

THE 'TRIANGULAR' COHERENCE BETWEEN BUSINESS AND KNOWLEDGE MANAGEMENT STRATEGY CONFIGURATIONS IN SMALL FIRMS

Carlo Bagnoli - Ca' Foscari University of Venice, Venice, Italy

Maurizio Massaro - University of Udine, Udine, Italy

Filippo Zanin - University of Udine, Udine, Italy

ABSTRACT

A firm's knowledge management (KM) strategy must be strictly linked to its business strategy in order to achieve a sustainable competitive advantage. This study aims to investigate the link between SFs' business strategies and their knowledge acquisition, selection and generation strategies in order to identify whether they are effectively aligned and if so, how this alignment has come about. After conducting in-depth interviews and cluster analyses on a sample of 56 SFs, the firms were classified into different groups based on their competitive advantages and knowledge acquisition, methods of selection and the types of generation activity they carry out. The level of independence of all those groups was then tested by using a Chi-Square Test. Our findings allow us to conceptualize two typologies of 'triangular' coherence between business and KM strategy configurations in SFs. They reveal two different business strategy groups: resource-based oriented firms and market-based oriented firms), three different knowledge generation strategy groups (experiential formalizers, experiential trainers and rational planners) two different knowledge selection strategy groups (personalizers and codifiers) and finally two different knowledge acquisition strategy groups (i.e. focused acquired and relational research). The findings also reveal that resource-based oriented firms are more oriented to being experiential formalizers or trainers or personalizers and focused acquired, while market-based oriented firms are more oriented to being rational planners, codifiers and relational researchers. These findings contribute to the KM literature conceptualizing the fit or coherence between business and KM strategies.

Keywords: Knowledge acquisition, knowledge selection, knowledge generation, Knowledge management strategy, business strategy, sustainable competitive advantage, alignment, small firms, alignment

1. INTRODUCTION

A knowledge-based view (KBV) of a firm stems from the increasing importance given to knowledge and to the activities performed to acquire, select and generate it in order to achieve a sustainable competitive advantage (e.g., Grant, 1996; Nonaka, 1994; Spender, 1996). Zack (2002: 270) argues that a firm's business strategy should be built around its knowledge-based resources, and that the actions a firm takes to manage its knowledge gaps or surplus with respect to the knowledge of its competitors should be guided by a knowledge management (KM) strategy: "KM strategy guides and defines the processes and infrastructure (organizational and technological) for managing knowledge. KM strategy typically includes broad generic components (e.g., emphasizing tacit vs. explicit knowledge, knowledge exploration vs. exploitation, or organizational vs. technical mechanisms for knowledge exchange) as well as those that are firm specific".

However, despite the claim of an increasing number of scholars that a firm's KM strategy must be strictly linked to its business strategy in order to achieve a sustainable competitive advantage (e.g., Bagnoli and Roberts, 2011; Halawi et al., 2006), there is little research which allows for more specific conceptualizations regarding this issue of inter-level strategic fit or coherence and even fewer which attempt an empirical investigation (Bagnoli and Vedovato, 2012; Smith, 2004). This is especially true for small firms (SFs) which, despite their knowledge-based resources, are generally more important than their property-based resources (Wiklund and Shepherd, 2003). Moreover, the issue of inter-level strategic coherence seems to vary among firms according to the level of alignment existing between those responsible for business strategy and those responsible for KM strategy (e.g. Smith and McKeen, 2003;

Zack, 2005). In SFs the alignment is at a maximum level, since an owner-manager is generally responsible for both business and KM strategies. This offers the possibility of studying the concept of business and KM strategies coherence in a 'pure form', free from organizational structure and political influence.

This research aims to study, through an explorative, qualitative-quantitative analysis performed on a sample of SFs located in the northeast of Italy, the link between their business strategies and their KM strategies (i.e. knowledge acquisition, knowledge selection and knowledge generation strategies) to try to understand if they are aligned and if so, how. The links between knowledge acquisition, knowledge selection and knowledge generation strategies are also investigated. The rest of this paper is organized as follows. Firstly, we provide an analysis of the studies that have investigated the concept of coherence between business and functional strategies. Secondly, we focus on those studies that have tried to conceptualize the coherence between business and KM strategies. Thirdly, we focus on the main gaps existing in the previous contributions in the specific context of SFs deriving the research questions. Fourthly, we describe the methodology used in the analyses. Finally, we close the study by discussing the results.

2. BUSINESS AND FUNCTIONAL STRATEGIES COHERENCE

The concept of fit has a long-standing tradition in the development of business strategies. Venkatraman and Camillus (1984) have identified several different conceptualizations of fit: a focus on strategy process (i.e. the process of arrival of fit) or on strategy content (i.e. elements to be aligned with business strategy); and various domains of fit in terms of consistency between business strategy and external environment (i.e. external fit) or internal environment (i.e. internal fit). Although scholars established a long time ago that internal fit is positively correlated with performance (e.g., Drazin and Van de Ven, 1985; Khandwalla, 1973), this concept has recently received a good deal of attention. Earlier work on fit has been mainly concerned with consistency on a broad level, while a more recent one has adopted a more fine-grained level of inquiry. According to Milgrom and Roberts' framework (1995), more recent work has stressed the importance of mutually reinforcing activities (Porter, 1996) or interconnected choices with respect to activities (Siggelkow, 2001) in creating a sustainable competitive advantage (Rivkin, 2000). Internal fit is not thought as 'parwise' associations between activities, but as a coherent configuration of activities or interconnected choices with respect to activities that are strategy-specific: "While some activities have configurations that are generically beneficial for all firms within an industry, the value of many activity configurations depends on the particular strategy a firm is pursuing" (Porter and Siggelkow, 2001: 3).

Nevertheless, there is a perspective on internal fit that is implicit rather than explicit in its definition. It views business strategy as a consistent pattern of choices in the pursuit of a sustainable competitive advantage with functional strategies as the supportive activities for translating a business strategy into an effective action plan. Therefore, strategies at a business level and a functional level need to be consistent to pursue a sustainable competitive advantage. McDaniel and Kolary (1987) have shown that firms adopting different (similar) business strategies tend to adopt different (similar) marketing strategies. Nath and Sudharshan (1994: 45) termed this consistency of strategic choices across business and functional levels 'strategic coherence': "Coherence of strategy is assessed by determining the dominant functional decision patterns pursued by firms following the same/similar business strategy. If two firms are following the same overall business strategy, we would expect their functional area decisions to be similar". With the aim of operationalizing the concept of strategic coherence in the context of hospitals, the authors have carried out cluster analyses to identify patterns of business strategies and of marketing, financial, human resources and production strategies, and have then, compared these patterns to assess coherence between them.

3. BUSINESS AND KM STRATEGIES COHERENCE

According to a KBV, the primary function of a firm is the acquisition, selection and generation of knowledge (e.g. Grant, 1996; Nonaka, 1994; Spender, 1996). In a KBV the most valuable, rare and inimitable resource is the knowledge a firm holds about how to coordinate and combine its other resources in new and distinctive ways, thus offering products that are better than those of its competitors. Therefore, a KBV potentially impacts on all aspects of a firm's business strategy and seems to offer the opportunity to integrate a market-based view (MBV) that focuses on the competitive advantage positions (e.g. quality of product), and a resource-based view (RBV) that focuses on the sources of competitive

advantage (e.g. financial resources) that provide an enhancement of these 'partial' theoretical models (McGee and Thomas, 2007).

Nevertheless, KBV is still not a theory of firms in formal sense (Grant, 2002). Attempting to contribute theoretical building blocks toward a KBV of a firm, Von Krogh and Grand (2002: 175) point out that specific concepts are required to explain knowledge origins and creation processes, the link between KM initiatives and competitive advantage, and strategic change and coherence that: "... should enable the justification of new knowledge created, if this knowledge is relevant for changes. Such justification operates largely at the value system of the firm, enabling the firm to distinguish new relevant from new irrelevant knowledge".

The relationship between strategic change and coherence in a KBV of the firm is doubtful. Internal fit or coherence, also between business and functional strategies, seems to make a firm's ability to adapt to radical changes in the external environmental more complex because it requires a revision of many choices simultaneously (Siggelkow, 2001). On the other hand, many scholars (i.e. Kogut and Zander, 1992; Alegre et al., 2011) consider KM to be one among the most relevant dynamic capabilities: "... the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997: 516).

Whether the coherence between a firm's business strategy and its KM strategies inhibits or promotes revolutionary changes is a matter of debate. In a KBV performance differences between firms are supposed to be results of their different knowledge bases and so of their different knowledge managing capabilities. Therefore, the coherence mentioned above seems to be even more important than the coherence between a firm's business strategy and its marketing, financial, human resources and production strategies.

To our knowledge, only three studies have specifically addressed the concept of coherence between business and KM strategies and none has examined the relationship between the latter concept and that of strategic change. The analysis of management consulting firms performed by Hansen et al. (1999) identified two distinct KM strategies: people-to-documents and person-to-person. These are the consequences of the differing business strategies of codification and personalization. A people-to-documents KM strategy can be implemented by those firms whose products are standardised, mature, and that exploit the explicit knowledge of employees (codification business strategy). A person-to-person KM strategy will be implemented by those firms whose products are customised, innovative and that exploit the tacit knowledge of employees (personalization business strategy).

O'Dell and Grayson (1998) point out that a KM strategy should be guided by one of these three value disciplines (Treacy and Wiersema, 1993): customer intimacy, operation excellence and product leadership. Firms focused on customer intimacy should invest in systems to collect information about their customers, including CRM, data mining, BI, etc. Conversely, firms focused on operational excellence should invest in systems such as best practice transfer, TQM, BPR, etc. Finally, firms focused on product leadership will choose KM strategies supporting communities, collaboration, forums, etc., requiring a highly creative environment and the ability to bring new ideas to market quickly. Smith and McKeen (2003) argue that a KM strategy should be guided by a business strategy as position in the marketplace or as capabilities. Firms which base their business strategies on the former view should adopt KM strategies to support urgent business needs that can be mainly related to performance or productivity. Firms which base their competitive strategies on capabilities should adopt KM strategies to provide the knowledge-creation capacities needed to support value innovation, environmental scanning or strategic experimentation.

4. BUSINESS AND KM STRATEGIES COHERENCE IN SFS

The above mentioned studies address the concept of coherence between business and KM strategies and mostly focus on large firms. Thus, although they provide general conclusions that could fit all types of economic organizations, we believe they cannot be easily generalized especially to SFs (Hutchinson and Quintas, 2008). Small and large firms develop their competitive advantages according to different business strategies, requiring the creation of different KM strategies: "... like so many aspects of business and management, the KM issues that SMEs will face may not be simply a scaled-down replica of large company experiences" (Sparrow, 2001: 3).

The applicability of the business strategies previously identified to SFs seems limited. Given their limited resources, the only value discipline in which SFs could try to excel is customer intimacy and the only positions in the marketplace that they could attain are the niche ones (Lee et al., 1999). Most of the positions of competitive advantages traditionally recognized in the strategic management literature such as production capability will not be suitable for SFs. Only price, innovation, the number of product lines, product variety within the lines and overall product and pre/post-sales customer service quality seem to be possible positions of competitive advantage for SFs (O' Donnell et al., 2002). Similarly, most of the sources of the competitive advantages traditionally highlighted in the strategic management literature such as financial resources are not suitable for SFs. Only relationships with customers, organizational procedures and culture and overall owner-manager and staff experience and skills seem to be possible sources of competitive advantage for SFs (O' Donnell et al., 2002; Barbero et al., 2011).

For similar reasons, the applicability of the KM strategies previously identified to SFs seems limited. Moreover, Hansen et al.'s (1999) study is mostly focused on knowledge selection strategy (i.e., strategies for selecting required knowledge from internal knowledge sources and making it suitable for subsequent use); while both O'Dell and Grayson's (1998) and Smith and McKeen's (2003) studies are mostly focused on the knowledge generation strategy (i.e., strategies for producing knowledge by either discovery or derivation from existing knowledge and making it suitable for subsequent use). Nevertheless, KM strategies are not confined to choices regarding how to select internal knowledge and how to generate new knowledge, but it also includes choices about how to acquire external knowledge (Bagnoli and Giachetti, 2012; Bierly and Daily, 2002). While knowledge acquisition strategies are important for all types of firms, they are even more so for SFs. The constraints of SFs' resources emphasize the importance of external knowledge sources to complement their internal strengths (Bierly and Daly, 2007; Chen et al., 2006).

Finally, in most large firms, strategies at a business level and at a KM level are not coherent because those in charge of the former rarely interact with those in charge of the latter, and vice versa (Zack, 2002; 2005). SFs decisions about business and KM strategies are usually taken by the same person; the owner-manager (Feltham et al., 2005). Thus, if two SFs follow the same overall business strategy, we would expect their knowledge acquisition, selection and generation areas decisions to be similar (Bagnoli and Vedovato, 2012). Therefore, the critical research question that we need to address is not so much if SFs' KM strategies are coherent with their business strategy, but what 'form' this kind of strategic coherence takes.

In order to conceptualize the coherence between business and KM strategies we have investigated, through an explorative, quali-quantitative analysis carried out on a sample of SFs, the link between their business strategies and their knowledge acquisition, knowledge selection and knowledge generation strategies. The links between knowledge acquisition, selection and generation strategies also need to be investigated. Similarly to Nath and Sudharshan (1994), the concept of SF's business and KM strategies coherence has been investigated following a configurational-fit approach. Instead of looking at a few variables or at the linear associations among such variables, we have also tried to identify business strategy groups as well as knowledge acquisition, knowledge selection and knowledge generation strategy groups (Miller, 1981), and the links between them. Since the concept of strategic coherence is strictly related to strategic change and the latter is also identified by Von Krogh and Grand (2002) as an additional building block for a KBV of the firm, we have also investigated the link between different forms of strategic coherence and different forms of strategic change distinguishing firms which undertook revolutionary change up to 2004 from others which did not.

5. METHODOLOGY

5.1 Sample and data collection

The present research was carried out in 2004 on a sample of SFs (less than 50 employees) located in the northeast of Italy. This region is particularly interesting for the aims of this study because knowledge sharing between northeast Italian SFs in close geographic proximity appears to be a key source of competitive advantage (Davenport, 2005). 100 potential participants were selected in cooperation with local SF associations. Because of the explorative nature of this study, the potential participants were not selected on the basis of their representativeness of the broader population. Instead, the selection was based on SFs' potential interest and willingness to participate in the study in order to obtain information

which is as rich as possible. Initial contact was carried out by phone to establish preliminary discussions with owner-managers regarding their research goals and, thus, to identify those who were willing to take part in this research. 56 SFs from various industries (annex 1) agreed to participate. All of them have power centralized mainly in a single person, i.e. the owner-manager, and have survived to the selection phase by being more than 5 years old. Only firms that have proven strategic coherence survive to the selection phase: "... 60 to 80 percent of new businesses fail in their first five years of operation. So a SME that has survived for more than five years is most probably doing something right, by undertaking a viable approach to managing knowledge" (Delahaye, 2005: 604).

Data were gathered from in depth face-to-face semi-structured (i.e., closed questions with closed and open answers) interviews with the owner-managers carried out by two research assistants. The questionnaire structure was organized in four sections: 1) a firm's general information; 2) a firm's historical evolution; 3) a firm's business strategy; 4) a firm's knowledge acquisition, selection and generation strategies. Examples of the interview questions regarding knowledge acquisition strategy included "Which are the most important external sources of knowledge?" and "Which are the most important mechanisms used to gain external knowledge?" Questionnaire framework comprehensibility and completeness were verified with pilot interviews in two firms carried out by the author and by the two researcher assistants involved in the collection of data. Each interview was divided into two half-day meetings of 4 hours on average. The initial interview resulted in the identification of the firm's general information, historical evolution and business strategy. The subsequent interview concentrated on the firm's KM strategies. During the interviews, informants were highly encouraged to ask questions regarding the research aims and to ensure that the meanings of the open questions were absolutely clear.

5.2 Variables and analysis procedures

Business strategy configurations

Consistent with Galbraith and Schendel's strategy types (1983), business strategy groups have been diagnosed from firms' competitive advantage configurations. A two-stage process was carried out in order to identify the business strategy groups. Firstly, a content analysis on the narrative information collected was performed separately by the research assistants involved in the collection of the data and by three added research assistants. Transcripts and notes were analyzed according to a categorical analysis in order to provide a super-ordinate list of competitive advantages sources and positions identified by the informants. During the initial analysis of transcriptions and notes, numerous first-order concepts were identified. Further readings were performed to assemble concepts into categories defining similar competitive advantages. Then, comprehensive cross-reference lists were developed in order to keep track of commonality in categories. On the basis of this study, some overlapping categories were merged. Second-order theoretical labels were then assigned to the emergent competitive advantages. Subsequently, a final iteration of comparison was conducted in order to decide if evidence could confirm an identified concept as a reportable finding. Lastly, second-order concepts were assembled into aggregate analytical dimensions providing a super-ordinate list of the competitive advantages highlighted by the owner-managers interviewed. This list was then analysed by the author in order to validate the qualitative analysis carried out by the five research assistants and to resolve cases of non-convergence.

Twenty-six diverse items make up the final list: 13 regarding positions of competitive advantage and 13 regarding sources of competitive advantage (annex 3). For each of these items above and for each of the analyzed firms, the research assistants specified - using a dummy variable - whether (1) or not (0) the owner-manager recognized the related position or source of competitive advantage. A cluster analysis was then carried out in order to classify the firms into different groups based on their competitive advantages. The cluster analysis was carried out using the SPSS 13.0 for Windows. We specifically chose Ward's hierarchical technique of clustering squared Euclidean distances. The same technique was applied by Nath and Sudharshan (1994) and de Pablos (2002). Moreover, it is the most often utilized in analysis regarding strategic management (Ketchen and Shook, 1996). The decision concerning how many clusters to use was guided by the visual inspection of the dendrogram and confirmed by the agglomeration schedule. In the first case, we looked for natural clusters of the data that were indicated by relatively dense 'branches'. In the second case, we examined the incremental changes in the coefficient. A large increase implies that dissimilar clusters were the result of a merger; thus, the number of clusters prior to the merger is most appropriate.

KM strategy configurations

According to the activity system perspective (Porter, 1996), firms' KM strategy groups have been diagnosed from KM activity configurations (Merono-Cerdan et al., 2007). Since the various KM activities play a distinctive role in providing a firm with a sustainable competitive advantage, they are usually organized into distinctive classes. Each class involves several distinct types of KM activities that may be guided by a specific KM strategy. There are numerous KM activity classes proposed in the literature (e.g., Alavi and Leidner, 2001; Chakravarty et al. 2003; Choo and Bontis, 2002; Gold et al., 2001). A framework which summarises them, and which is particularly useful to investigate the links between KM and business strategies, is the knowledge chain model (Holsapple and Singh, 2001; Holsapple and Jones, 2004). This identifies five KM activity classes: acquisition, selection, generation, assimilation and emission. Given that assimilation activities alter the "state of an organization's knowledge resources by internally distributing and storing acquired, selected, or generated knowledge" (Holsapple and Jones, 2004: 165), we opted to take into account only the last three activity classes. The previously mentioned two-stage process was also undertaken to identify the knowledge activity configurations. A content analysis was carried out to create a super-ordinate list of the types of knowledge acquisition, selection and generation activity highlighted by the informants, which were performed with the same procedure described above. Consistently with the structure of the questionnaire, the KM activity types resulted in a combination of these aspects:

- 'where' the knowledge acquired, selected and generated resides;
- and 'how' such knowledge is acquired, selected and generated.

The final list was made up of the following items: (annexes 5, 7 and 9):

- 25 different ways of acquiring knowledge (13 'where' + 12 'how');
- 16 different ways of selecting knowledge (4 'where' + 12 'how');
- 16 different ways of generating knowledge (7 'where' + 9 'how');

Also cluster analyses, carried out in order to classify firms into different groups depending on their KM activity types, were performed using the previously mentioned Technique.

Control variables

Firm age (date of foundation), firm size (number of employees), industry membership (manufacturing firms vs. non-manufacturing firms) and geographic proximity to similar firms (districtual firms vs. non-districtual firms) have been taken into account as control variables.

Business and KM strategy coherence assessment

To investigate the link between business and KM strategies, the groups identified at the business strategy level as well as at the knowledge acquisition, knowledge selection and knowledge generation strategies levels were taken into consideration. Given that all the variables above can be described as nominal, their independence was verified by performing a Chi-Square Test (χ^2). This goodness-of-fit test tabulates one variable into categories and performs a χ^2 statistic. It then compares the observed and expected frequencies in every category to test whether all categories feature the same proportion of values, or a proportion of values specified by the user. The χ^2 test was also used to test the independence of KM strategy groups and strategic change groups, and their geographic proximity to similar firms and industry membership. To test whether the means of the various KM strategy groups in terms of firm size and firm age significantly differ from each other, one-way analyses of variance were conducted.

6. RESULTS

6.1 Business strategy groups

The cluster analysis led to identifying two groups at the level of business strategy (annexes 2-3). These could be related to the views of strategy as capabilities or as positions in the marketplace (Smith and McKeen, 2003) and adapted to SFs that are usually unable to exploit strong market power and to control many (financial and physical) assets.

Group 1: Resource-based oriented firms

While the majority of these firms have positions of competitive advantage based upon customer service quality, only one-third aim at product quality. They all identified the experience and skills owned by the owner-manager and staff as important sources of competitive advantage. One-third also extended these to the know-how embedded in their facilities and to their ability to relate to current and potential customers. Thus, these firms seem to rely on their idiosyncratic and difficult-to-imitate assets (i.e. human resources) and competencies (i.e. individual's experiential learning) allowing them to build and maintain personal contacts with customers that are usually considered to be the main customer service quality components. In other words, they seem to emphasize the SFs' traditional basis for competition (O'Donnell et al., 2002), by paying more attention to internal/organizational strengths and weaknesses.

Group 2: Market-based oriented firms

The vast majority of these firms have positions of competitive advantage based upon product and customer service quality. Thus, their positioning is based on a combination of producing a subset of an industry' products (variety-based positioning) and of serving most of the needs of a particular group of customers (needs-based positioning) (Porter, 1996). One-third of the firms adopt aggressive pricing policies. Thus, if the latter are focused cost leaders, the majority are focused differentiators. Only one-third possess the sources of competitive advantage which are very common to SFs: the owner-manager's experience and skills. None of them attributes strategic value to staff experience and skills. Therefore, these firms seem to go beyond the SFs' traditional competitive basis, paying more attention to external environmental opportunities and threats.

6.2 KM strategy groups

Groups at the level of knowledge acquisition strategy

The cluster analysis led to identifying two groups at the level of knowledge acquisition (annexes 4-5). They differ from each other in terms of both focus and search mechanisms (Jordan and Jones, 1997; Zhang et al., 2006), taking into account that SFs often lack the time and resources to identify and use external (scientific and technological) sources of knowledge.

Group 1: The focused acquirers

The majority of firms belonging to this group have a focused external network. They have frequent relations only with knowledge sources located in close organizational, geographical and technological proximity (i.e. suppliers, customer, competitors, etc). This explains the limited mechanisms adopted for acquiring knowledge. They usually prefer mechanisms requiring low levels of interaction with sources of external knowledge, with a notable exception: the promotion of collaborative learning. The vast majority only adopt benchmarking analysis, have direct access to external knowledge bases and attend exhibitions and fairs, and industry meetings. Thus, these firms seem to have a weak external focus and to be characterized for acquiring knowledge by targeted searching for a specific item.

Group 2: The relational (re)searchers

The majority of the firms belonging to this group have a wide-ranging and varied external network, where only the scientific and technology transfer centers are infrequent. Coherently, they adopt many knowledge acquisition mechanisms where only benchmarking analysis is infrequent. They also adopt mechanisms that require them to build iterative and cooperative relationships with the external knowledge sources. The vast majority carry out cooperative research and promote collaborative learning, use external training and third-party tutoring, and visit competitor sites. Thus, these firms seem to have a strong external focus and rely mainly on interactive modes of knowledge (re)search (acquisition/generation) that require them to build lasting relationships with external sources of knowledge.

Groups at the level of knowledge selection processes

The cluster analysis led to identifying two groups at the level of knowledge selection (annexes 6-7). These could be related to the people-to-documents and the person-to-person strategies (Hansen et al., 1999) adapted to SFs that usually have fewer financial and human (ICT specialists) resources to invest in systems for knowledge codification.

Group 1: The personalizers

Half of the firms identified the knowledge databases in paper format as knowledge repositories, while the others did not identify any knowledge repositories. Nearly all the firms relied on 'person-to-person' knowledge sharing mechanisms (informal identification, meetings, standardization with supporting and training, generic events to advise organizational members on existing knowledge). Thus, these firms knowledge is spread throughout the organizational members and is neither easily nor readily identifiable. There is little propensity toward codification or developing impersonal sharing mechanisms.

Group 2: The codifiers

The vast majority of the firms identify the knowledge databases in paper as well as in electronic format as knowledge repositories. The majority also identified organizational actors' task descriptions as important tools for identifying knowledge. Nearly all the firms relied on 'person-to-person' mechanisms which were accompanied by others of a more 'people-to-document' nature, such as the internal training, formalization and diffusion of best practices, controlled experimentation, and the creation of database and knowledge yellow pages. Thus, these firms' knowledge is located not only in the head of the critical organizational actors but also in codified databases allowing the use of impersonal sharing mechanisms.

Groups at the level of knowledge generation processes

The cluster analysis led to the identification of three groups at the level of knowledge generation (annexes 8-9). They differ from each other by adopting experiential (bounded) rational searches (Gavetti and Levinthal, 2000). They may be related to the organization types proposed by Blacker (2002): knowledge-routinized (where the emphasis is on knowledge embedded in rules and procedure), knowledge-dependent (where the emphasis is on embodied competencies) and symbolic-analyst-dependent organizations (where the emphasis is on the embrained (conceptual) skills and cognitive abilities of key members); and adapted to SFs that are generally unable to support a formal R&D effort on an appreciable scale.

Group 1: The experiential formalizers

Nearly all the firms identified organizational actors without specific tasks of R&D and customers as sources of stimuli for generating knowledge. In addition, only the technical publishers and suppliers were frequently identified. All the firms resort only to learning by doing (on the job learning, local experimentations, trial and error routines, etc.) in order to generate new knowledge. The vast majority then disseminate the new knowledge by formalizing it in electronic or paper format; more than half embed it in samples. Thus, in these firms, innovation stems first from experiential learning. Some forms of knowledge dissemination tend to document the developed experiences.

Group 2: The experiential trainers

Nearly all the firms identified organizational actors without specific tasks of R&D and customers, as well as suppliers and technical publishers, as sources of stimuli for generating knowledge. The vast majority also interacted with professional associations and technology transfer centers. Nearly all the firms only resorted to learning by doing in order to generate new knowledge. The vast majority conducted internal training and generic events to disseminate the new knowledge. Very few have formalised the process. Thus, in these firms, innovation stems first from experiential learning. They prefer internal training to the documentation of developed experiences to disseminate the latter.

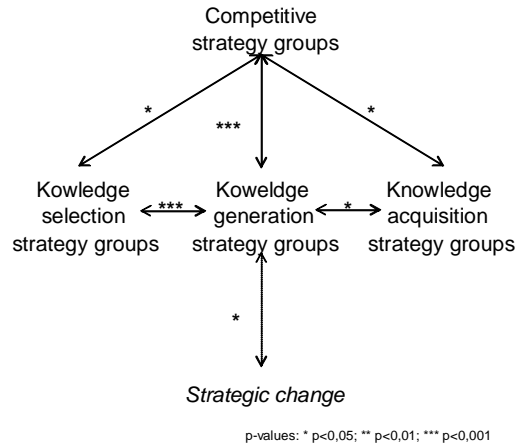
Group 3: The rational planners

Nearly all of the firms identified all the previously mentioned actors as sources of stimuli for generating knowledge. More than half also interacted with consultants and more than one-third even had organizational actors with specific tasks of R&D. Nearly all the firms resorted to learning by doing in order to generate new knowledge. Half, however, applied a structured approach to knowledge generation by which resources were specifically allocated and the activities carefully planned; one-third also had recourse to job mobility. The vast majority disseminated the new knowledge by formalizing it in an electronic or paper format and by organizing internal training and generic events. Thus, in these firms innovation was partially the result of the rational choices that had been made between various technical and structural alternatives.

6.3 Significant links among business strategy groups and KM strategy groups

Statistical analysis carried out on the variables investigated allowed for the identification of various significant links among them (Figure 1a).

FIGURE 1A: THE SIGNIFICANT RELATIONSHIPS

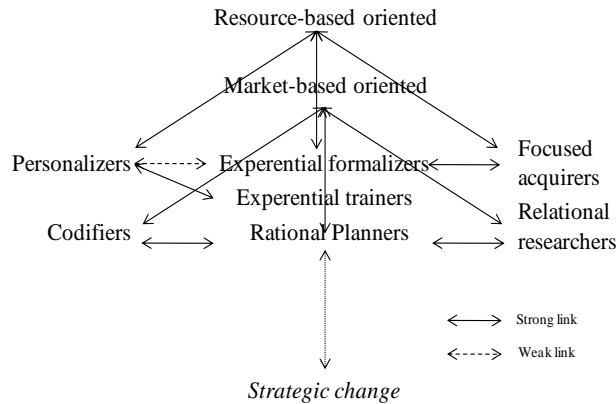


In particular, the χ^2 test procedure on the nominal variables (table 1) showed that very significant links exist between the business strategy groups and the knowledge generation strategy groups. It also shows that a less significant links exist between the former and both the knowledge acquisition and knowledge selection strategy groups.

TABLE 1: χ^2 TEST RESULTS BETWEEN BUSINESS STRATEGY GROUPS AND KM STRATEGY GROUPS

Significant relationships between:	Pearson Chi-Square		
	Value	Df	Asy. Sig. (2-sided)
Business strategy groups and knowledge acquisition strategy groups	5,914	1	0,015
Business strategy groups and knowledge selection strategy groups	3,901	1	0,048
Business strategy groups and knowledge generation strategy groups	17,932	2	0,000

FIGURE 1B: THE 'TRIANGULAR' LINKS



Moreover, the χ^2 test procedure (table 2) showed that a very significant links existed between the knowledge generation strategy groups and the knowledge selection strategy groups. It also showed that a less significant links existed between the former and the knowledge acquisition strategy groups.

TABLE 2: χ^2 TEST RESULTS AMONG KM STRATEGY GROUPS

Significant relationships between:	Pearson Chi-Square		
	Value	Df	Asy. Sig. (2-sided)
Knowledge acquisition strategy groups and knowledge selection strategy groups	1,125	1	0,289
Knowledge acquisition strategy groups and knowledge generation strategy groups	7,560	2	0,023
Knowledge selection strategy groups and knowledge generation strategy groups	21,741	2	0,000

In more specific terms, comparing the observed and expected frequencies reported in the cross-tabulations between the business and the KM strategy groups mentioned above (annexes 10, 11, 12 and 13), we noted 'triangular' links between (figure 1.b):

- Market-based oriented firms, rational planners and relational researchers, (right-hand fore triangle);
- Market-based oriented firms, rational planners and codifiers (left-hand fore triangle);
- Resource-based oriented firms, experiential formalizers and focused acquirers, (right-hand hind triangle);
- Resource-based oriented firms, experiential formalizers and especially trainers, and personalizers (left-hand hind triangle).

Furthermore, the χ^2 test procedure (table 3) shows that a significant relationship exists between knowledge generation strategy groups and strategic change groups.

TABLE 3: χ^2 TEST RESULTS BETWEEN KM STRATEGY GROUPS AND STRATEGIC CHANGE GROUPS

Significant relationships between:	Pearson Chi-Square		
	Value	Df	Asy. Sig. (2-sided)
Knowledge acquisition strategy groups and strategic change groups	2,114	1	0,146
Knowledge selection strategy groups and strategic change groups	2,556	1	0,110
Knowledge generation strategy groups and strategic change groups	8,213	2	0,016

Comparing the observed and expected frequencies reported in the cross-tabulations between the knowledge generation strategy groups and strategic change groups (annexes 15) we note that rational planners were more oriented to becoming revolutionary changers.

On the other hand, no significant relationship existed among KM strategy groups and geographic proximity to similar firms and industry membership (table 4). Finally, one-way analyses of variance showed that the means of the various KM strategy groups in terms of firm size and firm age did not significantly differ from each other (table 5).

TABLE 4: χ^2 TEST RESULTS BETWEEN KM STRATEGY GROUPS AND GEOGRAPHIC PROXIMITY, AND INDUSTRY MEMB. GROUPS

Significant relationships between:	Pearson Chi-Square		
	Value	Df	Asy. Sig. (2-sided)
Knowledge acquisition strategy groups and geographic proximity groups	2,413	1	0,120
Knowledge acquisition strategy groups and industry membership groups	0,007	1	0,934
Knowledge selection strategy groups and geographic proximity groups	0,036	1	0,849
Knowledge selection strategy groups and industry membership groups	0,007	1	0,935
Knowledge generation strategy groups and geographic proximity groups	0,240	2	0,887
Knowledge generation strategy groups and industry membership groups	1,587	2	0,452

TABLE 5: ANOVA RESULTS FOR FIRMS' AGE AND SIZE BY KM (PARTIAL) STRATEGY GROUPS

Firms features	Knowledge strategy	Groups	Mean	Std. dev.	Min	Max	F	Sig.
Age	Acquisition	<i>Focused acquirers</i>	31	19	9	109	0,651	0,423
		<i>Relational researchers</i>	38	39	5	197		
	Selection	Personalizers	27	11	8	48	1,833	0,181
		Codifiers	38	34	5	197		

	Generation	Experiential formalizers	24	12	5	44	2,439	0,097	
		Experiential trainers	34	19	8	89			
		<i>Rational planners</i>	43	41	19	197			
Size	Acquisition	<i>Focused acquirers</i>	13	11	0	50	1,246	0,269	
		<i>Relational researchers</i>	10	9	0	34			
	Selection	Personalizers	10	9	0	35	1,444	0,235	
		Codifiers	13	12	0	50			
	Generation	Generation	Experiential formalizers	11	8	0	35	1,407	0,254
			Experiential trainers	10	9	0	30		
<i>Rational planners</i>			15	13	0	50			

7. DISCUSSION

Our findings allow the conceptualization of a 'triangular' coherence between business and KM strategy configurations in SFs. They reveal that a significant link exists between business strategy and knowledge acquisition, knowledge selection and knowledge generation strategy configurations. They also reveal that a significant link exists between knowledge generation strategy configurations and both knowledge acquisition and knowledge selection strategy configurations, but not between the latter two. These findings seem to affirm the idea that knowledge generation plays a pivotal role in SFs' KM strategies. They also seem to affirm the idea that knowledge generated within the firm is more valuable than knowledge acquired from outside as it tends to be specific, unique and held tacitly, and so more difficult to imitate. Chen et al. (2006) affirm that SFs have very strong needs for external knowledge and inter-firm knowledge transfers because of their internal resource constraints. Nevertheless, the lack of substantial internal capacity to recognize, evaluate, negotiate, and finally adapt the knowledge existing in external sources reduces its potential strategic value. Thus, for SFs gaining competitive advantage seems to rely on extending organizational capabilities through the reorganization of existing strategic resources, rather than on creating links with external knowledge sources: "... limited resources would encourage these small businesses to focus on internal learning to develop the primary capabilities most obviously tied to competitive advantage, and encourage them to rely on external learning to develop secondary capabilities" (Bierly and Daly, 2007b: 47). This conclusion is particularly relevant, since knowledge sharing between northeast Italian SFs has been often considered to be a key source of competitive advantage (Davenport, 2005).

In more specific terms, our findings allow the conceptualizing of two typologies of 'triangular' coherence between business and KM strategy configurations in SFs. They reveal two different business strategy groups (resource-based oriented firms and Market-based oriented firms), three different knowledge generation strategy groups (i.e. experiential formalizers, experiential trainers and rational planners), two different knowledge selection strategy groups (personalizers and codifiers) and finally two different knowledge acquisition strategy groups (focused acquired and relational research).

They also reveal that resource-based oriented firms are more oriented to be experiential formalizers or trainers, while personalizers and those who are focused acquired therefore adopt a leveraging KM strategy: "This strategy sets out from existing knowledge domains and focuses on transferring that knowledge throughout the organization" (von Krogh, et al., 2001: p. 427). Since Resource-based oriented firms aim to exploit their unique, valuable, rare and inimitable resources that are first and foremost the specialized, complex, tacit knowledge rooted in owner-manager and staff, and shows itself as skill, they

are focused: "... on ideas of local search and the evolution of relatively stable organizational routines. Such routines reflect experiential wisdom in that they are the outcome of trial and error learning" (Gavetti and Levinthal, 2000: p. 113). Thus, they are focused on internal, experiential learning that ensures a form of backward-looking ability, sharing the knowledge generated in documenting the developed experiences when they are experiential formalizers, or through direct person-to-person contacts when they are experiential trainers. Resource-based oriented firms/experiential trainers then become more oriented to be personalizers. When knowledge is spread among an organization's members and when it is neither easily nor readily identifiable because there is little propensity toward codifying it, the interactive/informal facets become pivotal, not only in order to generate new knowledge, but also to transfer the knowledge generated to the other members of the organization. Resource-based oriented firms and experiential formalisers are instead more oriented to be focused acquired. Since SFs that are focused on ideas of local search would prefer to have frequent knowledge relations only with sources located in close organizational, geographical and technological proximity (i.e. suppliers, customer, competitors, etc), among the different types of external learning processes, those that characterize these firms are therefore learning by (local) interaction but also by imitation. Learning by interaction is principally based on the constant exchange of knowledge existing among firms and customers and also among firms and suppliers. In learning by imitation, several knowledge channels are used, like the consultation of industrial district and professional associations' knowledge bases, the benchmarking analysis of competitors and participation at industry meetings (Petruzzelli et al, 2007). Thus, our findings suggest that resource-based oriented firms seem to show a passive (i.e. adaptive, single loop, incremental, lower level) learning orientation (Chaston et al., 2001; Sadler-Smith et al, 2001) which involves the utilization of existing knowledge and trading experience as a basis for improving the efficiency of current operations.

Our findings also reveal that market-oriented firms are more likely to be rational planners, codifiers and relational researchers, adopting therefore an expanding KM strategy: "The emphasis is on increasing the scope and depth of knowledge by refining what is known and by bringing in additional expertise which is relevant to knowledge creation. Some of this expertise could come from partner firms, or partner firms could provide data, information and knowledge, in order to fuel the knowledge creation process. ... R&D as well as market research are key activities to facilitate expansion of the domain." (von Krogh, et al., 2001: p.430). Consistent with the fact that market-based oriented firms go beyond the SFs' traditional competition basis (owner-managers' and staff's experience and skills) in aiming to provide higher quality products and customer services than those of their competitors, they seem to show an active (i.e. higher level, double loop, transformational, generative) learning orientation (Slater and Narver, 1995). They

are more focused on a rational search mode that consists of a forward-looking form of alternatives evaluation based on organizational members' understanding of the world and the probable consequences of engaging in the proposed forms of behavior: "(rationality) permits the assessment of (a broad set of) alternatives 'off-line' (that could differ substantially from current behavior), that is, actors need not engage in an activity in order to evaluate it" (Gavetti and Levinthal, 2000: p. 113-114). Therefore, market-based oriented firms are more oriented to be rational planners, paying more attention to forms of knowledge generation that tend to be planned and targeted to formalize it in order to make knowledge generated available for all organizational actors. Also, market-based oriented firms/rational planners are thus more oriented to be codifiers. Existing knowledge is already generally stored not only in the heads of the critical organizational actors but also in codified databases and operating practices. This is strategically valuable because knowledge codification is a prerequisite to sustain cycles of new knowledge generation it depends on the continuous conversion of tacit and explicit knowledge, and also on the amplification of this knowledge across intra and inter-organizational levels (Nonaka and Takeuchi, 1995). Even if in SFs socialization dominates all the other knowledge-generation activity modes (Desouza and Awazu, 2006), scholars recognize a crucial role to externalization in an active learning orientation: "The drawing together of experiential knowledge of key employees (including the owner/manager) and the making explicit the effective routines developed within the firm in order to share, combine knowledge and create new knowledge is the innovative process that lies at the heart of KM" (Gray, 2006: p. 348). Furthermore, consistent with Morgan et al. (1998), Market-based oriented firms/rational planners are more oriented to relational researchers. They also tend to create competitive advantage through iterative, cooperative and cumulative relationships with the external knowledge sources. These 'strong' inter-firm linkages involve substantial knowledge sharing and the combination of complementary resources. Clarke and Turner

(2004: p. 39) argue that even in the SF sector, at least in high-technology: "This enables the creation of unique products, services and technologies and lower transaction costs compared to their competitors".

Finally, our findings allow us to conceptualize how the two typologies of strategic coherence mentioned above relate to the concept of strategic change. Since resource-based oriented firms/experiential formalizers-trainers exhibit a passive learning style, they are more oriented to be evolutionary changers. They are mainly focused on ideas of experiential search: semiautomatic routines which prove to be successful tend to prevail over time, creating a potential for lock-in effects and path dependencies that inhibit revolutionary changes. Conversely, since market-based oriented firms/rational planners seem to possess the conceptual skills and cognitive abilities needed to support an active learning style, they are more oriented to be revolutionary changers. They are more focused on rational searches that are based on owner-managers' explicit consideration of their choices, possible consequences. Fiol and Lyles (1985) contrast 'routine' behavioral adjustments with 'higher level' abilities in order to develop complex rules and to understand complex causations and also to support 'double-loop' learning; the kind of learning necessary to perform a revolutionary change (Argyris and Schon, 1978). A passive learning orientation could be appropriate for sustaining employee development aimed at optimizing organizational efficiency. This can be contrasted with markets where a firm needs to use product superiority as a strategy to differentiate itself from competition and/or periods of radical environmental change. Miller and Friesen (1982) argue that revolutionary changes are more effective than piecemeal incremental ones in facing structural change. Under these circumstances, it may be that a more active learning orientation may be the most appropriate path to follow (Nevis et al., 1995).

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ANNEXES

ANNEX 1: DISTRIBUTION ACROSS INDUSTRIES CLASSIFICATION STANDARDS OF SAMPLE FIRMS

Nace codes	Firms
D – Manufacturing	65%
DA - Manufacture of food products and beverages	11%
DB - Manufacture of textiles	9%
DD - Manufacture of wood and wood products	7%
DE - Manufacture of pulp, paper and paper products; publishing and printing	5%
DG - Manufacture of chemicals and chemical products	2%
DH - Manufacture of rubber and plastic products	5%
DI - Manufacture of other non-metallic mineral products	2%
DJ - Manufacture of basic metals and fabricated metal products	12%
DK - Manufacture of machinery and equipment n.e.c.	2%
DL - Manufacture of electrical and optical equipment	2%
DN - Manufacturing n.e.c. (Manufacture of furniture)	11%
F – Construction	7%
G - Retail and wholesale trade; motor vehicles, motorbikes and repairing of household	9%
I - Transport, storage and communication	5%
K - Real estate, renting and business activities	9%
O - Other community, social and personal service activities	5%

ANNEX 2: BUSINESS STRATEGY GROUPS: AGGLOMERATION SCHEDULE AND CLUSTER DENDOGRAM

Agglomeration Schedule						Rescaled Distance Cluster Combine							
Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage	C A S E Label	0	5	10	15	20	25
	Cluster 1	Cluster 2		Cluster 1	Cluster 2								
1	23	24	.000	0	0	27							
2	53	55	.500	0	0	6							
3	5	33	1.000	0	0	19							
4	4	20	1.500	0	0	18							
5	6	7	2.000	0	0	19							
6	2	53	2.833	0	2	31							
7	45	51	3.833	0	0	30							
8	25	49	4.833	0	0	20							
9	35	39	5.833	0	0	10							
10	32	35	6.833	0	9	29							
11	28	29	7.833	0	0	12							
12	12	28	8.833	0	11	21							
13	14	54	10.333	0	0	23							
14	34	50	11.833	0	0	29							
15	31	47	13.333	0	0	33							
16	41	44	14.833	0	0	22							
17	8	30	16.333	0	0	39							
18	4	22	17.833	4	0	34							
19	5	6	19.333	3	5	43							
20	9	25	21.000	0	8	46							
21	12	18	22.750	12	0	35							
22	13	41	24.583	0	16	24							
23	14	17	26.417	13	0	37							
24	13	19	28.333	22	0	36							
25	10	52	30.333	0	0	38							
26	36	43	32.333	0	0	38							
27	23	26	34.333	1	0	34							
28	16	21	36.333	0	0	40							
29	32	34	38.433	10	14	30							
30	32	45	40.690	29	7	52							
31	2	56	43.107	6	0	43							
32	38	42	45.607	0	0	44							
33	27	31	48.107	0	15	45							
34	4	23	50.607	18	27	49							
35	12	37	53.257	21	0	50							
36	3	13	56.007	0	24	46							
37	14	15	58.924	23	0	41							
38	10	36	61.924	25	26	44							
39	8	40	65.090	17	0	47							
40	16	48	68.424	28	0	42							
41	11	14	71.774	0	37	47							
42	16	46	75.190	40	0	48							
43	2	5	78.815	31	19	50							
44	10	38	82.815	38	32	45							
45	10	27	87.315	44	33	54							
46	3	9	92.149	36	20	51							
47	8	11	97.632	39	41	49							
48	1	16	103.282	0	42	51							
49	4	8	109.532	34	47	53							
50	2	12	116.180	43	35	52							
51	1	3	123.973	48	46	53							
52	2	32	132.392	50	30	54							
53	1	4	142.200	51	49	55							
54	2	10	155.724	52	45	55							
55	1	2	179.036	53	54	0							

ANNEX 3: BUSINESS STRATEGY GROUPS: DESCRIPTIVE STATISTICS

Items	Groups	Resource-based (29)	Market-based (27)	Total (56)
Positions of competitive advantage				
Number of customers		3%	7%	5%
Number of product line		14%	30%	21%
Variety within a product line		3%	19%	11%
Innovation		14%	4%	9%
Time to market		3%	4%	4%
Product quality		34%	67%	50%
Pre-sale customer service quality		55%	52%	54%
Post-sale customer service quality		62%	70%	66%
Advertising and sales promotion		0%	11%	5%
Control of distribution channels		0%	4%	2%
Price		14%	33%	23%
Firm size		0%	4%	2%
Location		3%	4%	4%
Sources of competitive advantage				
Fixtures and fittings		34%	15%	25%

Financial resources	3%	0%	2%
Owner-manager's experience and skills	100%	33%	68%
Staff's experience and skills	97%	0%	50%
Organizational procedures	31%	26%	29%
Organizational culture	17%	22%	20%
Control systems	10%	7%	9%
Relationships with human resources	3%	7%	5%
Relationships with potential customers	48%	41%	45%
Relationships with current customers	34%	26%	30%
Relationships with suppliers	7%	4%	5%
Relationships with other firms	7%	0%	4%
Relationships with credit and territorial institutes	3%	4%	4%

ANNEX 4: KNOWLEDGE ACQUISITION STRATEGY GROUPS: AGGLOMERATION SCHEDULE AND CLUSTER DENDOGRAM

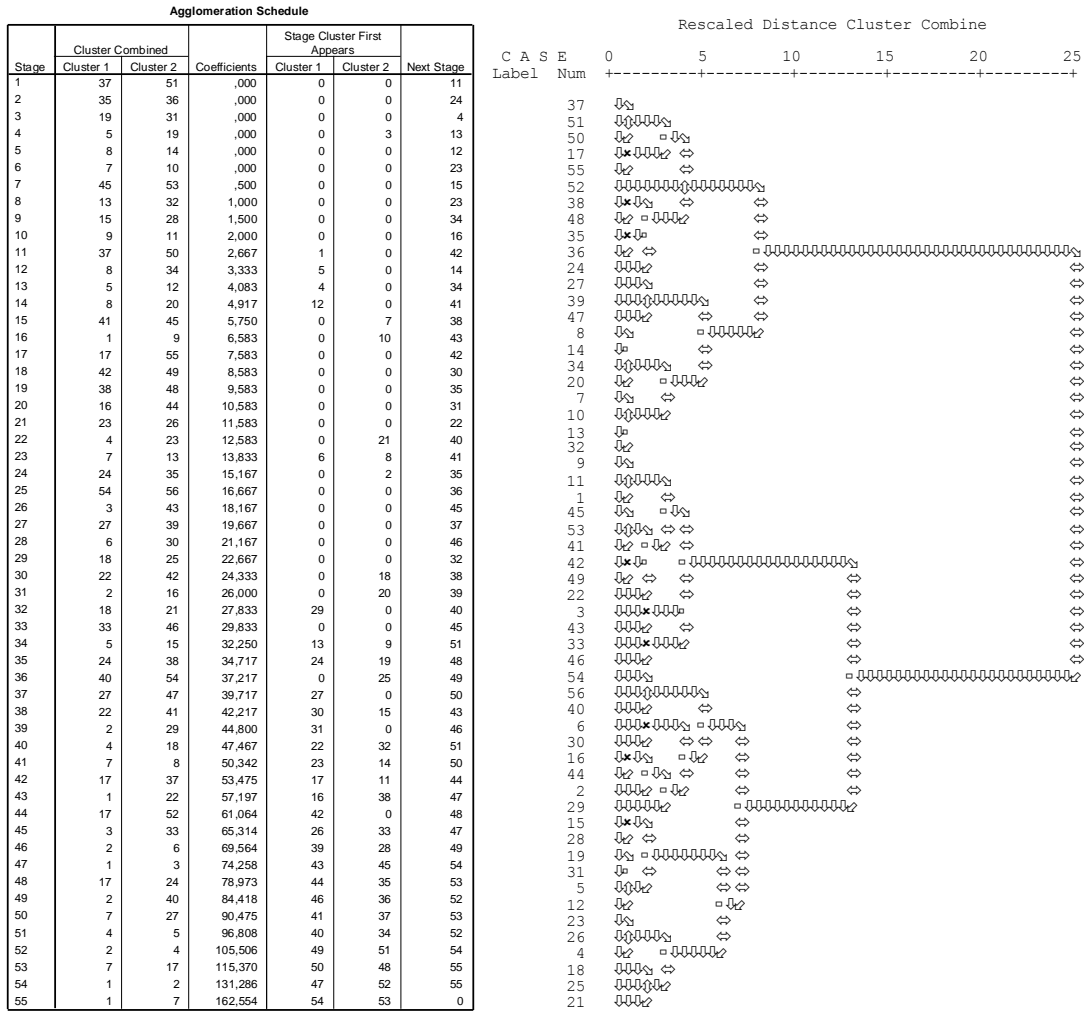
Agglomeration Schedule							Rescaled Distance Cluster Combine									
Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage	C	A	S	E	0	5	10	15	20	25
	Cluster 1	Cluster 2		Cluster 1	Cluster 2											
1	37	50	.500	0	0	31										
2	14	30	1.000	0	0	20										
3	36	38	2.000	0	0	26										
4	10	16	3.000	0	0	10										
5	47	53	4.500	0	0	29										
6	40	45	6.000	0	0	22										
7	5	19	7.500	0	0	11										
8	7	12	9.000	0	0	23										
9	1	2	10.500	0	0	21										
10	4	10	12.167	0	4	39										
11	5	17	14.000	7	0	30										
12	52	56	16.000	0	0	14										
13	26	55	18.000	0	0	24										
14	43	52	20.000	0	12	42										
15	33	51	22.000	0	0	31										
16	32	44	24.000	0	0	43										
17	29	34	26.000	0	0	32										
18	24	27	28.000	0	0	27										
19	15	23	30.000	0	0	27										
20	14	18	32.167	2	0	46										
21	1	54	34.667	9	0	44										
22	31	40	37.167	0	6	36										
23	7	9	39.667	8	0	29										
24	26	42	42.333	13	0	35										
25	26	28	45.167	24	0	37										
26	21	36	48.167	0	3	41										
27	15	24	51.167	19	18	45										
28	6	8	54.167	0	0	35										
29	25	47	57.333	0	5	40										
30	3	5	60.500	0	11	44										
31	33	37	63.750	15	1	42										
32	29	48	67.083	17	0	33										
33	29	46	70.500	32	0	43										
34	13	39	74.000	0	0	41										
35	6	35	77.667	28	0	49										
36	31	41	81.417	22	0	46										
37	26	49	85.517	25	0	40										
38	20	22	90.017	0	0	48										
39	4	7	94.683	10	23	48										
40	25	26	99.917	29	37	49										
41	13	21	105.217	34	26	52										
42	33	43	110.610	31	14	51										
43	29	32	116.026	33	16	47										
44	1	3	121.812	21	30	53										
45	11	15	127.612	0	27	50										
46	14	31	133.767	20	36	47										
47	14	29	140.721	46	43	54										
48	4	20	148.013	39	38	50										
49	6	25	155.846	35	40	51										
50	4	11	163.767	48	45	53										
51	6	33	172.013	49	42	52										
52	6	13	181.476	51	41	54										
53	1	4	191.094	44	50	55										
54	6	14	207.694	52	47	55										
55	1	6	231.804	53	54	0										

ANNEX 5. KNOWLEDGE ACQUISITION STRATEGY GROUPS: DESCRIPTIVE STATISTICS

	Groups (n° of firms)	Focused acquirers (36)	Relational researchers (20)	Total 56
Items				

Where			
Research centres	19%	15%	18%
Universities	8%	15%	11%
Technology transfer centres	11%	10%	11%
Industrial districts and professional associations	94%	90%	93%
Technical and professional institutes	33%	60%	43%
Credit and territorial institutes	17%	50%	29%
Chambers of Commerce	31%	50%	38%
Consultants	81%	95%	86%
Suppliers	94%	100%	96%
Customers	92%	100%	95%
Technical publishers	97%	95%	96%
Competitors	94%	85%	91%
Sales networks	17%	30%	21%
How			
Information research and gathering	50%	45%	48%
Benchmarking	69%	15%	50%
External collaborative learning	58%	95%	71%
Cooperative research	17%	70%	36%
Site visits	50%	90%	64%
Third-party tutoring	6%	65%	27%
External training	47%	85%	61%
Job mobility	17%	30%	21%
Industry meetings	69%	65%	68%
Generic meetings	50%	90%	64%
Direct access to external knowledge bases	72%	65%	70%
Exhibitions and fairs	78%	95%	84%

ANNEX 6. KNOWLEDGE SELECTION STRATEGY GROUPS: AGGLOMERATION SCHEDULE AND CLUSTER DENDOGRAM

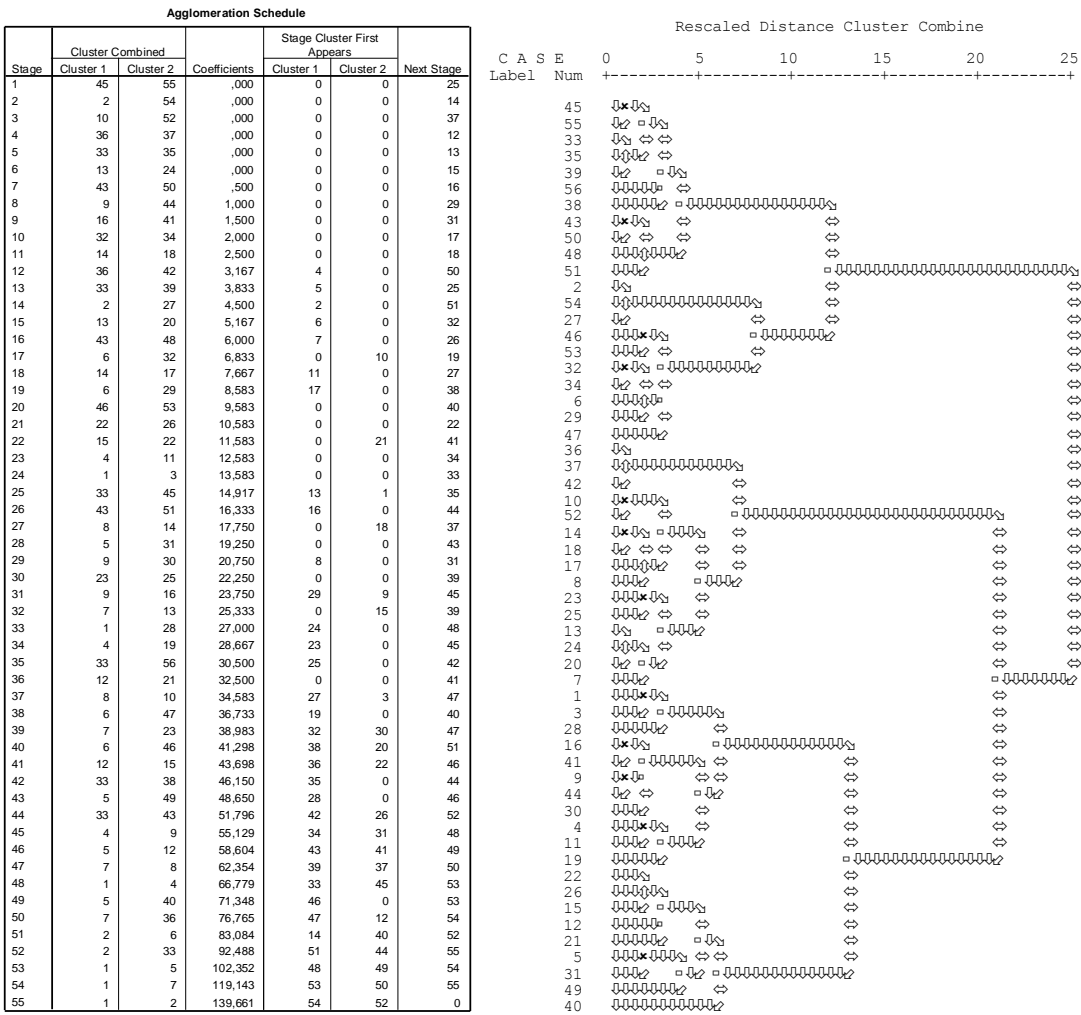


ANNEX 7. KNOWLEDGE SELECTION STRATEGY GROUPS: DESCRIPTIVE STATISTICS

Items	Groups	Personalizers	Codifiers	Total
	(n° of firms)	(22)	(34)	(56)
Where				
Organizational structure (organizational actors' tasks description)		5%	65%	41%
Balance sheet of human resource competencies		9%	26%	20%
Knowledge database in paper format		50%	79%	68%
Knowledge database in electronic format		0%	82%	50%
How				

Informal identification (spot, ad hoc analysis)	95%	97%	96%
Direct access to formalized knowledge bases	9%	65%	43%
Creation of databases and knowledge yellow pages	32%	76%	59%
Formalization and diffusion of best practices	32%	82%	63%
Standardization with supporting and training	91%	88%	89%
Controlled experimentations	45%	79%	66%
Collaborative learning	32%	38%	36%
Teamworking	14%	41%	30%
Formal and informal meetings	95%	97%	96%
Discussions in electronic forum	0%	21%	13%
Internal training	55%	91%	77%
Generic events to advise organizational members on existing knowledge	86%	65%	73%

ANNEX 8. KNOWLEDGE GENERATION STRATEGY GROUPS: AGGLOMERATION SCHEDULE AND CLUSTER DENDOGRAM



ANNEX 9. KNOWLEDGE GENERATION STRATEGY GROUPS: DESCRIPTIVE STATISTICS

Items	Groups (n° of firms)	Experiential formalizers (21)	Experiential trainers (15)	Rational planners (20)	Total 56
Where					
Organizational actors without specific tasks of R&D		100%	87%	100%	96%
Organizational actors with specific tasks of R&D		5%	0%	40%	16%
Suppliers		62%	87%	85%	77%
Customers		90%	100%	95%	95%
Consultants		48%	0%	60%	39%
Professional associations, technology transfer centres, etc.		19%	67%	85%	55%
Technical publishers		81%	87%	95%	88%
How					
Internal brainstorming and on-the-job learning		100%	87%	90%	93%
Job mobility		0%	0%	30%	11%
Generation in a structured way with resources allocat. & planning of activities		14%	0%	50%	23%
Local experimentations, trial and error, redefinition of procedures		100%	100%	80%	93%
Samples for the knowledge application		52%	20%	45%	41%
Internal training		0%	73%	85%	50%
Formalization of new knowledge in electronic or in paper format		90%	7%	100%	71%
Creation of team works on new knowledge		14%	13%	35%	21%
Generic events to advise organizat. members on newly generated knowledge		33%	80%	85%	64%

ANNEX 10. CROSS-TABULATION BETWEEN BUSINESS STRATEGY GROUPS AND KNOWLEDGE ACQUISITION STRATEGY GROUPS

		Knowledge acquisition strategy		Total
		Focused acquirers	Relational researchers	
Business strategy	Resource-based oriented	23 (18,6)	6 (10,4)	29
	Market-based oriented	13 (17,4)	14 (9,6)	27
Total		36	20	56

expected frequencies in brackets

ANNEX 11. CROSS-TABULATION BETWEEN BUSINESS STRATEGY GROUPS AND KNOWLEDGE SELECTION STRATEGY GROUPS

		Knowledge selection strategy		Total
		Personalizers	Codifiers	
Business strategy	Resource-based oriented	15 (11,4)	14 (17,6)	29
	Market-based oriented	7 (10,6)	20 (16,4)	27
Total		22	34	56

expected frequencies in brackets

ANNEX 12. CROSS-TABULATION BETWEEN BUSINESS STRATEGY GROUPS AND KNOWLEDGE GENERATION STRATEGY GROUPS

		Knowledge generation strategy			Total
		Experiential formalizers	Experiential trainers	Rational planners	
Business strategy	Resource-based oriented	18 (10,9)	7 (7,8)	4 (10,4)	29
	Market-based oriented	3 (10,1)	8 (7,2)	16 (9,6)	27
Total		21	15	20	56

expected frequencies in brackets

ANNEX 13. CROSS-TABULATION BETWEEN KNOW ACQUISITION STRATEGY GROUPS AND KNOW. GENERATION STRATEGY GROUPS

		Knowledge generation strategy			Total
		Experiential formalizers	Experiential trainers	Rational planners	
K.acquisition strategy	Focused acquirers	18 (13,5)	9 (9,6)	9 (12,9)	36
	Relational researchers	3 (7,5)	6 (5,4)	11 (7,1)	20
Total		21	15	20	56

expected frequencies in brackets

ANNEX 14. CROSS-TABULATION BETWEEN KNOW. SELECTION STRATEGY GROUPS AND KNOW. GENERATION STRATEGY GROUPS

		Knowledge generation strategy			Total
		Experiential formalizers	Experiential trainers	Rational planners	
K. selection strategy	Personalizers	11 (8,3)	11 (5,9)	0 (7,9)	22
	Codifiers	10 (12,8)	4 (9,1)	20 (12,1)	34
Total		21	15	20	56

expected frequencies in brackets

ANNEX 15. CROSS-TABULATION BETWEEN STRATEGIC CHANGE GROUPS AND KNOWLEDGE GENERATION STRATEGY GROUPS

		Knowledge generation strategy			Total
		Experiential formalizers	Experiential trainers	Rational planners	
Strategic Change	Revolutionary changers	2 (4,1)	1 (2,9)	8 (3,9)	11
	Evolutionary changers	19 (16,9)	14 (12,1)	12 (16,1)	45
Total		21	15	20	56

expected frequencies in brackets

AUTHOR PROFILES

Dr. Carlo Bagnoli (Ph.D., Ca' Foscari University of Venice) is Associate Professor of Business Policy and Strategy at the Department of Management, Ca' Foscari University of Venice (Italy). He was visiting research fellow at the University of Florida (USA). He is Scientific Director of the Strategic Innovation Business Centre in Portogruaro-Venice (Italy). His research interests include knowledge management, competitive strategy, business model innovation. Carlo's research work has been published in various outlets, including the *Journal of Business Economics and Management*, *Industrial Management & Data System* and *Journal of Management and Governance*.

Dr. Maurizio Massaro, (Ph.D. University of Udine), born 1975, is Aggregate Professor at Udine University since 2008, having worked as teacher at Udine University since 2001. He was visiting scholar at the Florida Gulf Coast University, Florida, USA, in 2010. His academic interests are primarily in the field of measurement of business performance, intangible assets and entrepreneurship. He wrote several publications on these topics, and has some more forthcoming.

Dr. Filippo Zanin (Ph.D., University of Udine) is an Aggregate Professor of Business Economics and Management in the Department of Economics and Statistics at University of Udine, Italy. His research interests pertain to linking knowledge assets to performance management and organization value creation. He has published several articles in national refereed journals. He is also member of the organizational board of the *Management Control* journal and he has been member of the organizational and scientific board of the 2011 International Accounting Conference, *Accounting Renaissance*, sponsored by IAEER.