

**The Heisenberg Uncertainty Principle and the Intellectual Property Protection in SMEs**  
[ the MAC-SSIIM Project contribution ]

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**Abstract**

The protection of intangible assets (Intellectual Capital) is an increasingly important issue for Small and Micro or Very Small Enterprises (VSEs). In the business framework of a global economy, networking requires knowledge exchange and this introduces the challenge of securing valuable innovations and knowledge. The different levels of innovation and the market selection process generate potential competitive advantage factors which must be protected for exclusive use.

The smaller size the companies are, the more difficult is for them to evaluate their formal Intellectual Property (IP) options. As the dominant enterprise size is not the Small (SME) but rather the Very Small, the 'problem' increases with the decreasing size of business. Traditional IP consisting of patents, utility models, trademarks, is not consistent with the requirements of VSEs as it is not cost-effective, as most of times, VSEs are not able to make the necessary enforcement of Intellectual property Rights (IPR). The mere act of registering and the will of protecting are not possible at the same time (as with Heisenberg Uncertainty Principle). New IP protection methods are needed.

Within the framework of critical thinking, informal and indirect IP protection methods are presented and discussed. In informal methods as opposed to the procedure in formal methods, the actions taken do not involve registration or a visible action, being as much as imperceptible as possible to 'protection targets'. The indirect methods rely on routine management options, but that take the IP protection issues into account within the different levels of the organization. These methods were evaluated and reviewed under the MAC-SSIIM European Project – and training materials were developed by the partners of the project.

**Keywords:** Intellectual Property; Informal and Indirect IP protection; Intellectual Capital; Innovation; Knowledge Management, SMEs

**Summary**

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# 1. Innovation as part of the Organization DNA

Innovation "is the act of introducing something new".

Innovation is therefore embodied in the life of any organization, as generating new ideas is part of the human activity. The 'new ideas' can be related to with very small things at any level of the organization, or can be part of a planned process.

It is possible to view innovation in many different ways. The 'usual innovation' concerns the development of products or technologies. But innovation can also be developed at the service and the process or organizational level. Two other types of innovation must also be considered: the **incremental innovation and the radical innovation**.

SMEs have a greater focus on incremental innovation (e.g. improvements to products, services and / or process often in **response to customer needs**) than on radical innovation (e.g. new products, services and/or processes and / or new markets). This focus on the existing core market implies a profound understanding of customers' needs and the ability to respond with improved products / services, in other words, incremental innovation. The interesting issue is that the focus on this type of innovation is actually related to an increase in turnover growth (Adgoke, 2003).

Less than 1 in 10 new products and services can really be considered as new to the world (Innovaro, 2003). This means that 90% of new product launches are incremental changes, ranging from repositioning and line extensions to small step improvements: Although the margins are often lower, the higher volumes and reduced risks involved, mean that the paybacks for incrementalism are in fact very important. As such, small step innovation should not be viewed as a second rate ambition but part of a balanced strategy – after all this has been the traditional focus for many successful companies and the vast majority in the service sector.

Many innovations result from the accumulation of small incremental innovations:  $I = \sum i$  that result from the daily activity and can be directed to customers and subject to **market selection** processes or connected with the inside ways of doing things and subject to internal activity selection.

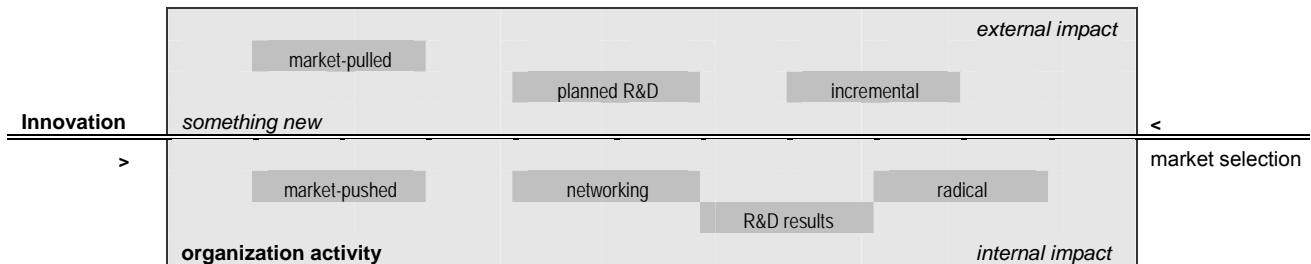


Fig. 1 - Innovation in the framework of the organization activity

Innovation management is not an option but a need for all organizations in a global, intensely competitive, knowledge driven - and subject to uncertainty and rapid changes economic environment. The 'natural' (mostly market driven) selection (nS) will condition the successful innovation (internal or external) being an Evolution factor:  $E = \sum i + nS$  in any organization

Many organizations, both public and private, confuse innovation with research. Research is an organized process for developing targeted innovation and can be part of a systematic management attitude that focuses on a specific innovation line of action.

1 key ideas	<ul style="list-style-type: none"> <li>• innovation is related with persons, it is a 'natural process and occurs in the daily activity</li> <li>• organizations are formed by groups of persons that work together towards a common aim / in the 'same direction'</li> <li>• innovation concerns more than just products or technologies, it also includes services and organizational processes</li> <li>• all organizations are innovative in different levels and in different ways</li> </ul>
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## 2. Innovation as a business driver and a competitive advantage factor

Innovation may result in Competitive Advantage, contributing to sustainability and to differentiation.

Innovation as a process of putting ideas into action for increased performance is widely acknowledged as the key to sustained competitiveness. Innovation can therefore be applied equally to a product, a process or a procedure.

• > If there is indeed innovation in all enterprises regardless of size, activity or location, how can innovation be a business driver and a competitive advantage factor?

The answer is quite simple: some organizations manage innovation and others just let it happen!

Some organizations have an innovation strategy others are managed by market strategies defined by others (competitors). Also many enterprises perceive innovation to be the responsibility of a few employees - elite - and do not regard it as systemic. That is the difference between innovative companies and the others. The difference begins with a company's approach to problem solving and extends through its structure and culture (Kanter, 1985). Innovative companies were found to have a distinct, "integrative" approach to management, while enterprises unlikely to innovate were described as "segmentalist" in being compartmentalised by units or departments.

Innovation management can be part of the management style and culture of the organization – as being part of people's attitude within the organization towards anything new. Therefore the most important is not to have an R&D programme or even formal innovation management tools in practice. Innovation management based organizations:

- operate at the edge of their competence, focusing on exploring the unknown rather than on controlling the known;
- measure themselves by future-focused visions (how far they have to go / can go) rather than by past standards (how far they have come).

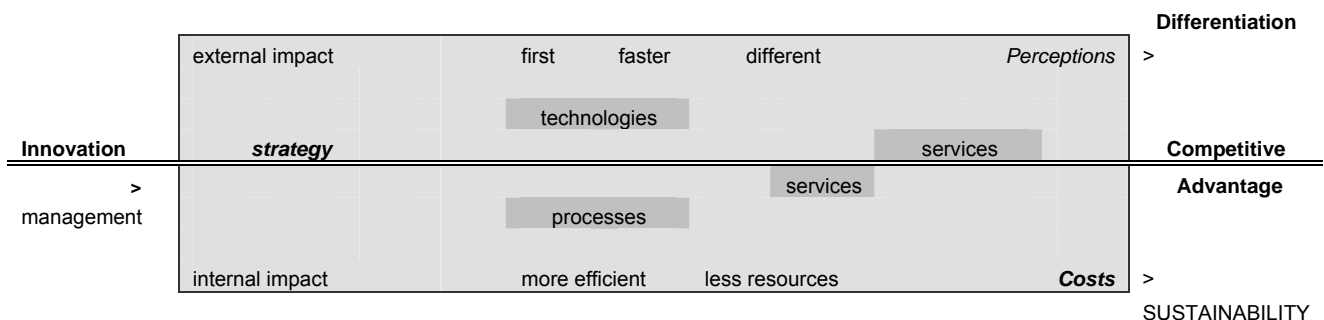


Fig. 2 - Innovation in the framework of the competitive advantage

Innovation is (a potential) source of Competitive Advantage when geared to contribute to Differentiation and Cost management directed to customer satisfaction.

Innovation must be part of the management strategy either in a very organized way or 'just' embedded in the culture of the organization. Innovation must be viewed through a holistic perspective as a 'natural' competence of all members of the staff.

2 key ideas	<ul style="list-style-type: none"> <li>• innovation may contribute to competitive advantage</li> <li>• innovation may contribute to differentiation as distinctive factors may come from the pool of new ideas</li> <li>• innovation may contribute to sustainability as is a 'natural' resource available to all enterprises</li> <li>• innovation is a business driver and a leading force contribution for market performance when strategically managed</li> </ul>
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### 3. Innovation and Networking as sources of Intellectual Capital

All enterprises must be connected to the most prolific sources of new knowledge and expertise, either directly or through multi-layered innovation networks that link the most research-intensive and / or innovative enterprises at regional, national and global levels.

Even more than larger enterprises, SMEs need to access external sources of information, knowledge, *know-how* and technologies in order to build their own innovative capability and to reach their markets.

Appropriate networking strategies, barriers faced by SMEs in seizing networking and partnering opportunities, as well as appropriate responses by government vary greatly depending on the type of enterprises, especially when it comes to their level of innovativeness and innovation mode. A "one-size-fits-all" approach is unwarranted, except for setting out the broad framework conditions (e.g. competition policy) that should allow market-friendly collaboration in the development and diffusion of new technologies.

"A network is here considered as a co-operative and organised set of relations with motivational reasons and management focus (Thrane, 2002) and networking is establishing, maintaining and utilizing a broad network of contacts (e.g., in government, media, and the community) in order to keep a pulse on public, political and internal issues and to make informed decisions. Innovative SMEs have dense external networks involving other enterprises (mainly SMEs) in a variety of relationships and involving R&D infrastructures.

Research Note # 1

For the vast majority of SMEs, creating or reinforcing (mainly non-technological) innovation capacity and promoting their involvement in innovation networks are closely interrelated policy objectives. The early stages of network formation and operation are critical to correct information in order to raise awareness about networking opportunities and benefits, and facilitate the search for partners.

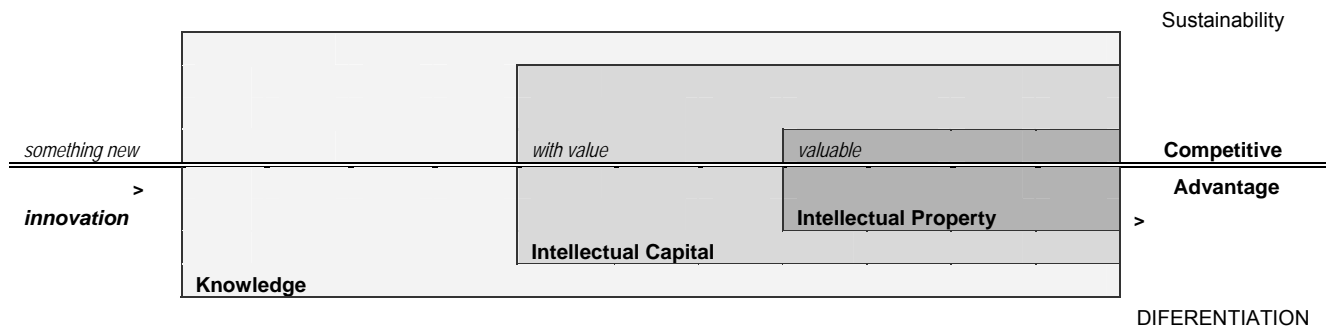


Fig. 3 - Innovation in the framework of Knowledge Management

The penetration of markets with new cross-sectional technologies and shorter product and innovation cycles is putting a strain on innovation. Small and medium-sized enterprises have no alternative but to redefine innovative competition at the management level. Thus, one of the key challenges of future-oriented policy is to eliminate impediments to the growth of innovative companies, to ensure growth-friendly overall conditions, and to support a new generation of "high-tech" entrepreneurs in their decision to set up their own business.

All businesses have network based Intellectual Capital but a few appreciate its value or understand the risks of losing it. There is an alarming lack of awareness of the very basics of Intellectual Capital, the key issues and how these can be managed in a strategic business environment. Intellectual Capital is a critical success factor, not only for knowledge-intensive organizations, but also for most other types of organizations (Lönquist, 2002). Intellectual Capital, as opposed to physical and financial capital, is increasingly regarded as a source of competitive advantage for individuals, enterprises and nations. Hence, in a successful business, all key decision-makers must understand the importance of Intellectual Capital and apply their knowledge in day-to-day operations. Sometimes they refer to it as *know-how* but what they really mean is *Intellectual Capital*.

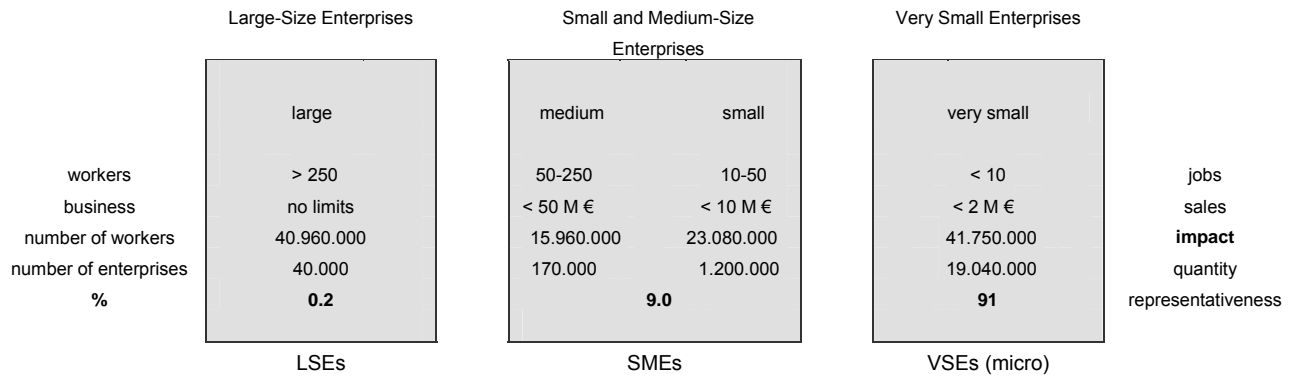
- |                                   |   |
|-----------------------------------|---|
| <p><b>3</b><br/>key<br/>ideas</p> | <ul style="list-style-type: none"> <li>• innovation can be related with all business factors</li> <li>• market selected innovations are a source of Intellectual Capital</li> <li>• business networking is a source of innovation and market opportunities</li> <li>• business networking requires Intellectual Capital protection</li> </ul> |
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#### 4. The European SME framework

The 'European SME' is a wide concept without real distinctive characteristics, even when compared with SMEs from other regions such as USA or Japan. If SMEs designates all but the large companies (LSEs) (which is to say any company with less than 250 workers and a turnover below 50 M€), it is logical and not a surprise that we have more SMEs than LSEs. The most interesting aspect is that within the European framework the average number of workers per company – where the large majority are Very Small Enterprise with an average of 7 workers...

“Regardless of the measure, one result is striking and needs to be emphasized - not only are most enterprises in Europe small, but they also account for a significant amount of European work experience and economic activity. For example, in 2003 there were more than 19 million enterprises in Europe-19, providing a job for almost 140 million people. By contrast, there are only about 40 000 large enterprises in existence, which account for only 0.2 % of all enterprises. So, the vast majority of enterprises in Europe-19 (99.8 %) are SMEs. Within the group of SMEs, the vast majority (over 90 %) are micro enterprises, employing fewer than 10 persons. Approximately half of these micro enterprises have no employees at all, thus only providing employment and income to self employed and family workers; this amounts to roughly 9 million enterprises. On average, a European enterprise provides a job for 7 persons; this measure of enterprise size varies between 3 in micro enterprises and over 1 000 in LSEs. So, the typical European firm is a micro firm.” (in Observatory of European SMEs ; 2003)

Research Note # 2



@ 2003

Fig. 4 - Very small enterprises within the eurobusiness size the framework

The designation of 'micro enterprise' is not 'logical' because 'micro' or  $\mu$  is a size factor used as prefix to a measurement Unit. A company is an entity and not a measuring unit – also micro refer to  $10^{-6}$  of a Unit which is not appropriate relation for an enterprise. Even having as size reference the Large-size companies, they do not have more than 1 million employees. Granted that the world largest multinational company Wal-Mart Stores Inc. reported 1.3 million workers in December 2004 - a singularity in world economy. Following that logic, Wal-Mart would be a Mega company, placed out of the traditional scale and thus being a VLE (Very Large Enterprise) with  $1.3 \times 10^6$  employees, having as multiplier the 1 person company. As the smallest possible size is 1 employee for a company (whatever its time allocation), we could have a micro company if it was (a virtual company) formed by 1 million or more members who would work an infinitesimal part of their time for the company...

As "micro enterprise" is not an appropriate designation it is suggested the use of VSE – Very Small Enterprise, under the logics of SME – Small and Medium-size Enterprises. This seems to be a suggestive terminology because Very Small is easily understood as near the minimum size which is the one employee enterprise. It is also proposed that social economists establish four size levels for companies so that they can be studied and compared: VLEs (Very Large Enterprises), MSEs (Medium Size Enterprises), SSEs (Small Size Enterprises) and VSE (Very Small Enterprises) – and when ever necessary the intermediate size companies (SSE+MSE) can be fused in SMEs (Small and Medium-seized Enterprises).

4 key ideas	<ul style="list-style-type: none"> <li>• all business are involved in networks, from suppliers, to staff and to customers</li> <li>• SMEs represent the dominant size in Europe's business networks (&lt; 250 persons and &lt; 50 M Euro)</li> <li>• micro Enterprises are the dominant size within the SME group with more than 90% of the companies in Europe</li> <li>• micro Enterprises are <b>Very Small Enterprises</b> (&lt; 10 persons and &lt; 2 M Euro) and create 1 in every 2 jobs</li> </ul>
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## 5. Innovation and Intellectual Capital in VSEs

Innovation is part of the activity of VSEs as it is of all organizations.

Very small organizations as VSEs with a very small number of workers, traditionally lower than 10, also have a reduced financial capacity and a low turnover per person. Their survival relies in their capacity in terms of skills and knowledge - of a limited number of persons. **In this kind of organizations 'Capital' is mostly 'Intellectual Capital'...**

A usual paradox of scale and scope faced by organisations wishing to achieve higher level innovation is one of size. There is a frequent belief that other companies find it easier to achieve breakthrough innovations than yours:

- Large companies often believe that innovation is more likely to occur and be successful in smaller enterprises that are more flexible, quicker to adapt and less burdened with legal systems and product ranges.
- Smaller companies claim that innovation is more difficult to achieve than it is for larger competitors with greater access to wider resources as they , probably have more market power and often have a wider range of capabilities to draw on.

Both views are limited: Yes, organisational size can be an issue in achieving high level innovation, but it needs not be a barrier. Equally, while many small companies are solely focused on maintaining a positive cash flow, others are, in their own ways delivering significant innovation into their markets. Big innovation is an ambition that should be put into context but also one that, alongside incremental innovation, should play a part in every new product strategy. It is also an ambition that is just as realistic for a host of different organisations: Although the challenges and barriers may vary, innovation can be successfully delivered, whether big or small.

Innovation activities in SMEs have also been of interest to academics. However, studies on innovation management in SMEs are scarce compared with similar studies on large enterprises. Namely, studies regarding types of innovation pursued by SMEs have largely been ignored in the literature. The situation in VSEs is even poor. Perhaps this is due to the argument that because of their nature, SMEs are able to undertake radical innovation more easily than large enterprises and those SMEs exist because of their ability to deliver radical innovations.

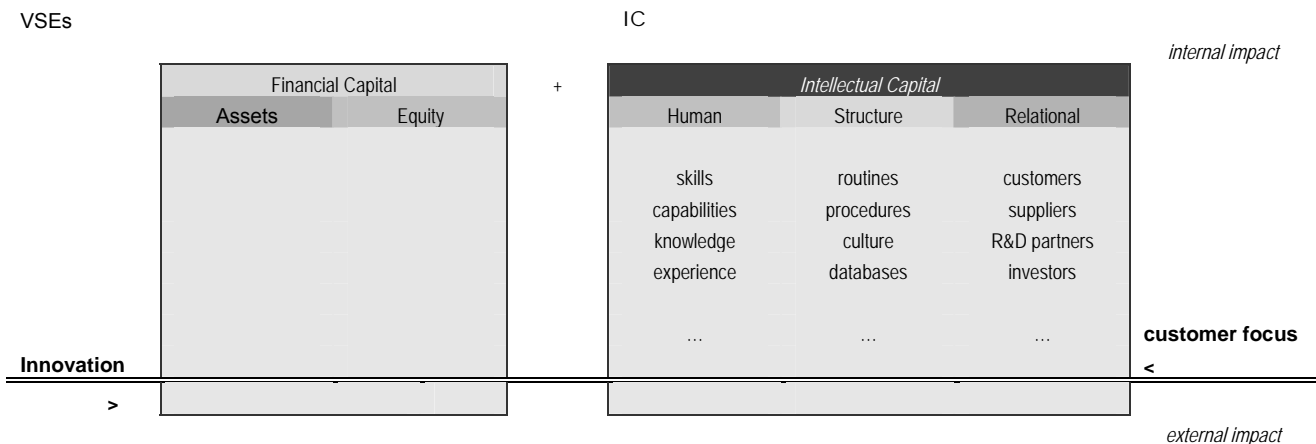


Fig. 5 - Innovation in the framework of the Intellectual Capital

Innovation in VSEs is not an option but a matter of survival. When a VSE loses the **innovative attitude** it loses the leading source of Intellectual Capital and the resulting competitive advantage. As VSEs are the 'dominant species' in Europe their weaknesses and strengths must have a high impact in the economy. As they employ more persons and as since innovation is related with results persons from persons, they must be a large pool of innovative resources and opportunities.

5 key ideas	<ul style="list-style-type: none"> <li>• VSEs as all organizations are also innovators</li> <li>• VSEs have mostly very small innovations or sometimes breakthrough ideas</li> <li>• very small innovations are difficult to protect and breakthrough ideas are difficult to enforce</li> <li>• globally there is a limited scope of 'traditional' Intellectual Property in VSEs</li> </ul>
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## 6. The Intellectual Property in VSEs

Intellectual Property allows people and organizations to own their creativity and innovation as they can own physical property.

The owner of IP can control and be rewarded for its use, and, in the case of patents and some other forms of IP, knowledge is made publicly available rather than kept as a trade secret, encouraging further innovation and creativity to the benefit of all. Material covered by IPRs is usually the result of a creative skill and / or significant labour and/or investment, and without protection, it would often be very easy to exploit material without paying the creator. It will often not be possible to protect IP and gain IPRs unless applied for and granted but some IP protection, such as copyright, arises automatically without any registration, as soon as there is a record of what has been created in whatever form.

New products, brands and designs appear regularly on the market and are the result of substantial financial investments. Protecting your Intellectual Property can allow to fully capture the return on the investment, and prevent others from benefiting from your hard work. IPRs can also provide a vehicle for exploiting IP assets in a variety of ways, sometimes by outright sale or assignment, but also through licensing agreements and as a bargaining tool when negotiating with other companies. Furthermore, capital for development can be raised by using IPRs as security. Even companies that choose not to do anything about their own IP interests still need to be aware of the rights of others to avoid infringement and expensive litigation. The use of IPRs can include searching IPR records for business or research partners or employees, avoiding or licensing-in other existing IPRs, and checking competitor's activity.

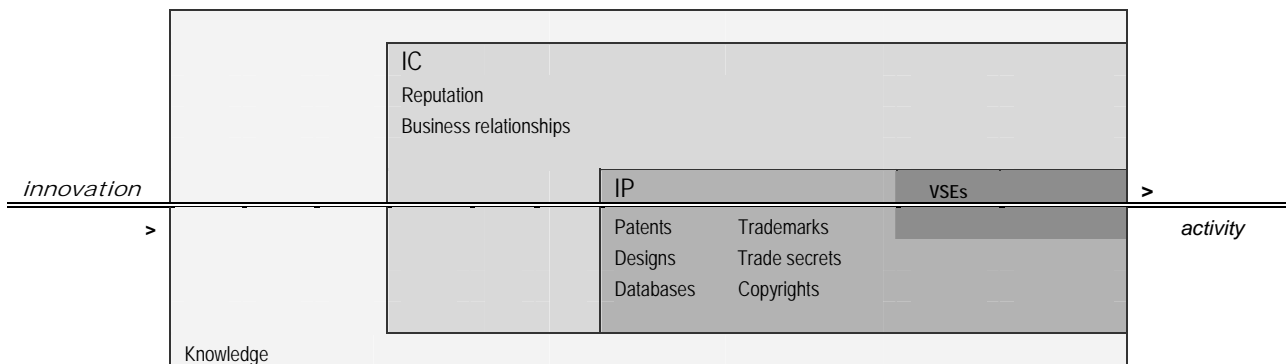


Fig. 6 - Innovation in the framework of the Intellectual Property in VSEs

In order to manage Intellectual Property, enterprises must first identify and prioritise it. Valuable Intellectual Property must be recognised so that it can be protected. It is common in larger organisations to have “invention disclosure forms” or similar conducts of information for researchers to bring their innovations to the attention of management. However this is done, it is crucial for management to determine the “fit” with the marketplace within which the business operates as an indicator of the value of the IP. What the business then decides to do with this IP will depend on the type of market in which the business operates and the nature of the IP.

IPR strategies adopted by VSEs are different from those of larger enterprises. Patent applications are not only expensive to formulate and file but also costly to maintain, with the fee increasing over the years. The rising tide of globalization has forced VSEs to market abroad but this also means higher costs for patent protection in new markets. In general, large enterprises are prepared to file patents on most inventions both as a protective means for product and market dominance as well as for potential cross-licensing with their competitors. However, many VSEs do not engage in Intellectual Property development due to a lack of awareness, financial and manpower resources, and public bureaucracy.

<b>6</b> key ideas	<ul style="list-style-type: none"> <li>• VSEs have trouble in defining and recognizing IP</li> <li>• VSEs are overwhelmed by complexity and costs when faced with formal IP</li> <li>• VSEs face enforcement inefficiency and cost effectiveness</li> <li>• VSEs need alternative models for IP</li> </ul>
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## 7. The Heisenberg Uncertainty Principle

In a global, knowledge-based economy, rapid innovation cannot be sustained without effective protection of intellectual and Industrial Property rights. The process of globalization, the rapid scientific and technological advancements, the newer developments and applications of information technology, the emergence of knowledge-based and capital intensive industries, the stricter quality standards and systems including ISO 9000 and ISO 14000, the environment and pollution control and energy considerations, the direct and indirect trade barriers by advanced countries are eroding the traditional competitive advantages.

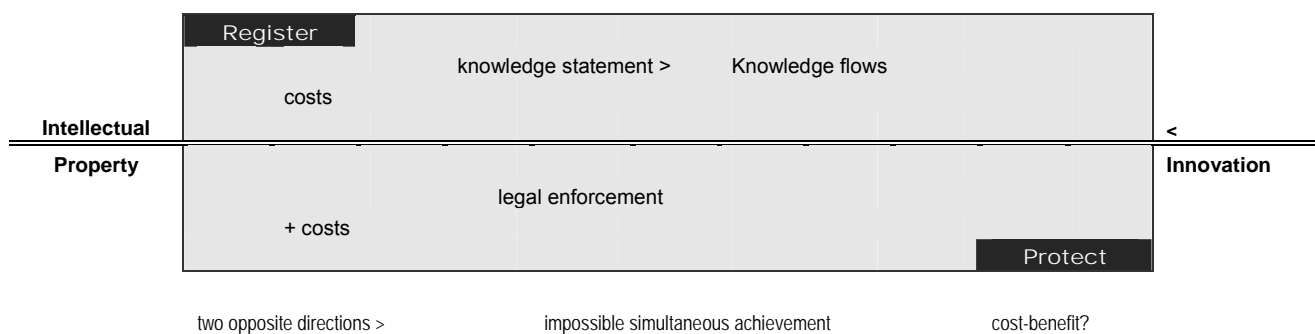


Fig. 7 - Innovation within the framework of the Intellectual Property

Moving towards a knowledge-based economy, effective technology management increasingly requires an effective management of your Intellectual Property (IP). In its broadest form the term encompasses “know-how”, confidential information, copyright material, design work and your trade marks, but for most technology based enterprises the key player is patents. Patents create an incentive to innovate, by allowing enterprises to recoup the costs of research and development. At the same time, by making details of the protected technologies public, patents speed the dissemination of new knowledge, enabling others to build upon state of the art input. However, patents can only accomplish this, should the costs of securing and defending patent rights be affordable.

**Werner Heisenberg** (1901 – 1976) was one of the greatest physicists of the twentieth century. He is best known as a founder of quantum mechanics, the new physics of the atomic world, and especially for the uncertainty principle in quantum theory. He first presented the Heisenberg Uncertainty Principle in February 1927 in a letter to Wolfgang Pauli, and then published it later that year. He is also known for his controversial role as a leader of Germany’s nuclear fission research during World War II. After the war he was active in elementary particle physics and West German science policy.

Research Note # 3

The Heisenberg Uncertainty Principle states that “it is not possible the simultaneous accurate measurement of variables such as the position and the momentum of a particle”. Simply put, Heisenberg’s Uncertainty Principle states that it is impossible to know both the exact position and the exact velocity of an object at the same time. Heisenberg realised that the uncertainty relations had profound implications. First, if we accept Heisenberg’s argument that every concept has a meaning only in terms of the experiments used to measure it, we must agree that things that cannot be measured really have no meaning in physics.

As with Heisenberg Uncertainty Principle, IP management is faced with the fact that it is not possible, in a global economy, at the same time to Register (involving knowledge diffusion) and to Protect (involving legal enforcement). These objectives evolve in different directions, as somewhere, someone can have access to registered knowledge and use it without the owner awareness ever.

7 key ideas	<ul style="list-style-type: none"> <li>• business sustainability requires business networking and knowledge flows</li> <li>• knowledge flows require protective actions</li> <li>• in global economy the registration of formal protection implies global diffusion of knowledge ( &gt; unprotected knowledge)</li> <li>• in a global economy it is impossible at the same time register and protect</li> </ul>
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## 8. Alternative methods for Intellectual Property protection

In knowledge-driven economies, IP protection and management become highly important elements for business success.

Ignoring the Intellectual Property inherent to any business opens up the possibility of competitors to take advantage of technical innovations, business ideas, goodwill and reputation in the market. If you have not taken steps to protect your company's Intellectual Property, you may lose the opportunity to forge business alliances. Negotiating strategies may be weakened, the possibility of arranging profitable licensing deals may be considerably reduced and your ability to obtain capital or investment finance may be eroded.

Know-how is one example of intangible assets. Around 70 per cent of business assets today are intangibles (ProACT Programme, 2005). The term know-how is used to broadly describe practice knowledge acquired through experience, and includes industrial information and data, including confidential information and trade secrets. Know-how encompasses useful information such as 'know-who' and 'know-where'. Know-how includes *formulae*, techniques, business and marketing plans intended for internal use, and all other Intellectual Property not protected in other ways that is particular and essential to the operation of the business. Unlike some other forms of IPR, there are no formal application or registration procedures for protecting know-how.

Know-how is therefore protected by keeping it secret, restricting access to it and only allowing disclosures to parties who formally agree to be bound by the strict terms of a confidentiality agreement. Trade secret protection is possible only if a company can put its product before the public and still keep the underlying technology secret. If an expert can understand and learn what an invention is by analysing the product, then a trade secret will not be the appropriate protection mode. Usually only *formulae* can be protected as trade secrets after the products are on the market. In some industries, particularly where innovation is embedded in processes, trade secrets may be a viable alternative to patents. However, if your invention is capable of being reverse engineered (finding out how an invention works by taking it apart), it should be protected by a patent.

Know-how can be broadly protected and can last indefinitely. However, if the know-how is discovered independently by someone else, the other person cannot be prohibited from using it, licensing it to others and possibly gaining IPR protection and preventing others from using it. Therefore, the decision to protect Intellectual Property as know-how, rather than seeking other IPR protection, should be carefully considered and evaluated in the framework of alternative IP protection methods.

	<b>Formal</b>		<b>Informal</b>	
options >	clear and visible action	indirect action	no visible action	< approach
<b>conventional</b>	<b>Direct</b>	<b>Indirect methods</b>	<b>Informal methods</b>	>
>	patents utility models design rights trademarks  copyrights	non-disclosure Agreements pre-know-how in Agreements Information Management knowledge related codification quality management systems counter information for targets material transfer agreement	doing nothing !!!  choice of collaborators segment suppliers information management Communities of Practice judicious usage of IP	<b>alternative</b>

Fig. 8 - Innovation within the framework of the alternative methods of Intellectual Property protection

SMEs rely heavily on their own internal resources for their innovation to the neglect of external resources; Formal protection methods give SMEs no help in innovating, but this does not mean that SMEs do not innovate. SMEs must innovate to survive, but it is not the kind of innovation, however, for which the traditional patent system was originally developed. The SME operates in a different world from that of the LE and needs its own kind of help.

The formal methods are seen as irrelevant by many SMEs which typically rely on informal practises (Macdonald, 1998). Informal methods are successful, cheaper and within the control of the company. A new approach is needed to protect both Intellectual Property and Intellectual Capital in SMEs. This is even more important for VSEs in any area of activity, as the Formal protection methods are not compatible with their level of IP and with their resources available for investment in protection. Protection must be part of the management process.

## INFORMAL METHODS

•> Informal methods rely on activities which have no framework, such as thinking, being aware (but doing nothing in a formal way). These methods rely on a non visible set of attitudes, more than actions that somehow contribute to Intellectual Property protection through management strategies. Any action that can be *perceived* as Intellectual Property protection becomes a formal or indirect methods of protection and might turn to un-protection. Informal means no direct action.

Some examples of informal methods can be described as follows:

- **Doing nothing !** Paradoxically this is by far the most effective informal methods for the protection of Intellectual Property. Once something is done the parts involved become aware of the potential value of knowledge (Intellectual Property). In this context, doing nothing means no visible action and essentially be attentive, take the issue to the strategic thinking level.
- **Being careful when choosing key staff members.** Innovation is all about people, and so is knowledge management. Therefore, a proper knowledge management strategy should take into account that Intellectual Property protection must be based in a very criteria selection of staff members in key knowledge related positions. This selection is very difficult and has to do with selecting people with character and ethical principles.
- **The segmentation or fragmentation of suppliers** is a simple method for some protection. A relevant part of a business competitive advantage can be (when relating with cost management, for instance) at the supplier level. The knowledge about who are suppliers and the specifications required may disclose important knowledge when concentrated in a small number – and more important than number is the critical information provided to each of them.
- **Monitor information management in the Corporative Management processes.** This is one of the more commonly used ways to protect knowledge in an almost informal way. The concept is the quantitative and qualitative evaluation of information flows within the organization.
- **Judicious usage of IP is the Intellectual Property management under the Intellectual Capital framework.** The idea at this level is to establish the corporate culture a concern on IP management.

## INDIRECT METHODS

•> **Indirect methods** consist of actions which apparently are not directly related with IP. These actions are related with routine management actions which additionally include an IP component which might or not be understood by the targets as a protection action. This is to say that indirect methods are part of the best practices in management.

There is a wide range of indirect methods that can be used and that changes from sector to sector, some examples are as follows:

- confidentiality agreements with employees, establishing codes of conduct and exclusivity contracts when appropriate; codification of critical information; division of knowledge- related information by unrelated topics and by different individuals; implement quality management systems segmenting knowledge areas.
- **Non-disclosure Agreement (NDAs) or Confidentiality Agreement (CAs)** is a contract in which the parties promise to protect the confidentiality of secret information that is disclosed during employment or another type of business transaction.

- **Pre-existing know-how** in a Consortium Agreements may be the description of know-how useful for the project to be developed, although not essential.
- **Communities of Practice (CoP)** are groups of people bound by informal relationships that share similar work roles and a common context. The CoP play a critical role: they are the major building blocks in creating, sharing and applying organizational knowledge (Lesser, 1999).
- **Information Management** describes the measures required for the effective collection, storage, access, use and disposal of information to support agency business processes. The core of these measures is the management of the definition, ownership, sensitivity, quality and accessibility of information. These measures are addressed at the appropriate stages in the strategic planning lifecycle and applied at the appropriate stages in the operational lifecycle of the information itself.
- In some companies, the strategy centers in the use of **Knowledge related Information Codification**. Knowledge is carefully codified and stored in databases, in order to be only comprehensible by the inside users. This is especially important when related with customer lists or product production procedures.
- The use of **Quality Management Systems** (such as the ISO 9001 framework or others) will involve a process-based management and specific working instructions and procedures can be created to prevent unwanted knowledge diffusion.
- Use **counter information for your targets** in order to systemically disseminate information reflecting the views and interests for the purpose of promoting some cause. Introduce interpretative information in the diffusion of materials
- **Material Transfer Agreement (MTAs)** defines the terms under which research materials are exchanged between investigators and institutions and are to be used in research

The SMEs worldwide under-utilize the IP system, with many enterprises opting for “informal” methods of protection, that are frequently considered as effective as more formal rights. But most of the times they are not aware of large range of possibilities and tools, neither the ways how to use them.

Informal and Indirect methods must be used under a management strategy perspective. This is to say used in a combined way and accordingly with any specific circumstances. Knowledge protection methods do not exclude each other. Different approaches might be most appropriate for different targets.

A concept review in informal and indirect methods was presented – the aim was to show the alternatives exist to formal IP methods. **How to** use informal and indirect IP methods in VSEs or even in SMEs is another topic...

8 key ideas	<ul style="list-style-type: none"> <li>• VSEs need Intellectual Capital management and IP management strategies</li> <li>• VSEs need a cost benefit evidence in the process because of short term objectives (when compared)</li> <li>• VSEs must combine informal and indirect Intellectual Property protection methods</li> <li>• VSEs can use the 'traditional' formal protection methods when appropriate</li> </ul>
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## 9. The MAC-SSIIM Contribution

The overall aim of the MAC-SSIIM project is to make a contribution to the development of knowledge-based economy in Europe by assisting SME managers and other decision-makers in building a fertile environment for knowledge-based entrepreneurship and new business formation.

Supported by the European Programme Leonardo da Vinci, MAC-SSIIM offers a real pan-European network of resources focused on I-IP Management: Informal Intellectual Property Management. MAC stands for Multi Actors Cooperation and also includes: SMEs, bigger companies, Individuals, Universities, Training Centres, Research Centres, Professional bodies, Public and social development representatives, trade-unions, Relay Centres. SSIIM stands for Sustainable SMEs through Informal Intellectual Property Management training.

	INTRO	KNOWLEDGE MANAGEMENT	BUSINESS NETWORKING	INNOVATION MANAGEMENT	LEARNING ORGANIZATION	IP MANAGEMENT	
how to ?							<
>		Sources of IC	Networking intro	Innovation	Management of change	Formal IP	training
		IC and Networks	Management of alliances	Innovation & networks	SME learning organizations	Informal IP	
		K management				SME IP protection	
						IPM in networks	

Fig. 9 - Innovation within the framework of the organization activity

The MAC-SSIIM (Multi Actors Cooperation for Sustainable SMEs through Informal Intellectual Property Management training) provides a set of IPR informal management tools in the form of training material. These tools have been developed for use by small and very small businesses and focus on indirect and informal methods.

Outputs of the project are in 5 languages: 1 CD-ROM with Training Materials (10 modules in PDF) + Slides + pedagogical guides for the Training modules and the 5 Key Themes; 1 DVD on Companies interviews and case studies; 1 DVD on Key Themes based on the Companies interviews and case studies.

MAC-SSIIM has been set up by wider Networks such as MAC-Team. Both networks are built on a model of Networks of Networks.

9 key ideas	<ul style="list-style-type: none"> <li>• the MAC-SSIIM Project contributes to raise awareness of the significance of IP management</li> <li>• MAC-SSIIM contributes to a proactive IP management training tool for SME and network development</li> <li>• the MAC-SSIIM contributes to enable learning through case examples of good practices in IP management</li> <li>• the MAC-SSIIM contributes to disseminate good practices in the management of Intellectual Property</li> </ul>
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## 0. Conclusions

Innovation management is a natural process in all organizations, being a driver of human evolution – and there is a wide range of innovation levels that impact in the activity of organizations. Even in protected or planned economies the market is the ultimate selection factor of innovation – either at the activity level (related with internal processes) or in the competitive arena (external processes).

Most organizations have are not aware that innovation is the chief driver of their activity and ever present in all their functions whether they realize it or not. Innovation is in the DNA of all human organizations even if their management is not a formal or direct process. Innovation must, therefore, have a significant impact in their competitive advantage – as it is part of their Intellectual Capital (IC).

When innovation is recognized as a strategic issue, one of the questions within the framework of innovation management is innovation protection. This happens when companies start to play in a global environment and establish networking relationships with customers, suppliers and other relevant parts of the business. That brings in the concept of Intellectual Property Rights (IPR) and the possible ways of that protection. If innovation is an advantage, 'how to' prevent others from benefiting from that is the first concern.

Large organizations, mostly large companies, have a clear focus in innovation strategies and moreover in knowledge management as an asset to their business. The smaller their size, in any business area, to the more evident becomes the lack of a formal attitude and involvement in formal innovation management and related Intellectual Property. This happens because the smaller the companies are, the stronger is their notion of the need to focus on cash-flows. Strategic issues are not usually in the agenda of small business, either because of unawareness or because of different priority levels.

Small and Medium Enterprises (SMEs) are the majority of business and the largest employer in Europe. However SMEs in most countries are not SMEs but more accurately **Very Small Enterprises (VSEs)** or micro-companies. When such companies are faced with the need to protect innovation they are overwhelmed by the complexity, cost and time required by formal IPR options (patents, design rights, trademarks, copyrights). At the same time, they realize the ineffectiveness of the proposed tools as most of the time VSEs are not able to enforce IPR in a global market.

There is no doubt that small and medium-sized enterprises are the most dynamic component in economic development, because of their internal flexibility, their adaptability to market change, and their ability to work at a high technological level. In a global economy there is also a global knowledge diffusion process and any formal protection of IP there is an underlying informal process of knowledge diffusion. As with the Heisenberg Uncertainty Principle: "it is not possible the simultaneous accurate measurement of observables such as position and momentum of a particle" – it is not possible, in a global economy, to preserve at the same time IPR and use formal methods, without enforcement capacity.

New management strategies are needed for Intellectual Property (IP) and Intellectual Capital (IC) protection for SMEs and VSEs, which call for indirect and informal methods as alternative options.

•> **Indirect methods** consist of actions such as: confidentiality agreements with employees, establish codes of conduct and exclusivity contracts when appropriate; codification of critical information; division of knowledge related information by unrelated topics and by different persons; implement quality management systems segmenting knowledge areas; introduce interpretative information in the diffusion of materials.

•> **Informal methods** consist of actions which have no framework, such as thinking, being aware (but doing nothing in a formal way); have a trust-based selection of employees which will deal with sensitive information; carefully manage the communication and marketing activities; monitor and pay attention to the knowledge flows using the information technologies.

Intellectual Property in SMEs (and VSEs) must be managed (indirect and informal methods) rather than just protected through traditional (formal) methods, and the smaller the companies are, the increasingly important is this alternative approach, as a result of the contradiction between registration and protection as with the Heisenberg Uncertainty Principle.

## Glossary

IP

**Intellectual Property (IP)** shall include the rights relating to: literary, artistic and scientific works, performances by performing artists, phonograms, and broadcasts, inventions in all fields of human endeavour, scientific discoveries, industrial designs, trademarks, service marks, and commercial names and designations, protection against unfair competition, and all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields (Convention establishing the World Intellectual Property Organization, Stockholm, July 14, 1967). Creative ideas and expressions that have commercial value and receive legal protection in the form of a property right. Intellectual Property rights (IPRs) are Specific forms of Intellectual Property, namely patents, copyright, trademarks, registered design, unregistered design right and know-how.

**Patent** is an IPR for inventions such as new and improved products and processes liable of industrial application. The patent gives the inventor and/or the applicant the right, for a given period, to prevent others from making, using or selling an invention without the owner's consent. Regarding patents, one of the subjects protected by industrial property, they are titles that: 1 give to the proprietor the exclusive right to manufacture, market or exploit for gain the invention claimed in the patent; 2 exclude others from the use of an invention without the consent of the proprietor (usually classified as a negative right), for 20 years from the date of the filing; 3 prohibit the import of protected products from countries in which the invention is not patented.

**Copyright** is an IPR for protecting material such as literary and artistic material, music, films, sound recordings and broadcasts, including software with a technical effect and multimedia.

IC

**Intellectual Capital (IC)** is any creation which emerges from the human mind. It is capital because it can be created, transferred and also can be used/reused and most importantly it is a product of the human intellect. Intellectual Capital Management focuses on building and governing intellectual assets from the overall perspective of strategic and enterprise governance, with some focus on tactics. Its function is to renew and maximise the value of the enterprise's intellectual assets.

**Human capital** is defined as the knowledge that employees take with them when they leave the firm. It includes the knowledge, skills, experiences and abilities of people. Some of this knowledge is unique to the individual, some may be generic. Everything in this category exists within the skills, experience and ability of your employees. Creativity, innovation and forward thinking drives a company forward and allows it to compete in an environment that is constantly becoming more complex and idea-dependant. Human capital is hard to measure, but is usually viewed in terms such as turnover and employee satisfaction. Examples are innovation capacity, creativity, know-how and previous experience, teamwork capacity, employee flexibility, tolerance for ambiguity, motivation, satisfaction, learning capacity, loyalty, formal training and education.

**Relational capital** is defined as all resources linked to the external relationships of the firm, with customers, suppliers or R&D partners. It comprises that part of Human and Structural Capital involved with the company's relations with stakeholders (investors, creditors, customers, suppliers, etc.), plus the perceptions that they hold on the company. Putting an emphasis on the customer can be extended to any outside party that creates value for a company. This is especially true for the emerging government contractors whose primary assets may be key relationships with contracting officers and teams at government agencies. Some organizations have been keeping tabs on this information as it relates to its revenue base. Many are now recognizing the relationship between customer loyalty and increased profits. Examples of this category are image, customer's loyalty, customer satisfaction, links with suppliers, commercial power, negotiating capacity with financial entities, environmental activities, etc.

**Structural capital** is defined as the knowledge that stays within the firm at the end of the working day. It comprises the organizational routines, procedures, systems, cultures, databases, etc. This category only includes things owned by the company, such as patents, trademarks, copyrights, formulas and databases. Converting human capital into organizational capital is difficult and means collecting and retaining employee ability so that it becomes the property of the company. Examples are organizational flexibility, a documentation management service, the existence of a knowledge centre, the general use of Information Technologies, organizational learning capacity, etc. Some of them may be legally protected and become Intellectual Property Rights, legally owned by the firm under separate title.

KM

**Knowledge Management** is the name of a concept applied to an enterprise that consciously and comprehensively gathers, organizes, shares, and analyses its internal knowledge in terms of resources, documents, and people skills. Knowledge Management has tactical and operational perspectives. KM is thus more detailed, and focuses on facilitating and managing knowledge-related activities, -such as the creation, capture, transformation, and use of knowledge. Its function is to plan, implement, operate, and monitor all knowledge-related activities and programs that are required for effective Intellectual Capital management.

**Know-how** can be considered as Industrial information and data, including trade secrets. Also includes useful information, such as 'know-where' and 'know-who'.

**Licence** is a contractual agreement giving written permission to another party to use an IPR. Cross-licensing is an agreement between two companies that grants each the right to practise the other's IPR. Licensing-in is agreeing a licence with an external IPR owner to obtain key products or technologies. Licensing-out is licensing your IPR to another company or individual in return for royalties or other considerations.

SME

**Large size enterprise (LSE)** employs more than 250 persons and has either an annual turnover over EUR 50 million, or an annual balance-sheet total over EUR 43 million.

**Medium size enterprise (MSE)** employs fewer than 250 persons and has either an annual turnover not exceeding EUR 50 million, or an annual balance-sheet total not exceeding EUR 43 million (Recommendation 2003/361/EC, European Commission, 6 May 2003).

**Small-medium enterprise (SME)** employs fewer than 50 persons and has either an annual turnover not exceeding EUR 10 million, or an annual balance-sheet total not exceeding EUR 10 million (Recommendation 2003/361/EC, European Commission, 6 May 2003).

**Very Small Enterprise (VSE) or Micro Enterprise** employs fewer than 10 persons and has either an annual turnover not exceeding EUR 2 million, or an annual balance-sheet total not exceeding EUR 2 million (Recommendation 2003/361/EC, European Commission, 6 May 2003).

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**General Remark:** All formulae or references to scientific principle are used in qualitative or illustrative purposes.

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