

Intellectual property protection in service sector

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1 Introduction

Intellectual property (IP) protection plays a key role in the innovation system and economic development. Service innovations, despite of their economic importance, cannot be effectively protected intellectual property rights (IPR) and there is a clear need to develop the thinking on intellectual property protection and management in service innovation context. Former studies on the use of methods to protect ‘intellectual capital’ among knowledge-based services have mainly focused on legal procedures, such as patents, trademarks and copyrights. However, the formal IPR system has mainly been developed to cater the needs of industrial manufacturing of physical goods.

There are significant differences between the traditional technology based innovations and service innovations. Where technological innovations typically are based on tangible products and processes that utilize complex technologies, many service innovations include intangible elements, interaction and gradual improvements of existing processes. Thus, IP protection is highly relevant, since imitation and copying of service ‘products’ may happen almost instantly once the new service has been launched on the markets. It is clear, that formal IPR covers only some elements of such multidimensional service innovation. As a result, innovative service businesses seek to apply a range of options to manage and protect their intellectual property.

This manual is intended as a intellectual property protection guide for innovative service businesses who seek to apply a range of options to manage and protect their intellectual property. This manual provides basic information in a compact format on various methods of protecting knowledge in business operations. First, the manual presents the traditional formal protection methods (industrial property rights and copyright). Besides to these methods, the manual provides an overview of the most common contract types related to knowledge protection. However, the protection capacity of formal protection methods and contracts largely depends on the resources and knowledge available. Therefore, the last section concentrates on informal protection methods. These methods and operating models can be used to support formal protection methods or instead of them. Especially important these methods are for service industries.

The section discussing the informal protection methods is based on the results of a study that was conducted in Finland and the UK. The manual illustrates the various protection methods that companies are using in practise. The examples are base on a telephone survey of 300 Finnish and UK knowledge intensive business service (KIBS) businesses in three dynamic industries (software consultancy and supply, business and management consultancy activities and advertising). The UK is one of the pioneers in the field of protection and thus selected to this study sample. The telephone survey elicits quantitative data on the innovation activity, internal and external intellectual property protection and on problems, which KIBS business managers face particularly in networks. The cross-country comparison enables more nuanced understandings in IP protection practices in Finland and the UK. Appendix 1 illustrates some basic descriptive indicators of the survey sample.

It should be noted that the various protection methods are not mutually exclusive or even competing with each other; rather they are supporting one another in a number of different ways. In most of the cases informal and formal protection methods complement each other and thus together provide effective means to protect and manage IP. Further on, it is important to bear in mind that there is no optimal combination of protection methods. Instead, the use of protection methods depends on the situation of company at any given moment. The need and usage of protection methods vary in line with changes in the company's operating environment, business activity forms and processes. This manual provides information on useful protection and operational methods commonly used in companies for the protection of intellectual capital. Especially important is the new knowledge on informal protection methods. This new knowledge covers a much broader range of issues than the traditional IPR related approach and can help the companies to protect their IP even better.

2 Managing and protecting intellectual property (IP)

2.1 The concept of intellectual property

Intellectual property (IP) comprises the knowledge, skills and other intangible assets which business can convert into usable resources to generate a competitive advantage (Teece, 2000). Therefore, it has a significant role in firms' innovation processes and competitive strategies. Intellectual property is also essential to the firms' survival and prosperity. IP can be embedded for instance in individuals, products, systems, routines or services and it can take various forms (Figure 1; see e.g. Meritum Project, 2002).

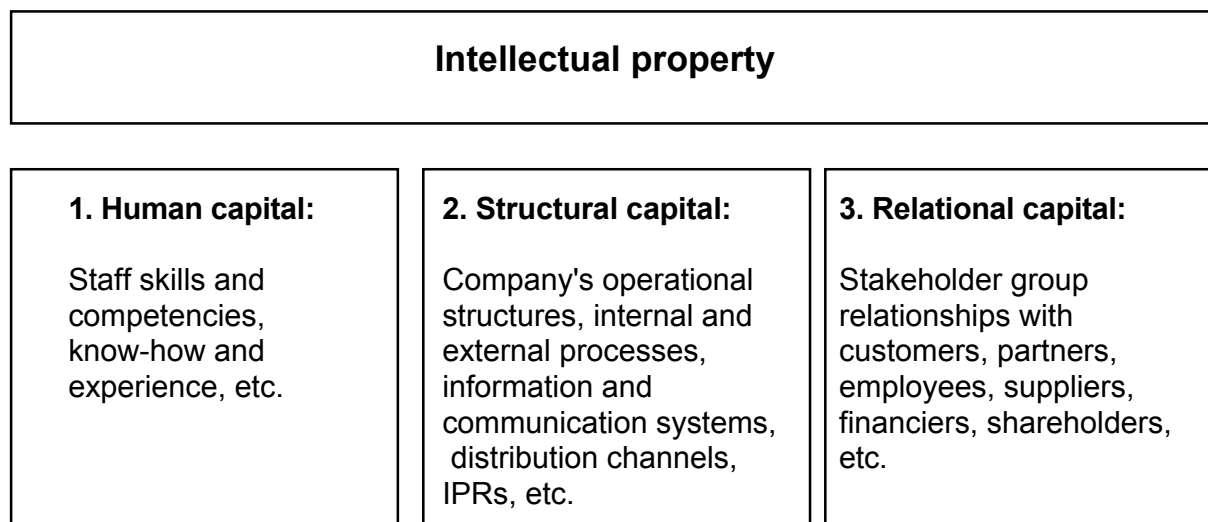


Figure 1. Intellectual property

The primary asset of the KIBS (Knowledge Intensive Business Service) businesses is mainly knowledge and human capital (Toivonen, 2001), but in some cases intellectual property takes also physical forms. Still, service firms' production processes are often wholly dependent on the employees' knowledge and skills, and physical capital and materials are not in the significant role. In many fields employees are considered the most valuable asset of the company (Kuusisto, Päälyysaho and Kulmala, 2005), after all much of the knowledge lies with the key employees. This is problematic especially in small companies where the key employee is often the sole expert in his/her own narrow field. Thus, the departure of a key person may cause a sudden loss of intellectual property and even necessitate shutting off the entire company.

2.2 The protection of intellectual property

Companies specialise and distinguish themselves from others in the market with the help of knowledge and know-how. The intangible nature of intellectual capital, however, complicates the issues of knowledge protection and management in innovative service firms. In consequence, often KIBS industries have adopted a variety of different ways to minimise the inappropriate use or loss of their IP. The Figure 2 gives the overview of the different types of knowledge protection methods. The protection methods are divided into three categories based on their level of legal formality.

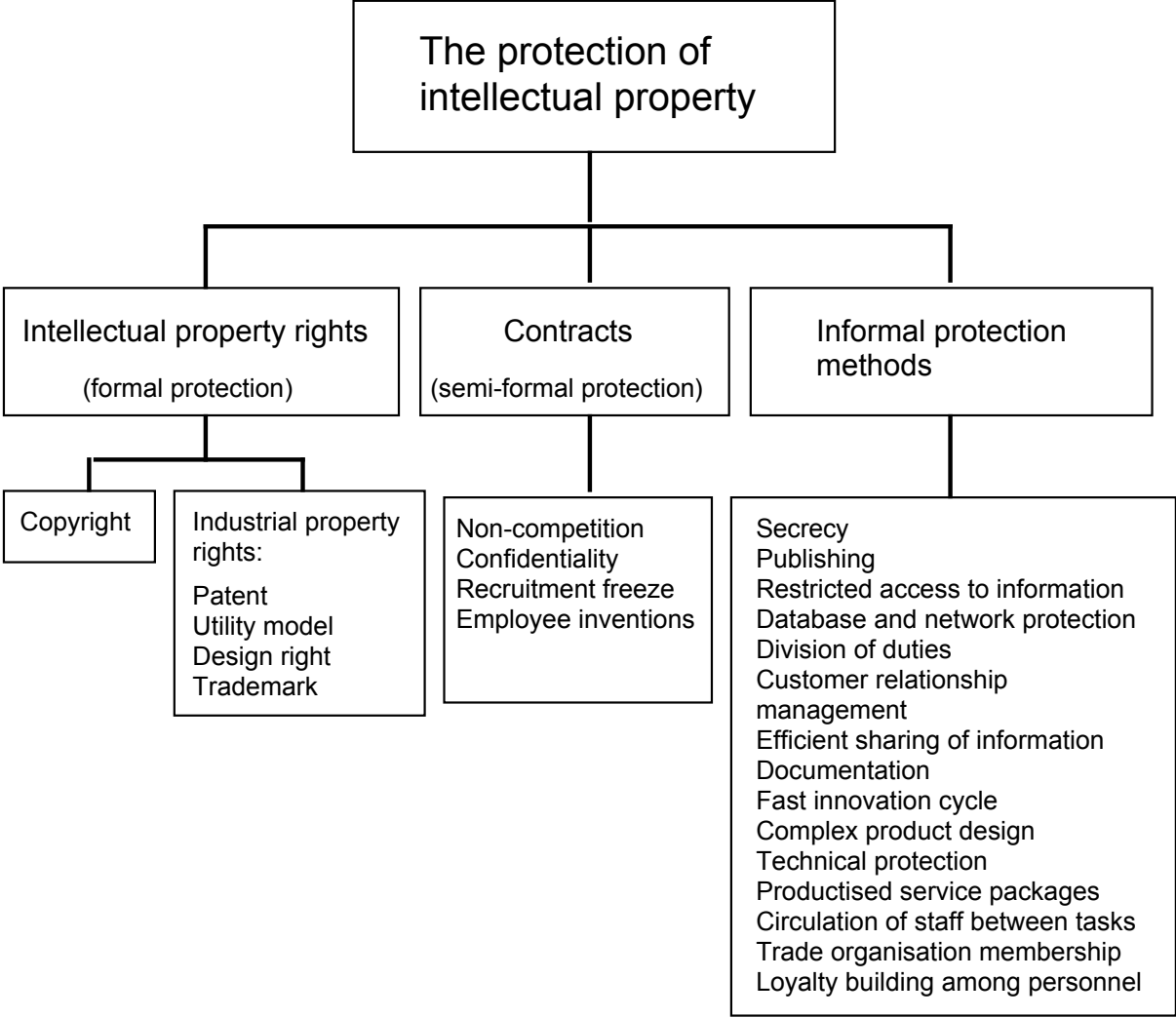


Figure 2. Protection methods according to their level of legal formality

2.2.1 Intellectual property right (IPR) system i.e. formal protection methods

Intellectual property rights (IPRs) are legally valid and they precisely define the nature of the items to be protected. Intellectual property rights comprise copyright and industrial property rights (e.g. patents, utility models and trademarks). Industrial property rights are not created of their own accord, but they are granted through applications after special inspection and

analysis. Maintenance of industrial property rights usually depends on the payment of regular fees and usage of the rights. Instead, to gain copyright, no notification or any other formal requirement is necessary: copyright is established automatically with the creation of an original work.

2.2.2 Contracts i.e. semi-formal protection methods

Contracts i.e. semi-formal protection methods are also based on law but they do not require any official registration. They (e.g. non-disclosure agreements and non-competition clauses) can be used similarly to formal protection methods, to protect knowledge and information, but they also are used to formalise and legalise the relationships of companies with partners and employees. Contracts can protect almost any kind of targets quite freely and their violations are punishable.

2.2.3 Informal protection methods

In fact, IPRs represent only ‘tip of the iceberg’ among the IP management and protection practices, and service businesses often employ various informal protection practices to protect their knowledge. These methods normally are affordable, simple, and easy to control. Informal protection methods are not entirely independent from each other and they partially seem to overlap. Some methods are closely linked to more formal methods such as contracts, and they may even be based on legal rights. On the other hand, some methods are embedded in normal working practices within the business and they are not valid in juridical sense. The purposes behind the use of each method vary: sometimes the main objective of the method is merely to protect IP, while sometimes it may mainly support the business activities.

The most important purposes of informal protection methods include e.g.:

- to decrease the risk of losing the core knowledge
- to prevent the leaking of confidential knowledge to outsiders
- to reduce the risk of incidences, which could cause knowledge leaks
- to reduce the risk of being copied or imitated by competitors
- to prevent the risk of losing a key employees or to minimize the harm from the employee mobility
- to create a ‘lead-time’ advantage over competitors
- to assist the patenting process
- to increase business efficiency and innovativeness

Knowledge protection in KIBS businesses

On the contrary to a common belief that small businesses do not protect their IP due to lack of knowledge in the area (see e.g. Beynon, Davies and Moore, 2003), most of the business managers (see Appendix 1) appeared to be well conscious of different types of protection practices. However, only a minority of the firms reported having a formal or written plan for protecting their intellectual property. Furthermore, the study demonstrated that Finnish KIBS businesses appeared to set less value upon systematic IP protection than their UK counterparts. Only less than third of the Finnish business managers reported having a planned strategy to protect their IP. On the contrary, approximately half of UK businesses revealed carrying out their IP protection according to a written plan. This result supports the earlier study of Kuusisto, Päällysaho and Kulmala (2005) that argues UK SME business managers to be better aware of both formal and informal IP protection methods.

The number of employees seems to affect the nature of IP protection in KIBS businesses. The willingness to maintain a well-defined plan seemed to grow significantly together with the size of the company. Only around one fourth of the micro companies (employing less than 10 employees) reported carrying out the systematic IP protection. On the other hand, bigger companies (with 20 to 50 employees) were in general found to build their protection system on a written plan. In this study, there were not any significant differences between various business sectors.

3 Intellectual property rights (IPRs)

Intellectual property rights (IPRs), i.e. industrial property rights and copyright, protect knowledge, human capital and competition advantage acquired by a company. The World Intellectual Property Organization (WIPO) defines the intellectual property right system as legal rights that result from intellectual activity in industrial, scientific, literary and artistic fields. The intellectual property rights offer a way to protect intellectual property from the misuse whether in the form of theft, imitation or modification. In other words, IPRs allow people to own their intangible creativity and innovation in the same way that they can own their physical property. IPRs are mainly based on patents for technical inventions, copyrights for artistic works, trademarks for brand identity, and designs for product appearance. However, IPRs are much broader than just above-mentioned categories extending to trade secrets, plant varieties, geographical indications, performers rights and so on.

3.1 Patents

Patents are probably the most publicised and conventional form of protection. A patentable invention must meet various criteria relating to its novelty, inventiveness and industrial applicability. Patent is granted upon application and it is an exclusive right to prohibit others from professionally manufacturing, importing or selling a patented product or from applying a patented method during the patent's period of validity. A patentable innovation must be innovative, novel and industrially applicable (i.e. must facilitate technical reproduction). A patent remains valid for a maximum for 20 years and it is maintained by paying annual renewal fees. Patents are regional protection methods and they should be applied for in all countries where the invention is going to be used, or where competing product can be expected.

It has been assumed that the service sector is in disadvantaged position to make use of IPRs. However, the rate of patenting in software sector appears fairly high and this somewhat contradicts the common argument that service businesses hardly make use of the patent system. Particularly software firms are that kind of businesses where the products or services are more tangible and patenting may suit better. Besides, in software sector IP tends to be in more important role than in many other industries. In addition to knowledge protection, patents can be used for other purposes. In the context of small firms, patents are often used for marketing purposes to give credibility for the business, and to improve the chances to attract financing from venture capital markets. This may be a crucial success factor for the company. Patents can also be used defensively as a way to make sure that company is not violating somebody else's IPRs.

3.2 Utility model

Utility models, also known as petty patents, provide patent-like protection for technical ideas and solutions that do not meet the requirements set for granting a patent. Utility models provide protection especially for smaller-scale inventions for which gaining patent protection would be too slow or expensive. Utility models are considered particularly for SMEs that make 'minor' improvements to existing products. Besides that, they primarily are targeted for mechanical innovations (WIPO, 2005). Utility models are very practical in situations in which

the invention is intended for domestic exploitation only or for a relatively short period of time.

3.3 Trademark

A trademark is any sign that can distinguish the goods and services of one trader from others. A trademark can be gained by registration or establishing, and it grants the trader exclusive rights to use the mark as a symbol of products or services. Besides for protecting purposes, trademarks are used as a marketing tool so that customers can recognise the product of a particular trader. The former survey of Blind et al. (2003) indicates that trademarks are ranked highest in the importance of various protection instruments in the service sector.

3.4 Registered design

Registered design protects the appearance of a product or pattern of decoration in professional use. Protection can be granted for the whole or a non-separable part of a product. In addition, multi-part products can also be protected. With registered design it is possible to protect e.g. textile patterns or a coffee cup handle. Design rights and trademarks overlap to a certain extent in that the appearance of a product can also be registered as trademark.

3.5 Copyright

By contrast to industrial property rights, copyright protection is automatic and subsists as soon as the work has been created in fixed form. Copyright belongs only to the person who has created the work in question, but for collective work, all authors have copyright. In such cases the consent to use the work needs to be obtained from all authors. Copyright protects concrete literary and artistic works, for example literary works, musical compositions, films, photographic works or other visual art products. However, the work must be independent and original.

This protection method seems to be essential to human creativity but also for computer software. Copyright protection, however, extends only to expressions, but not to ideas, procedures or methods.

3.6 Summary of intellectual property rights

Intellectual property rights, i.e. formal protection methods, include industrial property rights and copyright. The table below (Table 1) contains a summary of the basic features of formal protection methods. It should be noted that intellectual property rights are granted under the national laws of each country or region.

Table 1. Summary of intellectual property rights

IPR	Target	Requirements for registration	How to obtain the protection
Patent	Product, method	New, differs fundamentally from the others and industrially applicable	Granted
Utility model	Product	New, differs clearly from the others and industrially applicable; but does not necessarily meet patent requirements	By registration
Registered design	Appearance of concrete object made industrially or by hand	Design differs essentially from others	By registration
Trademark	Symbol of product or service: character, work, number, pattern, signal, sound, etc.	Identifying, clearly distinctive, not contrary to good practice	By registration or establishing
Copyright	Literary or artistic work	Independent and original	Automatically

3.7 The IPR system in service innovations

Blind et al. (2003) have studied the service firms from different business sectors and concluded, that the role of IPR system is obviously only of minor importance among the set of innovation strategies. Indeed, formal protection is the most suitable for technological innovations. On the contrary, in service sector, innovations are most often intangible, and often gradual improvements that build on the existing knowledge on service products or processes. Hence, the knowledge in question may not meet the criteria of novelty, which is a crucial aspect in patent protection. Still, such gradual improvements are important for the company success but easily copied by competitors.

In many cases applying for formal protection methods, such as patents, utility models and registered designs, is often a complex, time consuming and fairly expensive processes. To be able to reap the full benefits e.g. from patents, businesses must familiarise themselves with the patenting process and related regulations. Often this simply is not possible for small service businesses. Further, obtaining a patent and paying the annual fees for maintaining a patent are often too much for small businesses that have limited resources in terms of personnel and financing. The final, and most definite, hurdle comes from the extremely high costs related to defending a patent if it becomes necessary.

Sometimes the use of formal protection methods may even be considered as risky since during a patenting process the content of a new invention or innovation must be disclosed to outsiders. Even if the invention does not meet the criteria for patenting and the patent is not granted, the invention has anyway become public. In such a case the business can lose its competitive advantage over competitors without gaining anything.

Patents fit well in protecting innovations that can be clearly specified, are easy to copy and have a long life cycle. Typically, this applies to mass-produced industrial products rather than services. For example, in the pharmaceutical industry patent protection works reasonably well (Tang and Thomas, 1998). However, the profits made through the patents must be high enough to make it worth investing the time and money required for the patenting process, maintenance and enforcing of the patent. In the cases where products are complex, characterized by short life cycle, or involve low R&D expenses, other means of IP protection are often more appropriate.

Formal IP protection methods in KIBS

Only half of the respondents reported the use of at least one of the formal intellectual property protection methods (patent, utility model, copyright or trademark). Formal IP protection methods are not equally important to all business sectors, e.g. software firms were the most active in using IPRs and especially the patents. Furthermore, in many cases the size of the company influenced in variations in reported use between the companies. Overall, the UK companies seemed to be more active in using formal protection methods than their Finnish counterparts. From formal IP protection methods, the use of trademarks and copyrights were the most common examples. One tenth of the respondents reported the use of patent protection.

3.8 The role of IPR system for service sector

In addition, at least for small firms, patenting may also include many ‘informal’ objectives instead of the traditional motive of gaining monopoly position in niche market sector. Patents can be used to prop up the reputation of the business. For instance, patents improve the chances of securing venture capital financing. In addition, in some cases patent protection can raise the status and marketability of the new service/product. Besides, it should be noted that patents might also be used to ensure that the company itself does not violate the patent rights of another business. Small service businesses may even depend more on patenting than larger ones (Blind and Thumm, 2004). This is because their patent portfolio is the only economic asset they possess.

Also trademarks and copyrights have other dimensions. The protective role of copyright can on occasion be seen as only theoretical, and thus this practice may be used for less formal reasons, such as a customary working routine. Furthermore, trademarks can be applied rather for marketing reasons than for serious protection of IP.

4

Contracts

Contracts are an essential factor in professional business. Various contracts are especially important in situation, where patents, copyrights, trademarks or other formal protection methods cannot be used for protection purposes. Contracts are preventive protection methods. As IPRs, they are legal and violations are punishable. However, contracts are not directly comparable with formal protection methods, because IPRs require registration and define the type and form of protection precisely. Instead, contracts can protect various targets quite freely.

Contracts are used similarly to IPRs, to protect products and information, but they also are used to formalise and legalise the relationships of companies with employees, customers and other partners. Contracts are relatively inexpensive to draw up, and normally there are not costs related to their maintenance. However, it is important to notice that contracts should be reviewed and updated regularly. A concluded contract remains valid until it terminates on the agreed terms. This guide focuses on the contracts that can easily be used in the companies for the protection purposes.

4.1 Agreement of non-competition

An agreement of non-competition applies the time after the employment relationship. It limits the employee's rights to conclude an employment contract after the employment relationship has ceased with an employer engaged in business competing with the first-mentioned employer. The agreement can also limit the employee's right to engage in such operations as an independent entrepreneur.

An agreement of non-competition can be concluded upon signing the employment contract or during the employment relationship, and there must be a particularly weighty reason for concluding such an agreement. These reasons can be for instance the nature of the employer's operations, the need to keep a business or trade secrets, or the employee's status and nature of his duties. The purpose of an agreement of non-competition cannot be restriction of fair competition, nor can the agreement be used for exclusively preventing an employee from earning his living with work corresponding his professional skills. The restraint of competition period begins when the employment relationship ends and can last a maximum of six months. In exceptional cases, it can last up to one year. This is possible only if the employee can be deemed to have received reasonable compensation for the restriction imposed by the agreement of non-competition.

If the agreement of non-competition is violated, the employee can be ordered to pay the former employer compensation for damage or liquidated damages. At maximum the compensation can be the amount of pay received by the employee for the six months preceding the end of the employee's employment relationship. For executive staff liquidated damages can be even higher. The agreement of non-competition is not binding if the employment relationship has ended due to a reason deriving from the employer. However, if the employer terminates the employment relationship due to weighty reasons deriving from the employee, the agreement is binding.

4.2 Confidentiality agreement

Confidentiality agreements are used for ensuring the confidentiality of ideas, business secrets and other confidential information and material. The employment contracts act applies to the employee's obligation to maintain secrecy during the employment relationship. It means that while the employment relationship is valid, the employee may neither utilise nor disclose the employer's trade or business secrets. The prohibition remains valid in all employment relationships automatically for their entire duration. A separate confidentiality agreement extends the employee's obligation to confidentiality to the period after the employment relationship. A confidentiality agreement should always be concluded if the employee has access to the company's business secrets.

Already when looking for project partners, a company may have to disclose confidential information and material. Thus, confidentiality agreements should be concluded at the earliest possible stage, before any disclosure of confidential information. There is always a risk involved in disclosure of information, e.g. a partner can withdraw from co-operation, use the information for its own benefit, or give up the information to a third party.

Confidentiality agreements should include and specify the following:

- which information is confidential (and which are not)
- which are the permissible ways to use information
- how long does the confidentiality last
- what are the consequences of violating the agreement

4.3 Agreement on recruitment freeze

With an agreement on recruitment freeze the contracting parties can make an agreement that they do not attempt to recruit each other's personnel without the consent of the other party. Usually companies working in the same business sector conclude such agreements, or companies sign them with their own employees. In such cases the employees may not, after termination of the employment relationship, propose to other employees of the employer in question that they should change jobs.

It is important to specify whether the ban applies to active recruitment or moving from one employer to another on the employee's own initiative. Naturally, an employee cannot be prevented from entering into another company if he so wishes (this can be prevented only with an agreement of non-competition). However, the contracting parties can also agree the price of transfer. In such cases, the transfer is not prevented, but transfers are limited by ensuring the losing party sufficient compensation.

4.4 Employee invention – agreement on transfer of rights

Most of the inventions are made by employees, and in connection with research and product development projects. Thus, it is important to find out, who possesses the rights to the work created. According to the patents act, the rights to invention and its exploitation belong to the inventor. On the other hand, according to labour laws the employer has the rights to the results of the employee's work. The act on the right to employee inventions aims to balance these two acts.

Transfer of the right on the basis of employment is a significant exception to the general principle according to which the creator of human assets possesses the rights to the work created. The act on the right to employee inventions is enacted for the purpose of safeguarding research and product development in business life. The act on the right to employee inventions is applicable to inventions made by persons in an employment relationship or service that can be protected with a patent. This act, however, does not apply to teachers and researchers at universities, colleges or similar institutions. Either the act does not require patenting of the invention, even though it must be patentable.

According to the act on the right to employee inventions, the employer can have three types of right to an invention:

- rights in whole or in part
- the right to use
- the priority to agree with the employee on the use of the invention

The employer's right to an invention is most extensive if the invention results from a specific task assigned to the employee at work. In such cases the employer is entitled to acquire right to the invention either *in whole or in part*. The employer has the same right when the invention is the result of an activity in the performance of the employee's duties or essentially as a result of the experience gained in the service of the employer. In these cases, the use of the invention is required to fall within the field of the employer's activity. The employer can only obtain *the right to use* the invention, if the invention is the result of a more distant connection with the employment relationship. The employer has also the *priority to negotiate* on more extensive rights to invention if the invention is conceived in the employee's free time without connection to the employment relationship.

If the invention was conceived with no connection to the employment relationship, the employer has no more right to the invention than any other party. However, the employer may have rights to inventions made by an employee where an application for a patent has been filed during six months following the termination of the employment relationship.

Companies can ensure that rights to inventions transfer from employees to companies by using special rights transfer agreements or clauses on the matter included in the employment contract. It must be established whether personnel are granted rights to the results of work or whether all rights transfer to the company. Matters related to exploiting the results of the work should always be agreed clearly already in the beginning of the employment relationship.

4.4.1 Employee inventions and IPR strategy

An integral part of a company's IPR strategy is to compose guidelines to cover all the operations related to intellectual property protection. These guidelines should include various instructions for example how to use IP protection and who is responsible for IP management in the company. Another crucial factor is to establish practises for compensation and rewards. Companies should create incentive systems that motivate employees to continuous innovation and attract employees to commit themselves.

IPR strategy should also include the definition of the procedures on processing initiatives and employee inventions. These guidelines should concentrate on the rights and duties of the parties concerned, and e.g. define the transfer of rights. With that kind of guidelines on suggestion schemes, initiatives and employee inventions, the processing of employee

invention related matters becomes clearer within companies and the prevention of related problems becomes easier.

4.5 Agreements on ownership and right of use in co-operation projects

The principal rule in shared research or product development projects is that the party whose employee invented the result owns it and the related intellectual property rights. However, there are also other ways to agree on the rights involved:

- the party financing the research and development operations acquires all rights to the results
- the party financing party only acquires the right to use the results of the development work and intellectual property rights remains with the developer
- the rights are shared on the basis of who the product or service is developed for. If the product belongs to the financing party, all rights may transfer to it. The rights may remain the supplier's property when the product belongs to the supplier.

In the case of commission agreements, it is common that the commissioner usually wants to gain right of ownership to the result of the commission. Co-operation agreements can agree, for instance, that the right of ownership to results belongs to the party whose core competence the result belongs to, or whose background material has been used to achieve the results. In some cases several parties have contributed to the result so fundamentally that joint ownership is the most reasonable option. In that case the terms and conditions of joint ownership should be agreed precisely. Particularly important terms include those on the concession of rights of use and patenting.

Various agreements in KIBS

The vast majority of the Finnish and the UK firms required their employees to sign non-disclosure agreements, non-competition clauses or a recruitment freeze. Interestingly, there were not any significant differences in prevailing practices between the studied business sectors. However, the results indicated that the managers in advertising sector perceived potential benefits of various clauses less important than managers from other business sectors. Indeed, in advertising sector employee mobility is relatively high and often the general opinion is that employees cannot be committed through contracts (Kuusisto, Päällysaho and Kulmala, 2005). The study did not highlight that the size of the company would have caused any significant differences on the practices adopted in sample firms.

4.6 Summary of contracts

The purpose of the contracts presented in this manual is to protect a company's intellectual capital in a variety of ways. The Table 2 shows the main features of the contracts presented.

Table 2. Summary of main features of contracts

Contract	Concluded with	Goal
Agreement of non-competition	Employees	Limits the right of employees to enter employment with competitors
Confidentiality agreement	Employees and partners	Ensures confidentiality of information
Recruitment freeze agreement	Employees and competing businesses	Prevents/restricts recruitment of personnel from contracting company without permission
Agreement on transfer of rights	Employees	Ensures the transfer of rights related to inventions from employees to companies
Agreements on rights of ownership and use	Partners	Shares the rights to results from co-operation projects in a manner satisfactory to all contracting parties

5 Informal protection methods

Legal forms of IP protection seem to represent only ‘tip of the iceberg’ among the IP management and protection practices. In fact, the general conclusion is that formal IP regimes are applicable only to a small proportion of business activity, such as large manufacturing companies (Coleman and Fishlock, 1999). Kitching and Blackburn (2003) examine the reliance of firms on IPR system and found, quite unexpectedly, that firms prefer to guard their intellectual property by creating high-trust relations with customers and suppliers, by operating in niche markets and by maintaining a lead-time advantage over competitors. Arundel (2000) supports these findings and reports that in American and European firms lead-time and secrecy together are more important ways to protect intellectual property than patenting.

It has been argued that often SMEs as a whole are in disadvantaged position to make use of IP rights, and hence less likely to capture returns from their innovative efforts in comparison to large firms. This argument gets support from findings by Arundel and Kabla (1998) who demonstrate that small European firms have a lower propensity to patent their innovations than large firms.

There are a broad variety of distinct informal IP protection methods. These protection activities often are simple, easy to control and also economical to use and to some extent, often embedded in normal working practices within the business. In general these methods try to prevent the loss of knowledge or restrict undesirable access to sensitive information either inside the firm or in external relations. In respect of human resources, the main task of informal protection practices is to capture or share the information and knowledge inside the firm and on the other hand decrease the employee dependence. In addition, informal methods also enable the protection of firm’s tangible products, services or systems. These protection activities are often technical by nature.

Different informal protection methods are not entirely independent from each other and they partially seem to overlap. Some methods are closely linked to more formal methods such as contracts, and they even may be based on legal rights. On the other hand, some methods are embedded in normal working practices within the business and they are not valid in juridical sense. As well the purposes behind the use of each method vary: sometimes the main objective of the method is merely to protect IP while sometimes it may mainly support the business activity. The next chapters give the overview of the various types of informal knowledge protection methods.

5.1 Secrecy

Key knowledge or know-how can simply be kept secret either at least from some of the employees inside the firm and/or from external collaborators, such as business partners or customers. Secrecy is a commonly used informal protection method. Many companies are defining carefully what type of information is classified and which parties should be kept back.

Secrecy may have a negative impact on innovativeness and the quality of the collaboration. According to Miles et al. (2000), open attitudes allow free information flow between the parties and therefore support the innovativeness of the firm. Indeed, over-emphasising confidentiality can smother motivation and innovation of employees and decrease the productivity of co-operation relationships. Secrecy may also be linked to formal protection methods through contracts (e.g. NDA or confidentiality agreements).

Secrecy in KIBS

This study highlighted that many companies kept secret part of the key knowledge or sensitive information at least from some of their employees. Furthermore, most of the companies withheld some information from customers or external business partners. Interestingly, the UK business managers seemed to be exceedingly mistrustful of external business partners and argued hiding very often some of the key information in cooperative relationships.

Different business sectors approached secrecy in different ways. Advertising sector concealed information from their employees significantly less frequently than the software and business/management consultancy sectors. Almost half of the managers from software sector, on the contrary, stressed hiding knowledge or sensitive information from their customers. Interestingly, micro companies felt often unnecessary to hide any of their core information.

5.2 Publishing

In contrast to secrecy, the new idea or working practice can be published as widely as possible and the initial developer of the idea will become well known as the innovator. That might lead to prevention of copying the new ideas because imitation is seen unethical in the society. Indeed, reputational sanctions can be effective barriers to imitation, in particular when firms see a reputation for innovation to be a factor in their competitive success (Gemser and Wijnberg, 2001). This protection method is particularly important in service sector in which copying and imitation of ideas might be widespread (Kuusisto, Päällysaho and Kulmala, 2005).

Publishing is also legally valid in the sense that publishing in any way is an obstacle to novelty in patenting. Hence, publishing can be used to prevent other businesses from claiming patents in the same area. For instance, the key information can be published in small local newspaper. In such case patenting will be prevented but there is very limited chance that any competitor would pick up the key information from a local paper with a limited number of readers. In addition, some websites are specialised in publishing information in order to prevent patenting by other parties. Rapid publishing may therefore be an option if the company cannot afford to patent an idea it has developed, and if the risk exists that competitors are developing a similar idea.

Publishing in KIBS

More than half of the respondents reported protecting their ideas or working practices by publishing them. However, it seemed that Finnish business managers perceived publishing on average a bit more important than their UK counterparts. There were not any significant differences between the business sectors. Still, it could be highlighted that the respondents from advertising sector regarded publishing as a somewhat inefficient way to protect their IP. The willingness to publication seemed to grow together with the size of the company.

5.3 Restricted access to information

IP related risks could be limited by restricting the number of people who have the access to sensitive key information. Such limitations may concern people inside and outside of the business, hence the limitations concern internal as well as external relations. In principle this method is similar to secrecy. For instance, company database may include documents and files accessible for viewing and editing only by those employees who are working on a certain project.

Companies also may need to pay attention to the safety of premises as regards outside visitors. The possibility of industrial espionage and information leaks becomes considerably lesser when visitors' arrival and exit from premises are controlled. This can be done with access cards, cameras or doormen. The simplest way is to keep the doors locked.

However, exaggeration of restrictions inside the company may lead into insufficient knowledge sharing which becomes a barrier to innovativeness. These procedures must also be legitimised and thoroughly justified for company employees, who otherwise may perceive such procedures as signs of a lack of trust. This may decrease the motivation and innovation of employees. In addition, in small companies restricted knowledge sharing poses a threat of a sudden loss of IP in the form of the departure of a key employee.

Restrictions in KIBS

As assumed, a substantial number of businesses protected their knowledge by supervising visitors. Three quarters of the companies did not allow their customers to move inside the building freely and as much as two thirds of the businesses were restricting the access from subcontractors. Finally, almost one third of the businesses restricted even their employees' free access to some parts of the business premises.

The study highlighted that the UK businesses were more likely to prevent or limit their own employees' access to work premises than their Finnish counterparts. On the other hand, the UK businesses were not that restrictive concerning the visits of external partners.

The routines that were adopted to prevent knowledge leaks by restricting access to information varied significantly between the business sectors. For instance, respondents in advertising sector perceived any limitations unnecessary. In addition, the size of the business influenced the prevailing practices in building security. Micro businesses seemed to enforce the most relaxed rules on the visits by subcontractors, customers and third parties.

5.4 Loyalty building among personnel

Various loyalty building strategies are powerful ways to protect intellectual property, after all much of the knowledge lies with the key employees. In fact, in many fields employees are considered the most valuable asset of the company (Kuusisto, Päällysaho and Kulmala, 2005), and the departure of a key person might cause a sudden loss of IP. Effective strategies to maintain staff loyalty are e.g. financial incentives, training opportunities or other occupational development related incentives. Moreover, one successful way to enhance employees' motivation is to place some ownership arrangements with the key employees (Leiponen, 2001). In addition, effective strategies include the creation of a positive, confidential and challenging atmosphere. Enhancing the commitment of the personnel can be used regardless of the sector and the size of the company.

However, strong support for individual employees' effort may also harm the atmosphere inside the company. Holmström and Milgrom (1994) argue that compensation based on the performance of individual employee creates competition among employees and thus discourages cooperation. According to the study of Kuusisto, Päällysaho and Kulmala (2005), positive and supportive methods in personnel management are in general perceived as more efficient than negative and restrictive methods (e.g. contracts and agreements). In conclusion,

although it is important to all industries to enhance the commitment of personnel, good human resource management has proven to be essential in industries where human resource mobility is high and corporate culture not very conservative and formal.

Loyalty building among personnel in KIBS

This study highlighted that almost all of the surveyed businesses were actively cultivating personnel loyalty. The most popular way appeared to be the use of financial incentives. In addition, often the businesses offered their employees training opportunities or other job development related incentives, and also used some other ways of enhancing staff commitment. The above described loyalty building strategies were very similar in Finland and the UK. Also the differences between the business sectors were rather insignificant. However, micro businesses provided fewer financial incentives or training opportunities for their staff. As a whole, they were the least active in keeping the staff motivated and committed to the business.

5.5 Division of duties

Fragmented division of labour means that work tasks within the business are divided between employees so, that each employee controls only a fraction of the entity and no single person knows the overall concept of a new product or service. Also this method is tightly linked to secrecy inside the business and the objective is again to minimise employee related risks, e.g. to avoid the loss of valuable knowledge in the case of an employee chooses to leave the firm.

However, in small firms the human resources are often limited and the tasks cannot be fragmented into separate segments. Such fragmentation of work tasks may also be problematic in firms where the free flow of information is important. In practice, typically this method suits for larger organisations.

Division of duties in KIBS

Of business managers, only around one fifth of the companies were effectively fragmenting work tasks between employees. Most of the businesses used this method occasionally. Only small fragment of managers estimated to protect their intellectual property with dividing work tasks very often. Interestingly, majority of these companies were employing less than 10 employees. Furthermore, the research results demonstrated that UK business managers were likely to use compartmentalisation of tasks significantly more extensively than their Finnish counterparts. Among UK businesses division of duties was relatively important especially in software business and management consultancy. In particular, this was the case among the businesses employing 10 to 19 staff.

5.6 Circulation of staff between tasks

Rotating staff from one task to another and naming deputies for employees can be used to decrease the dependence on key personnel. The advantages of this protection practice are acknowledged especially in those business sectors, where the employee mobility is high and long-term commitments of personnel are rare. Besides the protection, this method makes both work and customer service more flexible and varied.

Effective task rotation is, however, problematic in small businesses where the key employee is often the sole expert in his/her own narrow field. However, this problem can be diminished with systematic and comprehensive documentation. Yet, this method naturally fits better to larger organisations where the knowledge structure substantially overlaps.

Circulation of duties in KIBS

This study highlighted that one third of the companies circulated staff with a view to decrease the dependency on key employees. It appeared that Finnish business managers perceived the circulation of staff from one task to another much more useful than their UK counterparts and many of the managers were frequently rotating staff or naming deputies for the key employees.

The role of staff circulation and naming of deputies was central in software business which was in clear contrast to business/management consultancy and advertising sectors. In advertising sector, many managers did not rotate staff or nominate back up workers at all. Supposedly, the smallest companies used circulation to decrease dependency on their key employees less frequently than the larger businesses did.

5.7 Documentation

Documentation of ideas, resources and thoughts can reduce the risk of losing key knowledge. In the study of Kuusisto, Päällysaho and Kulmala (2005), together with secrecy, documentation was a most widely used method for protecting internal intellectual property in businesses. By documentation businesses can transfer tacit knowledge into more explicit forms, e.g. into written documents, tapes or databases.

To be effective, documentation should be simple to implement and the process should be carried automatically and simultaneously as the innovation or the idea develops. Documentation need not be in the form of an official report. Instead, it might be an easy-to-complete text file. Companies can only maintain effective documentation if it is implemented systematically in an organised manner and employees are motivated to do it. Motivation can be enhanced, for instance with document-based personal or unit-specific merit pay.

For some companies, documented information stored in databanks is vital for the operations and strategy. If the company is sold, the documents act as a tangible evidence of what the company has done. Formally dated and updated documents can also help in patenting process, acting as a proof of when the idea is developed and about its content. This may prove to be important information if the company's patent rights are violated or a dispute on them arises.

Documentation is multi-dimensional. First of all, it enables the effective gathering and changing in-house information into a more precise and understandable format. Secondly, it enhances the sharing of knowledge inside the company. When the intellectual capital is documented, it is easier to share, reproduce and store. Finally, by documentation firms are able to reduce the risk of a sudden loss of IP through the departure of a key person (see Zack, 1999).

Documentation in KIBS

Most of the businesses responding to this study reported using documentation to assist the intellectual property protection. The results indicated that the Finnish business managers were very active in using documentation as a protection method. Especially the managers in software business sector rated the documentation utmost important: 100 % of the businesses recorded ideas, thoughts and information through the systematic documentation. The size of the company did not influence the readiness to adopt documentation.

5.8 Fast innovation cycle

By aiming at a fast innovation cycle and bringing new products and services to market quickly, businesses can create a lead-time advantage over their competitors. Launching new products to the markets rapidly on a continuous basis can reduce the risk of being copied or imitated by competing companies because by the time products or services are copied, the business has already moved on to the next generation of products. Fast innovation cycle may have a significant role especially in industries where the pace of development is fast, such as software and mobile technology industries. On the other hand, fast innovation rate can also support the business activities.

According to Moore (1996), especially small business owners protect their innovations by maintaining a lead-time advantage over competitors. Indeed, this strategy may suit smaller firms better due to their ability to respond quickly to changing market demands.

Fast innovation cycle in KIBS

This study demonstrated that the fast innovation cycle seems to have a central role in both countries. The respondents in software business sector appeared to have the most positive attitudes towards the fast innovation cycle and reported maintaining lead time advantage significantly more extensively than their counterparts from other business sectors. Interestingly, more than half of the UK software businesses managers perceived the fast innovation cycle as a very important method to protect their IP. This clearly confirms the previous argument that this strategy fits well particularly to fast developing sectors. Interestingly, the size of the company did not notably affect the views.

5.9 Technical protection

Technical protection provides a number of instruments to protect the intellectual assets. Illegal copying of software products is very common, and formal protection methods do not protect them sufficiently in many cases. Because software is nowadays often embedded, technical protection of software is very important not only in the software business but also in other industries. Some common methods in software protection are e.g. encryption, the use of security keys (dongles), code obfuscation or addition of pseudo codes. Moreover, software products can be sold as a black box, which means selling the product without releasing the source code.

Technical protection can also mean incorporation of specific identification codes into software programs or e.g. in photographs or other documents. Such codes can later be used to prove the copyright.

Encryption refers to coding or scrambling the information into an encrypted format so that it can only be decoded and read by someone who has the correct decoding key. Encrypted text can be converted back into understandable format without loss of any information.

Code obfuscation means converting a program into an equivalent one that is more difficult to reverse engineer. Copying can be prevented e.g. by deleting from the text comment sections and spaces which makes it easier to read, and by converting the names of variables and functions from descriptive ones to “gibberish”. However, functionally the software remains the same.

The use of **security keys (dongles)** does not protect the software code as such, but it is an effective method for limiting software use. The software users can copy the code as they like, but in order to use the software they must purchase a dongle. A dongle is a part of computer hardware that needs to be installed in the computers I/O port to enable the start up and the use of the software. This protection method is very effective but quite expensive to use.

Addition of pseudo codes means that unnecessary extra sequences of software code are slipped into the complete software code in several places. These extra sequences do not include any essential factors to the functionality of the software. If there is a reason to suspect that a competitor has copied the software code, the competitor can be sued and the content of the software code they are using checked. If the software code used by the competitor includes the same unnecessary sequences of software code, the proof of theft is obtained.

Technical protection in KIBS

Approximately two thirds of all respondents reported the use of technical protection. Again, there were not any significant differences between the practices adopted in Finland and the UK. The results indicated that a large majority of the business managers in software sector reported protecting their products by some kind of technical means. Maybe contrary to expectations, the companies in business/management consultancy and advertising sectors were also fairly well prepared using different instruments of technical protection.

However, the data suggested that the size of the company affected the SME business managers' willingness to use technical protection. The businesses employing 20 to 50 employees sought protection with different types of technical means significantly more actively than the companies having fewer employees.

5.10 Trade organisation membership

Membership of companies in trade organisations can promote the protection of intellectual capital. Some trade organisations strive to supervise the intellectual property rights of members. However, the support can be limited especially in industries where copying and imitation is hard to prove

5.11 Confidentiality

Companies seem to put lots of effort on developing confidential relationships with employees, business partners and customers (Dickson 1996). Confidential external relationships not only contribute the protection of intellectual property but they also allow free discussions and information flow between the parties. This supports innovativeness, because in service sector, new innovations often arise from relationships between small KIBS firm and its client (e.g. Muller and Zenker 2001b). Therefore, the relationships especially with clients should be underlined, because through customer connections important information may leak outside the company. Besides confidential external relationships, trustful and open relations inside the company support the creation of a pleasant working atmosphere.

It is necessary to establish a confidential atmosphere and procedures to ensure that all new ideas and innovations are disclosed. Employees are rarely able to form their ideas into usable entities that can be called inventions; neither can they often evaluate the possible financial value of their ideas. Therefore, the employees should have the opportunity to discuss their ideas in confidence without fearing that the ideas are stolen in-house. Companies should develop procedures to facilitate the disclosure of ideas, and to ensure that the rights of the inventor to the invention are respected. Incentive systems can also affect the disclosure of ideas.

Confidentiality in KIBS

The study highlighted that the protection of intellectual property and other confidential information poses surprisingly little problems if considering networks. More than half of the respondents replied that IP protection has never caused any problems when collaborating with other businesses or organisations. Again, the opinions in Finnish and UK business cultures were very similar. The size of the company did not appear to have any influence on the responses.

5.12 Efficient sharing of information

The basic principle behind the efficient sharing of information is the view that information increases rather than decreases when shared. Efficient sharing of information is the opposite of in-house confidentiality. From publishing it differs in that the purpose of the method is to spread information inside the company only.

The support of verbal exchange of information and knowledge inside the company is considered an important method of protection. This method can be used regardless of the sector and the size of the company. The main intention of information and knowledge sharing is to decrease dependence on key employees, thus enabling the company to decrease the risk that information and knowledge disappears when key persons change jobs or, for example, go on sudden, prolonged sick leave.

Close social interaction is crucial especially within companies, where the intellectual capital mainly consists of silent information linked to human resources. The transfer of silent information requires easy interaction for individuals so that they can share experiences. Thus, the transfer calls for personal relationships and spoken interaction.

The information and knowledge sharing may be conducted e.g. through regular meetings or informal discussions. Efficient sharing of information and communication is seen very important in industries where innovations are often made spontaneously as a result of interaction between employees as part of some other work.

Efficient sharing of information in KIBS

The verbal exchange of information and knowledge seemed to play important role in strategies for IP protection. Most of the interviewed business managers concurred that the effective sharing of information and knowledge within the business is more important for the success than intellectual property protection. There were not any significant differences in the opinions between the countries or studied business sectors. The size of the company did not appear to have any influence on the responses either.

Many of the business managers had, however, faced problems with effective information and knowledge sharing. Especially micro companies perceived that the specialist knowledge within the company is somehow too confined to few key workers.

5.13 Customer relationship management

Effective customer relationship management is particularly important in the service industry where service innovations are often born in co-operation with client or supplier. In a service situation, both parties must share confidential business information with each other. The resulting service innovations are often thoughts, ideas or operational models, and thus difficult to protect from outsiders. Through customers the new insights may travel easily from one company to another. Thus effective customer relationship management and enhancing the commitment of customers are important ways of decreasing the number of such leaks (Blind et al., 2003).

Customer relationship management in KIBS

Majority of the companies indicated that disruptive amounts of important or confidential information do not leak out of the company through customers. Unexpectedly, British respondents tended to see the relationships with customers a bit more problematic than their Finnish counterparts. However, the views on unwanted knowledge leaks caused by customers did not diverge among various business sectors and the size of the company did not appear to have any influence on the responses.

5.14 Complex product design

Companies can protect their products by making them so complex that they are very hard to copy, or copying is at least highly time-consuming. Indeed, a complex product design with a fast pace of innovation is seen an effective protection strategy.

Complexity can also be linked to the fact that company operates in a niche segment. If the company's product involves very specific expertise and its market niche is very narrow, it may be better for competitors to buy the product from the company rather than try to copy it.

5.15 Productised service packages

Productised service packages can be used to enhance the efficiency of business, and to decrease the dependence on key persons. Service packages can e.g. provide comprehensive solutions to certain specified needs and problems. Furthermore, companies with well-defined service packages and operations are less independent on individual employees. On the other hand, it is easier for competitors and other outsiders to copy service packages because these are clearly defined entities.

5.16 Summary of informal protection methods

There is a wide range of informal protection methods that differ from one to another both by nature and purpose of use (see Table 3). Typically informal protection methods are partly overlapping and the simultaneous use of several methods offers better protection for the intellectual capital. Besides providing IP protection, informal protection methods are employed because they can enhance business when integrated with operational procedures and working routines.

Informal protection methods are not static and they do not offer permanent solution for knowledge protection. In many cases they require constant updating and active maintenance. For instance, relationship management and motivation of the personnel are processes that require constant effort. Also the fast pace of innovation and technical protection requires constant development and renewal as the businesses operating environment changes. On the other hand, e.g. circulation of duties and documentation can easily be integrated into the company's daily operational routines and business culture.

Table 3. Summary of informal protection methods and their rationales for IP protection

Informal protection practice	Rationale for IP protection
• Secrecy	• Prevents the spill over of confidential information to outsiders
• Restricted access to information	• Decreases the risk for knowledge leaks
• Database and network protection	• Prevents a risk of information diffusion to outsiders • Prevents from attacks, viruses and other abuses
• Confidentiality	• Decreases the risk for knowledge leaks
• Technical protection:	• Makes copying and imitation difficult and time-consuming
• Documentation	• Increases efficiency • Decreases the risk of losing tacit knowledge • Assists in patenting process
• Division of duties	• No single person will know the overall picture about a new service or product
• Circulating of staff between tasks	• Decreases the dependency on individual members of staff
• Loyalty building among personnel	• Decreases the risk of losing knowledge bound to employees • Increases efficiency
• Customer relationship management	• Prevents knowledge leaks through customer interaction
• Trade organisation membership	• Seeks to supervise IPRs of the members. Role in IP protection limited
• Efficient sharing of information	• Decreases the risk of losing knowledge bound to employees • Increases efficiency and innovativeness
• Fast innovation cycle	• Creates 'lead-time' edge over competitors • Copying and imitation less harmful
• Publishing	• Prevents the risk of being copied or imitated • Prevents patenting by other parties
• Complex product design	• Makes copying and imitation difficult and time-consuming
• Productised service packages	• Decreases company dependence on employees • Increases efficiency

6 Comparison of protection methods

6.1 Use of various methods in different situations

Most of the formal and informal protection methods are intended for the protection of various internal and external threats (Figure 3). Various methods seek to protect the business against (1) internal risks, such as a departure of the key-employee (methods like loyalty building, documentation, circulating tasks). There also are some methods sheltering companies against (2) external risks, such as exploitation of new ideas by competitors (methods like technical protection, fast innovation cycle, secrecy, IPRs). Finally, some methods are targeted to govern (3) the co-operative and collaborative relationships with employees or external partners (methods like customer relationship management, loyalty building and concluding contracts). Besides, some of the protection methods have multi-dimensional functions and the motives behind the use of a certain practice vary remarkably between the business sectors and even between businesses within an industry.

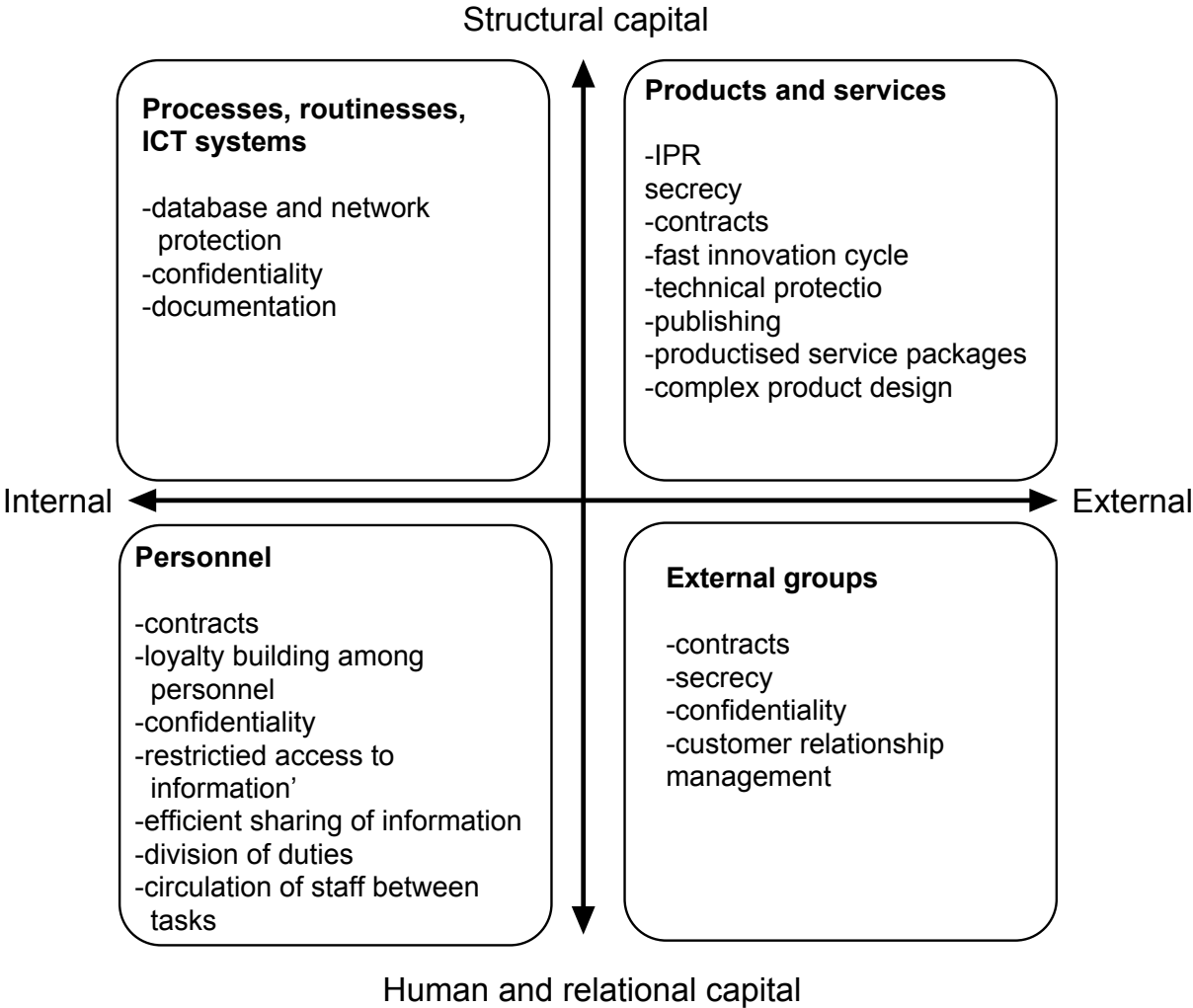


Figure 3. Protection methods in various business processes

6.2 Basic features of protection methods

Various IP protection activities (formal protection methods, contracts, informal protection methods), are not mutually exclusive or even competing, but rather supporting each other (Kuusisto, Päälyssaho and Kulmala, 2005). Table 4 provides a comparison of the basic features of various protection methods.

Table 4. Basic features of protection methods

	Formal protection methods	Contracts	Informal protection methods
Legality	x	x	(x)
Fastness		x	x
Costs	x		
Simplicity		x	x
Registration	x		
Big required resources	x		
Need for expert assistance	x	(x)	

Formal protection practices (IPRs) entail legal rights. These rights can be acquired through registration (e.g. patents, utility models, trademarks) or through contracts. In some cases they may arise automatically with the creation of an original work (e.g. copyrights). Contracts (e.g. non-disclosure agreement and non-competition clauses) are also based on law but they do not require any official registration. On contrast, informal protection methods are not formally organised and do not normally involve any legal forms of protection. It is possible to use some assistance of experts for the use of all protection methods, but for formal protection in particular is recommended.

Contracts and informal protection methods are often much simpler and faster to introduce than formal protection methods. They also can be maintained with limited resources. Formal protection methods, mainly IPRs, require major financial and human resources if they are to be exploited thoroughly in business.

6.3 Strengths and weaknesses of protection methods

Strengths and weaknesses of different protection methods vary (Table 5). Besides providing protection, formal protection methods are useful for business purposes. IPRs can generate income through licensing and can be regarded as separate company assets because they enhance a company's status as an innovative business. IPRs are useful in business acquisition or e.g. when acquiring financing from outside. In some cases they also can be used as collateral. The weaknesses of IPRs include the fact that they only protect certain types of precisely specified company processes. Besides, IPRs are expensive and complex methods to use.

Contracts do not require any official registration and they can be used for protecting various targets quite freely. Some of the contracts, mainly contracts for ownership and right of use, can be regarded as company assets, thus enhancing a company's status. However, contracts

such as confidentiality and transfer of rights agreements can have a negative impact on productivity of partnership and innovation of employees. Besides, too strict or long non-competition and confidentiality agreements can reduce the company's attractiveness as an employer.

As agreements, informal protection methods are adaptable to different situations. This is a clear strength, considering the different forms of intellectual property. Many informal protection methods can enhance business when integrated with operational procedures and working routines. However, they do not have any legal basis. Informal protection methods are not static and they do not offer permanent solution for knowledge protection. In many cases they require constant updating and active maintenance.

Table 5. Strengths and weaknesses of protection methods

	Formal protection methods	Contracts	Informal protection methods
Strengths	<ul style="list-style-type: none"> - legal protection - licensing - can be regarded as assets - negotiation tool, help to acquire financing, status factor 	<ul style="list-style-type: none"> - legal protection - can sometimes be regarded as assets - inexpensive and easy - can be modified for each situation 	<ul style="list-style-type: none"> - relatively inexpensive and easy - suitable for most of the companies - can be modified for each situation - enhance the efficiency of business
Weaknesses	<ul style="list-style-type: none"> - only protect knowledge product meeting certain criteria - costly to obtain, maintain and defend - do not protect if the company is unable to defend rights 	<ul style="list-style-type: none"> - can affect innovation negatively 	<ul style="list-style-type: none"> - no legal protection - some of them require constant updating and active maintenance

6.4 IP protection strategies in Finland and the UK

In many countries businesses seem to set lots of value upon systematic IP protection. The overall impression is that IP protection has increasing importance for firms' competitive ability and its role is still likely to grow in the future. In few countries the protection is mainly based on the assumption that the effective distribution of information and knowledge is a successful way to protect intellectual property. On the other hand, in some countries businesses simply limit part of the key knowledge or sensitive information only to selected parties.

Protection strategies in Finland and the UK

In Finland the protection strategy is mainly based on the assumption that the effective distribution and capture of information and knowledge within the business is a successful way to protect intellectual property. Typically Finnish businesses are not restricting their employees' access to information. On the contrary, personnel are actively rotated from one work task to another. This facilitates efficient information circulation that diminishes the dependence on employees and avoids of losing valuable knowledge in the case of a key employee leaves the firm. Moreover, in order to shelter the company against risks which emerge from the employees' activity, Finnish companies often required their employees to sign a non-disclosure agreement, non-competition clause or recruitment freeze. These clauses would be assumed to restrict the staff from engaging in any kind of competitive activities which, indeed, would be one of the biggest threats to the Finnish business managers (Kuusisto, Päällysaho and Kulmala, 2005). However, since the mobility of qualified employees tend to be rather high, the need to capture and protect embodied IP is important. Therefore, the tacit knowledge bound into employees is often transferred into more explicit form by comprehensive documentation.

On the contrary, the UK business system was characterised by lower level of trust between the company and staff. Often the key knowledge was protected in the UK companies by preventing or limiting their own employees' access to sensitive information. It was very peculiar that rather than circulating duties, the work tasks were divided between employees so that each employee would control only a fraction of the entity. This would lead to the situation where no single person knows the overall picture about new products and services and may indicate a tendency to keep a core knowledge only within the reach of a few persons. The tacit knowledge bound into employees was not transferred on a large scale into more explicit form by documentation. Indeed, UK business managers may not perceive their employees indispensable to the company. They conceive more important to protect themselves against external threats, such as competitors or getting a patent litigation from external party (Kuusisto, Päällysaho and Kulmala, 2005). Furthermore, one of the central protection methods for the UK businesses was taking advantage of copyrights.

6.5 Industry specific differences

The primary asset of the analysed KIBS businesses is mainly knowledge and human capital, but in some cases intellectual property takes also physical forms. Still, service firms' production processes are often wholly dependent on the employees' knowledge and skills, and physical capital and materials are not in the significant role. Secrecy and fast innovation cycle are generally valued protection methods for firms independent of their business sector whereas

the importance of formal protection practises seems to vary sector by sector but also between individual businesses.

Sometimes formal IP protection system is too slow to accommodate businesses that are engaged in highly dynamic innovation cycles. The businesses operating in rapidly developing business sectors seem to prefer informal methods that reduce the risk of harmful imitation. Effective internal communications, ability to respond quickly to market demands and organizational flexibility can speed up the R&D and commercialization cycle to an extent that it creates an effective barrier to harmful imitation. Often the business managers in these sectors are sceptical of the value of formal IP protection that can even be harmful for the high-speed innovation process. Thus these businesses are not willing to integrate formal IP protection into firm's customary operations. However, the businesses engaged in less dynamic innovation cycles with longer R&D periods, often need also an effective formal IPR system.

**The most important industry specific differences in IP protection
(Figure 4)**

Software sector

The results highlighted that the protection in software sector is very technical in nature by comparison to other analysed business sectors. In addition, software firms are found to be the most active in using IPRs, and in particular patents. Copyright has earlier been the central protection method for software but the role of patenting in IP protection has increased. In software sector the IP strategy is often based on secrecy within the company, i.e. information and sensitive knowledge is limited so that only some of the employees have access to it. Besides, businesses are limiting externals' access to their premises. In addition, the employees are not perceived indispensable and various methods to improve staff commitment are not effectively devised.

Advertising sector

Advertising sector prefers guarding their intellectual property by a range of loyalty building strategies targeted at their staff, and this way prevented the sudden loss of core knowledge through the departure of a key employee(s). Furthermore, companies in this sector did not find it necessary to prevent or limit their own employees' access to sensitive information. Interestingly, also technical protection attracted a lot of attention within this business sector.

Business and management consultancy sector

Business and management consultancy paid the least attention to formal protection. Also technical protection turned out to be slightly less favoured protection instrument. In this sector the businesses were controlling externals' access to core information, and they also allowed only selected individuals to be exposed to the key knowledge, i.e. sharing of information was not particularly favoured. Managers in business and management consultancy sector considered a relative big share of their employees to be included in key members of staff. This may indicate various problems related to inefficient distribution of information inside the company.

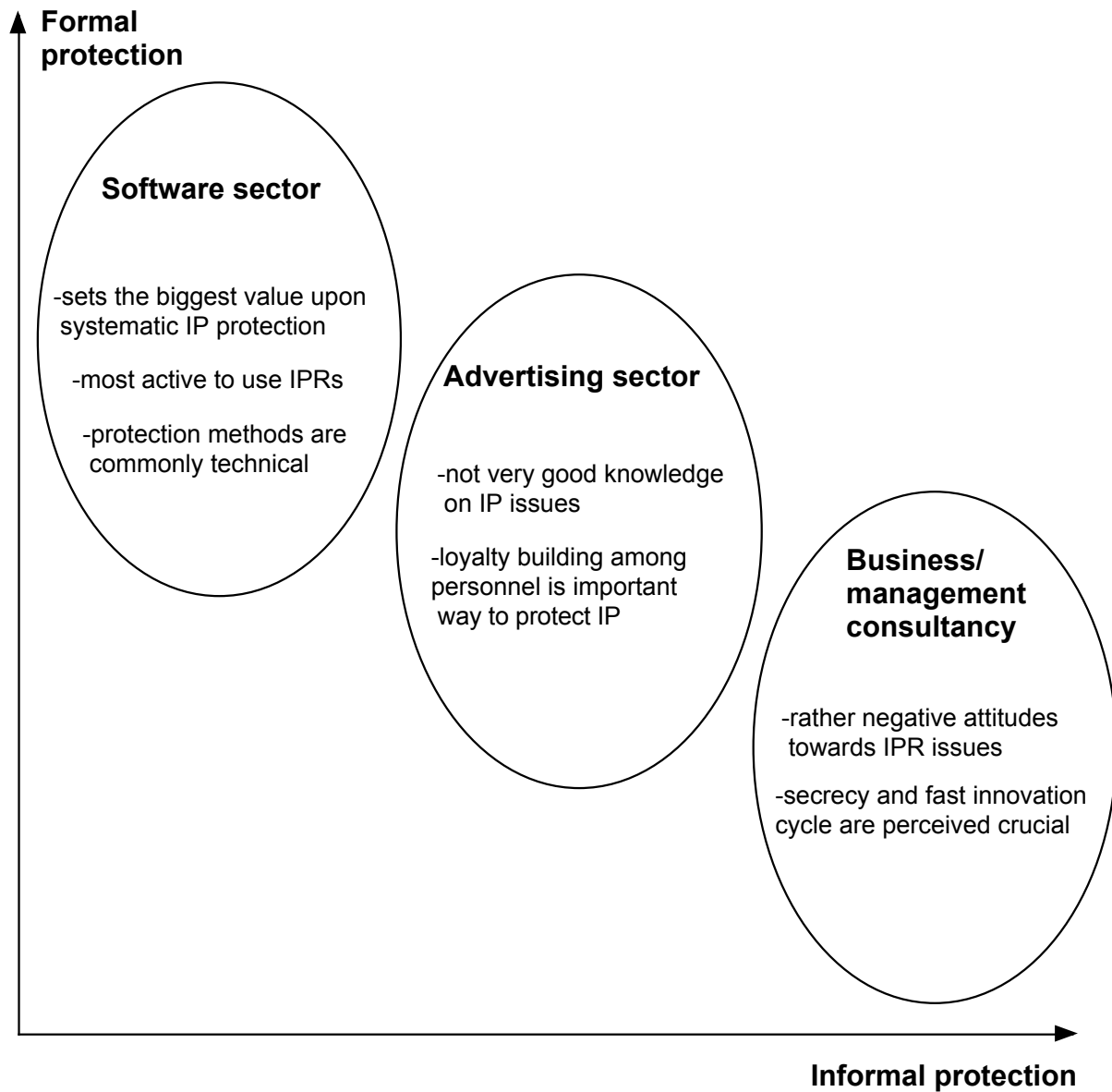


Figure 4. The most important industry specific differences in IP protection in three KIBS sectors

6.6 Differences in protection practises between size categories

The number of employees affects significantly the nature of IP protection in KIBS businesses. The likelihood that the company maintains an explicit plan seems to grow together with the size of the company. For instance, secrecy is generally a valued protection method for firms independent of their size, whereas the importance of restricting access to databases and different loyalty building methods seem to increase with firm size.

Often the IP activity grows with the size of the firm. This may be explained in the first place in terms of business views on costs and achievable benefits of enforcing different protection practices. Larger firms may be more likely to possess the resources and management expertise to acquire informal protection and particularly IPR system. Furthermore, larger companies may also have greater investments to protect and they simply may have more knowledge on the area.

Differences in protection practises between size categories

Micro companies (<10 employees)

Only a minority of the micro companies had a planned protection strategy. The protection was mainly based on efficient information and knowledge spreading inside the company, and businesses encouraged their employees to transfer the tacit knowledge into more explicit form e.g. by documentation. Furthermore, micro companies appeared to have rather negative attitudes towards secrecy, and thus limitation of key information only to selected staff was not very common. However, most of the micro companies did not effectively devise methods to improve staff commitment. It should be stressed that micro businesses tended to protect their IP by bringing new products and services to market quickly. Indeed, as a protection method, the fast innovation cycle seems to fit particularly well to fast developing sectors (e.g. Moore, 1996). Interestingly, also technical protection was important for micro companies.

Small companies (<50 employees)

Businesses employing 10 to 19 and 20 to 49 employees had fairly similar protection strategies. These businesses were found to put a high value on maintaining the effective staff loyalty and thus preventing the sudden loss of core information through the departure of a key employee. Commonly these businesses reported limiting the key information to selected individuals and they restricted employees' access to particular files or databases,

6.7 Innovativeness and knowledge protection

On average, the large firms seem to be more innovation intensive than smaller firms (see e.g. Hughes 2000). However, management literature indicates that small firms also have a crucial role to play in innovations and it is true, that at least in some sectors small businesses play an important role in technological innovation. In small and large firms the innovation activity is different, reflecting their relative strengths and weaknesses. Small firms seem to have organizational advantages that allow them to respond quickly to changing market demands. On the contrary, large firms are able to maintain e.g. management teams, attract highly skilled technical specialists and support large R&D facilities.

Informal and formal methods used for protecting innovations

The analysis demonstrates that highly innovative service businesses (see Appendix 1) are likely to put more effort into systematic IP protection than moderately innovative and non-innovative firms. They use different types of formal and informal protection methods, and many of them have well-defined plan for IP management and protection. The protection strategies in highly and moderately innovative businesses are often fairly similar. Typically these businesses do not restrict staff access to confidential information; instead they encourage the effective distribution and capturing of knowledge inside the business. There is an emphasis on effective capturing and documentation of tacit knowledge and new ideas. Especially the highly innovative service businesses regularly introduced effective security measures and e.g. limited externals' access to their premises. Moreover, innovative firms had a tendency to make effective use of various formal methods, e.g. patents and trademarks, as a way to protect their specialist knowledge. To conclude, it seems that innovative businesses are able to protect their IP with various ways.

In non-innovative businesses the IP protection strategy was often based on secrecy within the company, i.e. information and sensitive knowledge was limited so that only some employees had access to it. Typically the databases or files were secured with passwords. The tacit knowledge bound into employees was neither captured nor transferred into more explicit format, as was the case in more innovative companies. Typically these businesses did not restrict externals to access to their premises. Finally, less-innovative businesses were not very capable of making use of any formal or semi-formal protection practices. In this group businesses did not hold any patents or utility models. Non-innovative businesses did not either see the potential benefits of various contract clauses as important way to shelter the business against risks which emerge from the employee's activity. This all would seem to give further support for the finding that highly innovative businesses are likely to put more value upon systematic IP protection.

6.8 Informal and formal methods used for protecting innovations

In the knowledge protection, the formal and informal IP protection practices reveal the close and complementary relationships. This highlights the necessity and usefulness of the mixture of different of informal IP protection practices. It can be argued that various combinations of formal and informal methods provide the most effective protection for innovations.

Figure 5 illustrates stylised innovation lifecycle and the key protection method(s) in each development stage. In the early phase of the innovation life cycle, the only suitable protection methods are informal, such as secrecy and documentation. Formal IP protection methods (e.g. patents) are needed more obviously at the commercialization phase, if their use in general is meaningful and possible. This problem area is emphasized especially the case of multidimensional service innovations. Intangible innovations are often very difficult to protect by means of formal IPR. Instead, informal IP protection is possible for all types of innovations and throughout the entire innovation lifecycle. Informal methods are relevant prior, during the patenting process and after the patents have been granted. Therefore, informal and formal protection methods are not mutually exclusive or even competing, but rather supporting each others.

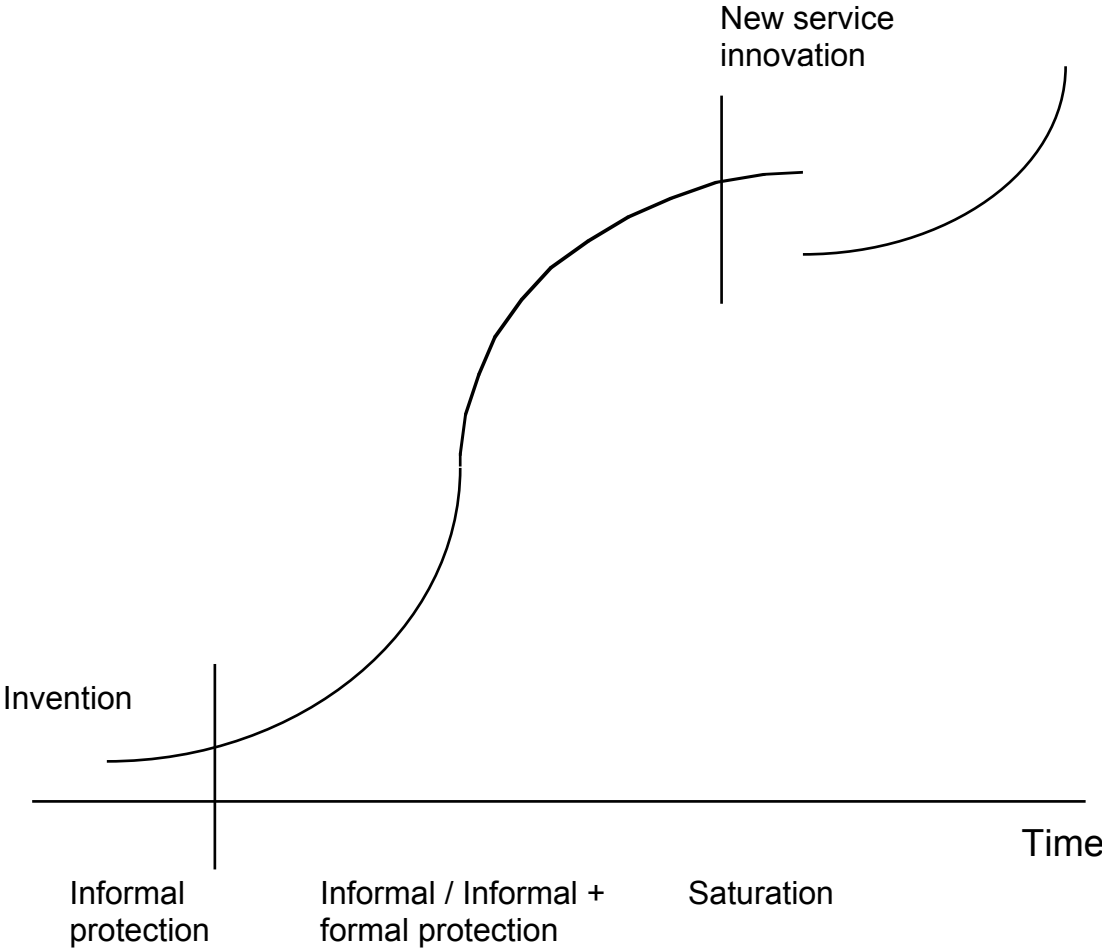


Figure 5. The usefulness of informal and formal protection methods during the innovation’s lifecycle

7

Useful web pages

WIPO – World Intellectual Property Organization

<http://www.wipo.int>

EPO - European Patent Office

<http://www.european-patent-office.org/>

European Commission

http://ec.europa.eu/internal_market/top_layer/index_52_en.htm

IPR-Helpdesk

<http://www.ipr-helpdesk.org/index.html>

U.S. Patent and Trademark Office (USPTO)

<http://www.uspto.gov/>

Office for Harmonization in the Internal Market (OHIM)

<http://oami.europa.eu/en/default.htm>

esp@cenet - Europe's network of patent databases

<http://www.espacenet.com/index.en.htm>

Eureka – A Network for Market Oriented R&D

<http://www.eureka.be/home.do>

Enterprise Europe Network

http://www.enterprise-europe-network.ec.europa.eu/index_en.htm

IFIA - International Federation of Inventors' Associations

<http://www.invention-iffia.ch/>

SC-Research

<http://www.sc-research.fi/>

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Appendix 1.

Survey Data of KIBS

Descriptive analysis and sample construction

This chapter presents the statistical material collected through a telephone survey in two countries, Finland and the United Kingdom. The study covered 300 small businesses in three knowledge intensive and innovative sectors (see Table 1): (1) Software consultancy and supply (NACE 72.2), (2) Business and management consultancy activities (NACE 74.14) and (3) Advertising (NACE 74.40). The literature demonstrates that this type of industry sectors are characterised by the use of informal methods in their IP protection (see e.g. Kitching and Blackburn, 1998; Miles et al., 2000; 2003).

Table 1. Research sample by sector and size category

Size category	No. of firms in software sector	No. of firms in business/management consultancy sector	No. of firms in advertising sector	Total
0 < 10	33	39	43	115
10 < 20	28	31	30	89
20 < 50	39	30	27	96
Total (N)	100	100	100	300

The aim of this research was to understand how intellectual property (IP) is managed, disseminated and protected within knowledge-intensive companies. The survey elicited quantitative data on internal and external intellectual property protection and on problems that Finnish and UK KIBS business managers face with the IP protection. Furthermore, the focus was on the protection and management practices in those situations where the knowledge and innovations are mainly intangible. Table 2 illustrates some basic descriptive indicators of various industries.

Table 2. Sample description by country, business sector and company size

	All Firms (N=300)	FIN (N=150)	UK (N=150)	SW (N=100)	B/M (N=100)	AD (N=100)	< 10 (N=100)	< 20 (N=100)	< 50 (N=100)
Employees, mean	18	17	19	21	18	15	6	13	37
Age of the firm, mean (years)	13	13	14	12	12	16	13	12	15
Turnover, mean (M€)	5.6	2.2	9.5	11.2	2.4	3.1	8.3	1.7	6.1
Turnover, median (M€)	1.3	1.1	1.8	1.3	1.4	1.3	0.6	1.2	3.0
Proportion of firms having export sales (%)	48	48	49	51	52	42	37	45	66
Proportion of export sales from turnover, means (%)	23	19	27	32	24	11	18	19	29
Proportion of tailored products, mean (%)	76	76	76	59	79	90	84	72	71
Proportion of key employees, mean (%)	47	36	58	43	54	43	64	45	27

(SW = software consultancy and supply, B/M = business and management consultancy activities, AD = advertising, < 10 = firms with 0-9 employees, < 20 = firms with 10-19 employees, < 50 = firms with 20-49 employees)

The size and age of the companies

The average (mean) was 17 and 19 employees in Finland and the UK (respectively). The average age of the firms was 13 years in Finland and 14 years in the UK. Median age was 12 years for both countries. Business/management consultancy sector is regarded a relatively new industry particularly in Finland and, indeed, in this business sector the oldest company belonging to this survey had been founded as late as in 1980. On the other hand, the oldest UK firm in this business was more than half a century old.

Turnover

The business sector averages (means) for turnover varied between 2.4 and 11.2 M€, whereas the medians varied just between 1.3 and 1.4 M€. The significant difference between averages and medians is explained with few very large companies that bring the averages up. As can be seen by studying the medians, most companies are, however, having relatively minor revenue. Majority of the surveyed companies (62 %) had turnover not exceeding 2 M€ in their last financial year. Moreover, only 5 % of the businesses had annual revenue bigger than 10 M Euros.

Export sales

Almost half of the Finnish and the UK firms reported export sales over the last 2 years. It appeared that the micro companies were less active exporting their products than bigger companies. Only around 37 % of the companies employing 1 to 10 employees reported selling products or services also outside of the country. Among surveyed companies, the percentage of turnover accounted for by exports ranged between zero and hundred. The business sector averages (means) for share of export sales varied between 11 % and 32 %. However, at the individual level, there were few firms in the sample that exported the biggest part of their sales, while most firms exported very little, reflecting the local nature of most KIBS services.

Specifically tailored products

Rather than standardised off-the-shelf products, a high proportion of KIBS businesses' output by sales is known mainly to be in the form of products and services tailored to the individual clients needs (see e.g. Tether, Hipp and Miles 2001; Aslesen and Isaksen, 2004). According to this survey, both in Finland and UK specifically tailored products accounted approximately for 76 % of businesses' turnover. Interestingly, there were significant differences between the business sectors. The managers in software sector reported their share of customised products and services to be on average only 59 % of their total annual turnover. This is somewhat less than is the case in management/business consulting and advertising sectors, which reported the share of custom tailored products and services between 79 % and 90 % (respectively). This conforms the results of earlier surveys (see e.g. Miles, 2003), where software sector has shown a relatively low share of tailored products that distinguishes it from typical KIBS sectors.

The number of key employees

As a key employee is meant those employees whose permanent absence would cause significant operational or financial difficulties for the business, regardless of their education degree. The survey data demonstrated that the share of key members in staff varied from 0 to 100 % among the sample firms. Interestingly, the UK business managers reported a bigger share of their employees to be counted as key members of staff compared to Finnish businesses (58 % and 36 %, respectively). The data did not highlight any considerable variation between various business sectors but the share of key employees had a negative correlation with the size of the company especially in the UK. Generally, the share of employees whose sudden departure would cause serious problems for the business tended to decrease when the total amount of staff increased. This for one further supports the argument noted in some earlier studies (see e.g. Mikkonen and Uusitalo, 2003): SMEs and especially small firms, which have staff less than 50, tend to be the most dependent on their personnel.

Innovativeness index

Analysis of service innovation has gradually expanded, mainly during the last decade (see, e.g. Gallouj, 2002). Typically service innovations are multi-dimensional, and they include intangible elements, interaction and process features (Ark, Broersma and Hertog, 2003; OECD, 2006). Previous studies have developed taxonomies for classifying companies according to the precise emphasis of their innovation activities (e.g. Kitching and Blackburn, 2003). Here, a similar procedure was used to divide the respondents into three different groups based on their comments concerning the introduction of new or significantly modified products/services, internal working methods (i.e. methods aimed at improving things within

the business itself) and working practises in relation to the customers (such as improved delivery systems or improved interaction with the customers). The three groups are following:

- **highly innovative businesses** - business managers reported the introduction of significantly improved or new products/services; and the introduction of new or significantly improved internal working practices; and the businesses had significantly improved working practices in relation to the customers over the last 2 years.
(n = 182, 60 per cent of the surveyed businesses)
- **moderately innovative businesses** - business managers reported either the introduction of significantly improved or new products/services; or the introduction of new or significantly improved internal working practices; or the businesses had significantly improved working practices in relation to the customers over the last 2 years.
(n = 107, 36 per cent of the surveyed businesses)
- **non-innovative businesses** - business managers did not report any introduction of significantly improved or new products/services; and the businesses had not introduced any new or significantly improved internal working practices; and they had not significantly improved any working practices in relation to the customers over the last 2 years.
(n = 11, four per cent of the surveyed businesses)

Not surprisingly, the highly innovative businesses group comprised the biggest part of the businesses. The study did not highlight any considerable variation in the level of innovativeness between the countries. Around 57 % of the Finnish businesses and 63 % of the UK businesses clustered into the highly innovative businesses group. About two per cent of the Finnish businesses and five per cent of the UK businesses were completely non-innovative. There was not any big sectoral variation. This further supports the view of Wood (1997) that most industries contain a wide variety of innovator types. Interestingly, around six per cent of the advertising businesses were categorised as non-innovative compared with two and three per cent of businesses in the other two sectors. However, it should be noted that the difference was not statistically significant.

The significant finding is that the level of innovativeness correlates remarkably with the size of the company. Micro companies (with less than 10 employees) were likely to be less innovative than the companies having bigger staff. Only half of the micro companies (46 %) fell into highly innovative businesses category in comparison to 63 % and 75 % of businesses employing 10 to 19 employees and 20 to 50 employees (respectively). Finally, another distinctive feature is that not a single business belonging to size category of 20 to 50 employees clustered into 'non-innovative businesses'.