COMPETITIVE KNOWLEDGE MANAGEMENT IN SMEs

FORMA-CON-GEST-PMI PROJECT
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FORUM

CONTENTS

CHAPTER 2

KNOWLEDGE RECIPES IN SMEs: A SYNTHESIS OF FIRMS INVOLVED IN THE PROJECT[1]

2.1 Introduction

The previous chapter focussed on the theoretical approach adopted in the research project. We now turn to the analysis framework, the context and content variables used to represent the firms' knowledge production function. Later, in chapter three, eight case studies will be discussed to provide evidence on how firms can be valued according to their competitive knowledge. To do this, the eight firms will be assessed against the following three variables: networking, absorptive capacity and socio-cognitive abilities.

The analysis framework has been developed to gather as much information as possible on the firms involved in the research project, focussing on the entrepreneur's view of the topic under investigation. For this reason, information was collected in different ways, depending on the characteristics of the knowledge we were looking for. A number of research questions were explored via story telling, encouraging the entrepreneur (or the other people interviewed) to freely recount his or her major experiences; sometimes the entrepreneur had to quantify the importance of variables in his or her subjective opinion, scoring it from 0 to 5; finally, the entrepreneur was asked questions and could reply by choosing from a number of codified answers.

This analysis framework, whose links with the theoretical approach presented in the first chapter are examined in the following paragraphs, served as a guide in building case studies (some of them are reported in chapter 3).

To give a comprehensive picture of the firms involved in the research, descriptive statistics were used to process some of the data collected according to the above mentioned framework. In detail, mean and standard deviation of the scores assigned by the interviewees to the examined variables were calculated. Answers to open questions were categorized; for each category frequency was computed. This analysis should help readers to acquire an overall view of the phenomena under investigation. Reading this part of the research, one should bear in mind that the firms involved in the project are not a representative sample of the whole population of firms. That is, findings should not be general-

[1] The Analysis' framework has been developed by Luciano Olivotto.

ized; they are meant to describe some characteristics of the studied firms, focussing on the knowledge production function.

The rest of the chapter contains a detailed description of the analysis framework applied in studying the firms. The description is completed, where possible, with the data collected during field research and the main findings are discussed. Before going on to illustrate the framework, a short description of the firms involved is provided in the next paragraph.

2.2 Main characteristics of the firms analysed

As mentioned above, analysis was carried out on 132 companies, belonging to the five organisations that took part in the project (Table 1). They are not a representative sample of the business sphere of each of the associations. Although the selection process aimed to reach a representative sample, the participation was mainly determined by the willingness of the entrepreneurs to subject their companies to close analysis. It should be remembered that the completion of the questionnaire required at least two half day interviews. It is therefore possible that the companies analysed were more sensitive to the idea of knowledge and that this interest is in some way connected to knowledge management.

Table 1. *Companies by geographical area*

Country	*No. of companies*	*%*
Austria (Graz)	30	22,7%
Germany (Leipzig)	21	15,9%
Spain (Barcelona)	24	18,2%
Italy (Vicenza)	28	21,2%
Italy (Udine)	29	22,0%
Total	132	100,0%

From the beginning, the research focused on small and medium companies. By the numbers indicated in Table 2 it can be seen that most of the companies (60,6%) have less than 15 employees. There are a number of differences in the various geographical areas: the Spanish companies are concentrated in the category of the biggest companies, while in the other four areas most companies belong to the first two groups (0-4 and 5-14). All of the companies, however, fall into the SME category.

As regards the business sector, manufacturing is clearly prevalent (Table 3), with the exception of the Austrian companies who focus principally on goods and services in the IT sector.

Table 2. *Companies by number of employees*

Country	*No. of employees*			*% distribution of employees*			
	0-4	5-14	≥15	0-4	5-14	≥15	
Graz	13	13	4	43,3%	43,3%	13,3%	100,0%
Leipzig	5	7	9	23,8%	33,3%	42,9%	100,0%
Barcelona	0	6	18	0,0%	25,0%	75,0%	100,0%
Vicenza	13	7	8	46,4%	25,0%	28,6%	100,0%
Udine	3	13	13	10,3%	44,8%	44,8%	100,0%
Total	34	46	52	25,8%	34,8%	39,4%	100,0%

Table 3. *Companies by sector*

Country	*No. of companies per sector*					*% distribution of companies per sector*					
	D	G	K	O	Z	D	G	K	O	Z	
Graz	3	3	22	1	1	10,0%	10,0%	73,3%	3,3%	3,3%	100,0%
Leipzig	11	2	0	6	2	52,4%	9,5%	0,0%	28,6%	9,5%	100,0%
Barcelona	13	5	5	0	1	54,2%	20,8%	20,8%	0,0%	4,2%	100,0%
Vicenza	18	2	4	2	2	64,3%	7,1%	14,3%	7,1%	7,1%	100,0%
Udine	19	4	3	1	2	65,5%	13,8%	10,3%	3,4%	6,9%	100,0%
Total	64	16	34	10	8	48,5%	12,1%	25,8%	7,6%	6,1%	100,0%

D = Manufacturing; G = Retail and wholesale trade; motor vehicles, motorbikes and repairing of household and personal goods; K = Real estate activities, hiring, IT, research, services for companies; O = Other public social and personal services; Z = Others.

2.3 The framework of analysis and the firms involved in the project

With reference to the analysis grid shown in Chapter 1, the questionnaire relates to the sections dedicated to the lean model, the knowledge-value relationships and knowledge management practices in companies. Put very briefly, the aim is to try to answer the following question: "How does a company transform knowledge into economic value?". To achieve this aim, the questionnaire was divided into three parts:

A. Firm's historical profile.
B. Firm's knowledge audit in an evolutionary perspective.
C. The economic, social and cultural context.

A. Firm's historical profile

This part attempts, along narrative lines, to reconstruct the development of the company from its foundation to the time of the interview. The aim is to obtain an evolutionary picture of the identity of the company and its personnel from the competitive knowledge perspective. In other words, the objective is to un-

derstand the way the entrepreneur represents the company, its critical variables and its evolution over time. Quite deliberately, no attempt was made to force the interviewee to classify information into literature based categories or to follow a rigid pattern of analysis; in this way it was easier to identify the associations and causal relationships which, from the entrepreneur's point of view, best described (or conveyed an impression of) the company.

With regard to the theoretical approach adopted in the research (see chapter 1), this section fleshes out, in a general and unstructured way, the lean model of the company. In this sense, some topics that will be further deepened in other parts of the report are briefly mentioned in this section as well.

Table 4 shows the path the researcher has to follow. As can be seen, the focus is on variables which allow the identification of the company's business model, its value proposition and what this is based on (with particular emphasis on people). Particular attention is given to the moments of change and discontinuity which the company has gone through in order to understand if, and to what extent, they have changed the way the company uses knowledge for competitive ends.

Table 4. *The first part of the framework of analysis (firm's historical profile)*

A.1. Start-up
1. When
2. Where
3. Who: people involved, roles and dynamics of main decisions
4. Original business idea
   - 4.1. How mission was initially defined
   - 4.2. Geographical area of reference (markets)
   - 4.3. Products and service offered (value proposition)
5. Technology, resources and competences
6. People

A.2. Evolution: description of competitive financial successes, failures, turnarounds

A.3. Firm's life up to now
1. Relevant phases: duration and description
2. Qualifying facts
   - 2.1. Business idea evolution
   - 2.2. Relevant changes (value proposition, product, market, resources, competences and people)

B. Firm's knowledge audit from an evolutionary perspective

This is the central and most extensive part of the analysis framework, where the knowledge production function is examined in detail. Having outlined the company's evolution over time, the variables influencing the way knowledge is used for economic ends are analysed along with the activities which directly use and generate knowledge.

In particular, a number of topics are dealt with, which in the plan set out in the first chapter are referred to as:

- context variables;
- competitive uniqueness and rigidity;
- critical processes;
- content variables.

It should be remembered that in this section the interviewee was asked to give an assessment, obviously subjective, of the variables and activities which were analysed by awarding a score on a scale of 0-5. By so doing, an attempt was made to understand the relative importance given to each variable. At the same time, space was given to exemplification, which was gathered in narrative form.

The starting point for this part was the *firm's knowledge profile* (B.1), or rather the context variables and the knowledge production function. A description of the role of these variables in the analysis framework is contained in chapter 1; Table 5 shows the section of the framework which refers to this topic; finally, Table 6 contains the data collected during field research and a discussion of the empirical evidence.

Table 5. *Section B.1: firm's knowledge profile – context variables and knowledge production function*

Question/context variable	*Description of the variable by the entrepreneur and scoring (0-5)*	
Purpose: o *Why did you become an entrepreneur?* o *Can you describe your company's main objectives?*		
Customer's value: o *Why should a customer choose your company?* o *Can you identify the main benefits you provide to your customers?*		
Culture: o *Consider this list of values: please indicate the importance for your company of each (0 low – 5 high)* 1. Innovation 2. Risk 3. Customer satisfaction 4. Continuous improvement 5. Collaboration 6. Trust 7. Future 8. Well being 9. Environmental care 10. Survival 11. Financial results 12. Others o *What about .....?* (e.g. 2, 7, 9, 11) o *Can you give an example of .....?* (e.g. 2, 7, 9, 11)		
Strategy: *Specify the prevailing one in entrepreneur's opinion*	Past	Future
o *Cost leadership*		
o *Differentiation [quality, delivery time...]*		
o *Mixed*		

Table 6. *Context variables in the analysed companies*

Mission

Purpose *Mission*	**Growth & success of the company**	**Maximization of customer satisfaction**	**To satisfy owner's needs**	**Other**
Frequency	49%	32%	18%	1%

The greater frequency of "Growth and success of the company" and "Maximization of customer satisfaction" compared to "To satisfy owner's needs", seems to indicate that entrepreneurs tend increasingly towards a vision of a company as an "institution" (this is particularly true as long as small firms are concerned) and away from the more traditional vision of a company as a "thing" at their disposal. They therefore seem to recognise the existence of interest in the company itself, standing in distinct contrast to any interest the entrepreneur might have in maximising personal profit, which could even be at the expense of the growth or the survival of the company itself.
The affirmation of this vision is undoubtedly influenced by the concern of many entrepreneurs to guarantee the continuity of the family firm and, in greater measure, to facilitate the transfer to a successor by handing over a healthy company. This, however, depends above all on their desire to see the company grow both in terms of size (turnover, employees etc.) and in market terms by gaining increasingly positive feedback from their customers.
The high frequency of "maximization of customer value" seems to indicate how a growth strategy can be developed, that is by means of a differentiation strategy, even though a large majority of the firms studied belongs to mature industries.
In these industries core knowledge should be widespread among firms, customers and products, processes and customer preferences should be fairly standardized. If so, one would expect the key competitive variable to be efficiency, pursued by reducing the number of products, by leveraging economies of scale and by locating plants close to suppliers and customers. On the other hand, it can be argued that the growing competition forces enterprises to pay increasingly more attention to customers and to rapidly adapt to their changing needs. This is why there is a growing number of firms that try to pursue "dynamic efficiency", continuously improving products performance, manufacturing processes and the quality of pre and post sale services.

Customer value

Purpose *Customer values*	**Product quality**	**Wide product portfolio**	**Service quality/ Customer orientation**	**Price**	**Product innovation**
Frequency	77%	18%	53%	16%	4%

"Product quality (tangible)" and "Service quality/Customer orientation" are the most frequent answers in the Customer values category, while "Product innovation" is the least frequent. For the correct interpretation of these data, it is worth remembering that "Product innovation" usually means as a radical innovation. The interviewed entrepre-

neurs used to refer to incremental product innovations, even those aimed at customizing products and services, as "Product quality (tangible)". The reason is that such innovations were perceived as directly affecting the performance of tangible products, that is "what the product does" and "how it does it" compared to customer's needs. The focus is on the "objective" characteristics of the product, such as size, weight, shape, etc., and most of all, on its reliability, resistance, safeness and on its user's costs: the reason for this focus can be understood if we consider that most of the firms studied produce and sell products and services for other firms. The same reasons justify why "Product quality (intangible)" was much less frequent. A product's intangible characteristics seem to be more valuable with reference to consumer goods or whenever the choice among products is affected by social, emotional and psychological variables.

"Service quality/Customer orientation" has usually been interpreted by entrepreneurs as the ability to put together professional competencies and relational skills. Professional competence is related both to technical competence (the ability to support customers in designing and industrializing products) and reliability (the ability to deliver the right product, in the right place at the right time). Relational skills allow the entrepreneur to build a trusted and liking relationship with his or her customer and, in turn, such a relationship allows the entrepreneur to offer his customer more effective and more timely support. An even smaller number of firms regarded "Wide product portfolio" and "Price" as means for creating value for customers. Many of the firms involved in the research belong to mature industries and are like sub-contractors: they often produce and sell a fairly small number of products to an equally limited number of customers. As mentioned above, however, even these firms should be obliged to pursue efficiency.

The frequency of "Product quality (tangible)", "Service quality/Customer orientation", "Product innovation" and "Width of products portfolio" leads us to believe that the majority of firms in the sample neither adopts a cost strategy nor a differentiation strategy, or at least as far as these two strategies are traditionally understood. The low importance given to "Price" also makes a mixed strategy fairly unlikely. Instead, most of the firms involved seem to look for very specialized niches, that is market segments where customized products are sold to a fairly small number of customers, who are located in the same geographical area and who look for highly specific products or services. Firms that operate on this kind of market usually devote a great deal of attention to building and maintaining close relationships with their customers, paying particular attention to product and service quality.

To sum up, empirical results don't seem to fit the strategy archetypes proposed by the managerial literature particularly well. The approaches adopted by the interviewed entrepreneurs seem to bear a common trait: competitive knowledge is both technical and contextual, with the latter meaning knowledge about expectations and needs of the customer and knowledge about his or her personality. Interestingly, technical knowledge becomes valuable when, thanks to contextual knowledge, it is "tailored" to customer requirements.

Culture

Culture	Innovation	Risk	Customer satisfact.	Continuous improv.	Collaboration	Trust	Future	Well-being	Environ-mentalcare	Survival	Financial results
Average	4,33	3,21	4,70	4,61	4,37	4,51	4,18	4,26	4,47	4,04	4,04
Std. dev.	0,89	1,37	0,84	0,70	0,94	0,76	1,24	0,95	1,00	1,45	1,02

On average all culture variables were given high scores. This could depend on the entrepreneur's inability to discriminate but also on the methodology adopted which avoids a precise definition of these aspects in order to observe the interpretation given by each entrepreneur. We could assume that they gave each variable the meanings they believed to be more important and as a logical consequence attributed them a higher score. Assessment of the results cannot therefore be separated from the previous recognition of the meanings most frequently attributed to each aspect under consideration.

Innovation – the following meanings, in decreasing order of frequency, were attributed to this concept:

- an internal company phenomenon, aimed at continuous improvement of company processes;
- external company phenomenon, aimed at the radical improvement of company processes;
- a basic orientation which guides company strategy, policy and organisational behaviour;
- an internal company phenomenon aimed at developing new products.

On average, innovation was given a high score. In keeping with the results regarding customer values – in particular "Product innovation" – this was mostly regarded as a process rather than a product innovation and, as such was considered to be:

- incremental process innovation rather than radical innovation (the latter is often gained by acquiring a new technology from machinery or goods suppliers);
- radical product innovation rather than incremental product innovation (the latter, however, as has been said, is often seen as a prerequisite for product quality).

Risk – the following meanings, in decreasing order of frequency, were attributed to this concept:

- a characteristic of entrepreneurship in that an entrepreneur must take risks in order to achieve significant growth (positive acceptance);
- an inseparable part of entrepreneurial activity which one tries to reduce through good sense and intuition and by avoiding actions with too high a risk factor (neutral acceptance);
- an aspect which afflicts specific entrepreneurial activity, in that it derives from and is strongly conditioned by the business in question: unhealthy nature of the product and/or production processes etc. (negative acceptance).

Different meanings and, above all, different scores were attributed to risk, as is shown by the fact that the standard deviation is the second highest. Despite this, it is surprising that the score given by the entrepreneurs is on average the lowest. This would lead us to suppose that at least some of them have lost the desire to take risks, which in the past undoubtedly contributed to the success of many small companies.

Customer satisfaction – meanings were attributed to this concept in the following order:
- an aspect which derives from the performance of the product and/or the particular sensations and emotions it stimulates, as well as from the way the service is provided;
- an aspect which derives from the above conditions but which requires the establishment of a "total relationship" with the customer in order to be able to resolve problems satisfactorily;
- a basic orientation which guides company strategy, policy and organisational behaviour.

In keeping with the mission and customer value results, customer satisfaction was given the highest average score. Once again it emerges very strongly how the overwhelming majority of companies in the sample pursue a strategy of differentiation.

Continuous improvement – the following meanings, in decreasing order of frequency, were attributed to this concept:
- improvement of the effectiveness and the efficiency of company processes through the fixing of objectives/plans of action and their subsequent monitoring;
- basic orientation which guides company strategy, policy and organisational behaviour;
- improvement of the effectiveness and the efficiency of company processes and product performance through learning by "doing".

In keeping with the innovation results, continuous improvement was given on average the second highest average score. As well as this, the fact that standard deviation was the lowest of all is proof of how deeply rooted this factor is among the entrepreneurs.

Collaboration – the following meanings were given to this concept:
- interaction with internal and/or external subjects for the sharing, in the first case, of strategies and company policies and, in the second case, of knowledge relating to the competitive environment, specific technologies, sector regulations etc.;
- agreements, whether formal or informal, with external subjects to achieve common objectives.

The high average score given to collaboration is fairly surprising in that small company owners are generally believed to be reluctant to interact internally and, above all, externally. This result is perhaps more an objective which the entrepreneurs would like to move towards rather than a result which has already been achieved.

Trust – the following meanings, in decreasing order of frequency, were attributed to this concept:
- a value which fuels and guarantees intra and inter-organisational relationships, guiding them towards collaboration; there are no half measures: either it's there or it isn't;
- a value which summarises the customer's opinion of the company, its products, the way it provides its services and its willingness to resolve even complex problems.

On average, trust received the third highest score, as well as the second lowest standard deviation. The result which emerges – above all considering the first attributed meaning – is perhaps, in this case too, a value which the entrepreneurs would like to create in order to enhance their collaborative relationship with their customers and other subjects, rather than a result which has already been achieved.

Future – the following meanings were given to this concept:
- a concept which refers to the company's prospects and, in particular, to factors that will allow it to grow significantly and guarantee its lasting economic continuity (narrow acceptance);
- a concept which refers to the company's prospects but also to broader contexts, such as, the business, the sector, the national and international macro-economic context (wide acceptance).

Different meanings and, above all, different scores were attributed to "future", as is shown by its having the third highest standard deviation. However, the average score given was one of the lowest, perhaps confirming and completing the theory previously put forward: some small entrepreneurs have lost the desire to take risks and no longer believe in the future.

Wellbeing – the following meanings, in decreasing order of frequency, were attributed to this concept:
- high quality working conditions, which allow personnel to give the best possible performance and therefore allow the company to achieve the best possible results (institutional vision);
- high quality of life, which allows the entrepreneur to have an above average lifestyle, but also to achieve a positive distribution of his time between work, family and personal interests (personal vision).

In keeping with the company mission results, wellbeing was interpreted above all according to an institutional vision, or rather in terms of the wellbeing of the company and its constituent parts.

Environmental care – the following meanings were attributed to this concept with equal frequency:
- tidiness and cleanliness in the workplace, seen as the preconditions for reducing waste and work time, as well as improving the company's image (internal perspective);
- protection of the natural environment, which is also to be promoted through regulations and by steps taken by the public administration (external perspective).

Respect for the environment was given so many different meanings that any comment on average scores is impossible. We can perhaps only highlight the fact that those entrepreneurs who interpreted the concept in terms of "tidiness and cleanliness in the workplace" display a bit too much internal focus. They seem to pay too little attention to the interests of certain categories of stakeholders who seem to be increasingly important in developing lasting success.

Survival – the following meanings, still in decreasing order of frequency, were attributed to this concept:
- a condition of difficulty, very close to that of bankruptcy, in which the company limits itself to routine activity as it waits for an upturn in fortune;
- a condition of lasting continuity, necessary for the creation over time of positions of leadership.

Different meanings and, above all, very different scores were attributed to survival, as is shown by the fact that it had the highest standard deviation of all. The average score is one of the lowest and is only just above risk. All this confirms the ideas developed in this case, as well as those relating to the concept of future.

Financial results – the following meanings were given to this concept:
- a signpost value of the economic efficiency of company management, as well as a prerequisite for self-financing (internal perspective);
- a signpost value of the company's financial solidity, as well as a prerequisite for the remuneration of financial backers (external perspective).

Financial results received the second lowest average score. This could depend on the fact that many of the interviewed entrepreneurs, like the majority of small entrepreneurs who founded their own companies after working as employees for similar companies, concentrate mostly on production processes. They thus end up giving more value to operational results than to financial results, partly due to the natural phenomenon of believing that what is not known is not important. Then, in this case too, an internal perspective seems to prevail where financial backers are seen as being amongst the least significant stakeholders.

Briefly, the importance and main significance attributed to well-being confirms the growing sense in the companies in the sample of the vision of a company as an "institution". The importance given to customer satisfaction, on the other hand, confirms the companies' desire to pursue growth through a strategy of differentiation. The central importance emerges of relationships not only with customers but also with suppliers and fellow entrepreneurs. Non-operational stakeholders, including financial backers, do not seem to assume particular importance. The primarily external origin of radical innovation could depend on the limited nature of available resources – financial resources but also those connected to relationships with research centres and universities – to develop structured research and development activities, but possibly also on the fact that some of the interviewed entrepreneurs seem to have lost the desire to take risks. This seems to be confirmed by the very negative meanings that many entrepreneurs attributed to the concept of survival. All this could lead us to suppose that competitive knowledge for many companies in the sample, from the point of view of its aims, is that which is most specifically linked to growth/survival at the expense of consideration for its real significance.

Strategy

Strategy in the past	Differentiation	Cost leadership	Mixed
Frequency	77%	5%	18%

Strategy future	Differentiation	Cost leadership	Mixed
Frequency	81%	0%	19%

In line with what has been seen so far, the large majority of interviewed entrepreneurs declared that they had pursued a strategy of differentiation or at least a mixed strategy, and an even higher number stated that they would follow these strategies in the future.

Subsequently *The competitive variables* (B.2) are analysed in order to identify what knowledge the company uses to maintain its market position (uniqueness) and, on the other hand, what knowledge restricts its development (rigidity). The entrepreneur was asked to indicate the three principal elements of

uniqueness and rigidity and to give an opinion (on a scale of 0-5) concerning to what extent they positively or negatively affect (and will affect) the areas of the company's competitive action (Tables 7 and 8). The same logical sequence was used to identify the expected future actions (strengthening of uniqueness or removal of rigidity) which intended to significantly improve the company's ability to compete (Tables 9 and 10).

Table 7. *Section B.2.1, Past and future competitive variables and their importance for competitive advantage*

Class variable	*Specific variable*	*Score (0-5)*
The 3 main "strengths" of the company	1 2 3	
The 3 main "weaknesses" of the company	1 2 3	

Important change in competitive uniqueness and rigidity in the near future: a short description of the foreseen change.

Table 8. *Past and future competitive variables in the analysed companies*

Uniqueness in the past

Uniqueness in the past	**Marketing**	**R&D**	**Management Information System**	**Management Team**	**Operations**	**Financial**	**Human Resources**
Frequency	88%	12%	2%	44%	30%	5%	21%
Average	4,78	4,86	5,00	4,60	4,29	5,00	4,55
Std. dev.	0,55	0,38		0,65	1,26	0,00	0,52

"Marketing" is the most frequent answer relating to uniqueness in the past. In line with the results regarding customer value and thus company culture, the following were recognised as sources of competitive advantage in decreasing order of frequency:

- product quality;
- quality of service;
- the ability to build up relationships with customers and to understand their real requirements;
- the ability to assist customers at the design and creation stages of the product;
- the ability to establish a "total relationship" with the customer, supporting him/her in all decision-making;

- the size of the customer portfolio;
- proximity to the customer;
- low price.

Given the prevalence in the sample of companies which operate in local markets, it might seem striking that the "local producer" advantage is amongst those least recognised. However, as has already been emphasised, most of the companies are in the manufacturing sector and are sub-contractor companies. As a consequence, they operate on a local scale but, pushed by the client companies and on the basis of these companies' characteristics, they find themselves competing in a national, or even international one.

The second most frequent answer is "Management team". The presence of the entrepreneur was believed to be an important source of competitive advantage or, more precisely, still in decreasing order of frequency:

- the managerial skills of the entrepreneur combined with his and his family's great personal commitment;
- flexibility and speed of reaction to changes in the competitive context thanks to the small dimensions of the company and the centring of all responsibilities in the figure of the entrepreneur;
- the absence of opportunistic behaviour due to the fact that management and ownership of company are in the hands of the same person.

The third most common answer is "Operations": seen in this case as sources of competitive advantage:

- respect of quality standards and delivery times, as well as deliveries corresponding to orders;
- flexibility and operational efficiency thanks to versatile machinery which allows the production of large numbers of items, customisation and/or small batches of production at low cost, the ability to effect changes in production immediately;
- flexibility and operational efficiency also due to outsourcing.

In any case, this source shows the lowest average score and, at the same time the highest standard deviation. The consequence of this is that many of those who consider "Operations" as a source of competitive uniqueness do not believe it is one of the most important aspects.

The fourth, but also the last, considered the source of competitive advantage to be "Human Resources" or, to be more precise:

- the completeness and quality of the total technical knowledge of the personnel;
- the presence of attitudes which favour "total quality" and "customer satisfaction".

This result is due to the fact that in many of the sample companies the entrepreneur is the only person who does not simply carry out instructions or at least perceives of himself as such.

"Research and development" was recognised as a source of competitive advantage with an even lower frequency. This may depend on the fact that it was mainly interpreted by the entrepreneurs as referring to structured activities. In any case, this source shows the highest average score and, contemporarily, the lowest standard deviation: only a few consider R&D to be a source of competitive uniqueness, but for those few it is fundamental.

Rigidities in the past

Rigidities in the past	Marketing	R&D	Management Information System	Management Team	Operations	Financial	Human Resources
Frequency	49%	2%	7%	19%	26%	46%	33%
Average	3,82	4,00	3,00	4,00	3,73	4,19	4,21
Std. dev.	1,06		0,82	0,77	1,16	0,80	0,63

"Marketing" is the most frequent answer regarding rigidities in the past. The companies that indicated as a competitive uniqueness the "total relationship" with individual customers, at the same time, recognised that this relationship has created the undesirable effect of dependence, as well as a gradual detachment from the market as a whole. They have thus recognised the following as sources of competitive disadvantage, in decreasing order of frequency:
- poor market orientation and attention to commercial aspects;
- limited customer portfolio;
- absence of a sales network or an underdeveloped presence in the area.

Given the small size of the companies in the sample, the second most frequent answer, "Financial", was more predictable. In decreasing order of frequency, the following were recognised as a source of competitive disadvantage:
- limited availability of financial resources;
- insufficient attention to financial management.

A number of companies, however, admit that the limited availability of financial resources depends on the difficulty of interacting with financial institutions, but also on a reluctance to use the capital of third parties, which derives from pride in wanting to keep the company strictly under family control, but also from the fear that the entry of "outsiders" might disturb a consolidated equilibrium.

For the same reasons given above, the third recognised source of competitive disadvantage was also predictable, that of "Human Resources", or more accurately:
- the limited competencies of the personnel and the considerable difficulty training them;
- the limited flexibility of the personnel in terms of contractual conditions.

"Human resources" has, however, the highest average score as well as the lowest standard deviation: only a third of the entrepreneurs recognise this factor as a source of competitive disadvantage but the same people regard it as the most important source.

"Operations" follows in terms of frequency and, in particular, low productive capacity which often prevents companies from establishing relationships with big customers, as well as negatively influencing the efficiency of the productive process. "Operations" has a high average score and the highest standard deviation of all: for some companies therefore this factor is the principal source of competitive disadvantage.

The last source of competitive disadvantage recognised by a significant number of entrepreneurs is the "Management team". In decreasing order of frequency, the following were particularly recognised as a source of competitive disadvantage:
- the entrepreneur's low inclination to take risks;
- the entrepreneur's limited management skills;
- the excessive hinging of responsibility on the figure of the entrepreneur.

If the first of these three sources represents further confirmation of the idea that a number of

small entrepreneurs have lost the desire to take risks, the other two reveal how others have begun to question their own abilities and to recognise that the growing complexity of company and environmental phenomena makes clear that it is crucial to possess both technical and managerial skills).

Uniqueness in the future

Uniqueness in the future	Marketing	R&D	Management Information System	Management Team	Operations	Financial	Human Resources
Frequency	91%	18%	4%	37%	30%	4%	21%
Average	4,83	4,70	4,50	4,65	4,59	5,00	4,58
Std. dev.	0,47	0,67	0,71	0,65	0,62	0,00	0,51

The results regarding uniqueness in the future are mostly similar to those regarding uniqueness in the past. On the other hand, most of the entrepreneurs explicitly declare their objective to confirm or enhance past competitive uniqueness by improving company processes through their reorganisation and/or by internalising technological developments as quickly as possible.
There is, however, a slight increase in the number of companies that identify "Marketing" as a future source of competitive advantage. In particular, further confirming the importance that might be attached in the future to the establishment of direct relationships with the market they believe a number of things to be possible:
- the consolidation of one of their product lines in the market;
- the drawing up of commercial agreements with other companies, even those outside their sector;
- the establishment of relationships with customers based on the concept of partnership.

The frequency of "Research & Development" increases very visibly, thus showing that greater attention is given to more structured research and development activities. This is also undoubtedly due to the constant encouragement coming from associations and other subjects.
"Management team", however, shows a decrease, despite maintaining its position in having the second highest frequency as a future source of competitive advantage. This depends on two phenomena which to a certain extent are in opposition: more and more entrepreneurs tend to question their own abilities or to believe that their successors will not be sufficiently capable. On the other hand, most of the companies in the sample were set up before the 1980s and therefore are approaching the critical moment of generational change.

Rigidities in the future

Rigidities in the future	Marketing	R&D	Management Information System	Management Team	Operations	Financial	Human Resources
Frequency	49%	2%	7%	26%	25%	42%	33%
Average	3,82	4,00	3,00	4,13	3,71	4,13	4,26
Std. dev.	1,06		0,82	0,74	1,20	0,80	0,65

The results for rigidities in the future, in terms of frequency and score, are also largely similar to those for rigidities in the past. On the other hand, most of the entrepreneurs declare their objective to eliminate past competitive rigidities, whilst at the same time admitting their difficulty in identifying new ones. The number of companies that identify a future rigidity in "Management Team" increases but only slightly; as already mentioned, for most of the companies involved. This is probably due to the impending difficulty of the generation changeover. In fact, apart from the increasing belief that the entrepreneur's managerial skills are insufficient, the following have been recognised, in the following order, as even more important future sources of competitive disadvantage:
- the progressive loss of the entrepreneur's motivation;
- the difficulty of adequately training the successors or those who will have to manage the company in the future.

The number of companies that identify "Financial" as a future rigidity decreases only slightly. The limited availability of financial resources is also identified as a future source of competitive disadvantage, while insufficient attention to financial management is no longer seen as such. The campaign by SME associations and banks to raise awareness regarding the application of Basle 2 has probably begun to bear fruit.

In any case, "Marketing" is also the most frequent answer regarding rigidities in the future, even if the sources of competitive disadvantage, identified in the following order, are different compared with before:
- the increasing difficulty in facing up to competition;
- the increasing difficulty in keeping pace with technological developments in the field.

What is more worrying than the progressive detachment from the market as a whole is the increase in the intensity of the competitive challenge due, above all to the rapid pace of technological developments.

"Human resources" is the second most frequent answer. Once again, in this case the limited competencies of the personnel and the great difficulty of creating competencies are considered sources of competitive disadvantage, while the limited flexibility of the personnel in terms of contractual conditions is no longer regarded as such. This is probably due to the results – both real and hoped for – deriving from the controversial application of reforms with regard to work.

Table 9. *Section B.2.2, Competitive variables and quantum leap improvement*

Class variable	*Specific variable*	*Gap (0-5)*
Radical improvement achievable thanks to acquisition of Competitive uniqueness	1 2 3	
Radical improvement achievable thanks to the removal of Competitive rigidity	1 2 3	

Table 10. *Competitive variables and radical improvement opportunities in the analysed companies*

Radical improvement opportunities achievable thanks to the acquisition of competitive uniqueness

Q.L.I. thanks to Uniqueness	Marketing	R&D	Management Information System	Management Team	Operations	Financial	Human Resources
Frequency	58%	18%	4%	9%	21%	4%	12%
Average	3,73	4,00	3,00	3,40	3,42	4,50	3,57
Std. dev.	1,04	0,67	1,41	1,14	1,00	0,71	0,98

The results regarding quantum leap improvement thanks to uniqueness are compromised by a lower answer rate compared to the preceding results; this is due to the inability of some entrepreneurs to identify such situations. Furthermore, most of the other entrepreneurs only recognised one possible situation.
In any case, "Marketing" is also the most frequent answer here too. By once again highlighting the importance that the establishment of direct relationships with the market might have in the future, the entrepreneurs believe that the following, in decreasing order of frequency, could favour a quantum leap improvement:
- the drawing up of commercial agreements with companies outside their own sector;
- the company's becoming more well known;
- the progressive transformation from a business-to-business operation to direct sales.

The second most frequent answer is "Operations". In particular, the entrepreneurs believe that improvements in efficiency through the automation of all the work cycles, above all those relating to items which are only produced in certain seasons, could favour a quantum leap improvement.
"Research & Development" follows in terms of frequency, as confirmation of the greater attention given to more structured research and development activities.

Radical improvement opportunities achievable thanks to the removal of competitive rigidities

Q.L.I. thanks to Rigidities	Marketing	R&D	Management Information System	Management Team	Operations	Financial	Human Resources
Frequency	37%	4%	7%	33%	9%	16%	12%
Average	3,67	3,50	3,75	3,58	4,00	3,67	4,14
Std. dev.	0,91	0,71	0,96	0,90	0,71	0,71	0,69

The results regarding quantum leap improvements thanks to rigidities are also compromised by a lower answer rate compared to preceding results; this is due to the inability of some entrepreneurs to identify this kind of situations. Furthermore, most of the entrepreneurs only identified one possible solution.

"Marketing", is yet again the most frequent answer. In particular, the entrepreneurs believe that an increase in the extent and the intensity of the commercial effort could favour a quantum leap improvement through:
- penetration into new geographical markets;
- the creation of roles and structures exclusively dedicated to sales.

The second most frequent answer is "Management Team" and, in particular, it is believed that the following could favour radical improvements:
- the development, with the help of consultants or partnership with customers, of the ability to interpret the competitive environment and to define strategies and plans of action;
- the entry of new partners, even with the aim of creating a separation between ownership and management.

The last point could in fact be connected to "Financial", which is the third most frequent answer. With regard to this, the entrepreneurs also believe that better access to credit and new forms of financing, for example, private equity, could lead to radical improvements.
In terms of frequency, "Human Resources" comes next – and in particular the strengthening of the competences of the personnel which occurs by sharing the competencies already possessed and acquiring new ones through the recruitment of skilled people. This is followed by "Operations" where the automation of all work cycles was considered by some entrepreneurs more as the removal of a rigidity than the creation of a uniqueness.

What lessons can be learned?
Brief, the results regarding "Marketing" and "Operations" in particular seem to confirm that in the majority of the companies included in the sample, competitive knowledge is above all contextual. For most of the entrepreneurs, it is this that made it possible to create a competitive advantage leading to the establishment of a "total relationship" with individual customers. The fact that the latter generally operate in national, or even international markets, means that even for those companies who have a primarily local dimension, competitive knowledge is that which is targeted at supporting global action. Technical knowledge applied to products, but also to processes, seems however to assume competitive importance only in that it allows the development of strong personalisation. Thus it appears to be subordinated to the knowledge of the specific contexts of individual customers. According to the entrepreneurs, the efficient development of this personalisation is made possible, especially, by flexible machinery. Therefore, technical knowledge depends more on external innovations than internal ones and is thus also subordinated to knowledge of the specific context of the individual machinery suppliers. Furthermore, the efficient development of this kind of personalisation – but also the resolution of the problems of low productive capacity which prevent many companies in the sample from establishing relationships with sizeable customers – often appears to be made easier by outsourcing, which implies that knowledge of single sub-contractors as well as knowledge of the general context of the supply market become relevant. All things considered, the importance assigned to knowledge of the specific context of individual customers is significantly higher than that assigned to knowledge of the specific context of individual suppliers and of the general context of the supply market. Putting things into perspective reveals that rather than knowledge of the specific context of the individual customers, what seems to take on importance is knowledge of the general sales market context and commercial management knowledge if the necessary means of

attacking that market are to be identified. In overall terms, knowledge of the needs of all the potential customers in different geographical areas – dividable into categories – who might be approached directly through a well developed sales network and a wide product portfolio. In this sense, knowledge of the individual customer's specific context remains crucial, if it also becomes a way of increasing knowledge of the market in general. Along with knowledge of this kind, greater importance also seems to be given to knowledge of the specific context of individual fellow entrepreneurs and even that of certain long-standing competitors. This is believed to be fundamental in developing commercial agreements made necessary by the increasing difficulty of facing national and international competition and by the increasing rapidity of technological advances.
The results relating to "Management Team" and "Human Resources" seem to indicate that in almost all cases competitive knowledge – regarding context, market, management and also technical aspects – is possessed only by the entrepreneur and not by the employees or by the organisation as a whole. Many entrepreneurs believe their personnel have limited knowledge and lack specialisation which is also difficult to acquire or increase. It is the overall knowledge of the entrepreneur together with his strong personal commitment and the modest dimensions of the company that would make it possible to constantly adapt to the most recent changes in the environment. However, considering things in perspective, concentrating all competitive knowledge in a single person is, according to an increasing number of entrepreneurs, above all a source of competitive disadvantage. This change in orientation must first of all be linked to the apparently increasing importance of knowledge of the general context of the sales and supply markets, together with both commercial and economic-financial management knowledge. The increasingly critical nature of the latter depends on the greater complexity of company and environment phenomena and, with reference to financial management knowledge in particular, also on the imminent application of the credit regulations established by Basle 2. All this contributes towards better access to credit and new forms of financing, such as private equity. A significant number of entrepreneurs regard the entry of new partners as a future possibility; these partners might have specific – above all commercial – competencies, or might be management consultants who could improve the ability to interpret the market and to define company strategies and policies. This must, however, be linked to the impending generation change-over which represents a delicate moment for many of the companies. An increasing number of the entrepreneurs seem to believe that the difficulties in training personnel might depend on the prevalently tacit form of the knowledge they possess and that this situation may thus repeat itself in the training of whoever might be managing the company in the future. As a result of this, some of the companies have begun a process which involves the strengthening of the knowledge basis of the personnel and the knowledge kept in either electronic or paper databases, by sharing the knowledge already possessed – starting with that of the entrepreneur - and the acquisition of new knowledge through the establishment of research and development activities and/or the recruitment of competent personnel.

The third section of Part B analyses the knowledge content of *company processes*. The aim is to understand what the processes and critical activities of the company are, if and how the knowledge is formalised and controlled and what margins of improvement are possible (Tables 11 and 12).

Above all, this section of the questionnaire refers to the processes of the val-

ue chain: the entrepreneur must indicate the principal activities (one or two) of each process and, subsequently, specify their importance in supporting the company's value proposal. The entrepreneur is also asked what degree of knowledge formalisation is used in each process/activity and how much control can be exercised over their results. This final question aims to assess the extent to which the input-output chain of causality can be manipulated by the entrepreneur. In general terms one can imagine two opposite situations: at one extreme, the perfect knowledge of the relationships of cause and effect (for example, on the basis of certain parameters of efficiency, the amount of raw materials used determines the amount of finished product); at the other, uncertain relationships of cause and effect, dependent on many variables, which might be beyond the company's control (for example, the effect of communication policies on market share).

Finally, we must consider which intervention might improve individual processes and activities. The logical pattern, within which lines of action that increase the effectiveness and/or efficiency of the operations are identified, is represented by the content variables (acquisition, sharing, generation and externalisation of knowledge), to which the next section of the questionnaire is dedicated (B.4).

Table 11. *Section B.3, Value chain processes*

Value chain process	Importance (0-5)	Formalization (0-5)	Control (0-5)	Improvement opportunities thanks to* (0-5) A B C D	How to
Primary activities					
Logistics					
Manufacturing					
Marketing					
Customer support					
Secondary activities					
Procurement					
Human resources mgt					
R&D mgt					
Administrative and general activities					

*A) out-in: Acquisition, B) in-in: Sharing, C) out-in-in: Generation, D) in-out: Externalisation

Table 12: *Value chain processes in the analysed companies*

Processes

Value chain processes		Importance	Knowledge formalization	Control	Improvem. thanks to Acquisition	Improvem. thanks to Sharing	aImprovem. thanks to Generation	aImprovem. thanks to Externaliz.
Logistics	**Average**	3,94	2,79	3,71	3,19	3,38	3,23	1,96
	Std. dev.	1,26	1,40	0,97	1,12	1,18	0,95	1,24
Manufac-turing	**Average**	4,73	2,65	3,91	3,36	3,91	3,82	2,51
	Std. dev.	0,49	1,40	0,87	1,14	1,02	1,20	1,32
Marketing & sales	**Average**	4,19	2,12	3,12	3,67	3,51	3,44	2,70
	Std. dev.	1,01	1,40	1,29	1,08	1,10	1,12	1,35
Customer Support	**Average**	4,40	2,12	3,68	3,40	3,58	3,72	3,02
	Std. dev.	0,83	1,30	1,00	1,14	1,09	1,05	1,25
Procure-ment	**Average**	3,89	2,68	3,68	3,75	2,91	2,81	2,47
	Std. dev.	1,12	1,34	1,03	1,24	1,23	1,21	1,20
Human resources	**Average**	4,35	2,49	3,59	3,51	3,96	3,71	2,45
	Std. dev.	0,69	1,53	0,96	1,23	1,12	1,22	1,47
Research & development	**Average**	4,29	2,10	3,48	3,92	3,58	3,83	2,73
	Std. dev.	0,92	1,32	1,18	1,15	1,03	1,23	1,48
Managem. & Financial Accounting	**Average**	3,91	3,46	3,69	3,43	2,91	2,98	1,91
	Std. dev.	0,92	1,16	0,97	1,21	1,28	1,24	1,40

The evaluation of the results must begin from the recognition of those processes which were most frequently considered by the entrepreneurs within each macro-activity. These are, in the case of

- logistics
  - managing orders: from receiving materials to despatching the finished product, with particular attention to any work done through outsourcing;
  - warehouse management regarding both purchases and sales;
- production
  - programming and operational control;
  - guaranteeing product quality;
  - plant maintenance;
- marketing and sales
  - institutional and commercial communication;
  - sales network management;
- customer support
  - customer support at the design and manufacturing stage;

improvem. thanks to Externaliz.
1,96
1,24
2,51
1,32
2,70
1,35
3,02
1,25
2,47
1,20
2,45
1,47
2,73
1,48
1,91
1,40

which
These

t, with

- updating the customer regarding the state of the order;
- after sales service;

– supply
- looking for, selecting and assessing suppliers;
- managing relationships with suppliers;

– the management of human resources
- the continuous training of personnel;
- delegation;

– research and development
- updating with regard to specific technological developments;
- plant modification in order to improve performance and safety standards;
- adapting existing products;
- new product development;

– management & financial accounting
- administration;
- treasury management;
- programming and monitoring;
- strategic analysis.

As previously indicated with reference to competitive variables, certain processes seem to be critical, above all as regards the future. For example, the processes of sales network management, of delegation, of new product development and of strategic analysis are all elements that help to create competitive uniqueness which is believed to be crucial in future terms rather than concerning the past.

Importance – On average, all macro-activities were given high importance. This may depend on the limited ability of the entrepreneurs to discriminate, but also on the methodology chosen which was to work on 8 macro-activities and to ask the entrepreneurs to think about their respective critical processes. In this sense, the average degree of importance given to each macro-activity is partially compromised – in absolute terms – by consideration of the single processes that each contains. However, the macro-activity which has on average the highest degree of importance and, at the same time, the lowest standard deviation, is production. This is further proof of how operational quality and therefore technical knowledge are in all cases necessary, although not sufficient, conditions in order to compete. This must always be linked to knowledge of the specific context of individual customers. The macro-activity which follows in terms of importance is customer support, which, has the third lowest standard deviation. Following this in terms of importance, is the macro-activity of human resources management, which has the second lowest standard deviation. This result is undoubtedly more surprising than the first two and should perhaps be interpreted with regard to the future. In this sense, the importance attributed to the delegation process could depend, for many of the entrepreneurs, on the impending generational change-over or transfer of the company, which means that competitive knowledge is no longer solely possessed by the entrepreneur, but also by the employees or the organisation as a whole. The results referring to the processes of research & development, marketing and sales – respectively the fourth and fifth macro-activities in terms of importance – should also be interpreted with a view to the future. It was in fact first shown how technical knowledge targeted at radical product innovation takes on more competitive importance when referring to the future rather than to the past. This also includes commercial management knowledge targeted at the

management of the sales network. It is worth taking note of how logistics and supply, together with management & financial accounting, are the macro-activities which, on average, have the lowest degree of importance but, at the same time, unlike management & financial accounting, the highest standard deviation. For some companies, probably for those that make extensive use of outsourcing, the processes of management of orders and selection, evaluation and management of suppliers are, respectively, among the most important. For most of the companies, however, the processes of administration and of control in the broad sense are seen to be unimportant, perhaps due to the constant lack of appropriate management systems for the requirements of small companies.

Formalisation – Almost all the macro-activities were given, on average, significantly low levels of formalisation of "used" knowledge, thus confirming that competitive knowledge is mostly possessed by the entrepreneur in a tacit or possibly implicit way. The highest levels of formalisation were attributed to the macro-activities which were seen to be the least important: administration, logistics and supply. This could depend on the fact that these processes:

- can either be easily formalised, creating gains in efficiency and effectiveness, but for this reason can be immediately copied by competitors and are therefore unimportant in the creation of competitive advantage;
- or are unimportant in the creation of competitive advantage; for this reason, however, it might be convenient to delegate them to employees or to external subjects.

Management & financial accounting undoubtedly falls within the scope of the first hypothesis, as it is an activity that greatly depends on the use of software which requires highly standardised procedures. Logistics, however, seems to come under the second hypothesis. Given its limited complexity, it is often dealt with through outsourcing. Finally, the high level of formalisation of supply is perhaps explained by the fact that the companies in the sample are supplied by big, consolidated companies who require adherence to their own formal procedures. After the macro-activities mentioned above, the one which has the highest level of formalisation of "used" knowledge is production, which can be interpreted as pertaining to neither of the above-mentioned cases or to both. This degree of formalisation, especially for manufacturing companies, depends on the fundamental role played by technical knowledge within the production process. On the other hand, the increase in the number of production processes that can be automated – that is those where it is possible to substitute the tacit knowledge possessed by the entrepreneur with the explicit knowledge incorporated within the plant – allows for improved efficiency without there being excessive loss in effectiveness. This is above all thanks to the advent of information and communication technologies (ICT) which have significantly increased the flexibility of machinery. It goes without saying, however, that this knowledge:

- if it belongs to the suppliers of machinery, is necessary but not sufficient, in order to compete, in that it can be acquired by all competitors;
- if it belongs to the employees of the company and thus to the entrepreneur who has modified machinery with the intention of improving performance or safety standards, it is both necessary and sufficient in order to compete, in that it is unlikely to be replicated by competitors. Incremental process innovations – as opposed to those regarding products –:
  - are difficult to see from the outside – many of the entrepreneurs keep their modified machinery jealously hidden under covers; hidden even from those involved in maintenance;

- and are generally firm-specific and thus difficult to adapt to situations other than those where they were originally developed.

Customer support and research & development are the macro activities which have the lowest average levels of formalisation of "used" knowledge. In these cases, we are referring to knowledge of the specific context of individual customers and knowledge of technical innovation, respectively. They also have the lowest standard deviation, preceded in this case only by administration, for which the formalisation of some activities and of their results is, at least in part, imposed by law.

Control – On average, all the macro-activities were given fairly high levels of control of the input-output relationship. All the entrepreneurs believe, therefore, that fundamentally they have company processes under control, even those that have low levels of formalisation of the knowledge "used". On the other hand, as shown above:

- the least important processes, which are, in order, logistics, management & financial accounting and supply, are also those which are most formalised, so that, even if their management is delegated to employees or external subjects, the entrepreneur can keep them tightly under his own control;
- the most important processes, which are, in order, customer service, human resources management, research & development and marketing and sales, are those which are generally managed directly by the entrepreneur and therefore the least formalised, being by definition under his control.

The macro-area of production is a particular case in that it is the most important process, but, at the same time, has the highest level of formalisation of "used" knowledge. The combined effect of these two aspects means, therefore, that it is the process with the highest average level of control and, at the same time, the lowest standard deviation. Evidence shows that, in the companies in the sample, the knowledge which is "used" is only formalised in the case of the least important processes, presumably for the reasons given above. This explains, at least in part, why the competitive variable "Management Information Systems" was never identified as a source of competitive advantage or disadvantage, either past or future, even in terms of quantum leap improvements.

Improvement opportunities – all the macro-activities were given, on average, fairly high levels of enhancement opportunities as a possible consequence of improving the processes of acquisition, sharing and generation of knowledge, while fairly low levels were given to improving the processes of externalisation. Therefore, in the light of increasing awareness of how the management of competitive knowledge is fundamental to smooth company development, there persists amongst the interviewed entrepreneurs the fear that the externalisation of knowledge will lead to its loss. Better externalisation of competitive knowledge – above all of a technical type – seems to potentially produce effects of very limited significance above all on the processes of human resources management, as well as on those recognised as less important: supply, logistics and management & financial accounting. It also seems to generate limited effects on production processes, a sign that the companies in the sample are not moving towards any degree of modularity. This makes it necessary to develop forms of cooperation which presuppose the putting together of the different elements of competitive knowledge – and not only the technical ones – with a view to creating an "extended company". More effective externalisation of competitive knowledge seems to have a positive influence on the processes of customer support in particular. If for no other reason, this is because it leads the customer

to better appreciate the extent to which this knowledge is important in developing requested personalisation and in the support that is given during the design and/or manufacturing stage of his product. Despite this, the interviewed entrepreneurs seem to believe that better externalisation of competitive knowledge finally brings more dangers than opportunities. This is debatable when a strategy of establishing a "total relationship" with a limited number of customers is concerned, and entirely incorrect when the strategy is one of opening up to the sales market as a whole. In this case it is quite impossible for a company to communicate its competencies to all potential customers in a way that is both effective and reserved. Better externalisation of competitive knowledge also seems to have a positive effect on the processes of research and development. On the other hand, effective externalisation of competitive knowledge is clearly a necessary, although insufficient, condition needed to set up processes of cooperation in research & development.

The macro-activity of research & development was given, on average, the highest level of improvement opportunity as a possible consequence of enhancement of the processes of knowledge acquisition. Presumably the entrepreneurs mainly refer to the knowledge – above all of a technical kind - produced by the research institutes, which up to now have had absolutely no contact with the business world and, in particular with the world of small enterprises. These follow the macro-activities of supply, marketing and sales, human resources management and management & financial accounting. Regarding the first of these, it is particularly important for the companies in the sample to have good knowledge of the overall context of the supply market but also of the specific context of individual suppliers, or rather knowledge of the proposals of raw material suppliers and of the competencies and production capacities of potential product suppliers. In the remaining cases it is important to acquire the managerial knowledge possessed by consultants in the fields of marketing, organisation, labour law and tax law. Lastly, we find the macro-activities of customer support, production and logistics. The entrepreneurs seem to believe that their relationships with customers and suppliers of materials and machinery allow them to acquire all of the useful knowledge which is available in the environment. On the other hand, the continual physical interaction with these subjects but also with competitors – made possible by their proximity to each other – has up to now allowed small companies:

- to externalise competitive knowledge sufficiently in order to "carve out" a role for themselves in the local production context, although this is insufficient to integrate the various production processes within the context of an extended company;
- and to acquire the knowledge necessary to adapt to changes in the local competitive context.

This interaction has also allowed relationships of trust to be developed with other subjects too, first of all financial backers; the expression "to do business you first have to look each other in the face" springs to mind. Briefly, the continual physical interaction between different players has facilitated the circulation of knowledge, but has also made it possible to regulate relationships based on trust, thus allowing small companies to participate in the development of local production systems. The increasing range of medium and large client companies also means that the "geographic glue" has less effect and that small companies are increasingly exposed to the risk of being pushed aside or even expelled from the market. The challenge for small companies, therefore, is to make it possible to recreate the cognitive environments described above albeit within a competitive, flexible, local context, but at the same time coordinated and global.

The macro-activity of human resources management and research & development was

given, on average, the highest level of improvement opportunities as a possible consequence of the processes of sharing and generation of knowledge, respectively. Almost by definition, on the other hand, the sharing of knowledge is considered – or should be considered – to be the identification of "who knows how to do what"; this premise is fundamental in order to assign responsibilities correctly and to plan training and career development which is in keeping with the competencies of the individual employees. By absolute definition, however, the generation of new knowledge is considered – or should be considered – to be the setting up of research & development processes. In both cases, the remaining macro-activities were given a level of improvement opportunities which clearly reflects the degree of importance they were given. The fact that more effective sharing and generation of knowledge seems to have a positive influence on all company processes in direct proportion to how critical they are – with the exception of the processes of management of human resources and research & development – raises the doubt that the entrepreneurs are not entirely aware of what the potential results of the actions in question might be, but also, as a logical consequence, of what efforts they should be making to put these actions into effect. This apparent lack of awareness, on the entrepreneurs' part, of the costs and benefits of improvements in the sharing and generation of knowledge processes, compared with improvements in the processes of acquisition and externalisation, might depend on the dominant role the entrepreneurs have with regard to the former. This could, however, also depend on the fact that the entrepreneurs do not recognise what they consider to be perfectly normal activities such as the sharing and generation of knowledge. For example, as has already been pointed out, they believe that incremental innovations in process and/or product are part of their day to day job and are not therefore the result of the process of knowledge generation. This has perhaps led them to underestimate the importance of increasing the effectiveness of the processes of the sharing and generation of competitive knowledge.

As an extension of the above points, the challenge for small companies becomes that of making it possible to create:

- further conditions for the effective acquisition and externalisation of knowledge, the establishment of relationships of trust and, in the end, integration of the value chains within a competitive context which is flexible and local, but at the same time coordinated and global;
- new conditions for the effective sharing and generation of knowledge.

The fourth section of Part B analyses *knowledge improvement opportunities*. Content variables are analysed more closely here (see chapter 1 for an explanation of their significance in the analysis grid), or rather the processes of acquisition, sharing, generation and externalisation of knowledge used by the company.

Tables 13-15 show the path taken in order to reconstruct the acquisition process. It shows that two areas of analysis were identified:

- the acquisition mechanisms (Table 13), or rather the external subjects that the company contacts to obtain new knowledge and the way this knowledge is brought into the company and distributed;
- the characteristics of the external knowledge environment (Table 14), iden-

tified on the basis of the kind of knowledge and the degree to which they are accessible to the company.

To make the mechanisms and routes of knowledge acquisition clearer, a narrative section is included (Table 15), where the entrepreneur can relate relevant events in the life of the company in a more unstructured way.

Table 13. *Section B.4.1.1, Analysis of the mechanisms and paths of knowledge acquisition (B.4 = Knowledge improvement opportunities; B.4.1 = Knowledge acquisition)*

Processes	*Mechanism*	*Importance/ frequency (0-5)*
Identifying (where)	The main external source of knowledge	
Acquiring (way)	The means used to acquire knowledge	
Organizing (how)	How the identified knowledge is (re)organised and transferred to the company	
Transferring (how)		

Table 14. *Section B.4.1.2, Assessment of external knowledge environment (B.4 = Knowledge improvement opportunities; B.4.1. = Knowledge acquisition)*

Knowledge not in company but accessible in the environment	
Knowledge items or sources	*Importance (0-5)*
Examples:	

Knowledge not in company and not accessible in the environment	
Knowledge items or sources	*Importance (0-5)*
Examples:	

Knowledge not in company, not accessible and perceived as not existing	
Knowledge items or sources	*Importance (0-5)*
Examples:	

Table 15. *Section B.4.1.3, Narrative exemplification of knowledge acquisition routes followed by the company (B.4 = Knowledge improvement opportunities; B.4.1. = Knowledge acquisition)*

Examples from the company's experience regarding external acquisition of knowledge significant for competitive aims, with indications regarding the subjects involved, means of discovery, type of knowledge acquired etc.

Table 16. *The process of knowledge acquisition in the analysed companies*

The importance of phases of the knowledge acquisition process

Phase Importance	Identifying	Capturing	Organizing	Transferring
Average	4,09	3,93	3,74	3,67
Std. dev.	0,89	0,88	0,88	0,83

The importance of external sources of knowledge

Subject Importance	University Centres	Research Centres	Technology Transfer Institutions	Professional & Technical Institutes	Advisory & Facilitating Agencies	Chambers of Commerce	Cluster & SME associations	Technical Publishers	Consultants	Suppliers	Customers	Competitors	Sales network
Average	2,46	2,58	2,58	3,09	1,98	2,53	3,72	3,32	3,58	3,96	3,96	2,35	4,00
Std. dev.	1,81	1,88	1,75	1,68	1,66	1,54	1,16	1,15	1,15	0,87	1,10	1,22	1,57

Frequency of answers concerning mechanisms of knowledge acquisition phases

Where (Identifying)	University Centres	Research Centres	Technology Transfer Institutions	Professional & Technical Institutes	Advisory & Facilitating Agencies	Chambers of Commerce	Cluster & SME associations	Technical Publishers	Consultants	Suppliers	Customers	Competitors	Sales network
Frequency	11%	18%	11%	42%	28%	37%	93%	96%	84%	96%	95%	91%	22%

Way (Capturing)	Cooperative research	Collaborative action learning	Benchmarking	Industry meetings	Generic meetings	Labour mobility	External mentoring	External training	Direct access to external knowledge bases	Site visits	Exhibitions & fairs	Information search and collection
Frequency	35%	72%	47%	67%	63%	21%	26%	60%	70%	65%	84%	47%

How (Organizing &Transferring)	Knowledge database & yellow pages creation	Compilation and dissemination of best practices	Standardization through process partnering & training	Monitored trial & error action	Teamwork development	Formal & informal meetings	Web forums	Internal training	General actions to stimulate knowledge transfer & to spread specific advice
Frequency	60%	63%	77%	56%	26%	93%	14%	67%	63%

Evaluation of knowledge potential existing in the environment

External but accessible knowledge	Technology	Product	Market	Other	External but not accessible knowledge	Technology	Product	Market	Other	"Unknown" knowledge	Technology	Product	Market	Other
Frequency	32%	67%	53%	37%	**Frequency**	12%	40%	33%	12%	**Frequency**	9%	21%	21%	12%

Taking analysis of the knowledge that companies do not have as a starting point, we can see that in the case of accessible knowledge, the most frequent needs are those that relate to the product or knowledge of the production system and, therefore to the needs of individual customers to design ad hoc solutions. This is despite the fact that this knowledge was frequently recognised as the most important in the creation of competitive advantage. After this come the knowledge needs regarding the structure and dynamics of the market and in particular: the structure of distribution channels, the factors which are critical to success and demand trends. After this, in the category "other", attention turns to knowledge which supports administrative and managerial activities (ways of achieving quality certification, new legislation etc.) and knowledge of the economic-financial solidity of customers. Lastly are the knowledge needs regarding new materials, new machinery and new production techniques and repairs, further confirming how most entrepreneurs believe they already have sufficient technical knowledge.

Similar results, both in terms of relative frequency and contents, emerge regarding knowledge which is neither present nor accessible in a company, and also concerns situations where knowledge is hidden in the sense that it is not known if anyone actually possesses it. In both cases, and transversally in relation to the categories used, the entrepreneurs recognise above all the knowledge which is developed by subjects who, by their very nature, are dedicated to the creation of new knowledge (universities, research centres etc.) and/or the transfer of knowledge to the production system (technological transfer centres etc.). This result is a strong confirmation of the distance that still exists between these subjects and the business world (that of small businesses in particular). With particular reference to knowledge needs linked to the structure and dynamics of the market, they recognise the evolution of macro-economic scenarios, the strategies of competitors but also those of customers and main suppliers. This last

result reveals the weakness of many small companies that, despite everything, do not manage to establish a partnership relationship with either their clients or their suppliers. Knowledge that supports delocalisation and entry into the emerging markets of Eastern Europe and China also becomes particularly important. With particular reference to the knowledge needs relating to the category "other", there is one element which stands out regarding non-accessible knowledge and that is knowledge relating to the sources and techniques of financing; this reveals that the category associations and/or chambers of commerce are ineffective in transferring information.

As regards the process of knowledge acquisition, greater importance was given to the stage of *identifying* compared to that of *capturing, organising and transferring*. This indicates, therefore, that the entrepreneurs believe that the most critical aspect in the acquisition of knowledge is the identification of who possesses it. This depends on the entrepreneur who might have difficulty deciding whether knowledge is or is not potentially useful (possibly due to a chronic lack of time), but also on the subjects who possess the knowledge, who are disinclined to open up to outsiders and interact with them or have a low opinion of small companies, and on those who should support the activity of identification by small companies. Once a source has been identified, the entrepreneurs – despite what has previously been said about the possessors of knowledge – regard it as fairly simple to have access to it, to achieve possession and to organise its transfer into the company.

At least in part, this result depends on the real or perceived lack of those subjects whose specific task is to create new knowledge – above all knowledge regarding technical innovations – and/or to transfer it into the production system. This refers particularly to universities, research centres and other technology transfer centres. These subjects, in the same order, are the ones which were given the lowest level of importance. On the other hand, they have the highest standard deviation of all. The majority of companies in the sample who believe that universities, research centres and other technology transfer centres have little importance for the acquisition of new competitive knowledge stand in contrast, therefore, to the minority who consider them to be a primary source of knowledge. In keeping with these results, a small number of companies have active relationships with these external subjects. Doubt remains whether the lack of active relationships with universities, research centres and other technology transfer centres depends on their low importance as sources of knowledge acquisition, or if the opinion of entrepreneurs depends on a lack of active relationships caused by distancing between these subjects and companies (in particular small companies). As an act of provocation, one could assert that companies have only rarely, and then very timidly, approached universities, research centres and other technology transfer centres with questions and that these questions have generally not received an answer.

In terms of importance, the aforementioned subjects are only preceded by advisory and facility agencies and by competitors and, if universities are excluded, by chambers of commerce. These subjects, however, present very different situations as regards the frequency of activation:

- very few companies say that they have acquired new knowledge through advisory and facility agencies and chambers of commerce;
- many companies, however, claim that they have acquired knowledge from their competitors, despite the fact that the latter undoubtedly make efforts to defend their competitive knowledge.

Presumably, the low level of importance attributed to competitors depends, therefore,

on the difficulty experienced in acquiring their knowledge, as well as the desire of the entrepreneurs not to appear as mere imitators. Caution of this nature is perhaps a particularly important factor nowadays given the depressive effect on all western economies of Chinese imitators. The low importance given to advisory and facility agencies and chambers of commerce could be explained by the same factors, only slightly diminished, as those put forward to explain the importance given to universities, research centres and other technology transfer centres. Following this, in increasing order of attributed importance, but also in frequency of activation, come those subjects which are progressively less concerned with the transfer of knowledge, except for customers and suppliers for whom the transfer of knowledge is secondary to their principal activities. An exception to this rule is the sales network which has the highest level of importance but, at the same time, low frequency of activation. This last result depends on an unfavourable relationship between costs and benefits deriving from the creation and management of a sales network for all those companies in the sample, the majority, that have up to now pursued a strategy of offering a limited number of products to an equally limited number of customers. A partial exception to the rule is represented by the technical publishers who have medium level importance but, at the same time, a high frequency of activation. This apparent contradiction can easily be seen to depend on the fact that the knowledge transferred has limited competitive value, if for no other reason, because of the extreme ease with which it can be acquired. In any case, customers and suppliers are also the elements that have the lowest standard deviation: thus, almost all of the companies consider them to be the most important subjects in the context of knowledge acquisition and, in keeping with this, they exploit the relationships established with them for this purpose. In this case too, the doubt remains whether the frequent activation of customer and supplier depends on their high importance as sources of acquisition of new knowledge or whether this opinion depends on their frequent activation for reasons which were quite different in the first place. In general terms, the doubt is raised that the majority of companies in the sample attempt to exploit, for the purposes of knowledge acquisition, relationships that have been established for other reasons and that they do not make efforts to establish new ones simply to acquire knowledge.

Logically, the kinds of subjects which are activated have an effect on the ways of acquiring knowledge. Thus, we can see a greater frequency in the means of acquiring knowledge possessed by suppliers and customers through private or public channels, with or without the mediation of SME associations and/or chambers of commerce. We are referring here to: a) the participation in exhibitions and national and international fairs with the assistance of SME associations and/or chambers of commerce; b) the collaborative action learning developed with suppliers and customers to consider possible innovation in materials and machinery or product performance; c) direct access to the knowledge bases of SME associations and/or chambers of commerce, but also to those of suppliers and customers (Siemens, for example, has a site which allows its maintenance firms to update their repair techniques); d) the industry meetings organised by SME associations and/or chambers of commerce in order to discuss specific subjects; e) explorative site visits to potential and existing suppliers in order to assess performance and to receive updates regarding technological developments; f) occasional or regular generic meetings with people within or outside the sector in question to discuss particular subjects. What follows, regards the ways of accessing the knowledge possessed – although possibly less useful for the creation of competitive advantage – by those subjects whose primary interest lies in the transfer of knowledge. Passive methods are more com-

mon here than active ones. External training organised by SME associations and/or chambers of commerce and/or directly by consultants is aimed at the entrepreneur or the administrative staff; training organised by technological transfer centres and/or suppliers is aimed at technical staff. Whatever form it takes, external training is more important than information search and collection, whether general (web search, reading newspapers and technical magazines) or specific (targeted web research and informal contacts with fellow entrepreneurs and category associations). Next come ways of sharing knowledge (benchmarking) and creating new knowledge (cooperative research). Knowledge that can be acquired in these ways is potentially the most useful in terms of creating competitive advantage. Their limited frequency is therefore perhaps further evidence of the passivity with which the companies in the sample face this problem. Lastly come the acquisition techniques which involve the entry of an external subject into the company. Here we mean:

a) external mentoring by the customer during production at the start-up phase (spin-off);
b) external mentoring by the supplier for the adaptation and use of sophisticated machinery;
c) external mentoring by consultants for the adaptation and management of information and computer systems used in management, production, marketing etc.;
d) labour mobility, in the sense of the acquisition of specific competencies which are not present in the company through the recruitment of personnel, both poached from competitors and freelance personnel available in the market. The limited frequency here could depend on the fact that small companies do not often tolerate the presence of extra personnel and/or the fact that small entrepreneurs are often inclined to be particularly reserved.

In keeping with the prevalently tacit form of the knowledge possessed by the companies in the sample, the most frequently used techniques for organising and transferring acquired knowledge within the company are based on personal transference rather than impersonal transference. In this way, formal and informal meetings are more frequent than training and the diffusion of best practices, generally through the modification of existing procedures or the introduction of new ones. They are also more frequent than the creation of knowledge data bases and yellow pages by keeping and systematically or non-systematically updating information collected in electronic or paper databases (collections of catalogues, visiting cards, instructions and maintenance manuals, guarantees, order confirmations etc.). A similar interpretation is to be given to the results regarding standardisation through process partnering and training. This activity is aimed at newly recruited personnel and at personnel involved in job rotation and internal training; an activity normally undertaken by staff who have taken part in update courses organised by suppliers. Monitored trial and error actions, which aim to promote the use and development of acquired knowledge, have an even lower frequency; these activities might be structured or unstructured and records of results may or may not be kept. Team work development of homogeneous or heterogeneous competencies has a similarly low frequency. The number of companies that use the web or a local network to organise discussion forums is completely insignificant; this is further proof that the potential of ICT is not exploited by small companies.

The pattern used in the analysis framework to deal with the second content variable (sharing) is more or less similar to that regarding acquisition. Apart from the mechanisms and routes of sharing (Table 17), an attempt is made to discover if there are margins for improving the exploitation of competitive knowledge, or rather if the company has knowledge which is insufficiently used or exploited (Table 18). Finally, as before, the entrepreneur is given the opportunity to report any significant events which exemplify the approach used to distribute knowledge within the company (Table 19).

Table 17. *Section B.4.2.1, Analysis of the mechanisms and routes of knowledge sharing (B.4 = Knowledge improvement opportunities; B.4.2. = Knowledge sharing)*

Processes	*Mechanism*	*Importance/ frequency (0-5)*
Identifying	The main mechanism for identifying (internal) knowledge available and sharable	
Acquiring	The methods used to acquire internal tacit knowledge	
Organizing	How the identified knowledge is (re)organised	
Transferring	How the identified knowledge is transferred to/among employees	

Table 18. *Section B.4.2.2, Assessment of knowledge sharing potential (B.4 = Knowledge improvement opportunities; B.4.2. = Knowledge sharing)*

Knowledge sharing potential	
Knowledge items	*Importance (0-5)*
Examples:	

Table 19. *Section B.4.2.3, Narrative exemplification of the company knowledge sharing routes (B.4 = Knowledge improvement opportunities; B.4.2. = Knowledge sharing)*

Examples from the company's experience regarding internal knowledge sharing significant for competitive aims, with indications regarding the subjects involved, type of knowledge shared etc.

Table 20. *The process of knowledge sharing in the analysed companies*

The importance of the phases of the knowledge sharing process

Phase Importance	Identifying	Capturing	Organizing	Transferring
Average	3,23	3,39	3,35	3,49
Std. dev.	1,27	1,25	1,25	1,18

Frequency of answers regarding mechanisms of knowledge sharing phases

Where (Identifying)	Knowledge database (accessible through ITC), corporate memory	Knowledge database (not accessible through ITC)	Formalization of workers skills	Organization Chart/ Important functions (job description)	Informal identification (spot, ad-hoc analysis)
Frequency	51%	68%	21%	42%	96%

Way (Capturing)	Collaborative action learning	Formal sharing	Informal sharing	Internal mentoring	Internal training	Direct access to internal knowledge data bases
Frequency	35%	37%	98%	75%	58%	44%

How (Organizing &Transferring)	Compilation and dissemination of best practices	To standardize through process partnering & training	Monitored trial & error actions	Team work development	Formal & informal meetings	Web forum	Internal training	General actions to stimulate knowledge transfer & to spread specific advice
Frequency	44%	88%	58%	26%	95%	11%	65%	68%

Assessment of knowledge sharing potential

Knowledge Sharing Potential	Technology	Product	Market	Other
Frequency	12%	74%	16%	23%

Starting with the analysis of the existing knowledge in a company, which is not fully shared, we can see how this is linked, above all, to products. The interviewed entrepreneurs refer to knowledge of the production systems of their own companies – often exclusively in their possession – rather than, as happened in the acquisition process, of their customers. The reasons for the lack of sharing of this knowledge have been ascribed to the resistance to sharing as follows:

- the personnel. The entrepreneurs believe that their employees are not interested in assuming responsibility, in collaborating, working in groups and in updating and improving their competencies;
- the entrepreneurs. They admit that they are not inclined to delegate, to create intra-organisational relationships based on collaboration and trust, to organise team work, to develop a training policy to improve the competencies and motivation of their employees.

The difficulties of the "transmission" and "reception" of competitive knowledge explain why *transferring* is regarded as the most critical phase within the process of sharing. What was said about *organising and transferring* within the acquisition process can also be applied here to transferring. The companies seem to use similar systems for organising and transferring acquired knowledge as they do for shared knowledge, with the exception of knowledge data bases, the creation and compilation of yellow pages and the dissemination of best practices. The last of these mechanisms is the only one which has a significantly different frequency according to whether the knowledge to be organised and transferred is acquired or only shared. In particular, within the process of sharing, where it is also used by a smaller number of companies. In this last case, the modifications to existing procedures in order to improve the efficiency and effectiveness of company processes can only be developed internally and not acquired externally from, for example, company consultants. The absence of the first mechanism from the sharing process depends, however, on the fact that it was considered more useful for the identification of explicit knowledge present in the company and thus potentially more sharable than it was for the organisation and transfer of knowledge.

In line with the results of the acquisition process analysis, the knowledge data base is a mechanism used by only some of the companies in the sample: just over half of these companies use electronic data bases. Only a minority of the companies formalise the tasks and organisational responsibilities and an even lower number formalise the skills of employees through an assessment of competencies. If the first result is further proof that the potential of ICT is not fully exploited in small companies, the subsequent ones show how almost all of the entrepreneurs believe that the possible benefits of the codification of knowledge are completely insignificant compared to the costs involved. The only mechanism for the identification of potentially useful sharable knowledge used by almost all the companies is that of informal identification. This also explains why the identifying phase was also recognised as the least critical within the sharing process, as further

proof of the fact that the knowledge of small companies is nearly always possessed by the entrepreneur or a limited number of collaborators.
In keeping with the above evidence, the most frequently used ways of capturing the knowledge present in the company, but which is not sufficiently shared, are only partially based on codification. Informal sharing, which takes place verbally and/or through direct observation, internal mentoring, conducted by experts during the execution of tasks, and internal training, undertaken mostly by the entrepreneur, have a higher frequency compared to direct access to internal knowledge data bases and formal sharing. The last of these takes place through the creation of procedures for the standardisation of operations: writing technical reports, preparing instruction manuals on the working and setting-up of machinery, making samples and keeping records regarding client and supplier information, invoices, order confirmation, the economic-financial performance of the company and its various parts etc. Collaborative action learning, which aims to encourage the use and development of shared knowledge, has an even lower frequency.
Overall, the results show that the process of competitive knowledge sharing within an organisation is not considered to be particularly critical by most of the entrepreneurs involved. In a few cases, the process of quality certification was the only element believed to be significant in this context owing to the formalisation of knowledge and the definition of tasks and responsibilities that this involves. In other cases, the only important factor was seen to be the transfer of knowledge during the generation change-over stage. In many cases the sharing of competitive knowledge was only believed to be useful in limiting the dependence of the company on one or a small number of individuals. In each case, the effectiveness of sharing seems to depend on certain company characteristics: its size, the atmosphere of the organisation, the way work is organised, the variety of competencies, the behaviour and attitudes of the personnel, and, above all, the entrepreneur.

The third content variable examined is the generation of competitive knowledge. To have a picture of the way the enterprise generates new competitive knowledge, the mechanisms and routes which are usually used (Table 21) were considered, as in the previous two cases, but in this case they refer to the procedures (systematic or episodic, formal or informal), the tools (brainstorming, experimentation etc.) and the subjects (internal and external) involved. What is important is not only the actual generation of innovative ideas, but also the way in which the ideas are translated into goods and services and the way the knowledge they contain is transferred within the company. Given the importance of human capital in characterising this content variable, close attention is paid to people and certain tasks that must be performed within the company (Table 22). Once again, the picture is enhanced by allowing the interviewee to relate his experiences in an unstructured way (Table 23).

Table 21. *Section B.4.3.1, Analysis of the mechanisms and paths of knowledge generation (B.4 = Knowledge improvement opportunities; B.4.3 = Knowledge generation)*

Processes	*Mechanism*	*Importance/ frequency (0-5)*
Identifying	The main mechanism for identifying input or stimulus to activate a new idea generation process	
Acquiring	The way used to acquire the essentials of the stimulus	
Organizing	How the new idea is translated into practice	
Transferring	How the successful innovations are implemented in business practices	

Table 22. *Section B.4.3.2, Skills audit to assess the potential for the generation of new knowledge (B.4 = Knowledge improvement opportunities; B.4.3. = Knowledge generation)*

Skill category	*Score (0-5)*	*Trend (+, -)*
a. worker attributes (generic abilities and skills) – aptitudes and abilities (cognitive, physical, sensory..) – basic workplace skills (reading, writing, computational) – cross functional skills (information gathering, communication, problem analysis, negotiating..) – occupation specific skills (ability to use specific tools, machines or equipment) – occupation specific knowledge (programming, foreign languages, software)		
b. skills dimensions (articulated and situated abilities) – content skills (reading comprehension, active listening..) – process skills (critical thinking, active learning..) – cross functional skills (developed capacities that facilitate performance) – social skills (coordination, persuasion, negotiation..) – complex problem solving skills (problem identification, information gathering, synthesis/reorganisation, idea regeneration..) – technical skills (operation analysis, technology design, equipment selection…) – system skills (systems visioning, systems perception, – identifying downstream consequences, identification of key causes…) – resource management skills (time management, management of finance, material, personnel) – information and communication technologies		

Table 23. *Section B.4.3.3, Narrative exemplification of knowledge generation routes followed by the company (B.4 = Knowledge improvement opportunities; B.4.3. = Knowledge generation)*

Examples from the company's experience regarding knowledge generation significant for competitive aims, with indications regarding the subjects involved, type of knowledge generated, procedures followed etc.

Table 24. *The process of knowledge generation in the analysed companies*

The importance of the phases of the knowledge generation process

Phase Importance	Identifying	Capturing	Producing	Transferring
Average	3,98	3,80	4,23	3,71
Std. dev.	0,86	0,84	0,71	1,00

Frequency of answers regarding the mechanisms governing knowledge generation phases

Where (Identifying)	Important figures in the firm with analysis & research tasks	Important figures in the firm without analysis & research tasks	Stimulus of associations, technology transfer institutions, etc.	Technical publishers	Consultants	Suppliers	Customers
Frequency	16%	95%	54%	86%	39%	75%	93%

Way (Capturing)	Systematic activities of research & development	Inside brainstorming & on the job learning	Labour mobility	Seeking assistance from research centres	Seeking assistance from consultants	Site visits & relationships with subjects that hold sought knowledge	Discussions, speeches & visits to customers or other subjects that collaborate at informal level	Participation in conferences and talks	Exhibitions & fairs
Frequency	16%	91%	11%	11%	49%	61%	72%	33%	88%

How (Producing & Transferring)	Systematic knowledge development through ad hoc & planned processes	Spot experimentation, trial & error and redefinition of procedures	Team work on new knowledge	Sample development to validate acquired knowledge	Formalization of new knowledge through electronic or paper tools	Workers training	Spread of knowledge and raising of workers' awareness about new knowledge
Frequency	12%	91%	21%	40%	70%	49%	63%

Analysis of excellence level of personnel skills

Worker's skill	Aptitudes & abilities	Basic workplaces skills	Cross functional skills	Occupation specific skills	Occupation specific knowledge	Content skills	Process skills	Cross functional skills	Social skills	Complex problem solving skills	Technical skills	System skills	Resource management skills	Information & communication technologies
Average	3,20	3,12	3,20	3,36	3,02	3,14	3,33	3,20	3,47	3,49	3,02	3,22	3,24	3,16
Std. dev.	1,26	1,27	0,90	1,17	1,30	0,96	0,90	0,74	1,00	0,96	1,15	0,92	0,92	0,96

In assessing the importance of the separate phases, *producing* received the highest assessment both in absolute terms (score) and relative terms (standard deviation). The phases of *identifying and capturing* followed in consecutive order and, further behind, also in terms of standard deviation, was the *transferring* phase. The development of this discrimination process seems to be influenced both by the diversity of the results produced by the separate phases and by the efforts involved in the activities of the phases themselves. In this context, the phase of *producing* is benefited as it leads, unlike the phase of identifying and capturing, the stimuli for the creation of new ideas in particular, to tangible results like the development of prototypes and, in general, of experiments. As a consequence, it is easier to perceive and characterise, albeit in qualitative terms, the contribution to the creation of value. Apart from this greater transparency of the relationship with generated value, the quantification of the effort involved seems to have a significant role. In most of the interviewed companies, knowledge generation, in the strict sense of the word, is limited to the entrepreneur, who often decides to invest material resources, energy and time in these activities at the expense of his own family and personal interests. The sacrifice is often seen as necessary for the improvement of the competitive set-up of the company, but the entrepreneur remains very much aware of the cost involved.

The stimuli for the generation of new ideas come primarily from the quality of the subjects within a company and, in particular, from the entrepreneurs who, in the vast majority of the interviewed companies, conduct R&D activities in an unstructured and occasional fashion. The stimuli also derive from the specific requirements of customers and from technological innovations published in specialised trade magazines. The result reveals a set of conditions which recur with a certain frequency in starting off the processes of innovation, in particular in those which aim at the continuous improvement of operational activity and products: the excellence of technical competencies and the experience of the entrepreneurs, skill in dealing with situations which are not completely known, combined with the commitment shown to the updating of knowledge and the complete satisfaction of the customers needs, are some of the fundamental ingredients of the formula for the competitive success of many small companies. Further stimuli derive from the interests of suppliers, who promote directly within companies the advantages of new materials and machinery, and also, though they might not take place frequently,

from events organised by SME associations and from the qualified support of technology transfer centres and consultants. The latter, together with suppliers, act mainly as sources for the acquisition of highly specialised knowledge, often not present within the company, which is to be used during very specific innovation activity. It is not by chance that, along with customers, consultants are often the most sought after subjects for collaboration which aims to achieve radical product innovation through co-designing, co-production, co-development of new materials etc... On the other hand, associations and agencies involved in the production and transfer of knowledge are seen more as organisers of training events of general interest (conferences, talks, demonstrations) as well as, to a lesser extent, suppliers of knowledge to be used directly in company operations. Briefly, we can say that the stimuli to the generation process are both internal and external and that the internal stimuli, unlike the external, derive from a set of sources which is more limited both in number and in kind; there is also no particular behaviour pattern which might give continuity and structure to the creation of new ideas, which is generally prompted by necessities and opportunities as they emerge.

The variety of external stimuli leads us to a recognition of the entrepreneur's skill, not only in identifying the source but also, and above all, in assessing the quality of the stimulus and its potential usefulness by reworking it and adapting it to particular objectives. However, this skill appears to be limited to contacts with subjects with whom the entrepreneurs have maintained a consolidated business relationship for some time and where there is trust on both sides. It is not by chance that participation in trade fairs and sector exhibitions and relationships with customers are amongst the most frequently indicated ways of capturing stimuli. In first place we find internal brainstorming and learning by working, further proof of the operational character of innovation, while in the last places we find, respectively, systematic R&D activity, workers' mobility and the assistance of research centres. In order to acquire stimuli, the companies in the sample turn mainly to the creativity of the entrepreneur, which might be backed up by discussion with trusted co-workers and forms of learning which are triggered during the carrying out of daily tasks. Frequent use is made of channels through which information about the state of the art of the sector can be acquired, as well as those which are limited to the carrying out of business activities. Overall, the capture of stimuli is limited to small areas, as it is conditioned by the absence of any programmed or planned action, by the entrepreneurs' limited propensity to take risks and by a reluctance to explore sections of the external environment which are little known, entirely unknown or seen as too distant from the world of small companies. This is confirmed by the fact that there are no links to research centres and that there is a reluctance to employ people of high professional standing to deal with critical tasks, where results like radical product innovation are unpredictable.

Activities specifically designed for the generation of knowledge are neither structured nor systematic. The generation of knowledge is, almost exclusively, the result of experimentation on many levels ("Directed experimentation, trial and error and redefinition of procedures") which often lead to the building of prototypes in different stages of development, the starting point for further experimentation and an important way of validating results. Furthermore, this is a process which is rarely used in situations where work is organised along collective lines and which tends to be formalised at the stage of intermediate results, in order to exploit possible economies due to the replication of solutions which have proved to be effective and efficient ("Formalisation of new knowledge in electronic or paper form"). From the overall results and in keeping with the meanings

attributed to the concept of innovation (Table 6), it appears that the knowledge generation process is aimed, respectively, at incremental process innovation, at the continuous improvement and/or customisation of the product and, finally, at radical product innovation.

In the first case, the main objectives which drive new knowledge generation are: a) the continuous improvement of productive efficiency, which takes place through organisational intervention with the purpose of reducing the times of movement of materials and work cycles; b) the continuous improvement of productive effectiveness, which takes place through the automation of brief work cycles and the customisation of machinery. These tasks are conducted primarily by using internal resources and, in particular, the creativity and experience of the entrepreneur. The generated knowledge is transferred within the company in ways which vary according to the results achieved. The redefinition of operational procedures is used mainly when production is reorganised, while the training of employees follows intervention regarding the physical-technical capital.

In the second case, the objective is to ensure high quality standards and a high level of service for customers, in order to consolidate business relationships and to present oneself as a trustworthy, competent interlocutor and the only person able to meet the customer's requirements. The difference in this case is that the input comes from the customer, who requests product changes and gives to the company the task of finding a solution that optimises, on one hand, the requirements of differentiation and, on the other, the rationalisation of costs. The increased complexity of the process requires the application of a greater amount of knowledge acquired externally (often in the form of specifically produced articles or parts and components acquired through outsourcing) and the particular advice of fellow entrepreneurs and suppliers, as well as the use of instruments for the formalisation of the knowledge generated during the different development stages. The transfer of new knowledge normally occurs through informal sharing backed up by the redefinition of operational procedures and the storing of information in databases which can be accessed through ICT tools.

In the third case, the main objective is to acquire sustainable competitive differentials through the constant offering of new products. This is only an objective for those companies who have a direct relationship with the final consumer and are thus the exception within a sample made up almost entirely of companies which sell to other companies (only 4% of the interviewed entrepreneurs recognise "product innovation" as a source of value generation for the customer). Dissimilar to the two previous profiles, innovation is often the result of planned and structured activity, where resources are dedicated to specifically organised internal procedures (project organisation, process organisation, teamwork) or to collaboration with external subjects, mostly with customers and specialised suppliers. Internal solutions are preferred if the competencies and abilities for the complete development of the innovation process are available in-house. In this case the company has complete control over the process and thus reaps the full benefits of the product's introduction into the market. Conversely, external solutions are preferred when the necessary resources can only be acquired through external purchasing. In this case the effectiveness of the process depends on the combined efforts of the single participants and the benefits are divided up according to the extent of individual contributions. In both situations, generation is no longer to be regarded as an occasional process but as a systematic and organised one. The creation of a new product involves the redefinition of the procedures which support the supply, and in particular, the production processes. The new knowledge is transferred by the standardisation of processes, often

combined with periodic meetings between important figures and the head of the company.
Finally, a few brief comments on the results of the entrepreneurs' assessments of employee skill levels. An initial reflection is that the values regarding importance deviate little from the average. This effect derives not so much from any discrimination on the part of the interviewed entrepreneurs as from the method that was used, which led to consideration of all personnel taken as a whole rather than homogeneous groups of employees. Social skills and skills regarding the solving of complex problems were the categories with the highest importance values. This result contradicts, at least partially, the commonly held view that employees have a low propensity for solving daily operational problems, for continuous improvement, interaction and working in groups. Perhaps these opinions, especially those which regard employees as the main cause for the lack of knowledge transfer within an organisation, need to be revised or at least reconsidered in the light of the well known narcissism of certain entrepreneurs. Specific knowledge and technical skills, on the other hand, are the categories with the lowest importance but are amongst those with the highest standard deviation, revealing the fact that these skills are seen to be of a particularly high standard in some companies but not in others. This result is surprising, above all, with respect to the quality of specific knowledge linked to the performance of tasks and seems to indicate a new tendency in training policy, i.e. a focus on the development of heterogeneousness competencies rather than specific specialisations. It is not surprising, however, to see the low assessment of technical competencies, which include the ability to manage and develop knowledge of the technical aspects of the functioning of plant and equipment. The high specialisation of these competencies is one of the reasons why small companies acquire them externally rather than develop them internally, unlike large companies who prefer to manage and control them directly. The final consideration regards the skills of resource management and of ICT. The first of these was given a higher assessment, albeit only slightly higher, than average, but not as high as it was reasonable to expect, above all considering the fact that the entrepreneurs were asked to give an assessment of their own work. This is a fairly reliable indicator of the common awareness of the need to improve techniques and styles of company management, if for no other reason than to guarantee the security of the company in a competitive scenario which is undergoing constant change. The second, however, were given a lower than average assessment, revealing once again that the use of ICT and the ability to manage these new technological tools are still at an early stage in small companies.

Finally, attention is given to externalisation, or rather the activities, procedures, products and services through which the company ensures that its knowledge is visible to its current and potential customers. Once again the mechanisms and routes followed by the company are important (Table 25). As regards externalisation we can consider the way the company identifies the knowledge it believes to be important and the way it transfers it (through communication and promotion or through its products and services) to external subjects who might be interested in using it in their production or consumption processes. It is particularly important to understand how the company is

remunerated for the transferred knowledge: indirectly through the price of the product sold, or directly by putting a price on the knowledge itself.

As usual, the picture given by this variable is completed by the entrepreneur's accounts of experiences directly relating to externalisation (Table 26).

Table 25. *Section B.4.4.1, Analysis of the mechanisms and routes of knowledge externalisation (B.4 = Knowledge improvement opportunities; B.4.4. = Knowledge externalisation)*

Processes	*Mechanism*	*Importance/ frequency (0-5)*
Identifying	How available company knowledge is communicated to external potential users	
Structuring	How company knowledge is transferred to external subjects	
Negotiating	How the company gets money for the externalised knowledge	

Table 26. *Section B.4.4.2, Narrative exemplification of the routes of externalisation followed by the company (B.4 = Knowledge improvement opportunities; B.4.4. = Knowledge externalisation)*

Examples from the company's experience regarding knowledge externalisation significant for competitive aims, with indications regarding the subjects involved, type of knowledge externalised, procedures followed etc.

Table 27. *The process of knowledge externalisation in the analysed companies*

The importance of the phases of the knowledge externalisation process

Phase importance	**Identifying**	**Structuring**	**Negotiating**
Average	3,40	3,30	2,54
Std. dev.	0,78	0,84	1,32

Frequency of answers regarding the mechanisms governing knowledge externalisation phases

Where (Identifying)	**Existing or potential customers**	**Raw materials, parts & semi manufactured suppliers**	**Equipment suppliers**	**Banks**	**Colleagues**	**Associations**	**Research centres, training institutes**	**Economic environment**
Frequency	95%	58%	37%	9%	75%	68%	28%	65%

Way (Structuring)	Product Use	Product functionality	Product management modalities to ensure effective and efficient exploitation	Material, part, technology and process production features	Material, part, technology and critical issues in process production
Frequency	49%	30%	23%	79%	60%

How (Negotiating)	Non structured Contacts	Conferences and talks, structured contacts	Catalogues/ company magazines	Product handbooks & maintenance manuals	Knowledge database accessible through ITC	Samples	Improvement/ Customization of products	Consulting & assistance in design & manufacturing phases	Technical reports	Training events
Frequency	84%	21%	37%	18%	9%	44%	72%	47%	35%	11%

In the assessment of the importance of the different phases, *identifying* had the highest score, followed by *structuring and negotiating*. It also had the lowest standard deviation, evidence of the fact that most of the entrepreneurs had the same opinions, whereas the standard deviation for the other phases, especially *negotiating*, was higher. The entrepreneurs are thus shown to be fairly careful in selecting the receivers of transferred knowledge, whereas they display contrasting behaviour in the ways they manage both contacts and interaction in general. On one hand they show that they can recognise which receivers would make reliable interlocutors, able to make a valuable contribution to the exchange of knowledge, and that they are aware of the conditions which should regulate the effective management of the externalisation process. On the other hand, however, they are not always able to exploit those conditions and show a certain inability to control negotiations. The activation of relationships with external subjects targeted towards knowledge transfer would, therefore, seem to be subordinated to the following set of conditions: a) the certainty that the receiver is not behaving opportunistically, i.e. that he is not acquiring substantial advantage with minimum effort; b) the willingness of the receiver to collaborate with the company at a later date, in keeping with the principal that a company is prepared to "cede knowledge now in order to obtain it in the future"; c) the real possibility of creating strong, lasting business relationships, particularly with customers; d) the real possibility of improving the quality and quantity of company performances through the development of cooperation between participants based on knowledge sharing.

The difficulty that many of the entrepreneurs have in fully achieving the expected results of knowledge externalisation can be seen to depend on a limited perception of the real value of ceded knowledge, perhaps due to an inability to quantify the impact the new knowledge might have in a new context. Or perhaps, more simply, they regard knowledge externalisation as unavoidable; a price that has to be paid to obtain better perfor-

mance from suppliers, to obtain the trust and the respect of customers and to be able to participate in the local development of innovation.
It can easily be seen that existing or potential customers, with 95% of replies, are the main beneficiaries of knowledge transfer. Colleagues, associations, economic and social environments and suppliers of raw materials, parts and semi-manufactured goods follow a long way behind. This confirms a behaviour pattern that tends to give importance to relationships within the local environment and with subjects who are directly involved in the business and are thus considered more reliable. Equipment suppliers are not sought out as receivers of information, perhaps due to the complexity of the knowledge possessed, and are more often seen as sources from which to acquire knowledge rather than subjects to whom knowledge can be ceded. Next come research centres and training institutes and banks, mentioned only in 9% of replies. The difficulty of interacting with research centres is due to the lack of adequate contact channels, their low visibility and the mentality of the entrepreneurs who see them as centres designed to satisfy the radical innovation requirements of big companies. Banks are not favoured as interlocutors. The low frequency is partly due to the fact that entrepreneurs tend to place more emphasis on the technical-production sphere, rather than on the economic-financial sphere; these relationships are often regarded as inevitably conflictive. The low visibility of the financial sector can be traced back to the fact that many of the companies do not employ communication tools such as business plans, investment plans or industrial plans. The problem may become particularly critical due to the restrictions on credit imposed by the Basle 2 agreements.
The prevalence of information regarding operative matters as the subject of externalised knowledge is confirmed by the first two categories, "Characteristics of resources and processes used" and "Critical aspects of the resources and the processes used and their evolution". The companies intend to show that, above all else, they are particularly skilled in production acitivities and in the acquisition of technological developments. Next comes contents which are linked to the performance and functionality of the product (Product use, Product functionality) not only in general terms but also as specific assistance required to ensure the correct and economical use of the product by the customer.
As far as mechanisms for contact with the user are concerned, there is a clear prevalence of those of an informal nature. These mechanisms support interaction with the customer aimed at customisation and product improvement and assistance during the design and production stages. When what is to be externalised is more specific and directed at a more heterogeneous audience than customers, there is a preference, as instruments for the transfer of knowledge, for company catalogues and magazines and for instructions and maintenance manuals. Databases accessed thorough ICT tools are only used by a small minority of the companies in the sample.
From the overall results, it appears that the purpose of the process of knowledge externalisation is, in order of importance, as follows: the differentiation of the value proposal for customers, achieving better conditions for the acquisition of a service from a third party and, finally, the creation of a distinctive company image and reputation.
In the first case, the transfer of knowledge acts as a lever to enhance the strategies of differentiation of the offer, which are calculated to defend the position of advantage in a local context which has been shaken by the decision of leading companies to relocate production and by the arrival of Asian competitors. The effectiveness of the process of differentiation comes to depend directly on the quality and the quantity of the knowledge

released to the customer. In the second case, the underlying logic lies in the idea that one transfers knowledge to a supplier in order to gain something in return which would not otherwise be easily available at normal market conditions. For example, to ensure respect for the quality and delivery times of outsourced work, it is necessary to train a supplier and to check periodically the quality of the service offered. In the same way, to obtain quicker updates regarding technological advances and more reliable technical assistance from suppliers of machinery, it is a good idea to offer advice about improving the performance of machinery currently in use and about the development of new prototypes. In this case, the value of the released knowledge cannot be measured in monetary terms. It is part of the higher quality of the service received and, in the view of the entrepreneurs who release the knowledge, it can be assimilated into the cost of obtaining the service. In the third case, the forms of the transfer of knowledge act as a lever for the enhancement of the reputation and image of the company. The process assumes the characteristics of institutional communication, which addresses a specific economic and social environment, even if there are other forms of communication which are more specifically directed both in terms of objectives and content. In general terms, the intention is to promote the reputation of a company as one which pays attention to local development, is sensitive to social well-being and care for the environment, is reliable in its business relationships and innovative in the solutions it proposes.

C. The economic, cultural and social context

The last part of the questionnaire returns to the context variables (see chapter 1) and focuses in particular on the environment in which the company operates. The intention here is to give a clear impression of the context within which the company operates, identifying the principal changes taking place, the characteristics of the prevailing culture and the existence of any infrastructures that might support the production and use of economic knowledge. For this reason the analysis is conducted at various levels. In particular, after having asked the entrepreneur to indicate the strengths and weaknesses of the environment in question (in a broad sense of the word and including economic, social, political and associative aspects; see Table 28), the most significant characteristics are reconstructed.

The analysis has two dimensions. First of all attention focuses on (Table 29):

- the economic variables which characterise the competitive environment (macro analysis: the sectors the company is connected to, the impact of globalisation etc.);
- the social and cultural characteristics of the geographical area where the company is located (micro analysis: the prevailing social climate, the structure of the labour market, the presence of leaders etc.);
- the role of sector associations (morphological analysis).

Subsequently, the environment is observed more directly in terms of knowledge (Table 30): an attempt is made, in particular, to understand if, in the entrepreneur's opinion subjects and infrastructures exist which favour the acqui-

sition of new knowledge and, if so, to what extent they help a company to create sustainable competitive advantage.

Table 28. *Section C.1, Narrative description of the principal economic, social, cultural and political environments the company operates in*

Unstructured description by the entrepreneur of the most typical characteristics, both negative and positive, of the economic, social, cultural and political environments the company operates in.

Table 29. *Section C.2, Map of the company's specific environment*

C.2.1.1. Macro level of analysis

Question	*Answer*
Which sectors is the company linked to? Does any public assistance or public infrastructure support the firms? What is the impact of globalisation on the firm?	

C.2.1.2. Micro level of analysis

Question	*Answer*
Are there shared common beliefs in the area? Did action on the part of the Public Administration have a strong impact on the SME system? Is there a particular social climate in this area? How dynamic is the local environment? What are the characteristics of the labour market and what are the levels of labour mobility? Who are the leaders in the area? How homogeneous is the SME system (family links, class, entrepreneur origins and education)? Is there a local cultural identity?	

C.2.1.3. Morphological map

Question	*Answer*
What are the common trends in competition, in technology and in market evolution? Does an SME association exist? Who supports SMEs and the SME system?	

Table 30. *Section C.2.2, Map of knowledge infrastructures*

Process	*Actors*	*Index of perceived importance (0-5)*
Acquiring Knowledge	• Research centres • University centres • Technology transfer institutions • Cluster and SMEs associations • Professional and technical institutes • Advisory and facilitating agencies • Chamber of Commerce • Consultants • Suppliers • Customers • Technical publishers • Others	