kaplan and Norton's framework: financial, customer, internal process and learning and growth (Kaplan and Norton, 2000). The main objective of this first session was to depict the current cause-and-effect chain that explains the firm's value creation process. The strategic content was visualized in a strategy map, in order to make the direct connections between the strategic perspectives visible.

In the second step of the interview session we asked each interviewee to discuss the diversification strategy of the business portfolio with the delivery of a broad scope of business advisory services. They were stimulated to analyze the adequacy of the existing firm's competencies, as the strategic change would require additional knowledge and skill resources. The diversification of the service portfolio and the introduction of new and specific services involves the development and the deployment of human resources required to produce those services. Accordingly, the development and accumulation of these types of knowledge resources is relevant for making the delivery of new business advisory services effective. We reported the ideas in a new strategy map. An example of a strategy map is provided in Figure 1 below.

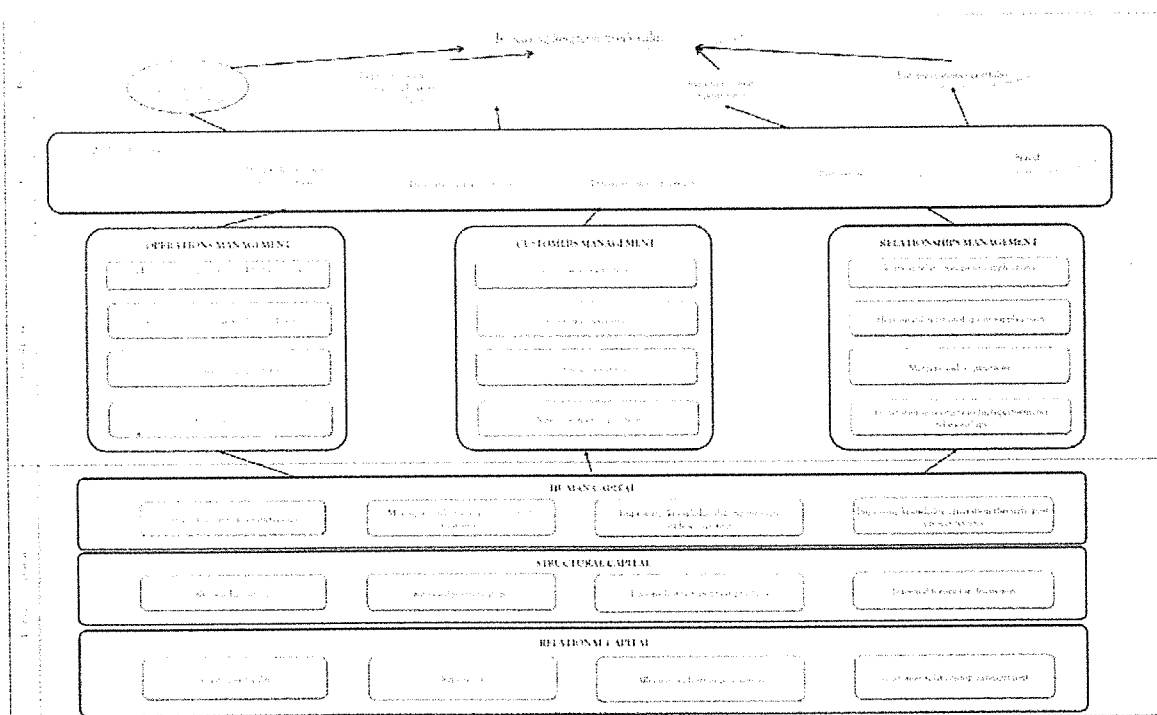


Figure 1: Strategy map with new directions: An example

Third, following the approach used by Edwards et al. (2005), we organized a group discussion, asking each interviewee to describe the suggested strategic changes by showing the final version of his strategic map to others. Each interviewee had the opportunity to see the strategic maps of the others, to raise objections and to ask explanations. In this way, knowledge sharing was facilitated, creating a brainstorming-type session (Shaw et al., 2006).

7. Data analysis

In order to understand how visual representations work towards an effective representation, sharing and transformation of knowledge sources for strategic change, we proceeded as follows. First, we delved into the observational and interview data to retrieve evidence of the active role of strategy maps in influencing strategic decisions and actions. Since we found multiple knowledge effects of strategy maps in facilitating both exploitation and exploration of strategic knowledge, we moved to a more focused stage of analysis, examining the benefits of visual representations in depth. Through inductive analysis of data, the first author clustered the available information by content (Grise and Gallupe, 1999), developing the data structure shown in table 2. He used short descriptive labels, trying to remain as close as possible to the expressions employed by our informants or directly observed in the field.

Table 2: Data structure: Focus on the roles of visual representations.

1 st order concepts		2 nd order themes		Categories
Visualization of the key strategic and knowledge concerns Holistic understanding of the unfolding character of strategy formation by linking past, present and future Making the cause-effect relationships between strategic and knowledge variables self-evident and concrete	→	Knowledge formalization Structuring of the cause-effect chain between variables and objectives Facilitating self-awareness of the evolution of the strategy-knowledge links over time	→	Reflexive practice
Creation of a symbolic platform where discussion arose by comparison of different views Sharing of opinions among managers by using a common language Creation of discursive practices making combinations and recombinations of meanings possible	→	Mobilization of knowledge across the different cognitive frameworks Mobilization of knowledge mediated by symbolic artifacts Mobilization of knowledge for providing access to a wide range of actors	→	Negotiation practice
Allowing managers to make a dynamic interaction with the representations of their conceptual combinations Asking pivotal questions about the firm's actual and future process of value creation to incorporate a broader perspective Favoring dynamic thinking about the complex link between strategy and knowledge dimension	→	Knowledge transformation and generation Breaking consolidated perspectives and favoring opinions out-of-the-box Exploring new patterns and finding innovative solutions	→	Epistemic practice

Thus, we started to identify patterns of strategy maps' roles. The set of roles showing the features of organizing strategic thinking was grouped together under the category of "reflective practice". The set of roles that increases the possibility to exchange knowledge and meanings with other parties was grouped together under the category "negotiation practice", because of its social and/or political nature. Finally, the set of roles that stimulates development of new ideas leading to change in the firm's value creation process, was grouped together under the category "epistemic practice", which appeared as an important step in strategic renewal.

8. Main findings

The roles of strategy visualizations in the business renewal

In our study we explored how the reflective and epistemic practices took place in change initiatives for the diversification of the business service portfolio in a small professional service firm. We discovered that visual representations in the form of strategy maps support strategic decision making, because they facilitate a conscious control of the reciprocal interdependencies between changes that occur in the strategic dimension

and those that involve the knowledge sources of the firm. Representations convey different types of knowledge, depending on the symbolic structure used, to give sense to data and complexity. They are useful for bridging, in a dynamic way, not only the different strategic concerns involved in a strategy formulation process – in our study, the alternative ways of diversification of the business portfolio and the configuration of the firm's knowledge sources – but also the different cognitive structures of the people involved, stimulating both the exploitation and the exploration of knowledge. The exploitation of knowledge allowed the efficient rationalization of strategic decision-making by capturing specific aspects of the “means-ends chain” of the interlacing between strategic objectives, activities and resources. Such representations illustrated, in a simple-to-use way, the current firm's value creation processes and helped managers to shape planned and emergent strategy, giving a common symbolic ground for facilitating the reflexive connections between the past, present and future strategy and the formulation of judgments about the adequacy of the existing competencies. Strategy maps were revisited when working on the reflective data on the dynamics of the firm's strategy development over time. This reflexive process generated considerable discussions on how past strategies arose, which strategies failed and why and promoted a better sensitivity to the translation of strategic objectives into action plans.

Under this reflexive and rational representation of strategic decision-making, it is possible to recognize the role of the strategy maps as *technical objects*. The cognitive process was framed by incorporating reflections from different perspectives (the cognitive structures of each manager involved into the decision-making) and verifying the consistency of the strategic conceptual combinations of each manager that were displayed into the strategy map. This enabled managers to identify and align the gaps between knowledge and strategic contents and thus represented the first step in adjusting the organizational knowledge sources, in order to make change possible and concrete.

The exploration of knowledge was manifested by managers making sense of unstructured and emergent situations, with the aim to gain insights in addressing the right balance between business objectives, action plans and knowledge resources. The dynamic configuration of the translation of desirable objectives in concrete action was encouraged by a continuous engagement in learning processes that provided shared sense-making while new patterns unfolded. In this manner, strategic decision-making was qualified as a situated knowledge process, which proved useful in enabling knowledge generation to move outside routine-based activities. The enactment of this dynamic knowledge context was possible by the display of visual representations and we appreciated their functioning as *epistemic objects*. The conceptual combinations represented in the maps facilitated a shift in perspective by stimulating new answers to pivotal questions. Asking such questions forced managers to challenge current assumptions and stimulate discussions for making better choices and finding innovative solutions to strike the right balance between strategy and knowledge contents.

9. The outcomes of the epistemic practice

Three new strategic initiatives aimed at the diversification of the business portfolio arose from the epistemic process supported by the strategic maps: the development of a web platform for the delivery of standardized services; the spreading of internal knowledge for the improvement of traditional services; and the creation of new knowledge for purposes of diversification.

Each pattern was the result of the reflexive, interactive and generative processes where individual and collective thinking was synthesized and adjusted by the mediating role of the strategy maps.

The development of a web platform for the externalization of knowledge

This strategic initiative is consistent with the acquisition of new clients and the minimization of costs for the production and delivery of standardized services. The strategic thinking surrounding this initiative can be synthesized by presenting the “what-if” assumptions behind it: if the traditional service portfolio will be broadly ranged, then the client's satisfaction will increase and revenues will become more stable for the future. Conversely, to make this initiative concrete, a massive knowledge acquisition process is needed in order to reinforce the existing capabilities and acquire the technical knowledge for assuring the quality of service delivery. As for the unfolding of decision-making, we highlight that the emphasis on the interaction among the four strategic dimensions stimulated the identification of emerging opportunities in the more consolidated and traditional business area as well. The usefulness of strategy maps was evident in recognizing the changing nature

of the main competitive variables and providing the basis for the generation of new ideas, able to challenge ways for competing.

The spreading of internal knowledge

To make the delivery of traditional services more efficient, some limitations in the internal knowledge were identified and the activities to address those limitations emerged as an important strategic topic. Strategic attention was drawn to the exploitation of existing knowledge by encouraging ways through which knowledge is shared and distributed among the organizational levels. In order to fill in this knowledge gap, the proposed solution was to shape the firm's knowledge structure by linking knowledge repositories to individuals involved in the provision of traditional accountancy services within the network. Regarding the decision-making process, our study reveals that this solution was the final outcome of a continuously-reframed strategic thinking where different perspectives were mobilized by the mediating role of the strategy maps. Moreover, this dynamic process allowed us to understand that the knowledge growth and diffusion is not only a systematic and formalized process (knowledge that flows from sender to receiver), but also a social process. This allowed us to operationalize the creation of a digital archive and the configuration of a specific internal network, based on participation in topical discussions where individual knowledge and experience is shared informally.

New knowledge creation for business diversification

The desirability of pursuing the reconfiguration of the current value-creation process by evolving business advisory services was recognized as involving strategic positioning and knowledge generation. First, the unfolding of strategic decision-making helped managers to acknowledge the desirability of taking opportunities for the development of the advisory services portfolio. Second, for the purpose of business diversification, several options for developing knowledge were generated, encouraging a critical perspective on the ways through which knowledge is currently created, shared and acquired from internal and external sources. This means that the decision-making process allowed managers to take into consideration the reciprocal interdependencies between strategic and knowledge choices. While recognizing the need for a strategic diversification, managers also engaged in epistemic practices to encourage the movement from an organization based on standard accountancy services to an organization based on business advisory services, where the knowledge-producing activities are strictly coupled with strategic options.

10. Conclusions

This study aims to explore the different roles of visual representation in the strategic renewal of a small Italian accounting firm. The topic is the conceptualization of decision-making as a knowledge-production process and the ways in which strategy maps facilitate the alignment between strategic and knowledge changes. Our findings suggest that strategy maps are multifaceted artifacts, as they represent knowledge, convey meanings and discover new insights during the unfolding of the decision-making process. Moreover, we find that the use of visual representations helps both exploitation and exploration of knowledge. By providing the ideal locus for the representation, negotiation and generation of knowledge, strategy maps provide the comprehension and conceptualization of the firm's knowledge structure and enable interactive sense-making, allowing an epistemic shift by moving from stability and order to dynamism and change.

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