



HELSINKI UNIVERSITY OF TECHNOLOGY
Software Business Laboratory
Institute of Strategy and International Business



Finnish Software Product Business: Results from the National Software Industry Survey 2005

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Petru Huurinainen, Markku Maula, Mika Ahokas, Jyrki Kontio



Centre of Expertise
for Software Product Business



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Ohjelmistotuoteliiketoiminnan osaamiskeskus

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2005

ISBN 952-99529-4-5
ISBN 952-99529-5-3 (PDF)

FOREWORD

The software product-based business has been considered an important and potential growth sector for Finland. In a recent, national initiative the growth targets for the industry have been set to reach an annual turnover of 15 billion euros by the year 2015. In order to reach this growth objective, this would require about 25% annual growth rate for the next 10 years. Given the economic international growth potential of this industry, this level of growth is not only possible but also the growth path that the industry should aim at. Based on the findings of this report, the Finnish software product industry has many of the prerequisites for high growth and success: strong technology base, skilled workforce, strong national focus on research, and, increasingly, experienced pool of executives with international experience.

However, there are substantial challenges that need to be remedied in order to facilitate the targeted growth. First, the owners and executives of software companies need to have the willingness and drive to aim at high growth and success. There is great potential in software but that potential can only be untapped if there is enough entrepreneurial commitment to get there.

Second, we need to find better ways of allowing the entrepreneurs to take the risks required by such commitments. Software product business requires investments and, in most cases, software companies need external capital in order to achieve this growth. The domestic venture capital market has become increasingly active and competent, but we also need to be able to attract foreign venture capitalists to Finland. They have more resources and can accelerate and ensure the internationalization and growth of a software company.

Third, we need to raise the level of awareness and knowledge of the software business and international business in the boards, executive teams, and management teams of software product companies in Finland. Knowledge-sharing, training programs, mentoring, university education, and networking all need to be enforced to boost competence development at all levels. Cooperation between industry and universities is a crucial part of this activity.

Fourth, we also believe that research in software business and software technologies is fundamental for sustained growth and success of the industry. Both companies and the government need to ensure that Finland's investments in research and product development will be kept at levels that keep Finland in a competitive position in this area. One example of such research is the survey, which is presented in this report. It is one of the longest running studies in software product business in the world. The findings from this type of research will give us better insights to understand the special characteristics of the industry – and also to leverage this understanding by turning it into better business.

This year's report shows that in 2004, the industry grew by 21%. That is an excellent growth rate, given the global and national economic situation. However, it is not quite enough; we need higher growth in the future years. We hope that this report will help initiate the actions required to enable this growth.

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ABSTRACT

The state of the software product industry in Finland has improved from the previous year. In 2004 the software product turnover grew by 21% reaching 1.19 billion Euros. Also the international sales increased by 7% amounting to 405 million Euros (380 million Euros in 2003). Development of the industry revenue is presented in the figure below. The profitability of the industry also improved during 2004: profitability increased from the previous year's 0.1% to 2.2%. In addition, employment increased in 2004: the amount of employees in the Finnish software product business increased by 3.3% from previous year to 12 400 software professionals. Unfortunately, revenue per employee was only 111 000 € (113 000 € in 2003). However, growth was evident in small, medium-sized, and large companies. The future expectations of the companies are also more optimistic than year ago e.g. companies are planning to recruit more personnel in 2005.

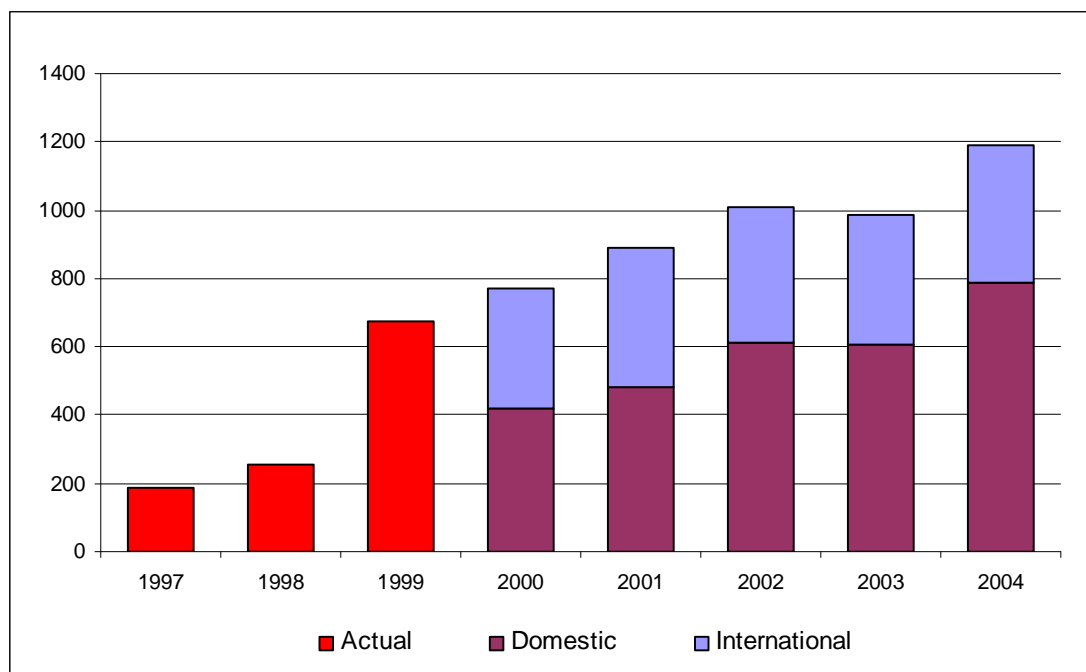


Figure: Development of the Finnish Software Product Business Turnover

This report contains the findings of the 8th national software product industry survey, which was jointly performed by the Software Business Laboratory and the Institute of Strategy and International Business of the Helsinki University of Technology. The objective of this survey is to provide basic information about the current state of the Finnish software product business. This research was commissioned by the Centre of Expertise Software Product Business in co-ordination with Ministry of Trade and Industry and National Technology Agency.

This survey focused on the *software product companies* i.e. companies that sell software products they themselves design, develop, and maintain. The survey was carried out in May-June 2005 using a web-questionnaire and it reached 220 companies, which represents ca. 20% of the estimated 1 100 Finnish software product companies. The responding companies were estimated to generate over 65% of the whole industry's revenues and over 87% of the international revenues of the industry.

On average, founders and their family members owned 73% of the Finnish software product companies, with only minor foreign (4.2%) and external ownership (3.7%). Lack of capital was seen as a major barrier for the emergence of new companies, especially by the young companies, with 64% of the 0-2 year-old companies indicating so. A few years ago the weakened venture capital situation decreased the product development investments of the young companies in particular. This has emphasized the role of public funding in the role of financing companies in the early product development phase.

The current financing situation is causing significant product development reduction and also reduction in the internationalization attempts of the existing companies. 31% of the companies seeking external financing reported that they had to change their business plans due to problems with the availability of financing. Therefore, it is important for the success of the Finnish software product industry that the most promising companies could find the financing they need. Companies' intentions to seek external finance during 2005 and 2006 are presented in the figure below.

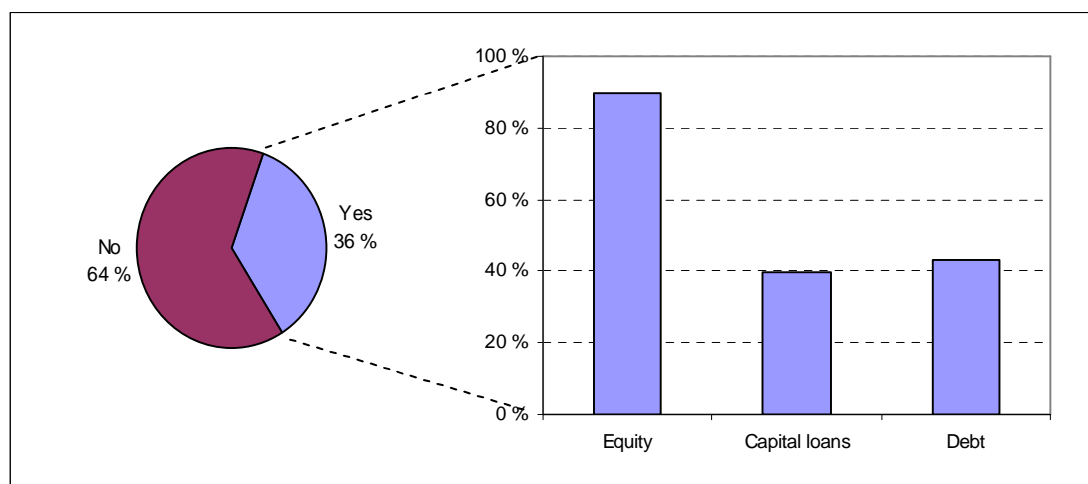


Figure: Intentions to Seek for External Finance during years 2005-2006

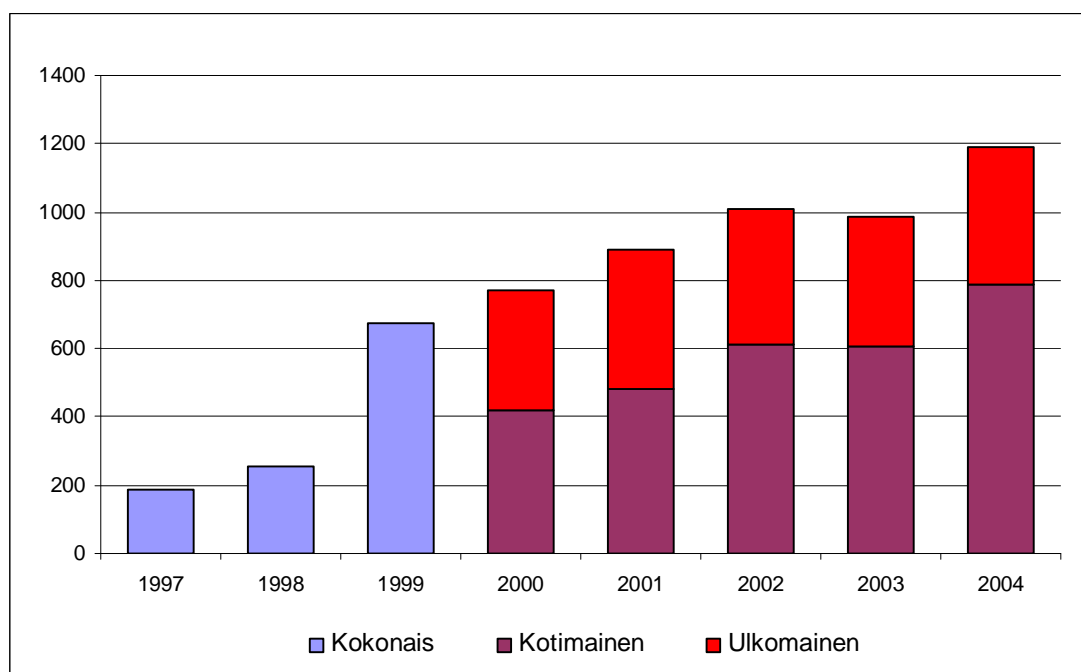
Of the respondents, 46% had some international operations. The most important export countries were again Sweden, Germany, and USA (same as in 2003 and 2002). Even though there are many international companies in the sector, there is a gap between initial foreign sales and full internationalization, as 57% of the internationalized companies received less than 25% of their revenues from abroad and as only 15% of the internationalized companies received more than 75% of revenues from abroad

All in all, change for the better has arrived: the software product revenue grew significantly and the profitability of the companies increased. Also the amount of personnel increased in 2004 and the companies are also planning to recruit more people this year. Unfortunately the revenue per employee figure is still low compared to the most successful countries in this area, such as USA and Israel. The financing situation is also very challenging for the young companies and for companies planning internationalizing their business.

This study brought up some issues that are critical in the development of the software product industry. These development areas include: improving the understanding of the SW product business, strengthening and developing networks and supporting services in case of small companies, and improving the internationalization capabilities especially in case of the SMEs.

ABSTRACT IN FINNISH

Suomalaisen ohjelmistoliiketoiminnan tila on parantunut viime vuodesta. Vuonna 2004 ohjelmistoliiketoiminnan liikevaihto kasvoi 21 prosenttia ja oli kokonaisuudessaan 1,19 miljardia euroa. Myös ulkomainen liiketoiminta kasvoi 7 prosenttia ollen 405 miljoonaa euroa (380 Me 2003). Liikevaihdon kehityksen kuvaaja on esitetty alla. Ohjelmistotuoteliiketoimintaa harjoittavien yritysten kannattavuus parani 2004: kannattavuus nousi 0,1 prosentista 2,2 prosenttiin. Tämän lisäksi alan työllistyvyys lisääntyi 2004: suomalaisen ohjelmistotuoteliiketoiminnan työllistämien määrä kasvoi 3,3 prosenttia ja oli noin 12 400 henkeä vuoden 2004 lopussa. Valitettavasti liikevaihto per työntekijä jäi edelleen matalaksi ollen vain 111 000 euroa (113 000 € 2003). Tästä huolimatta kasvua oli selkeästi havaittavissa niin pienten, keski-suurten kuin suurtenkin yritysten kohdalla. Tulevaisuuden odotukset olivat positiivisemmat kuin vuosi sitten, yritykset esimerkiksi suunnittelevat rekrytoivansa lisää henkilöstöä tänäkin vuonna.



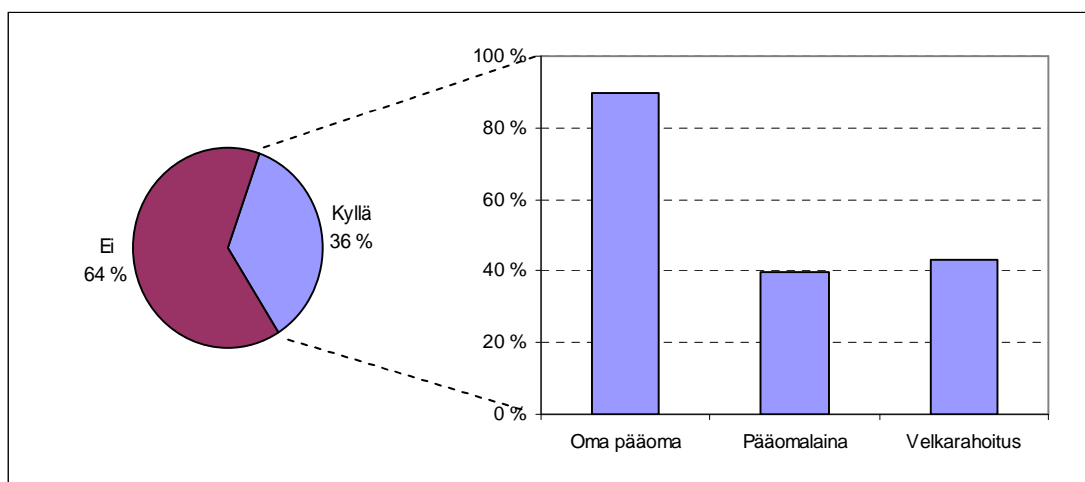
Kuva: Ohjelmistoliiketoiminnan liikevaihdon kehittyminen 1997-2004

Tämä raportti sisältää tulokset kahdeksatta kertaa järjestetyn suomalaisen ohjelmistotuoteliiketoiminnan kartoituksesta, joka suoritettiin Teknillisen korkeakoulun Ohjelmistoliiketoiminnan laboratorion ja Yritysstrategian ja kansainvälisen liiketoiminnan laboratorion toimesta. Raportin tavoitteena on luoda yleisluontoinen katsaus suomalaisen ohjelmistoliiketoiminnan nykytilaan ja rakenteisiin. Tutkimuksen toimeksiantajana oli Ohjelmistotuoteliiketoiminnan osaamiskeskus, yhteistyössä KTM:n sekä Tekesin kanssa.

Tämän kartoituksen kohteena olivat ohjelmistotuoteliiketoimintaa harjoittavat yritykset eli yritykset, jotka myyvät ohjelmistotuotteita joita he itse kehittävät, toteuttavat ja ylläpitävät. Kysely toteutettiin verkkokyselynä touko-kesäkuussa 2005 ja omaa ohjelmistotuoteliiketoimintaa harjoittavista yrityksistä tavoitettiin 220 eli n. 20% alan 1 100 yrityksestä. Vastanneet yritykset muodostavat arviolta yli 65% koko toimialan liikevaihdosta ja yli 87% kansainvälisestä liiketoiminnasta.

Keskimäärin perustajat sekä heidän perheenjäsenensä omistavat 73% suomalaisista ohjelmistotuoteyrityksistä ja yksityisten pääomasijoittajien sekä ulkomainen omistusosuus on hyvin pieni (3,7% ja 4,2%). Riskipääoman puute nähdään yhtenä syynä sille ettei uusia yrityksiä synny lisää, erityisesti nuoret yritykset kokivat varhaisen vaiheen riskirahoituksen puutteen edelleen keskeiseksi esteeksi uusien ohjelmistotuoteyritysten synnylle (64% alle 2 vuotiaista yrityksistä). Muutaman vuoden takainen kehitys rahoitusmarkkinoilla on vähentänyt etenkin nuorien yritysten tuotekehitysinvestointeja. Tämä lisää julkisen rahoituksen roolin tärkeyttä etenkin tuotekehityksen varhaisten vaiheiden rahoituksessa.

Tämän hetkinen rahoitustilanne on vaikuttanut merkittävästi ohjelmistotuotekehityksen vähentymiseen ja myös vähentänyt yritysten kansainvälistymishankkeiden toteuttamista. Ulkoista rahoitusta hakevien yritysten määrään nähden melko suuri osa vastanneista yrityksistä (31%) ilmoitti joutuneensa muuttamaan liiketoimintasuunnitelmiaan rahoituksen saatavuuteen liittyvien ongelmien vuoksi. Tämän takia olisi tärkeää että lupaavimmat suomalaiset yritykset pystyisivät hankkimaan tarvitsemansa rahoituksen. Alla olevassa kuvassa on esitetty ulkoisen rahoituksen hakemisen jakautuminen.



Kuva: Ulkoisen rahoituksen hakeminen vuosina 2005-2006

Vastanneista yrityksistä 46 prosentilla oli kansainvälistä liiketoimintaa. Tärkeimmät kohdemmaat olivat Ruotsi, Saksa ja USA (samat kuin 2003-2002). Suuri osa yrityksistä on kansainvälistymisprosessin alussa (57% yrityksistä saa alle 25% liikevaihdostaan ulkomailta,) mutta osa yrityksistä on erittäin kansainvälisiä (15% yrityksistä sai yli 75% liikevaihdosta ulkomailta).

Kaikenkaikkiaan muutos parempaan päin on nähtävissä: ohjelmistotuoteliiketoiminnan liikevaihto kasvoi merkittävästi 2004 ja kannattavuus parantui. Henkilöstömäärä kasvoi 2004 ja yritykset aikovat rekrytoida lisää myös tänä vuonna. Valitettavasti liikevaihto per työntekijä on yhä alhainen verrattuna alan menestyksekkäimpiin maihin kuten USA ja Israel. Tilanne rahoituksen hankkimisessa on edelleen haasteellinen nuorten ja kansainvälistymistä harkitsevien ohjelmistoyritysten kohdalla.

Tämä tutkimus toi esiin muutamia alan tulevaisuuden kehitykselle tärkeitä kehittämiskohteita kuten ohjelmistojen monistettavuuteen perustuvan liiketoimintaosaamisen kehittämisen, erityisesti pienten yritysten verkostojen sekä tukipalveluiden kehittämisen ja vahvistamisen sekä kansainvälistymisosaamisen jatkokehittämisen erityisesti pienten ja keskisuurten yritysten osalta.

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1 INTRODUCTION

1.1 Background

In 2004 the worldwide packaged software market was approximately 190 billion Euros and it is expected to reach 215 billion Euros in 2006 (EITO 2005). It is the fastest growing IT market sector and is estimated to account for nearly a quarter of all IT spending by 2006 (IDC 2003). The U.S. software market is the largest market for software, accounting for almost 45% of the world market. The European software market was approximately 67.2 billion Euros in 2004 and is forecasted to grow significantly, to 75 billion Euros in 2006.

According to EITO's report in 2005, the European ICT investments are expected to grow from 630.9 billion euros in 2004 to 682 billion euros in 2006. The worldwide ICT market was 1959 billion euros in 2004. Software products had a 10% share of the whole ICT market in 2004.

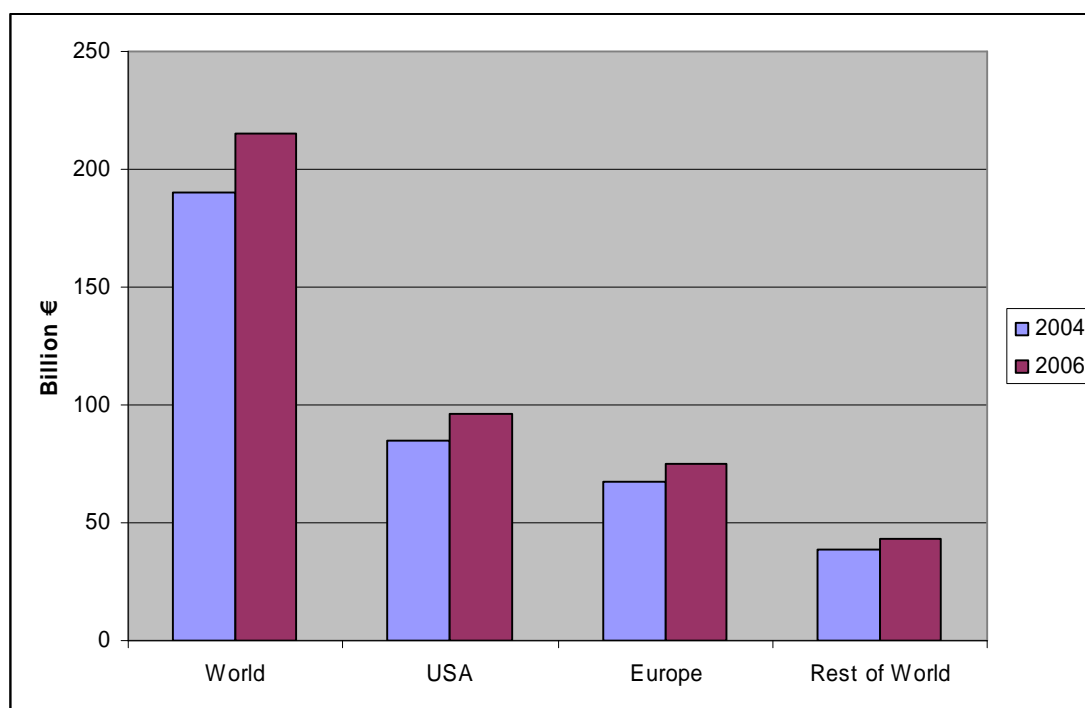


Figure 1. World Software Product Market Growth in 2004 and Growth Estimate of 2006 (EITO 2005)

In Finland, the software industry has grown rapidly during the 1990's. The total revenue for 1999 has been estimated at 1.6 billion Euros (Nukari and Forsell 1999). The European companies have lagged behind the U.S. firms in the packaged software segment, due, e.g., to small and diverse home markets, low degree of productization¹ and

¹ We are using the term "productization" in this report to refer to the degree of standardization in the software offering of a company., both in terms of technology and marketing. Technically, the word "productization" is not formal English, but it is being used relatively widely in the field.

internationalization, and weak links to universities (Malerba and Torrisi 1996). This seems to be true also for the Finnish companies. The trend, however, seems to be towards greater degrees of both productization and internationalization, i.e., from custom software developed for local markets towards mass-market software intended for international distribution.

Unfortunately, the Finnish software product industry does not have any industrial classification code of its own, making even the basic statistics unavailable. To alleviate this problem, the Center of Expertise for Software Product Business, has initiated a series of national software industry surveys. Previous studies have been carried out in 1997 and 1999-2003. This report contains the findings of the 8th national software product business survey, conducted by the Software Business Laboratory and the Institute for Strategy and International Business of the Helsinki University of Technology. This research study was commissioned by the Center of Expertise for Software Product Business in co-ordination with Ministry of Trade and Industry and National Technology Agency (Tekes).

1.2 Software Products and Software Product Business

The offerings of the software industry can be roughly divided into three categories: software products, customer tailored software (or customized software), and embedded software, as shown in Figure 2 below (Nukari and Forsell 1999). In this study, we are interested in *software products* as a product category that is distinct from embedded or integrated software on one hand and customer tailored software on the other. We make accomplish this by examining the *object of trade* and the *degree of customization*.

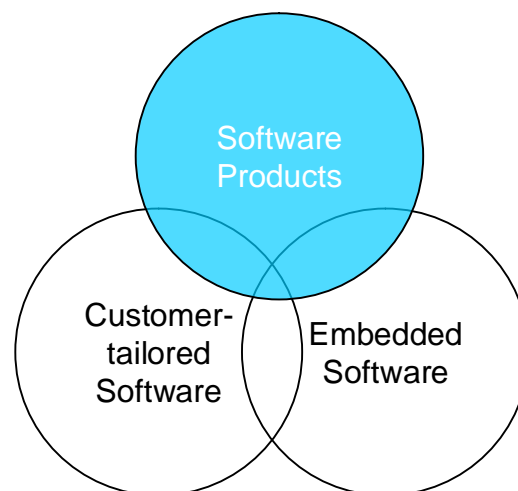


Figure 2. Types of Software Products (Nukari and Forsell 1999)

1.2.1 Object of Trade

Software products are traded on their own, not as part of other products. Although software product business often includes other things, such as installation, training, and even customization, the main object being traded is software.

Embedded software, on the other hand, consists of software that is built into other products, such as cellular phones, refrigerators, paper machines, or television sets, and not sold separately. Though embedded software has several characteristics of "pure" software products (developed once, sold in many identical copies, high development

costs, and low manufacturing costs), it is excluded from this study since it can not be bought separately.

1.2.2 Degree of Productization

Software can be prefabricated, developed specifically to the needs of each customer, or both. This dimension, the degree of productization, is crucial for differentiating between software product and project business. The degree of productization ranges from standard “packaged” software products that are delivered “as is” i.e. without any changes to a large number of customers, to customer tailored software, i.e. software that is developed according to the requirements and needs of individual customers. Figure 3 illustrates this degree of productization and shows the positioning of software products within it.

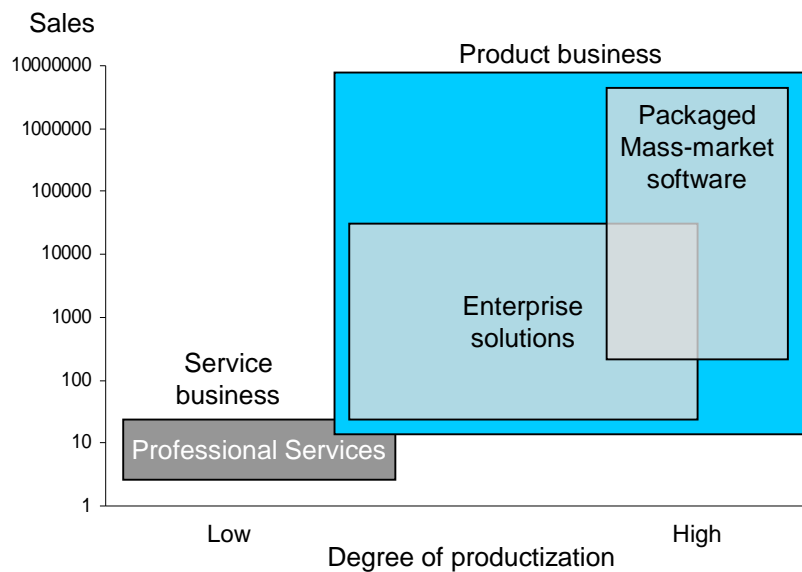


Figure 3. Software Product and Service Business (Hoch et al. 1999)

Productization means the standardization of the elements in the software offering. The term productization includes several technological elements from the very early stages of designing a product (i.e. the management of the user requirements, selection of the underlying technology, design of the product architecture etc.) to the commercial elements of selling and distributing the product (i.e. delivery channels, positioning of the product, and after sales activities). Some of the key elements influencing the degree of productization are product market, concepts, benefits, positioning, requirements, features, specifications, delivery channel, marketing, selling, and packaging (adapted from Cooper 2000).

Pure software products are highly productized and often referred to as packed, mass-market, or shrink-wrap software. These kinds of products are delivered to a large number of customers in exactly the same format –without any customer tailoring. This being the case, the product development and order-delivery processes are completely separated. Software products of this kind can be sold to millions of customers with close to zero marginal costs since there are hardly any traditional manufacturing costs. For example, the costs of the first CD containing the Microsoft Windows 95 operating system were above \$1 billion. The cost of producing the second CD was less than \$3 (Hoch et al.

1999). Typical examples of packaged software products include word processing software, spreadsheets, accounting software and operating systems.

In the enterprise application business at least some customization is almost certainly needed in order to implement and integrate the software to suit the customers' processes and other information systems and IT infrastructure. This also places certain limits to the number of customers; the number of customers is in the hundreds or thousands rather than in millions. Installation projects may take months or even years, instead of hours or minutes required by mass-market software products. However, enterprise solutions business is based on pre-developed software products, making it a highly productized business. In many cases, the customization is made by changing the program's configuration (parameterization) thus requiring no changes to the actual software product (and its source code).

At the low end of the productization spectrum, still belonging to software product business, we have occurrences in which the customization is done by changing the source code of the software product on a customer specific basis. Here, the distinguishing feature is that the amount of work going into customer-specific tailoring is small compared to the whole effort of the actual product development.

Customized software consists of software developed to the requirements and needs of individual customers. This business is often based on selling projects, not software, and has many characteristics of the service industry. Although synergies exist between product and service businesses, extending the business beyond company's dominant position is very challenging as these sectors differ significantly. There is strong evidence that majority of the service companies have failed their product business initiatives. Some of the main differences between the product and service businesses are listed in Table 1 (Nambisan 2001).

Table 1. Comparing Product and Service Companies on Five Key Issues (Nambisan 2001)

Key issue	Software product companies	Software service companies
<i>Intellectual property rights</i>	Very important	Less Important
<i>Product complementary</i>	Very important	Less Important
<i>Returns from scale</i>	A fixed-cost structure allows for higher returns from scale	A variable-cost structure makes increased returns from scale rare
<i>Abstracting knowledge and integrating technology</i>	The company must be able to gather generic product knowledge so that the product can be used in a variety of contexts.	Knowing clients' idiosyncrasies is more important than the knowledge abstraction.
<i>Connections with users</i>	Architecture level technology integration is important for the smooth running of the end product Companies have long-term relationships: typically the users are technologically sophisticated	Companies rely upon data-interface-based technology integration: the primary emphasis is on development efficiency Companies have project-driven relationships: typically, the users are technologically unsophisticated

1.3 The focus of the survey

The focus of this survey is the Finnish software product companies and their software product business. In this survey we define the software product and the software product business as follows:

- Software product is an application that is productized and can be customized to suit the customers' needs by configuration
- Software product business is business concerning software products where the customer tailored parts are not an essential part of the whole software
- Own software product business is software product business, which is based on company's own, in-house developed and maintained software products

In Finland the software product industry generates approximately 30% of the whole software industry's revenues. The scope of the survey is presented in Figure 4 below.

Decisions concerning SW product business are made:

		in Finland	Abroad
SW development is done:	in Finland	Included	Included
	Abroad	Included	Not included

Figure 4. The Scope of this Survey: the Finnish Software Product Companies

2 THE FINNISH SOFTWARE PRODUCT INDUSTRY: CURRENT SITUATION AND FUTURE PROSPECTS

2.1 Review of the Research on the Finnish Software Product Industry

The Finnish software product industry has not been thoroughly studied, as is the case in many other countries, including the U.S. Seppänen et al. (2001) has studied software industry research in the U.S. and they suggested two main reasons for the lack of research in this area. First, software product industry was found to be so complex that defining and setting the frames for the industry is extremely hard, if not impossible. Second, it could be argued that there is no such industry as a software product industry. The second argument assumes that software does not differ from other information products and, therefore, there is no need to study software separately from. Consequently, the number of studies related directly on software product industry is very limited.

However, there exist a recently published research study performed jointly by the Universities of Oulu and Jyväskylä focusing on the strategic development evaluation of the entire software industry (Tyrväinen, Warsta and Seppänen, 2004). This study addressed the current situation and the future prospects of the entire Finnish software industry.

The two main analyses of the Finnish software product industry that have been conducted are Autere et al. (1999) and Nukari and Forssell (1999). Autere et al. analyzed the state and growth potential of the Finnish software product industry and the problems it faces. They listed financing as a major problem in addition to commercial services such as PR, marketing, law, and education of professionals in the fields of software engineers, product management specialists, and international sales experts. They also pointed out the importance of clustering and networking between the companies in the industry. In addition, Autere et al. pointed out that companies should have a standardized software product or components that can be copied and reproduced with low, close-to-zero marginal costs.

Information about the fundamentals of the industry has been provided by the national software industry surveys between 1997 and 2004 (and this report is the 8th one in this series). However, already in the late 1980's ATK-kustannuksen vuosikirja (Tiihonen, 1988) provided statistical information about the whole software and hardware cluster in Finland. Moreover, the software product industry has been included as part of the whole software or IT industry in several studies (e.g. Toivonen 2002).

Rajala et al. (2001) carried out a study on the business models of the software industry. They identified four different elements of the business model: the product development approach, the revenue logic, the marketing and sales model, and the service and implementation model.

Sallinen (2002) studied different supplier types and the development of supplier firms in the context of the Finnish ICT cluster. She identified firms of five different types: resource firms, resource firm with supporting projects and products, software product firm, software product firm with supporting projects and a system house.

The empirical studies in Finland focusing specifically on the size and demographics of software products business started 1995. A Finnish venture capital company SFK collected information about software exports among the Finnish software companies through a questionnaire survey. SFK reported that the exports then were about 75 million Euros. More systematic approach to collect data from the industry started in 1997 when Culminatium Oy (Helsinki Centre of Expertise), Tietotekniikan liitto and Helsinki University of Technology conducted their first study in the field.

In 1997 it was found that the exports of the industry were 83 million Euros and the revenue from software products were 185 million Euros. The reason why the reported exports grew annually below 5% 1995-1997 might have been because ICL/Fujitsu reorganized their operations during that time and reduced software exports from Finland. Since 1997, Helsinki University of Technology and Centers of Expertise have produced the survey annually. The financing has mainly come from the National Technology Agency Tekes and the Ministry of Trade and Industry.

2.2 Implementation of the Survey

The data was gathered by a questionnaire, which was sent to 2 298 companies in April – May 2005. We received a total of 285 responses, out of which 220 companies were in the software product business in 2004. According to the professional estimates, there were approximately 1 100 software product companies in Finland in the year 2004. As we reached approximately 20% of the industry, we believe that the results of this research study represent well the whole industry in general. Furthermore, we also systematically approached larger companies in order to estimate volumes at the industry level and in order to increase the generalizability of the results. However, unfortunately some of the companies did not answer to all of the questions of this survey. Therefore, we show the number of responses for each question that is reported in this paper. The methodology of the survey is explained in more detail in the Appendix I.

2.3 Regional Distribution of the Companies

Over half of the companies (51%) were located in the Uusimaa province. Pirkanmaa, Keski-Suomi and Varsinais-Suomi were other provinces that were home for at least ten companies. Together these four provinces hosted 76% of the responding companies. The regional distribution could indicate the reasons for centralization of companies: six provinces of the highest number of the responding companies have both a university providing high-level technological education and technology centers in the population centre. Major relative change in the amount of companies compared to the previous year was in the Pohjois-Pohjanmaa province, where the amount of companies answering to the survey was 8 in 2005 while it was 14 in 2004. The geographic distribution of the companies is presented in Table 2.

Table 2. Location of Software Product Companies by Provinces Answering the Survey (n=199)

Province	Amount of companies
Uusimaa	102
Pirkanmaa	19
Keski-Suomi	17
Varsinais-Suomi	14
Pohjois-Pohjanmaa	8
Satakunta	8
Päijät-Häme	5
Pohjanmaa	4
Itä-Uusimaa	3
Kymenlaakso	3
Etelä-Karjala	3
Etelä-Pohjanmaa	3
Pohjois-Karjala	3
Pohjois-Savo	2
Kanta-Häme	1
Keski-Pohjanmaa	1
Kainuu	1
Lappi	1
Ahvenanmaa	0
Etelä-Savo	0
Location not given	1

The company revenue from their own software product business and the distribution of provinces is depicted in Table 3. From Table 3 we can see that 74% of the companies with a revenue exceeding 3 million Euros from their own software product business are located in the Uusimaa area. The relatively high number of companies with over 3 million Euros revenue companies is explained by the fact that these companies were systematically contacted if they had not responded to the questionnaire in time. This was done in order to be able to estimate the industry volumes more precisely and in order to be able to increase the generalizability of the survey's findings.

Table 3. Provinces of the Software Product Companies by Software Product Business Revenue (n=199)

Province	Revenue from companies' own software product business in 2004 (million Euros)					Total
	<0.2	0.2-0.99	1-1.99	2-2.99	3-	
Uusimaa	24	36	5	9	28	102
Pirkanmaa	5	5	4	1	4	19
Keski-Suomi	4	7	4	1	1	17
Varsinais-Suomi	8	5		1		14
Pohjois-Pohjanmaa		2	2		4	8
Satakunta	4	4				8
Päijät-Häme	2	2		1		5
Pohjanmaa	1	2		1		4
Itä-Uusimaa	2	1				3
Kymenlaakso	2			1		3
Etelä-Karjala	1				2	3
Etelä-Pohjanmaa	2				1	3
Pohjois-Karjala		3				3
Pohjois-Savo	2					2
Kanta-Häme			1			1
Keski-Pohjanmaa	1					1
Kainuu		1				1
Lappi		1				1
Ahvenanmaa						0
Etelä-Savo						0
No location given	1					1
Total	59	69	16	15	40	199

When analyzing the location of the respondents, it is noticeable that the software companies are usually located very close to the technology centers. Even despite the good infrastructure for telecommuting – thanks to well working communication networks – software product companies are still mostly located in the largest cities. The seven most popular Finnish cities, listed in Table 4, hosted 149 companies, which represents 75% of all of the respondents. The most popular cities were the same as in the previous year's survey, although the order has changed for some cities.

Table 4. Most Popular Software Business Cities

City	Number of companies
Helsinki	62
Espoo	27
Tampere	19
Jyväskylä	16
Turku	10
Vantaa	8
Oulu	7
Total	149

In Table 5, we present the software product business revenue in these above-mentioned seven most popular cities. This table also shows that the larger companies are mostly located in the technology centers and in the major cities.

Table 5. Location of the Companies by City and Software Business Revenue

City	Revenue from companies' own software product business in 2004 (million Euros)					Total
	<0.2	0.2-0.99	1-1.99	2-2.99	3-	
Helsinki	15	18	4	7	18	62
Espoo	6	10		2	9	27
Tampere	5	5	4	1	4	19
Jyväskylä	4	6	4	1	1	16
Turku	6	3		1		10
Vantaa	2	5			1	8
Oulu		2	2		3	7
Total	38	49	14	12	36	149

A possible explanation for the concentrated location of the software product companies is that the importance of technology centers and universities, which often enable networking and supporting services, is high for the software product companies.

2.4 Age of the Software Product Companies

The age of the software product companies varied a lot. Even though the Finnish software product industry is regarded as a relatively young industry, the oldest companies in the business are more than three decades old. On the other hand, there are large number of companies founded in the late 1980's - early 1990's and also several companies that have been founded after 1999. The average age of the companies was 11.0 years (11.3 in 2003), and the median age was 10 years (10 in 2003). However, according to industry experts, the distribution of the companies in this sample is probably biased. There are at least two explanations for this. First, the emphasized focus on the largest companies (that more often are old than not) skews the age distribution. Moreover, in this survey, the start-up companies were not very well reached (i.e. they did not respond to this survey) for reasons not well known. One likely reason is that start-up companies can be classified in numerous industry classifications, especially if they are spin-offs from the parent company. It is also more difficult to find and reach the small and new companies than existing and well established companies. Nevertheless, according to the industry experts, the number of young software product companies should be larger. Regardless of the possible bias in the companies' age distribution, it is interesting to compare this distribution to the previous year's distribution. The share of the young companies (age under 3 years) is 5% (it was 7% in 2004 and 4% in 2002), whereas it was 13% in 2001. Clearly, during the industry boom time of 2000-2001, the number of founded companies was larger than after those years. Age distribution of software companies is depicted in Figure 5.

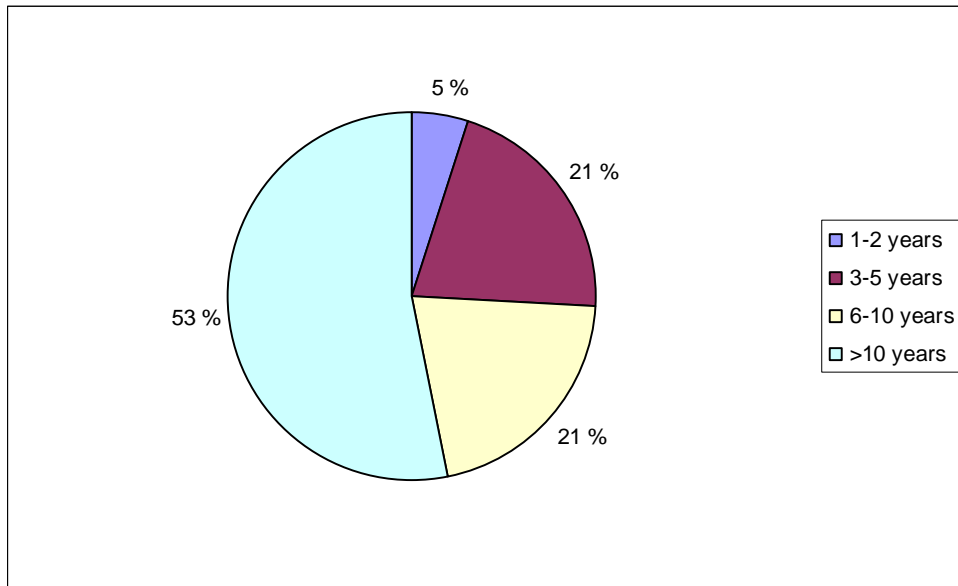


Figure 5. Age Distribution of Software Product Companies (n=158)

As can be seen in Figure 6, 9% (12% in 2003, 11% in 2002, and 21% in 2001) of the companies have been in the software product business for less than three years. Despite the relatively large amount of young companies, 63% of companies had been in the software product business for more than five years. The average age of the software product business was 9.2 years and the median was 8.5 years. According to industry experts, this distribution does not accurately represent the whole industry: according to the experts, the proportion of the young companies should be a bit larger.

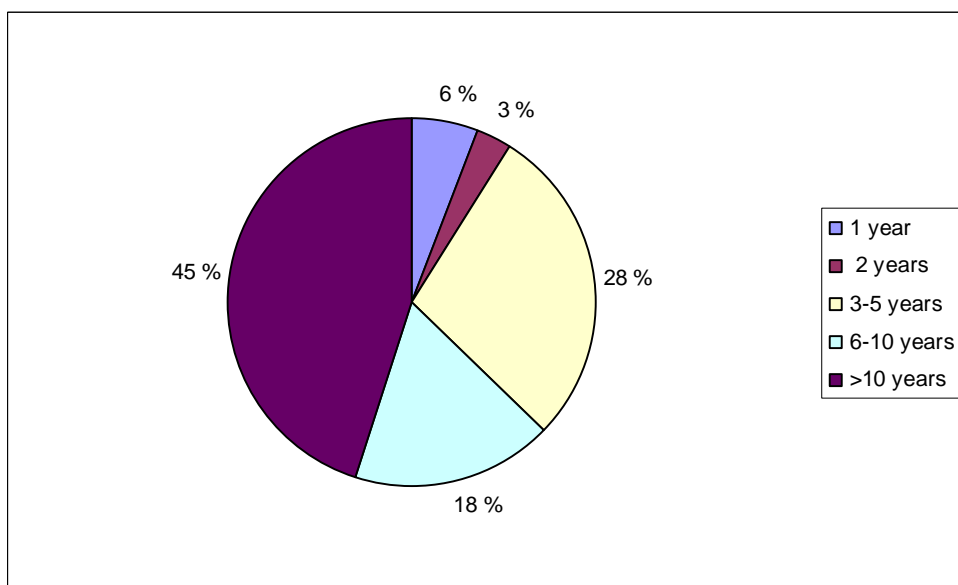


Figure 6. Age of the Software Product Business (n=158)

As Figure 6 shows, despite the fact that the Finnish software product industry is rather immature, there are many companies that have been in business for more than a decade. When looking at the largest companies, which are mainly publicly listed companies, one can see that these companies were mostly founded before the mid 1990s – some of them even dating back to much earlier years.

2.5 Revenue

Companies were asked about their revenue in the year 2004 and their budgeted revenue for the year 2005. In addition, we asked how their software product business revenue is divided between the domestic and the international markets.

The software product companies had an average total revenue of 13.6 million Euros (15.7 million Euros in 2003) and a median revenue of 0.9 million Euros in 2004 (0.7 million Euros in 2003). The average software product business revenue was 3.9 million Euros (3.7 million Euros in 2003) and the median revenue was 0.5 million (0.5 million Euros in 2003). The significant difference between the averages and medians is explained with large companies that bring the average up. As can be seen by studying the medians, most companies are relatively small. Distribution of the responding companies' total revenue in 2004 is presented in Figure 7.

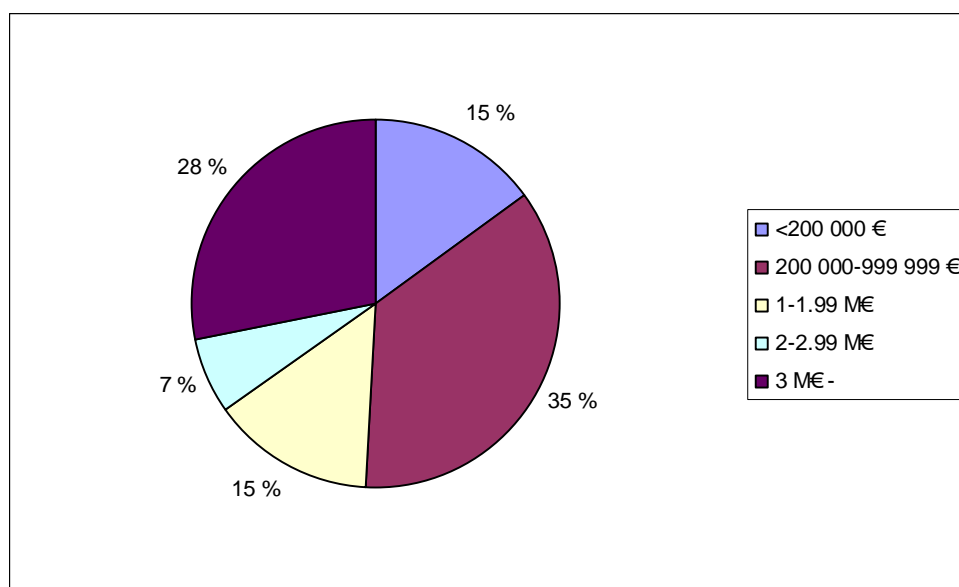


Figure 7. Responding Companies' Distribution of Total Revenue in 2004 (n=199)

The total revenue tends to grow when companies mature, which is evident in the positive correlation between the total revenue and the age of the company (Pearson correlation 0.306). The total revenue's (M Euros) regression analysis against the age of the company reveals that the coefficient of the age of the company is 0.398. Pearson correlation between the software product business revenue and the age of software product business is 0.242 and the respective regression coefficient of the age of the software product business is 0.314. Both of these correlations are significant at the 0.01 level. These dependencies between turnover and age were quite similar as in previous year.

In order to shed more light regarding the business focus of the respondent companies, Figure 8 shows the percentage of the companies' own software product business revenue in relation to the overall company revenue. On average, the respondents received 54% (55% in 2003) of their total revenue from their own software product sales and the median was 58% (60% in 2002). As Figure 8 shows, the responding companies of this survey had quite often the software product business as their core business. This is quite reasonable, since these companies are probably the most eager to improve the conditions in the Finnish software business environment and also to participate in this survey. However, a relatively large amount (35% in 2004 and 32% in 2003) of companies with the total revenue ranging from 0.2 to 0.99 M Euros received less than 26% of their total revenue from the software product business. In addition, 39% of companies with total revenue ranging from 1 to 1.99 M Euros received less than 26% of their total revenue from the software product business. This could indicate that the companies of this size may not have set a clear strategy whether to focus merely on the product or project/consulting business or if their current economic situation does not permit them to focus on the software product business even if they desire to do so.

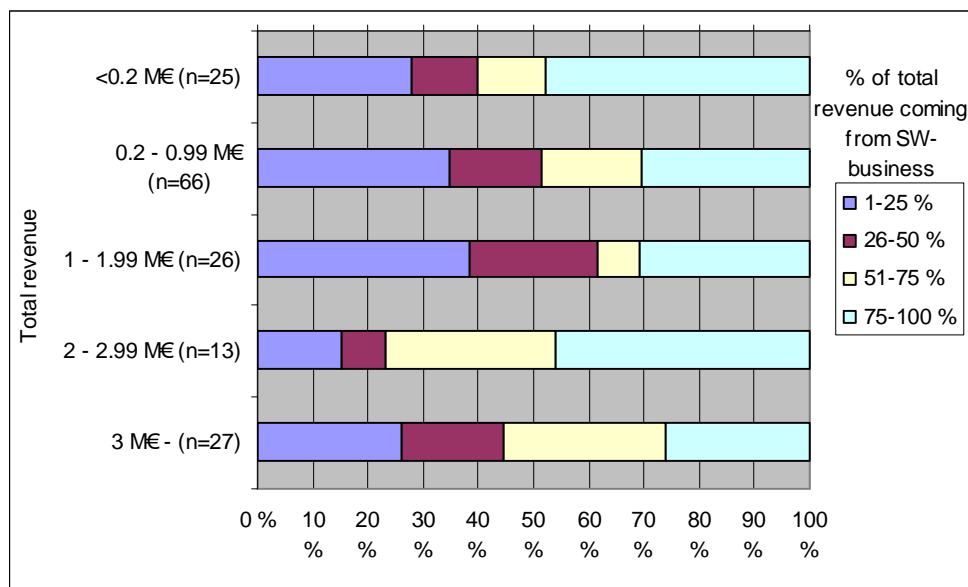


Figure 8. Percentage of Companies' Total Revenue Acquired from Company's Own Software Product Business in 2004 (n=157)

Figure 9 shows the distribution of the responding companies based on their revenue from companies' own software product business. We can see that majority of the responding companies are rather small as 64% of the responding companies' software product business revenue did not exceed 1 million Euros in 2004.

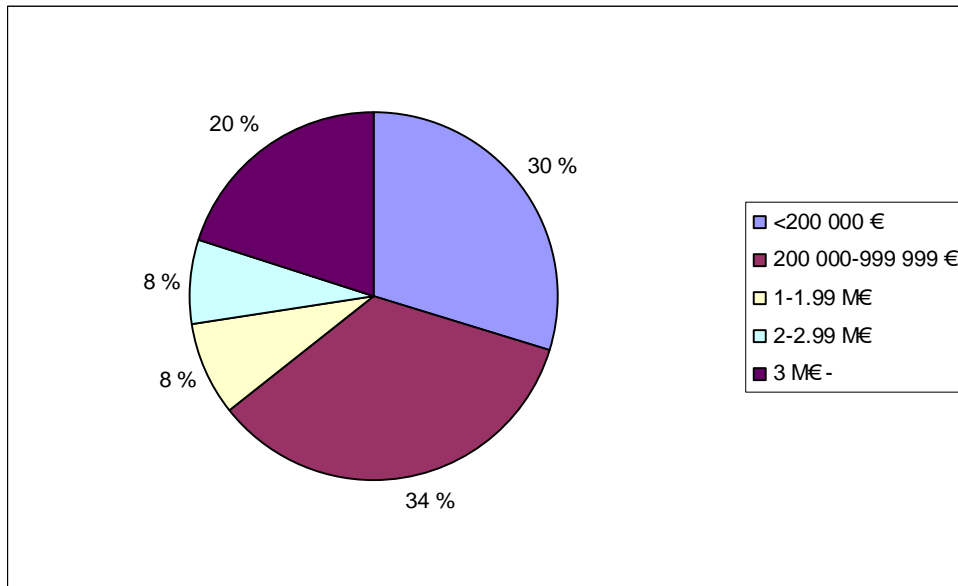


Figure 9. Respondents' Distribution of Companies' Software Product Business Revenue in 2004 (n=199)

In order to extrapolate the overall value of the industry we used the following approach. First, we systematically checked with the industry experts that we have reached all the companies whose software product business revenue exceeded 3 million Euros in 2004 – there were 40 such companies. After that, we calculated a “rough” coefficient by dividing 1060 (1 100 is the total number of companies in the industry – the 40 largest companies = 1060) by 159 (the number of companies participating the survey whose software product business revenue in 2004 was known and not exceeding 3 million Euros), which equaled 6.67. Taking into consideration that our sample had an overrepresentation of large companies, we rounded the coefficient down to 5.55. By using this method the overall calculated value of the industry is 1 192 million Euros and the value of exports is 405 million Euros. It is worth mentioning, that the value of the 40 largest companies alone was 687 million Euros, of which 342 million Euros came from exports. Thus, over 80% of the export came from the 40 largest companies.

The value of the industry had increased 21% from the year 2003 (985 million Euros). The value of exports increased 7%, from 379 million Euros in 2003 to 405 million Euros. The development of the industry revenue is presented in Figure 10. Since the figures before the year 2000 were calculated using a different estimation approach, they are not directly comparable to those from the years 2000 – 2004.

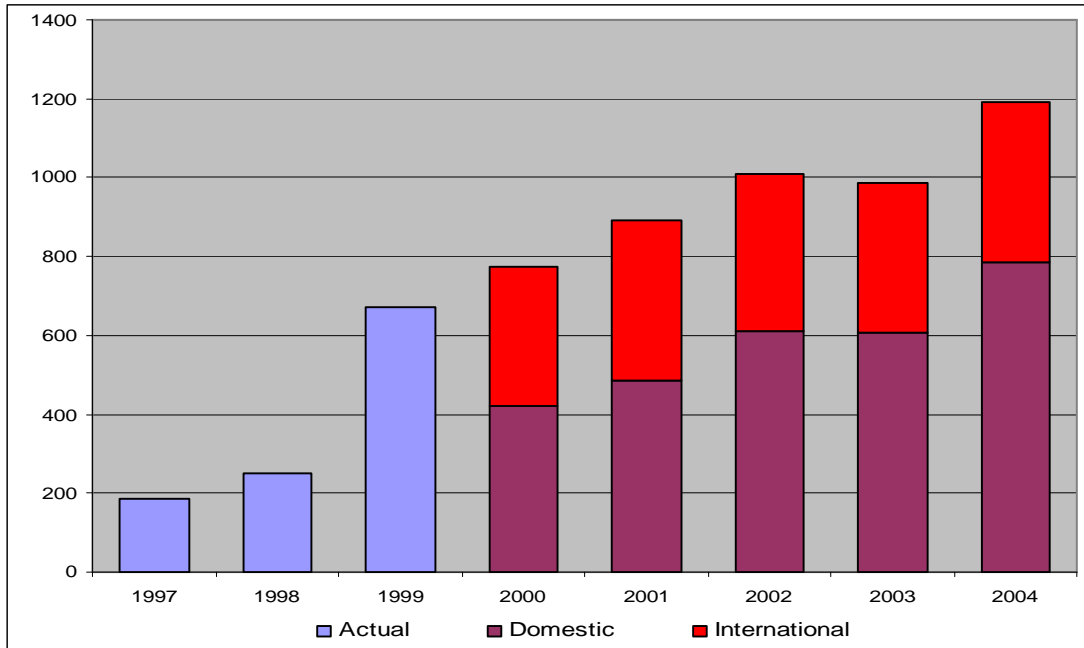


Figure 10. Development of the Revenue at the Industry Level in 1997 - 2004

The budgeted figures are the estimated values of the industry (based on the responding companies) given in the software industry survey in the previous year (Figure 11). We can clearly see from Figure 11 that the changes in the economic situation after the year 2000 have also made the companies to be more realistic in estimating their growth prospects in the recent years.

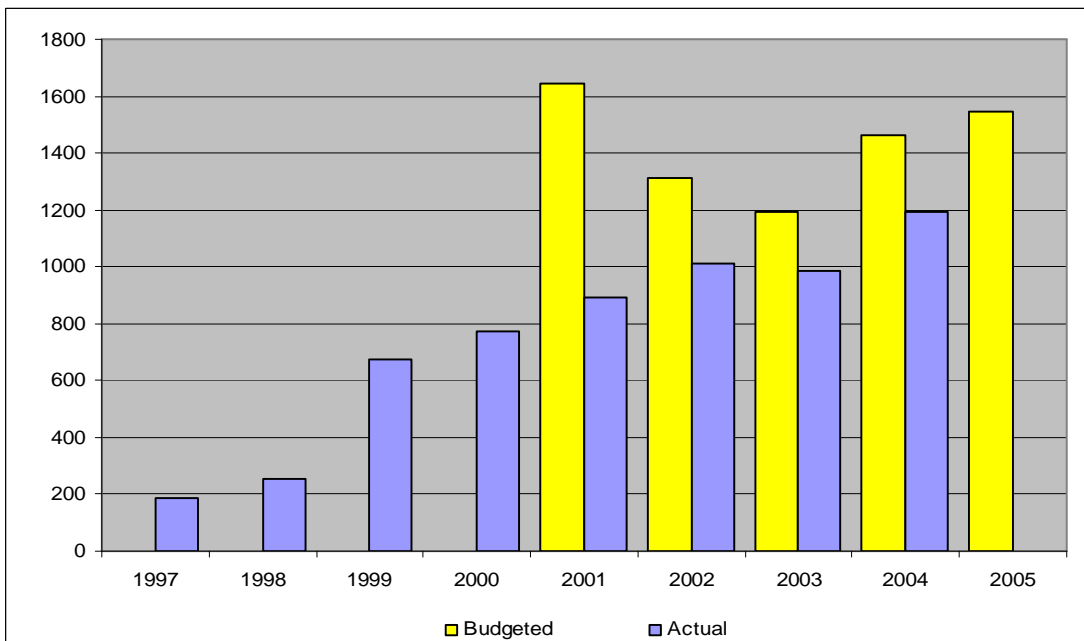


Figure 11. Development of the Revenue and budgeted revenue at the Industry Level in 1997 - 2004

The total revenue and the amount of employees working for the companies responding to the survey was summed up, which made the revenue per employee 111 000 Euros (113 000 Euros in 2003). However, the number of large companies strongly influences this ratio. When calculating the revenue per employee ratio as an average of single companies mean ratios, the ratio is 92 000 Euros per employee (77 000 Euros in 2003). When we studied the development of the revenue per employee ratio based on the time the companies had been in the business, we found that the ratio was typically higher for those companies who had been in the business for a longer time. This indicates that it can take some time before the first product is successfully launched into the markets and starts to generate revenue. When compared to the year 2003, the companies with less than 3 years in the software product business have significantly improved their revenue per employee figures in 2004. This is shown in Figure 12.

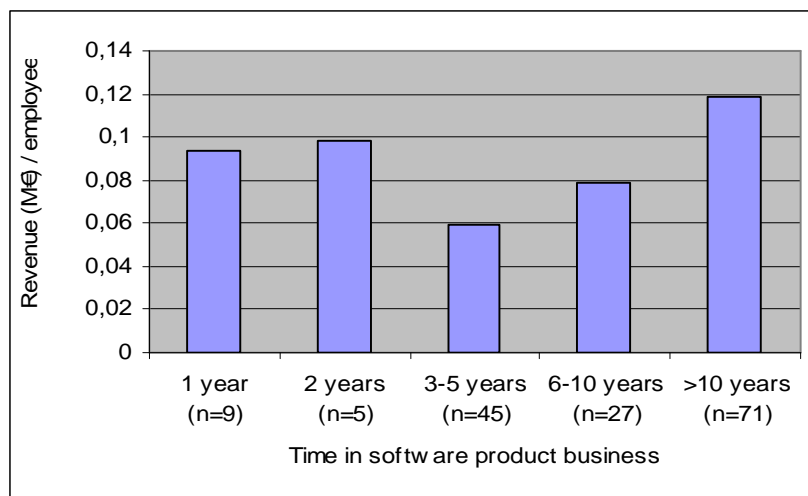


Figure 12. Development of Revenue per Employee in 2004 by the Age of the Software Product business

When studying how the software product business revenue affects the revenue per employee ratio, we can see that companies with software product business revenue exceeding 1 million Euros reach the ratio of over 100 000 Euros per employee. Companies that were smaller than this are more likely to still be in the product development phase, which can be seen in the moderate rates (under 100 000 Euros per employee) as is evident in Figure 13.

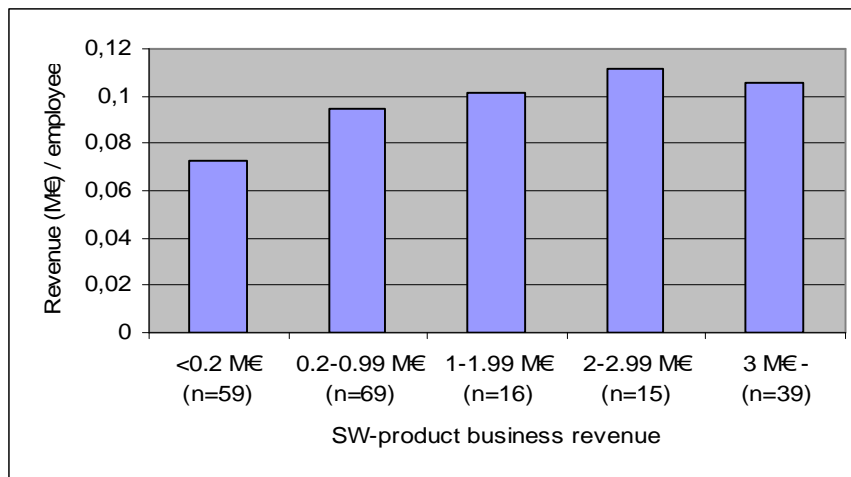


Figure 13. Development of Revenue per Employee by the Revenue of the Software Product Business

The smaller software product companies expect the fastest growth rate in their software product business revenue for the year 2004. Some of these companies are just launching their products to the markets and this could cause a substantial increase in their sales. In addition, it is often more difficult for the young and small companies than for the established companies to estimate their future sales. It is worth noting that a relatively small amount of all of the responding companies answered to the question about their future expectations. It could be argued that the companies with positive views were more eager to answer these questions compared to those who did not see the near future so positive. Therefore, the figures in Table 6 should be interpreted cautiously.

Table 6. Expected Annual Growth of Software Product Business for the Year 2004 (n=98)

Revenue from companies' own software product business in 2004 (million Euros)					
Annual growth expectation	<0.2	0.2-0.99	1-1.99	2-2.99	3-
<0 %	6	3	1	1	
0-10 %	7	15	1	8	2
10.1 –20 %	2	13	4	1	3
20.1 –40 %	7	14	3	2	6
40.1 - 100 %	13	12	2	1	
>100 %	12	4	2		1
Amount of companies	47	61	13	13	12
Mean	179 %	36 %	51 %	11 %	30 %
Median	50 %	20 %	25 %	9 %	29 %

We studied also how the companies have actually grown from the year 2003 compared to their growth estimates for the year 2004. Unfortunately the number of companies for which this comparison could be made is relatively small (n=37). On average, the companies had expected an annual growth of 161% (259% in 2003 and 92% in 2002) but the actual growth was 271% (181% in 2003 and 285% in 2002). The expected median growth was 47% (33% in 2003 and 25% in 2002) and the actual growth only 7% (20% in

2003 and 0% in 2002). The differences in the averages and the medians mean that some of the companies have been able to increase their revenue significantly, but on the other hand some companies have suffered from the decline in their revenue. As the differences to the previous year's median of the expectations show, the companies were more optimistic in their growth expectations for the year 2004 than a year before. The expected and actual medians and averages are presented in Table 7.

Table 7. Expected and Actual Growth in Software Product Business in 2004 (n=37)

Revenue from companies' own software product business in 2004 (million Euros)							
		<0.2 (n=5)		0.2-1.0 (n=16)		1- (n=16)	
Annual growth in 2004	Mean	Median	Mean	Median	Mean	Median	
Expected (in 2003)	542 %	50 %	147 %	62 %	57 %	47 %	
Actual	-8 %	-25 %	136 %	0 %	493 %	13 %	

2.6 Personnel

The companies responding to the survey employed a total of 24 281 people working in 198 companies in 2004 (22 634 people working in 184 companies in 2003). Most of the employees, approximately 89%, work in companies with revenue of at least 3 million Euros from their own software product business. Out of these 24 281 employees, some 6700 worked in software product business. When this is extrapolated to the industry level, the amount of employees working in software product business was about 12 400 in the year 2004. This extrapolation was made in the same way as the extrapolation for the revenue. On average, there were 123 employees per firm (median 10 employees) and 35 people working in software product business (median 7 employees).

When taking a closer look at the distribution of personnel in the software product firms that responded to the questionnaire, it can be seen that 28% of the companies have less than six employees (27% in 2003). On the other hand, only 13% (13% in 2003) of the firms employ more than 100 people. As mentioned before, large companies are over-represented in our sample. Figure 14 presents the distribution of the companies' personnel.

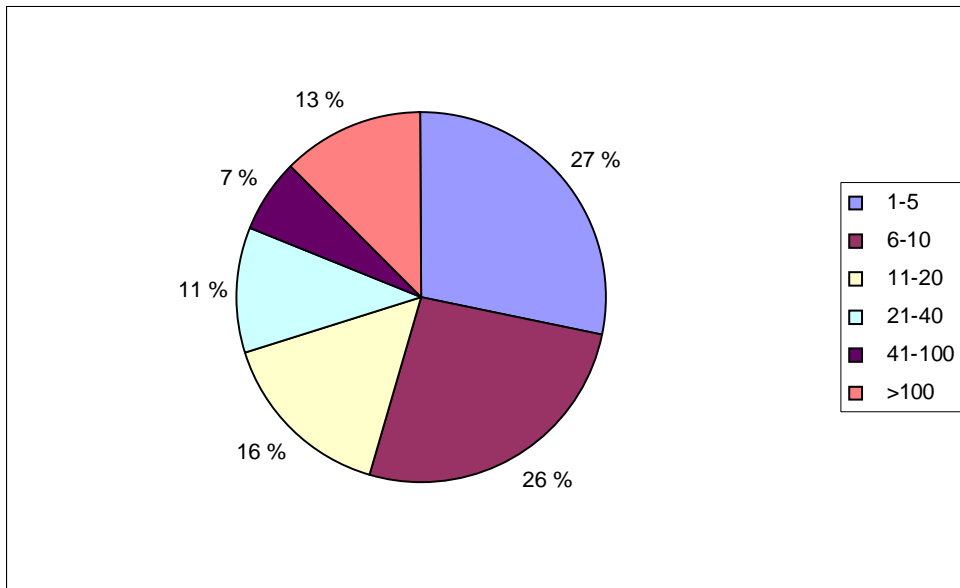


Figure 14. Distribution of Overall Personnel in Software Product Companies in 2004 (n=198)

Figure 15 shows the distribution of companies' software product business personnel. There is a strong correlation between the software product business revenue and software personnel (Pearson correlation of 0.916). Regression analysis reveals that the coefficient of software personnel is 0.116. This means that, on average, the software product business revenue grows by 116 000 euros by each additional software professional.

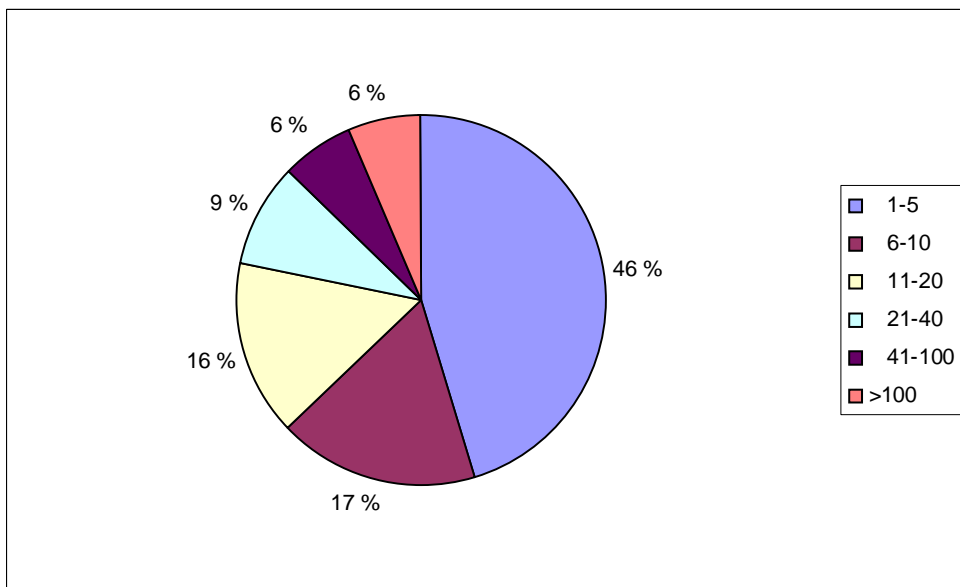


Figure 15. Distribution of Software Personnel in Software Product Companies (n=192)

The companies were also asked about how the personnel are allocated to various functions. The results show that 27% of the employees work in sales and marketing and 5.5% of the personnel are located abroad. Direct comparison to previous years' results cannot be performed as this question was changed from the previous year.

At the industry level, the total number of software professionals has increased 3.3% from the year 2003. The extrapolation was done using the same approach as when calculating the revenue of the industry. Particularly the smaller companies' (turnover from their own software product business <3 million Euros) number of personnel increased while for large companies the total number of their personnel decreased by 3%. Furthermore, the companies had a positive outlook for recruiting in 2005 budgeting for 11% increase in the software product business personnel. Small companies plan to increase personnel on average 13% in 2005, while the large companies plan for 5% increase in their personnel. Development of the software product business personnel in 1999 - 2004 and budgeted estimates for 2002 - 2005 are presented in Figure 16.

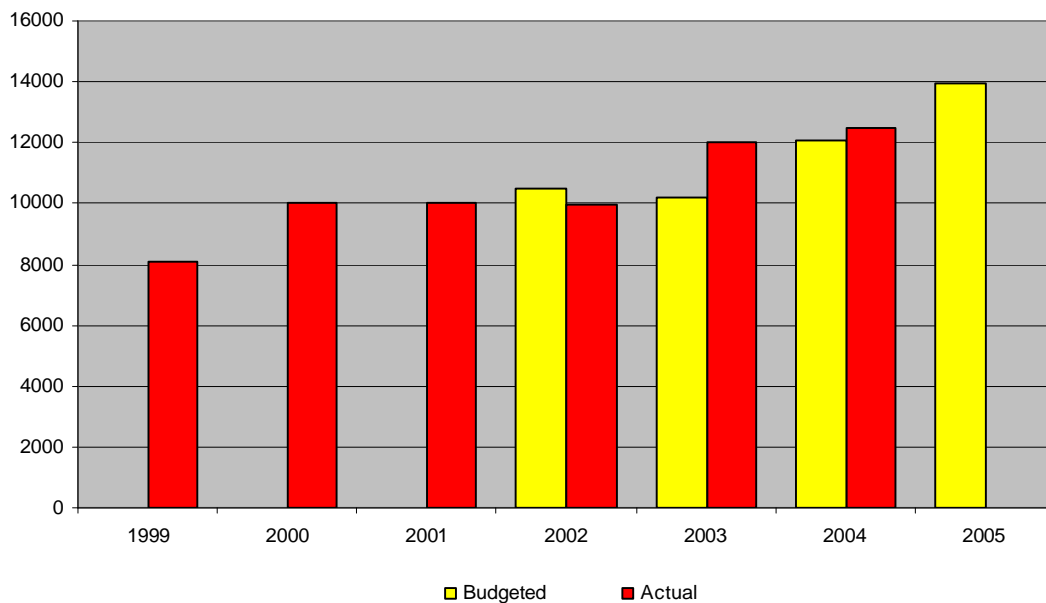


Figure 16. Development of the Software Personnel at the Industry Level

As Figure 16 shows, companies have recruited more personnel than they expected in 2004. Unfortunately, only 55 companies reported the number of personnel in the software product business both in 2003 and 2004. These 55 companies employed 3852 software professionals in 2004 (4 035 in 2003), with an average of 70 (73 in 2003) and a median of 20 people (20 in 2003). Actually, 64% had decreased or kept the same amount of software employees, 27% had increased the software personnel from 1% to 40% and 9% have increased the amount by more than 40%. The changes in the number of software product business personnel are presented in Figure 17.

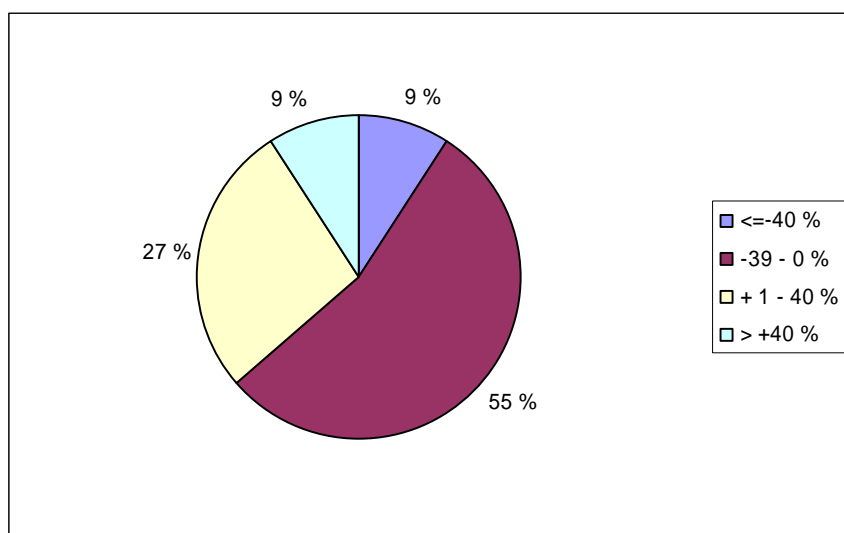


Figure 17. Percentage Change in Software Personnel from 2003 to 2004 (n=55)

When comparing these changes to the percentage changes in software personnel from 2002 to 2003, the most notable finding is that the share of the companies increasing software employees over 40 percent decreased from 24% to 9%. In addition, the share of the companies decreasing software employees from 0% to 39% increased from 48% to 55%.

2.7 Profitability

Year 2004 was not as challenging for the companies as the previous year. Among the responding companies, as it can be seen in Table 8, the year 2004 was generally profitable. While in 2003 half of companies with revenue less than 1.0 million Euros from software product business had a negative result, for 2003 this figure was only 10%. In 2004, 35% of companies with revenue less than 1.0 million Euros from software product business had no profits nor made losses. However, on average the small companies were profitable.

Table 8. Companies' Average Profits in the Year 2004

Revenue from companies' own software product business in 2004 (million Euros)	Mean	Median	Sum	n
< 0.2	0.046	0.015	2.33	51
0.2-0.99	0.018	0.033	1.11	62
1-1.99	-0.205	0.110	-2.88	14
2-2.99	0.341	0.300	4.78	14
3 -	5.499	0.850	164.97	30
Total	0.996	0.400	170.31	171

Altogether, the companies responding to the survey generated profits of 170.31 million Euros (145.38 million Euros in 2002). Moreover the companies with software product business revenue less than 3 million Euros generated total profits of 5.34 million Euros

(10.48 million Euros in 2003). In addition, it is noticeable that only 171 out of 220 companies reported their profits for the year 2004. There is a tendency that companies doing relatively well are more eager to report their profits. Therefore, the actual situation is likely to be a bit worse than this sample indicates.

From Table 9 we can see that only 5.3% of the companies generated larger losses than 0.5 million Euros in the year 2004. 62.5% of the companies were in the range of from 0.5 million Euros losses to 0.1 million Euros profits. Some 32.2% of the companies generated larger profits than 0.1 million Euros as can be seen in Table 9.

Table 9. Companies' Profits in the Year 2004

Profit (million Euros)	Frequency	Valid Percent	Cumulative Percent
<-0.5	9	5.3 %	5.3 %
-0.5 - 0	45	26.3 %	31.6 %
0.01 - 0.1	62	36.2 %	67.8 %
0.11 - 1	40	23.4 %	91.2 %
>1	15	8.8 %	100.0 %
Total	171	100.0 %	

Figure 18 presents the companies profits in proportion to their revenues in the year 2004. There are no significant differences in the profitability based on the companies' sizes. It is noticeable that the majority of the companies, despite the current economic situation, remained profitable.

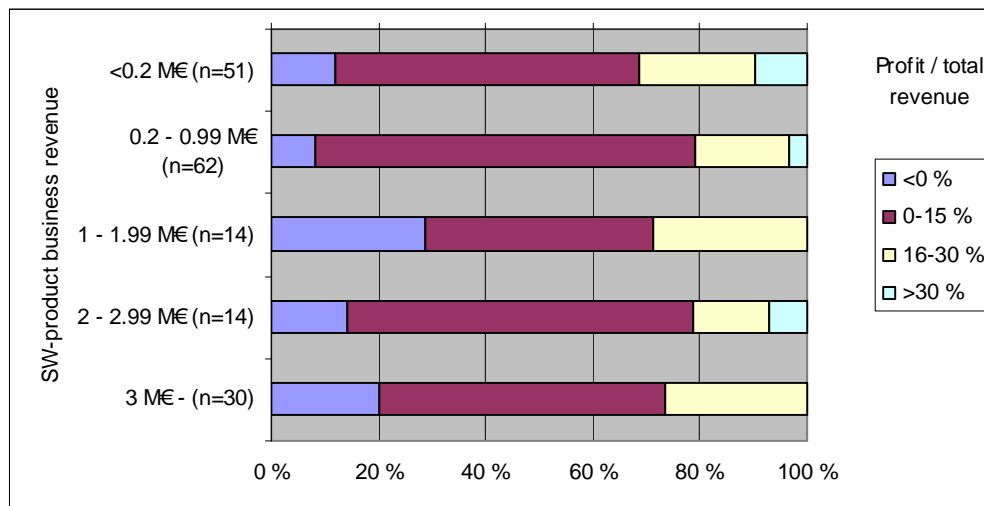


Figure 18. Company Profit per Revenue in the Year 2004 (n=171)

2.8 Improvement Areas

We stated nine possible improvement areas in the survey that companies can focus on, as presented in Figure 19. The companies were asked to mark their two most important improvement areas with numbers 1 and 2, where one was the most important and two the second most important improvement area in the next three years.

The companies were also asked to mark their two least important improvement areas with numbers 7 and 8, where 8 was the least important improvement area and 7 was the second least important improvement area. 33% of the companies rated Improvement of personnel knowledge as the most important or the second most important improvement area. There is a clear difference to year 2003 when 44% of companies rated product development or productization as the most important or the second most important improvement area. For this year's study that question was divided into two separate areas – first product development and then productization. It is worth to mention that only 3.9% of the companies rated product development or productization as the least important or the second least important improvement area. International sales and marketing and networking and cooperation were also quite often ranked as important improvement areas as can be seen from Figure 19.

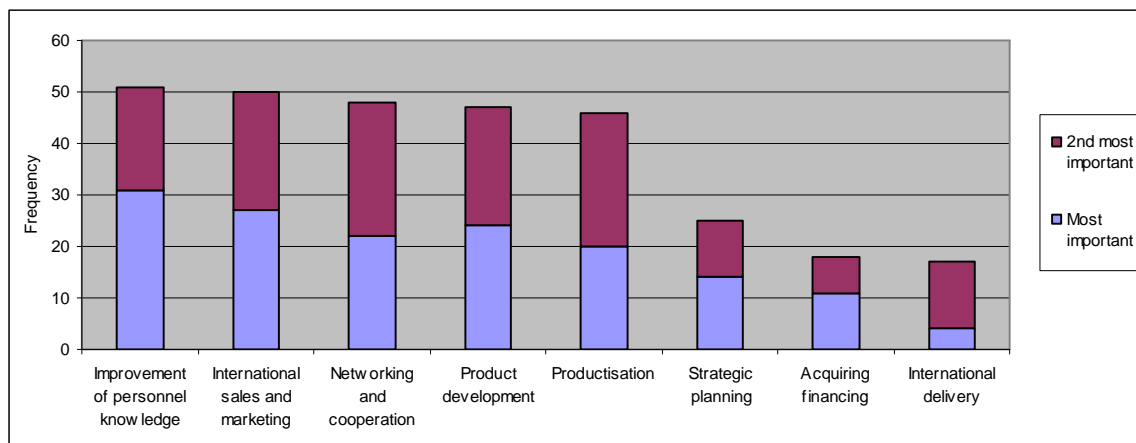


Figure 19. The Most Important Improvement Areas within 2005 - 2007 (n=154)

We studied how the size of the company, defined by software product business revenue, affects the improvement areas. The small companies (revenue 0-2 M Euros) selected most often the product development as the most important improvement area. Networking and cooperation in addition to productization were also very important improvement areas for the smaller companies. The larger companies ranked most often international sales and marketing as the most important improvement area. Improvement of personnel knowledge was also very important improvement area for the larger companies. Despite the company's size in general, most important improvement areas seemed to relate to the very fundamentals of the software product business i.e. to product development, networking, productization, and international sales and marketing. First and second most important improvement areas by the size of the company are presented in Figure 20.

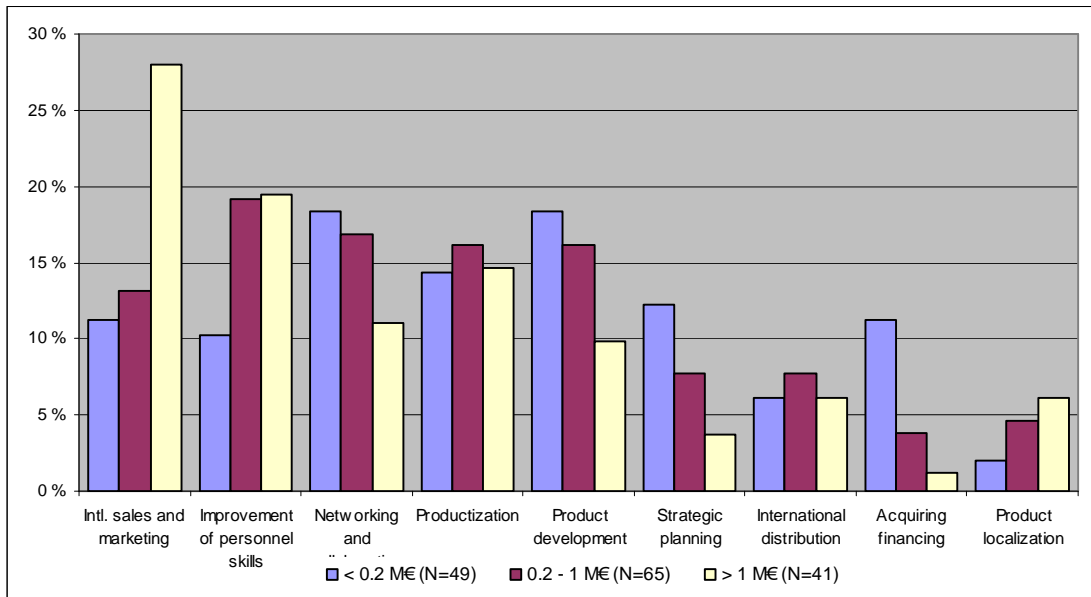


Figure 20. Distribution of the Most Important Improvement Areas within 2005 - 2007 by the Software Business Revenue

We also studied how a company's age affects to the improvement areas. The youngest companies saw most often product development or networking and cooperation as the most important improvement area and young companies saw also quite often productization as the most important improvement area as can be seen from Figure 21. Companies aged between 3 to 5 years considered productization and international sales and marketing as the most important improvement area. The companies aged between 6 to 10 years saw most often the international sales and marketing or the improvement of personnel knowledge as the most important improvement area. For companies older than 10 years, the improvement of personnel knowledge was regarded as the most important improvement area.

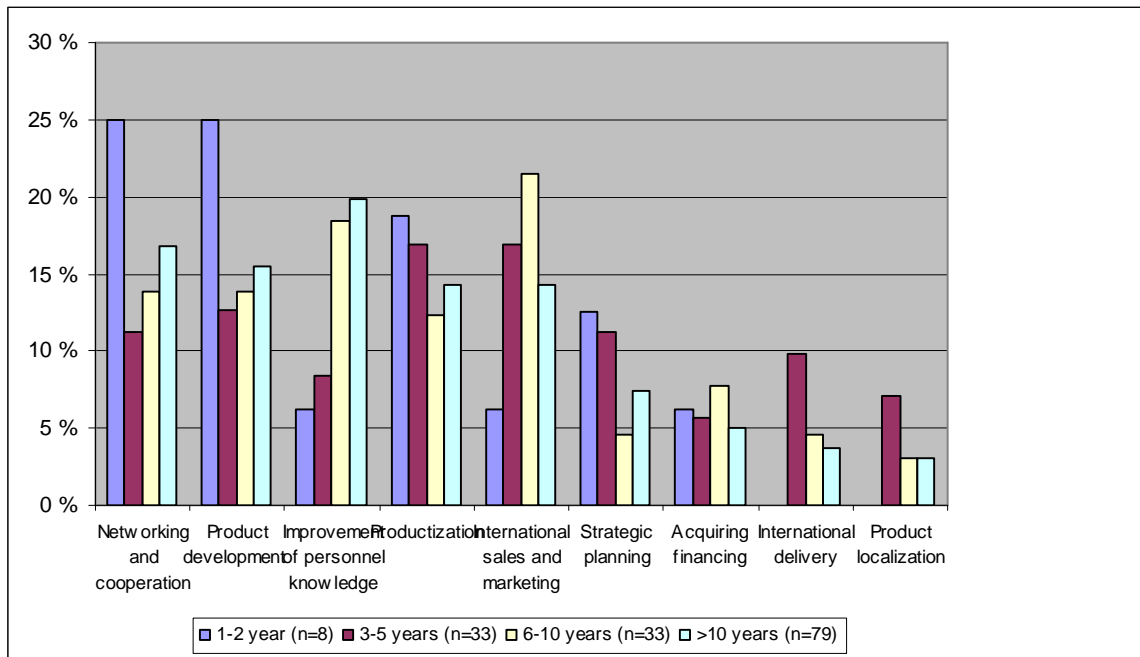


Figure 21. Distribution of the Most Important Improvement Areas within 2005 - 2007 Based on the Age of the Software Product Business

3 CHARACTERISTICS OF THE BUSINESS

3.1 Main Product

In this section we examine the business and revenue models of the Finnish software product companies. In order to gain a deeper understanding of the business models and development methods used by the Finnish software product companies, we asked them various questions related to the development, end users, and product development investments. In the following sections we present our findings regarding e.g. the revenue models, composition of the sales revenues, usage of open source components, sales channels, and delivery methods.

3.1.1 Composition of Sales Revenue

The companies were asked about the composition of their main product's customer projects. We asked how the revenue from customers was divided between the following categories, which were: software license sales or renting, customization, integration and software development projects, customer installation and implementation, user training, maintenance, updates and support, and other.

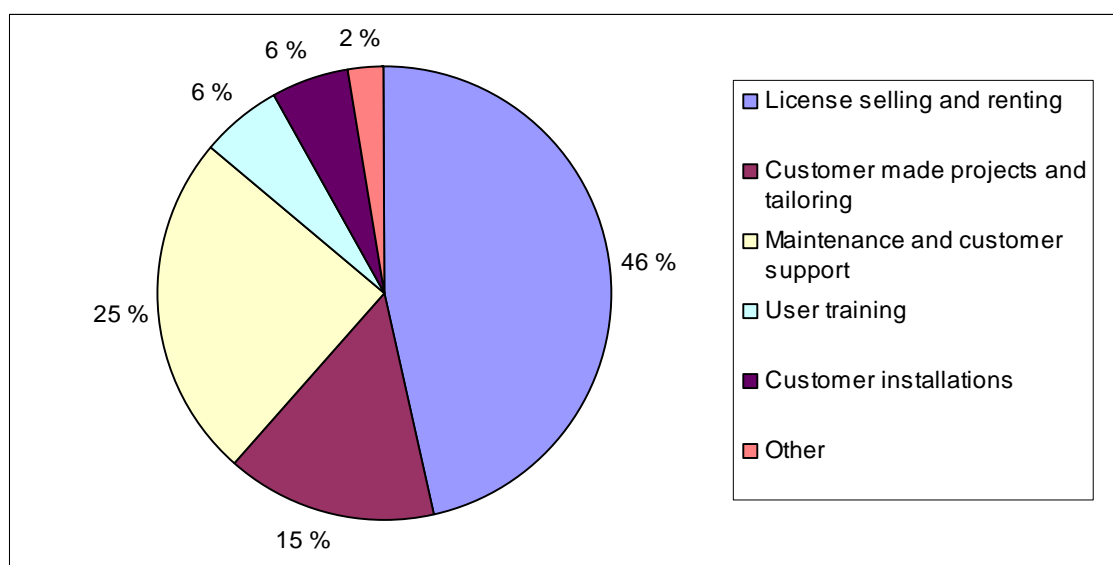


Figure 22. Composition of a Typical Customer Sales Revenues of the Main Product (n=141)

Figure 22 shows how the typical customer projects' cost was distributed into the above-mentioned categories for all respondents. From this figure, we can see that on average 46% (47% in 2003, 51% in 2002) of the sales revenue came from licenses. Maintenance accounted for the second largest amount, 25% of the revenues. Customization and tailoring accounted for 15% (26% in 2003, 19% in 2002) and installations and training both 6% of the customer revenues as a whole. In other words roughly half of the Finnish software product companies' revenues come from license sales and half from product related services.

Figure 23 shows the main product's composition of software product sales in 2004 according to the SW firms' revenue size. It seems that the license sales make up at least 40% of the typical delivery of the software products. From the previous years, we can conclude that more and more of the actual revenues of SW firms are coming from software related services instead of license sales.

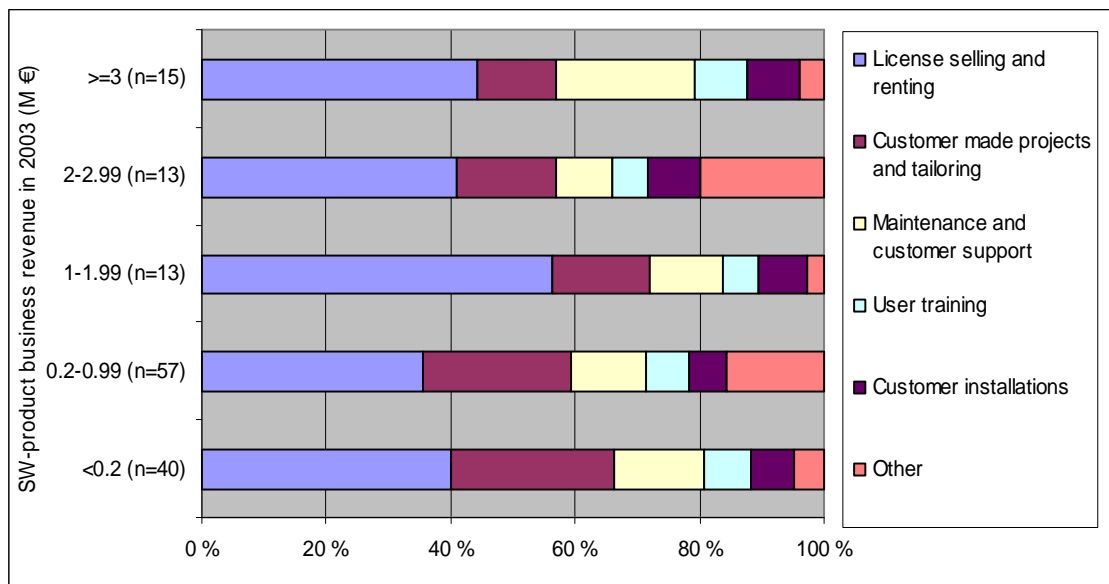


Figure 23. Composition of Business Revenue According to Software Firm Size

However it has to be said that for some of the companies, it is somewhat difficult to distinguish between the license and maintenance revenue. For example, a company might receive maintenance revenue, which includes the updates or new versions (upgrades) of the product. Customer support fees could also be included in the maintenance figures and also this could qualify as license selling as well. Due to this "bundling" of the SW product and services related to it the companies find it hard to divide the customer revenues into the above-mentioned categories (i.e. the line between the products and services has become blurred). Also the category "Other" has grown for these reasons since the software firms are starting to bundle additional consulting services (e.g. business process, requirements specification etc.) into their product and service offerings.

In addition to the above, the SW companies paid only a marginal share of their main product's revenues to third parties, on average just 6.7%. The size of the software company did not seem to affect the percentage paid to third parties.

3.1.2 Sales Channels and Product Delivery Methods

We asked the companies what different sales channels they preferred to use in their main SW product sales and how the actual product was being delivered. We listed the various sales channels and delivery methods and asked the companies to estimate how much they used them on a Likert scale from 1 to 7, where 1 meant "hardly at all" and 7 "very much". As in previous years, again the most common way of reaching the customer was through software firms' own direct sales. Resellers and agents were the second most popular sales channel, little more often used by the larger companies. Other sales approaches were seldom used, as can be seen from Figure 24.

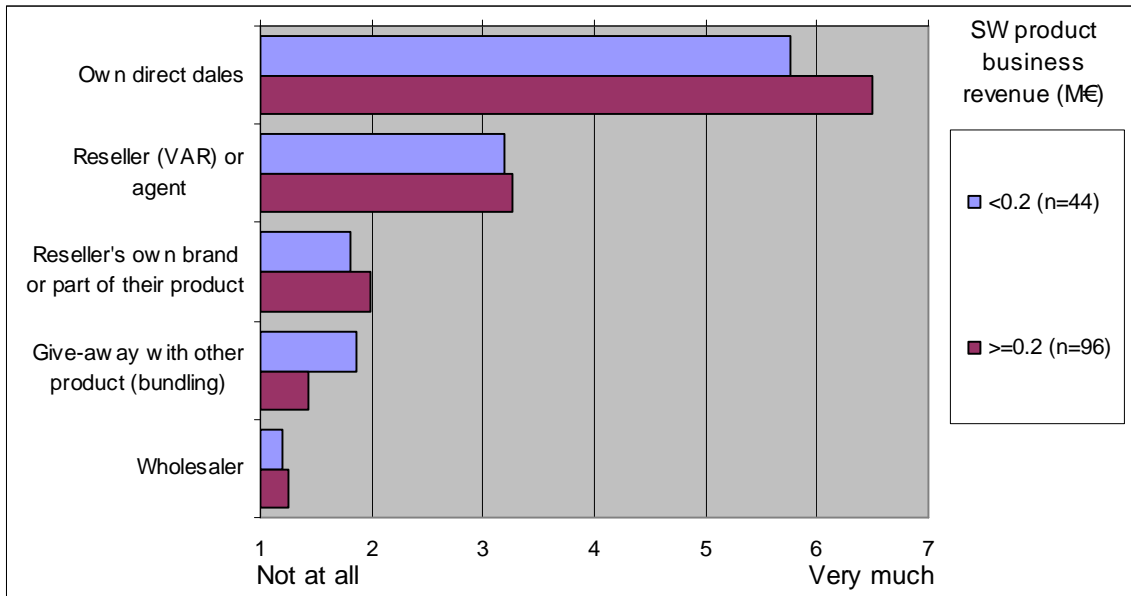


Figure 24. The Different Sales Channels and Their Usage

Both the larger (software product business revenue >0.2 M Euros) and smaller companies (software product business revenue <0.2 M Euros) rely more on electronic delivery method (the Internet) than using physical delivery (CD-ROM, DVD or disk). Larger companies prefer electronic delivery more than smaller companies, as illustrated in Figure 25.

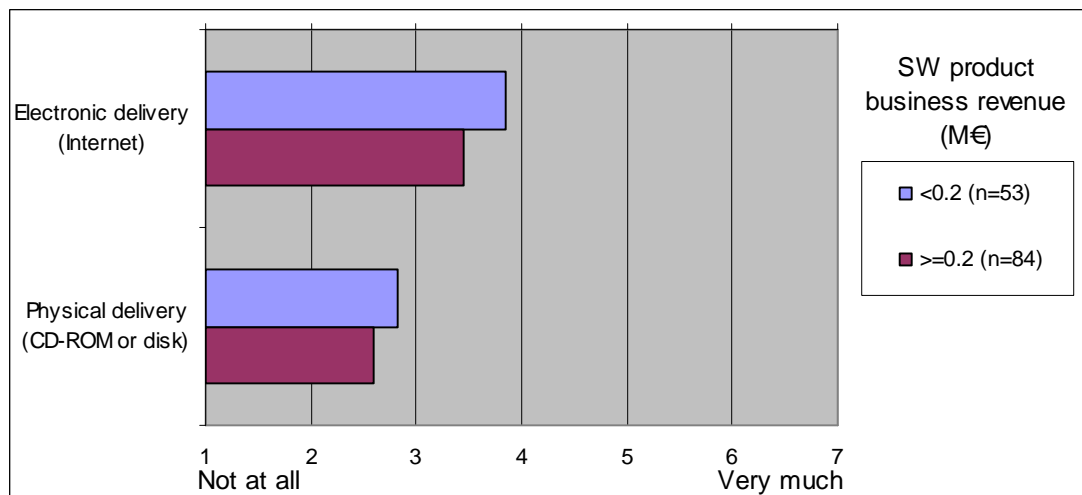


Figure 25. Main Software Product's Delivery Channels

3.1.3 End Users and Market Segments

The companies were asked to identify their main product's end users. We categorized the different end users into six groups according to their size and whether they were

businesses or consumers. The categories were the micro enterprises (1-4 employees), small enterprises (5-50 employees), medium enterprises (51-250 employees), large enterprises (over 250 employees), public (government) sector, and private consumers. The majority of the Finnish software firm's products are sold to enterprises and to the public sector, and only few software products are solely targeted towards the consumers. From the table below we can see that also the share of the micro enterprises was also quite low. It has to be noted that since one company can (and usually does) have customers in more than one customer segment (hence the dichotomy label), the overall sums of the percentages in individual columns can reach above 100% in Table 10.

Table 10. End Users in Different Market Segments

Dichotomy Label	Revenue from companies' own software product business in 2003 (million Euros)				
End user	< 0.2	0.2-0.99	1-1.99	2-2.99	3 -
Micro Enterprise	19%	16%	19%	13%	5%
Small Enterprise	39%	49%	38%	27%	15%
Medium Enterprise	48%	46%	69%	40%	23%
Large Enterprise	32%	48%	50%	47%	30%
Public Administration	29%	39%	31%	60%	18%
Private consumer	10%	4%	6%	7%	8%
Number of cases	59	69	16	15	12

3.1.4 Releasing New Versions of the Software

We also asked the companies on which basis they release new versions of their main software products. In the case of the smaller companies, with software product business revenue not exceeding 0.2 million Euros, 49% of them release a new version without a pre-defined cycle (52% in 2003 and 51% in 2002). In the case of the larger companies (SW product business revenue >0.2 M Euros), only 24% of them indicated that their version releasing is not based on a pre-defined cycle (42% in 2003 and 60% in 2002). Based on the responses, the smaller companies can be said to be more customer friendly than the larger companies in their release cycles as they released more often versions of their software based on customer needs. An interesting finding was also the popularity of basing the release of new versions on a fixed schedule as 44% of the larger companies indicated so (48% in 2003 and 30% in 2002). The version release basis of the respondent companies is presented in Table 11.

Table 11. Basis of the Releasing a New Version of the Main Product

Dichotomy Label	Revenue from companies' own software product business in 2003 (million Euros)	
Release basis	< 0.2 (n=56)	0.2 – (n=85)
	% of responses	% of responses
In every customer delivery	10.2 %	5.0 %
Without pre-defined cycle	49.2 %	24.3 %
Based on the customer need	62.7 %	37.1 %
On a fixed schedule	20.3 %	43.6 %

There were no actual changes in how many versions a year companies released a new version of their main product compared to 2003 and 2002. Both the smaller companies (software product business <0.2 M Euros) and larger companies (software product business revenue >0.2 M Euros) released on average two new versions of their main software product per year. Interestingly, the differences in the release frequency of new versions between the smaller and larger software companies were very small as Table 12 indicates.

Table 12. Version Release Interval of the Main Product

Version release interval	Revenue from companies' own software product business in 2003 (million Euros)	
	< 0.2 (n=49)	0.2 – (n=108)
Weekly	0 %	0.9 %
Monthly	6.1 %	3.7 %
Every second month	4.1%	6.5 %
3-4 times a year	24.5 %	23.1 %
2 times a year	18.46 %	27.8 %
Annually	26.5 %	26.9 %
Less frequently	20.4 %	11.1 %
Total	100.0 %	100.0 %

We also studied how the maturity of the software development processes affects version release intervals. We found only a very low correlation between the version release intervals and the maturity of the software development processes (Pearson correlations were less than 0.088). Naturally, the type of the software produced affects among many other factors to the need for releasing new versions. For instance, in security business (e.g. virus protection) version release is critical when a new virus appears but in game industry there are rarely many versions released of the same game (minor patches and updates excluded).

3.2 Research and Development

On average, in 2004, the software product companies invested 26.8% (31.2% in 2003) of their revenue on R&D. There was a significant decrease in large companies' R&D investments (relative amount of total revenues). Particularly companies that generated revenue from their own software product business more than 1.0 million Euros decreased R&D investments on average from 30.8% of their revenues in 2003 to 24.1% in 2004. In addition, the median investment of all the companies (n=147) decreased from 21% in 2003 to 18% in 2004. However, it is important to notice there was a notable increase in terms of firms' revenue in 2004 when at the same time the relative amount of total revenues invested in R&D decreased 4.4%. This implies that the relative amount of total revenues invested in the R&D decreased, but the absolute amount invested in R&D remained almost on identical level.

Table 13 presents the average and median product development investment (% of the revenue) for the year 2004 for those companies, whose software product business revenue is known.

Table 13. Product Development Investments in 2004 in Relation to (% of Total Revenue)

Revenue from companies' own software product business in 2004 (million Euros)	Mean	Median	n
< 0.2	32.7 %	20.0 %	45
0.2–0.99	24.3 %	15.0 %	58
1 -	24.1 %	20.0 %	44
Total	26.8 %	18.0 %	147

Table 14 presents the product development investments based on the amount of time the company has been in the software product business. In 2003, on average the less than one year old companies invested 24.2% and the two year-old-companies invested 55% of their revenue on R&D. The investments in 2004 were 44.8% and 18.8% respectively. On average, less than one year old companies' and more than six year old companies' R&D shares increased, when at the same time, all the other companies' R&D shares decreased notably. However, even the one-year-old companies R&D shares have been relatively low in 2002, 2003 and 2004 compared to 2001, when the one-year-old companies invested 169% of their revenue on R&D. The lower R&D shares can indicate that in the current economic situation companies finance their R&D merely by income financing compared to the situation, where more companies could finance their R&D by venture capital. This is an important finding and indicates that companies face an increased challenge in their productization aims. Furthermore, this also indicates that companies are pursuing short-term benefits by cost-saving activities concerning the R&D function.

Table 14. Product Development Investments in 2004 in Relation to the Age of Software Product Business

Time company has been in software product business (years)	Mean	Median	n
1	44.8 %	50.0 %	9
2	18.8 %	17.5 %	4
3–5	27.3 %	15.0 %	43
6 –10	28.7 %	18.5 %	26
> 10	24.0 %	18.0 %	64
Overall	26.92 %	19.0 %	146

Figure 26 depicts the R&D median investments according to the maturity of the software product business. Majority of the young companies (age of software product business was two years or less) increased their R&D investments in 2004, but the median R&D investments are far from the level of year 2001. More notably, more mature companies (age of software product business was three years or more) decreased their R&D investments in 2004 and the investments were at their lowest level since 2001. However, the decrease was most significant in the companies aged between 3 and 10 years. This clearly points out the fact that in the current economic situation, despite in which phase the company's life cycle phase is, majority of the companies are investing 15-30% (median) of their revenues on R&D where as in 2003 companies, except youngest ones, invested substantially larger amount in their R&D (in terms of relative share of total revenues).

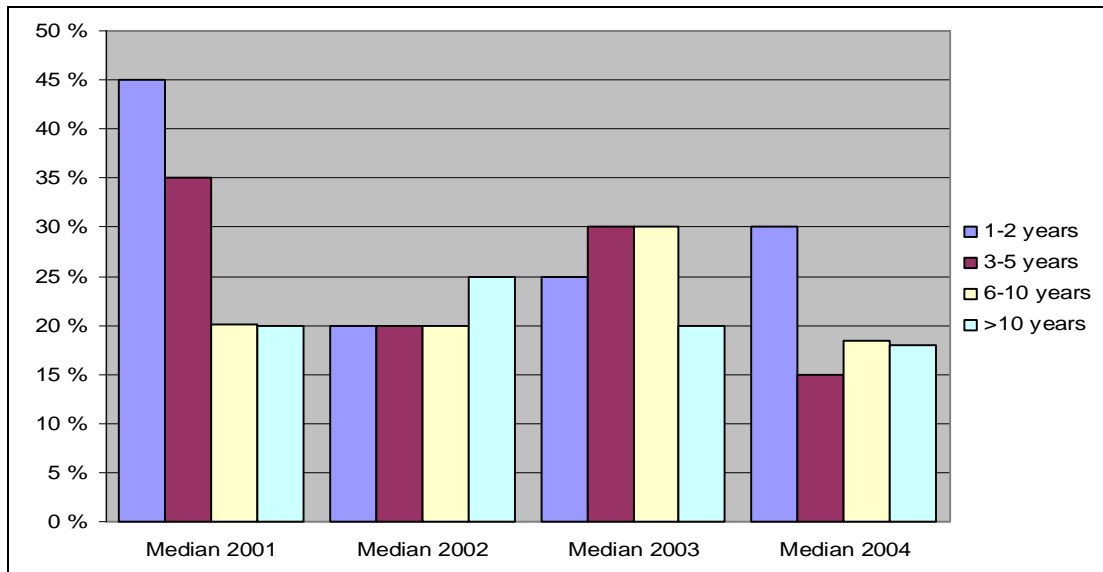


Figure 26. R&D Investment (% of Total Revenue) According to the Maturity of the Software Product Business in 2001 - 2004

We also studied how the focus of the product development has changed in the company sample from 2001 to 2004. During these years, most product development emphasis had been placed on increasing the degree of productization and on creating value-adding services. Particularly the emphasis on new market specific versions and on value-adding services and the degree of productization increased in 2004. In addition, the R&D emphasis of creating new products had significantly decreased from year 2001 as Figure 27 indicates. This could indicate that in the current economic situation the companies try to avoid risky R&D projects and focus merely on the less risky, e.g. in improving their current products and creating services related to them.

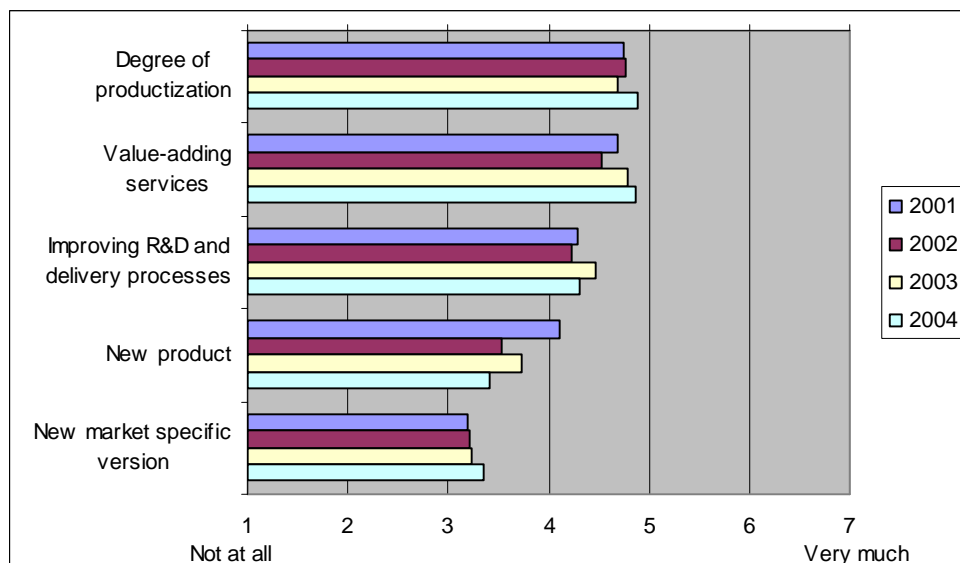


Figure 27. Product Development Emphasis 2001 - 2004

Similarly to 2003, in 2004, the companies that have been in the software product business for less than six years emphasized leveraging the degree of productization and value-adding services. In 2003, companies that have been in business for at least six years emphasized the most of the creation of value-adding services related to their main product and improving their R&D and delivery processes. In 2004 these companies emphasized value-adding services, but the degree of productization was seen more important than improving the R&D and delivery processes. Interestingly, software companies are investing more on productization of their current offering instead of investing in the new product development. This is in line with the trend when considering the investments in R&D. Furthermore, it seems that the companies are trying to gain from short-term cost-savings, which can be harmful for the long-term success because new products and innovations are the source of future revenues. Product development emphasis sorted by the age of software product business can be seen in Figure 28.

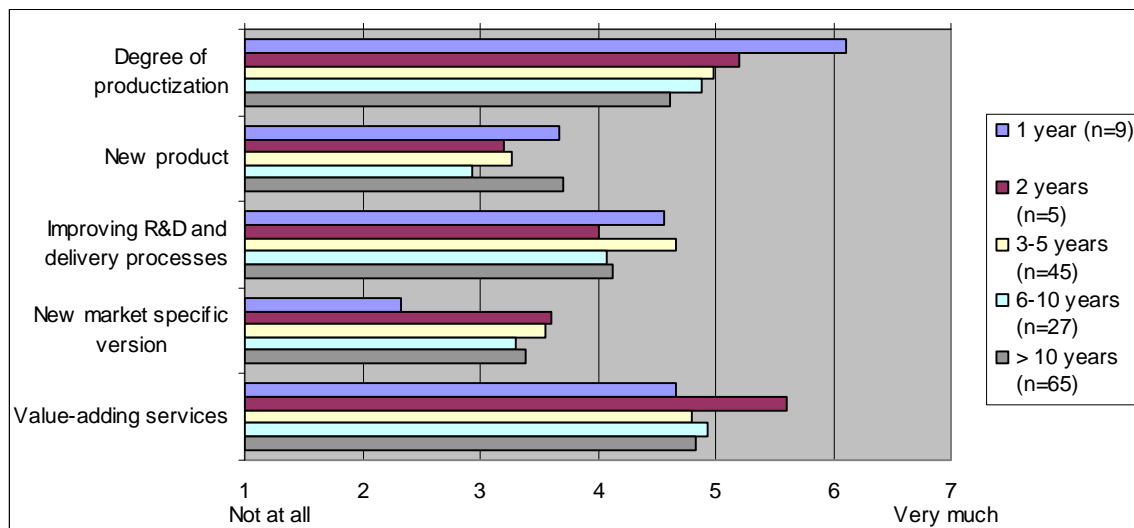


Figure 28. Product Development Emphasis Based on the Age of Software Product Business

3.3 Product Development Processes

We asked companies about their product development processes. 42.5 % of the companies did not systematically set milestones in their product development projects (given no more than a value of 4 on the 7-scale Likert). The averages of the used approaches in product development are depicted in Figure 29.

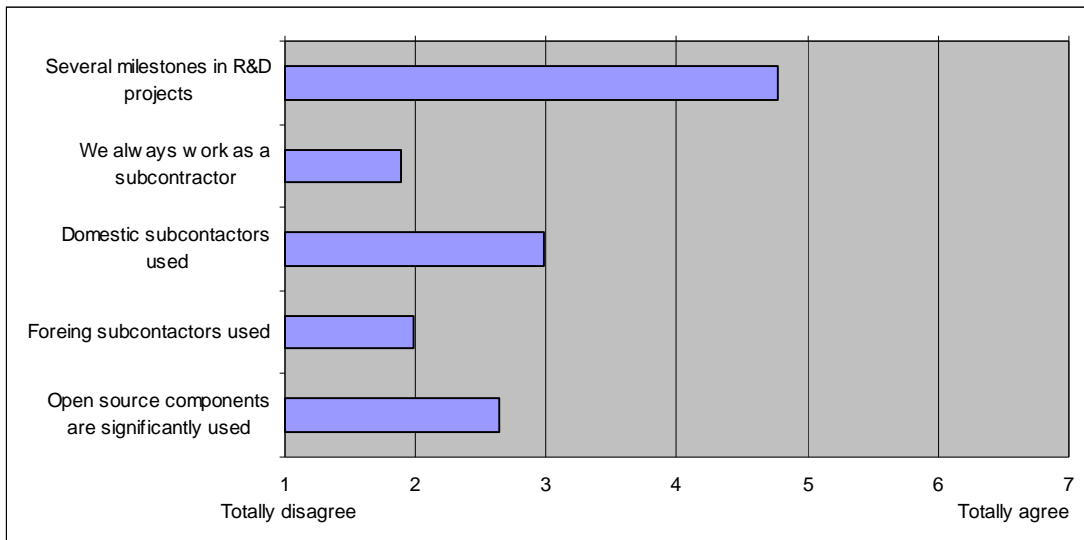


Figure 29. Describing Factors of the Product Development Process

This year was the first time when the companies were asked the question about the usage of open source components in their software product development. The results showed that 19.9% of the companies (n=151) used open source components significantly in their software product and its development (given at least a value of 5 on a 7-scale Likert).

While the most of these companies were small, 26.7% of the companies that used the open source components software business revenues over 1 million Euros (Figure 30).

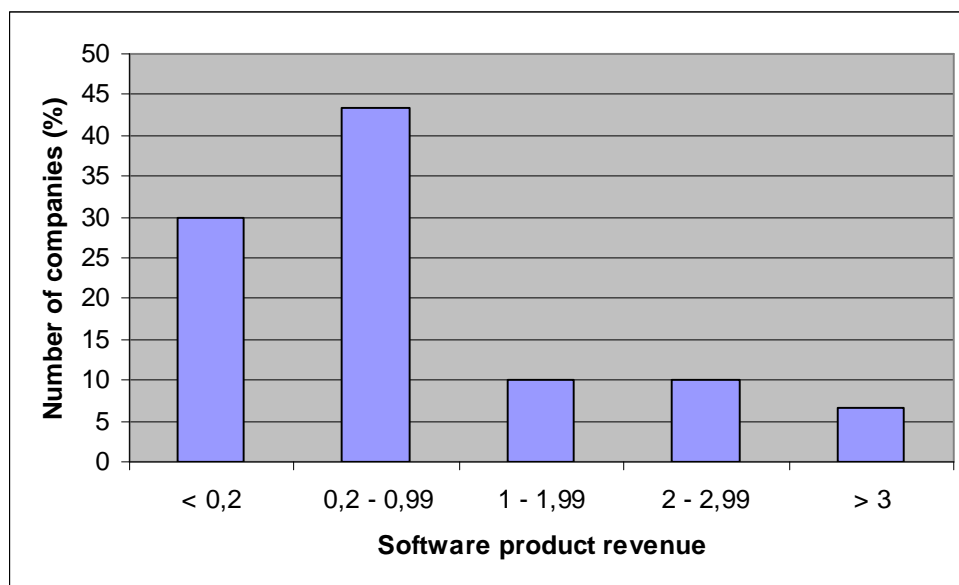


Figure 30. The software product revenues of companies using open source component significantly in their software product

When looking at the age of these companies 40% of them were less than six years old. Evidently, also the older companies use open source components as can be seen from Figure 31.

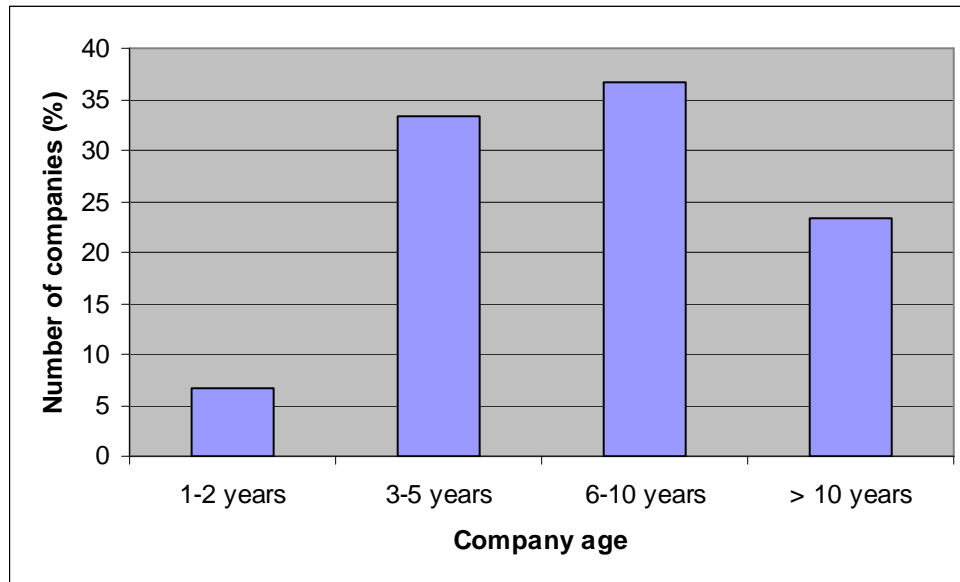


Figure 31. The Age of Companies using Open Source Component Significantly in their Software Product

Interestingly, the previous methods (Figure 29) used in the product development process did not dramatically seem to affect the degree of productization. Interesting correlations were found between subcontracting and cooperation with the open source-community. Cooperating with the open source-community correlated slightly with the usage of domestic subcontractors (Spearman correlation 0.281, significant at the 0.01-level).

We also asked the companies to estimate their product development processes by some statements, where the far-ends were not necessarily opposites, but describe i.e. how the information is gathered and how the decisions concerning the development of new products is done (Figure 32). Majority of the companies (64.2%) indicated that the new product development projects are at least partly based on understanding the market needs, instead of basing the decisions merely on the companies own technological competence (given at least a value of 5 on a 7-scale Likert). In addition, 32.5% companies released versions of their new products based on a fixed time schedule (given no more than a value of 3 on a 7-scale Likert).

Whereas 48.1% of the companies were including almost all of the product's planned features despite delays in the product release (given at least a value of 5 on a 7-scale Likert). Furthermore, majority of the companies gathered requirement and feature needs from their customers whereas the market research was more rarely used, as only 32.9% of the companies indicated doing so (given at least a value of 5 on a 7-scale Likert).

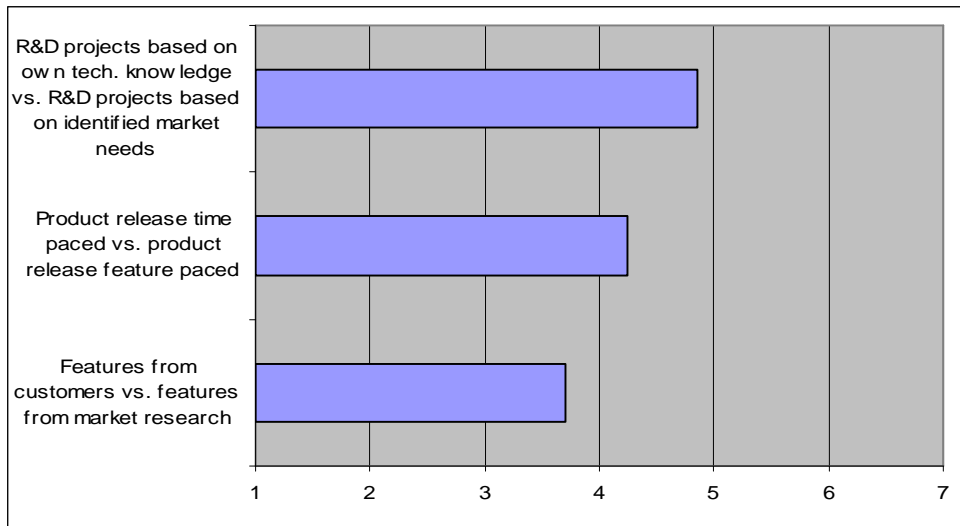


Figure 32. Characterizing Factors of the Product Development Process

Interestingly, a small positive correlation was found between the degree of productization and product features based on market research (Spearman correlation 0.246, significant at the 0.01-level). This can be explained by the fact that the software products with a high degree of productization are usually sold to hundreds or thousands of customers. Therefore, the market research is usually the most effective way to gather and manage customer requirements and needs especially if there are a lot of potential customers.

4 INTERNATIONAL OPERATIONS

Software product business is typically dependent on high volumes, reusability, and wide market acceptance. Therefore, international expansion will at some point become a necessary step for growing companies beyond the growth limits imposed by the size of the Finnish market, which counts for less than 1% of the world software market. But internationalization is also highly risky. The pressure on early internationalization, required resource intensity, the dynamism of external environment, fierce competition, and the general immaturity of the industry are only some of the factors that contribute to the high risk level of internationalization. These risks impact not only the growth and profitability prospects of the internationalizing firm, but often also the very viability of the business. These arguments justify the special attention put to international operations in this report.

This chapter provides an overview of Finnish software product industry firms' international operations. More specifically, the focus of this chapter is on identifying the typical profile of an internationally operating software product firm and its differences from its domestically operating siblings. We also analyze data on the process of internationalization, on primary foreign markets, on modes of international entry, and on the resource propensity of the analyzed firms for international operations.

4.1 Scale of International Operations

Overall, 81 (46%) out of the 174 responding firms had some revenue streams from foreign markets in 2004, and thus can be considered as internationally operating. This represents a slight decrease from the 49.7% reported a year ago. The distribution of internationally operating firms, as well as the distribution of their foreign revenue share, is presented in Figure 33. We can observe that well over half of the companies with international sales received only one quarter or less of their revenue from outside of Finland. The share of firms receiving 25 to 75% of their revenues from abroad increased from last year's 10% but in other categories there was a slight downward shift. This U-shaped distribution suggests a gap between initial sales abroad and full-scale internationalization.

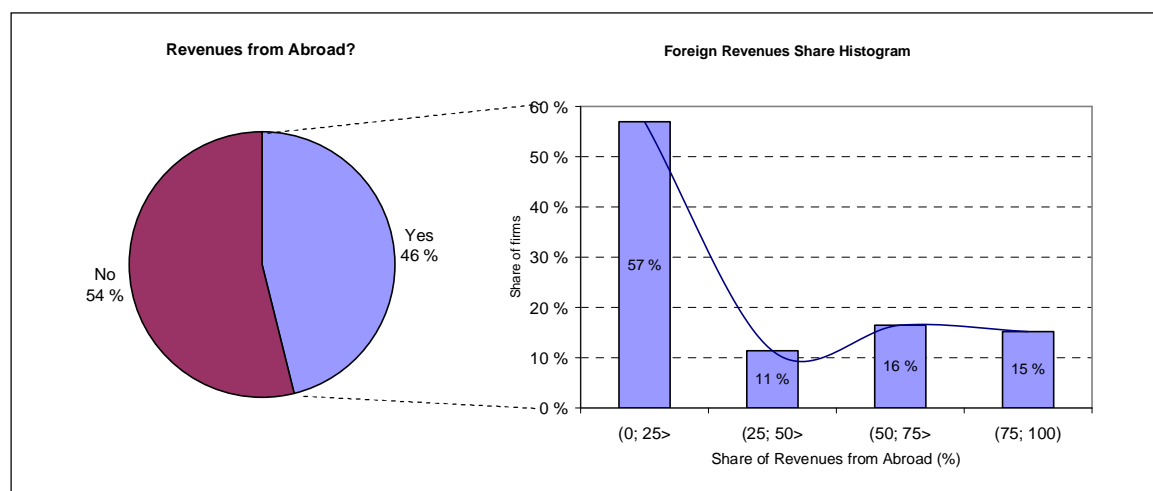


Figure 33. Firms that Generated Revenue from International Operations ($n_1=176$ and $n_2=79$)

4.2 Profile of Internationally Operating Firms

The basic indicators of international operations and their averages from 2004 and 2001 for internationalized firms are presented in Table 15. The average number of foreign markets targeted in 2004 was 9.4. This represents a significant growth in geographic coverage, as the corresponding figure was 5.3 in 2001. Last year, the average number of countries generating revenue was 6.3, so in recent times there has been a growing trend in geographical coverage. Also the median number of export countries had grown significantly: from 2.0 export countries in 2001 to 4.0 in 2004. The corresponding figures from the year 2003 were 3.0 and 1.5 so there is support for wider internationalization in this year's sample firms.

Probably the most important internationalization indicator, the share of foreign revenue, shows that 31% of revenue (20% in 2001) was generated abroad in internationalized software product companies. However, almost half of the firms gained only 10% or less of their revenue from international operations. Hence, the corresponding median is 10 percent units lower, at 20%. Also, the median for export share in 2001 was just 3% in 2001. The average numbers indicate a significant increase in the share of foreign revenue since 2001 in some sample firms but the overall medians stay at the same level as last year.

The figures are very close to those discovered last year representing the corresponding figures from 2003 and 2000. In the last year's sample the share of revenues from outside Finland was on average 31% and in 2000 19%.

On average, internationalized firms had employees in 1.4 countries. However, almost 65% of the firms did not have any employees abroad. Just over one quarter of their total employees (including those based in Finland) focused on export business on a full-time basis. Again, the corresponding median value is only 10% (5% in 2001). The strong increase since 2001 suggests that many companies today assign significantly more employees to foreign operations than they did three years ago. All in all, there has been positive development in the software sector. On average the sample companies are bigger and more internationally oriented than they were three years ago.

Table 15. Indicators of International Operations

<i>Indicator</i>	<i>2004</i>			<i>2001</i>		
	<i>Mean</i>	<i>Median</i>	<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>N</i>
Number of countries generating revenue, excl. Finland	9,4	4,0	80	5,3	2,0	75
Share of revenues from outside of Finland 2002 (%)	31 %	20 %	93	20 %	3 %	75
Number of countries where company had employees, excl. Finland in 2002	1,4	0,0	77	0,8	0,0	69
Share of employees focusing full-time on foreign operations in 2002 (%)	27 %	10 %	77	19 %	5 %	71

A comparison of some key descriptive statistics between internationally and domestically operating companies is presented in Table 16. The average total revenue of internationalized firms was 24.9 million Euros in 2004. There was a significant difference in total revenue between internationalized and domestic firms both in terms of mean and median values. The average internationally operating company was more than 10 times

bigger than the average domestic software company. However, the findings differ markedly from last year's results. Last year's survey excluded many large firms and the average revenue of internationally operating companies was a mere 4.1 million Euros. This year's findings are closer to those of the year 2002. The findings are well in line with the 31.1 million Euros revenue in 2002 and the 27.4 million from 2001. Hence, according to the sample firms there has not been much growth in the last three years but this is due to some very large firms still being missing from the sample. However, as some very large companies bias the results, the distribution median gives a more correct profile of a typical internationally operating software firm. The median of total revenue by international firms grew from 1.2 M€ to 1.8 M€ and that of domestically operating firms from 0.25 M€ to 0.5 M€ since last year.

All mean values are greatly influenced by some large companies' figures. For instance the average profit of internationalized companies in 2004 is largely biased downwards by some companies' heavy losses. Hence, the median better describes the actual situation of the firms. Still, also the median values indicate significant differences in all the company characteristics between domestic and international software product firms. Internationally operating firms are bigger both in terms of revenue and number of employees as well as profits than their domestically operating siblings. They also expect a stronger growth for the following year. On the other hand, they may be less profitable as domestically operating firms, which yet again tells about the risky nature of internationalization.

Table 16. Profile of International vs. Domestic Firms in 2004

<i>Indicator</i>	<i>International</i>			<i>Domestic</i>		
	<i>Mean</i>	<i>Median</i>	<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>N</i>
Revenues in 2004 (M€)	24,9	1,8	109	2,0	0,5	101
Predicted growth rate 2004-2005	39 %	20 %	69	32 %	20 %	87
Proportion of revenues in 2004 from own SW products (%)	74 %	100 %	91	75 %	80 %	93
Age of company	12,5	11	83	10,9	11	95
Age of own software product business	10,3	8	84	9,7	8	94
Number of employees in 2004	207,4	20	113	18,1	6	104
Profit in 2004 (M€)	2,0	0,07	92	0,2	0,03	86
Return on sales	-2 %	6 %	92	10 %	6 %	85
R&D per sales in 2004 (%)	27 %	20 %	61	30 %	15 %	78

In order to analyze differences in the distribution of revenue between international and domestic firms, we have used a modified histogram², which is presented in Figure 34. It shows that domestic firms tend to have lower sales volumes than international firms. In the categories of middle income firms the shares are quite similar, but in the category of smallest revenue the share of domestic firms is over twice as big as that of internationalized firms. On the other hand, only 14 % of domestic have revenues from 2 to 10 million Euros, and just 4 % have a total revenue over 10 million Euros. Last year

² Modified histogram: The bar chart showing frequency of occurrence within a series of variable (non-constant) ranges. While this chart can emphasize differences between variables, it should not be used to conclude on shape of distribution due to the irregular categories and consequent deformation of distribution shape.

there were no domestically operating firms with revenue over 10 million Euros at all. All in all, there seems to be a relation between internationalization and larger revenues.

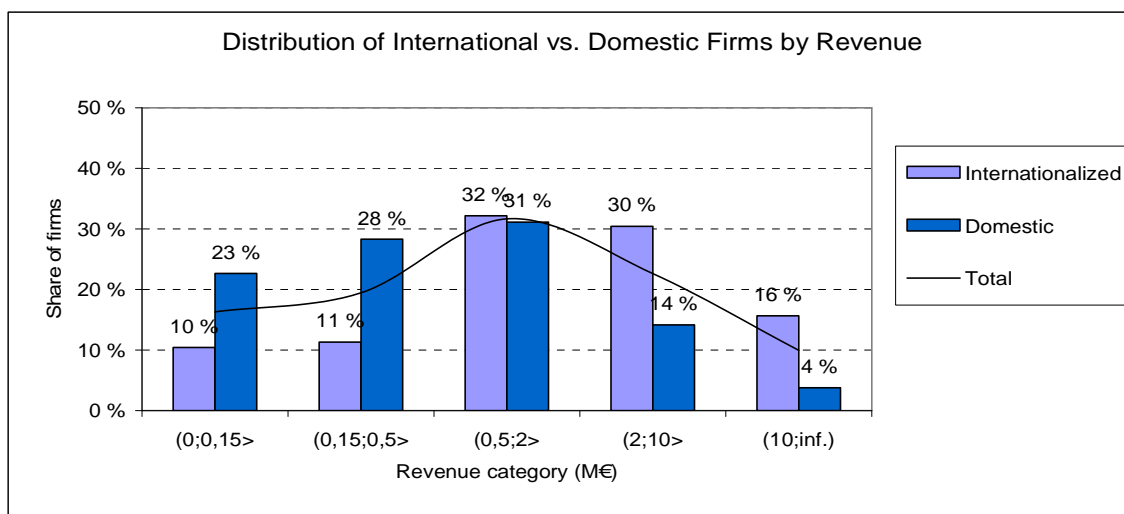


Figure 34. Distribution of International vs. Domestic Firms by Revenue (n=221)

The average profits of both domestic and international firms are rather small, the average for internationalized firms being 2.0 million Euros and for domestic firms 0.2 million Euros. Both figures are shifted downward by a few firms with great financial losses in 2004. Median of internationalized firms was about 70 000 Euros and of domestic firms 30 000 Euros. The distribution of domestic firms by profitability is much more centralized and is highly concentrated around zero. Approximately 81 % of domestic firms have profit between 0 and 100 000 Euros whereas the corresponding figure for international firms is 54%.

On the other hand, the profit distribution of internationally operating firms is wider, with almost one third of these reporting losses or zero profit, and over a quarter reporting profits in excess of 300 000 Euros. This clearly indicates that international operations are significantly riskier in general than domestic ones. These risks are associated with greater growth opportunities, if the firm is successful. Another, perhaps more objective and comparable measure is profitability. The following analysis focuses on return on sales (profit divided by annual sales). The distribution of international and domestic firms is presented in Figure 35.

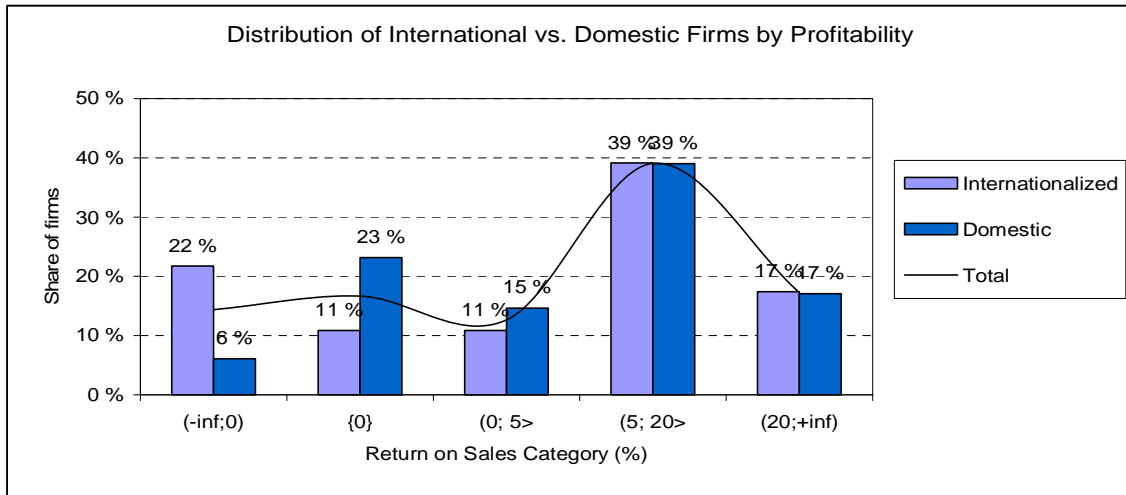


Figure 35. Distribution of International vs. Domestic Firms by Profitability (n=174)

Highly surprising is the finding that age, both in terms of mean and median, is quite similar for both international and domestic firms. This would suggest that decision to internationalize is in software business somewhat independent of maturity of the firm in terms of age. Even closer examination of age distribution, as presented in Figure 36, does not uncover any significant differences between the age structure of international and domestic firms.

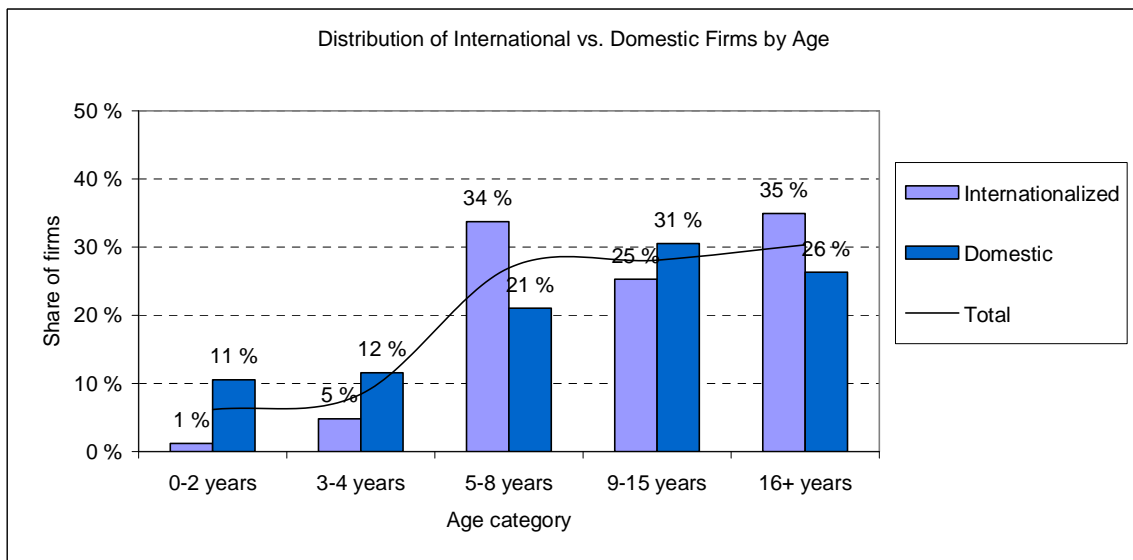


Figure 36. Distribution of International vs. Domestic Firms by Age (n=178)

4.3 Improvement emphasis

The next issues of our interest are the differences in emphasis on key improvement areas. The importance of nine areas as perceived for horizon of three years by international vs. domestic firms is presented in Figure 37. The average internationalized firm in our

sample finds as key areas for improvement international sales and marketing, knowledge and skills of personnel, networking and co-operation and productization.

The findings are well in line with those of last year. Last year also the most important improvement areas by internationalized firms were considered to be international sales and marketing, followed then by R&D and productization and networking and co-operation. So there were no drastic changes, the five most important areas are the same apart from their order having been changed slightly.

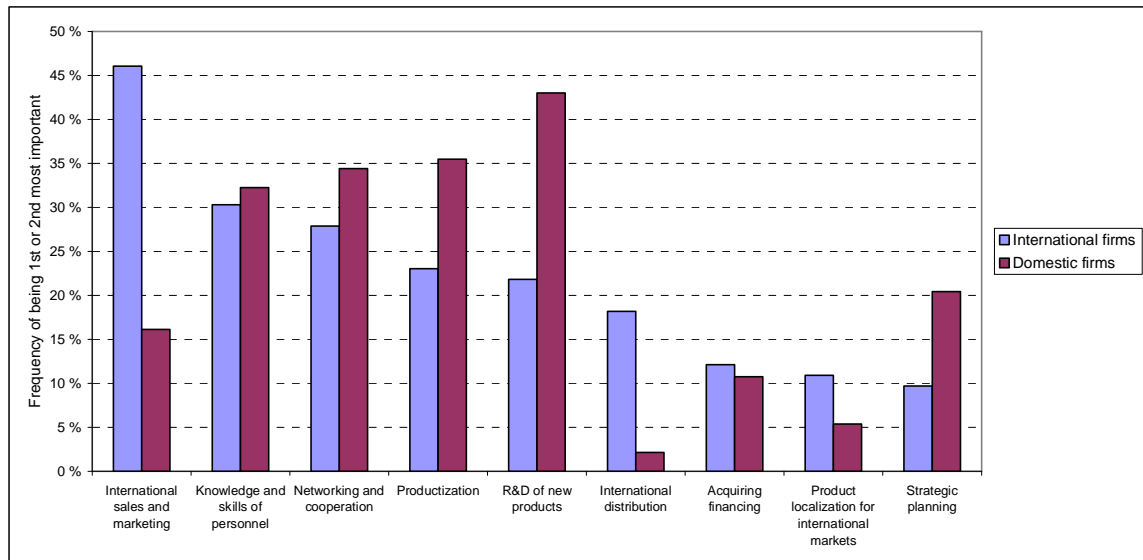


Figure 37. Improvement Emphases by International vs. Domestic Firms for 2004-2006 (n=115)

The most significant difference in importance perception between internationally and domestically operating firms is in international sales and marketing, and also in international distribution, which are found much more important by international companies. The results indicate that for many currently domestically operating firms, internationalization is not currently issue of high priority. However, distribution of the answers is highly heterogeneous and about every sixth domestic firm found international sales and marketing as one of the two most important improvement areas.

Networking and knowledge and skills of personnel were found almost equally important by both international and domestic firms. Product localization for international markets was felt to be more important by domestic firms than international ones. This can be explained by the fact that most of the internationally present firms have already gone through product localization phase and established corresponding processes, while for some domestic firms thinking of internationalization this is the current issue to deal with. This assumption gains further support by the fact that both R&D of new products and productization were on average considered more important by domestic firms than by international firms. Last year strategic planning was considered more important by international than domestic firms. The findings suggest the opposite for the firms in this year's sample.

4.4 Primary Foreign Markets

The next issue, being of major concern when analyzing international operations, is to find out what geographic markets are perceived as the most important ones, how foreign sales are distributed between them, and, in addition, if and what functions are located in these major export markets.

The Swedish market was reported to be on top in terms of importance as presented in Table 17. Sweden, Germany and USA have been reported as one of the three most important markets most often. As other most important markets were mentioned the UK, Norway, Estonia, Denmark and France. The structure of geographic markets in 2004 was quite similar to the year before. However some changes, such as the growing importance of Germany and Denmark and the diminishing importance of USA and Russia, took place.

Table 17. Three Most Important Markets

Rank	1st export country (n=87)		2nd export country (n=64)		3rd export country (n=64)		1st-3rd export country* (n=228)	
1	Sweden	30 %	Sweden	17 %	Germany	14 %	Sweden	56 %
2	USA	16 %	Norway	13 %	Sweden	9 %	Germany	36 %
3	UK	13 %	Germany	12 %	USA	9 %	USA	35 %
4	Germany	10 %	USA	9 %	Denmark	8 %	UK	25 %
5	Estonia	6 %	UK	8 %	Hollanti	6 %	Norway	18 %
6	France	3 %	Holland	5 %	Latvia	6 %	Estonia	16 %
7	Russia	3 %	Denmark	5 %	UK	5 %	Denmark	15 %
8	Norway	3 %	Estonia	5 %	Estonia	5 %	Holland	14 %
...
		100 %		100 %		100 %		300 %

* Probability of being one of the three most important export markets

The concentration in a single foreign market has slightly decreased since last year. In the sample of 52 firms, on average 44% of the export volumes came from single foreign market compared to last year's well over half. The three most important countries stood for about three quarters of all exports. The concentration of exports for 2004 is shown in Figure 38.

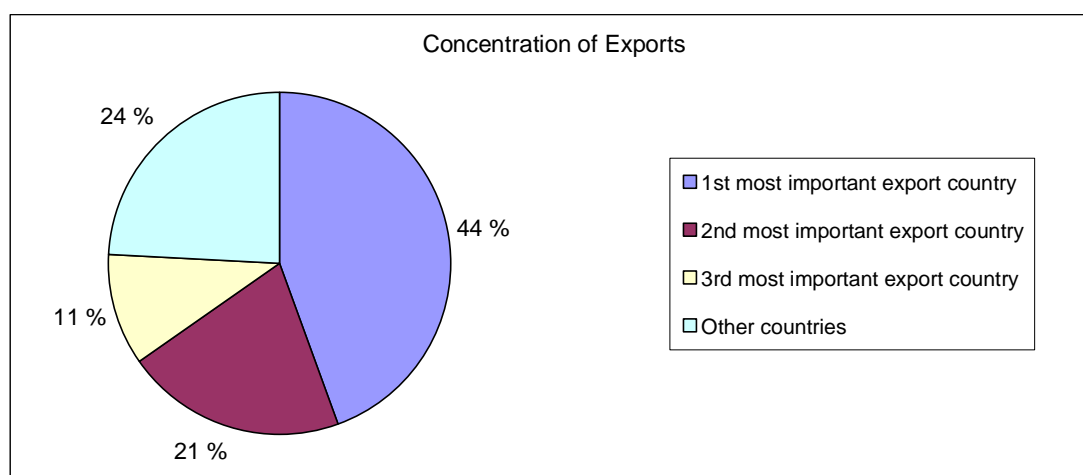


Figure 38. Concentration of Exports (n=52)

The plans for increasing geographical export coverage are illustrated in Figure 39. Most of the companies planning to expand the geographical coverage of their exports are next targeting Scandinavia or other parts of Europe. After Europe come the USA and Asia but they are together only as important as Scandinavia on its own. When the expansion is targeted to Europe, it is most often Germany or the UK that is being sought after.

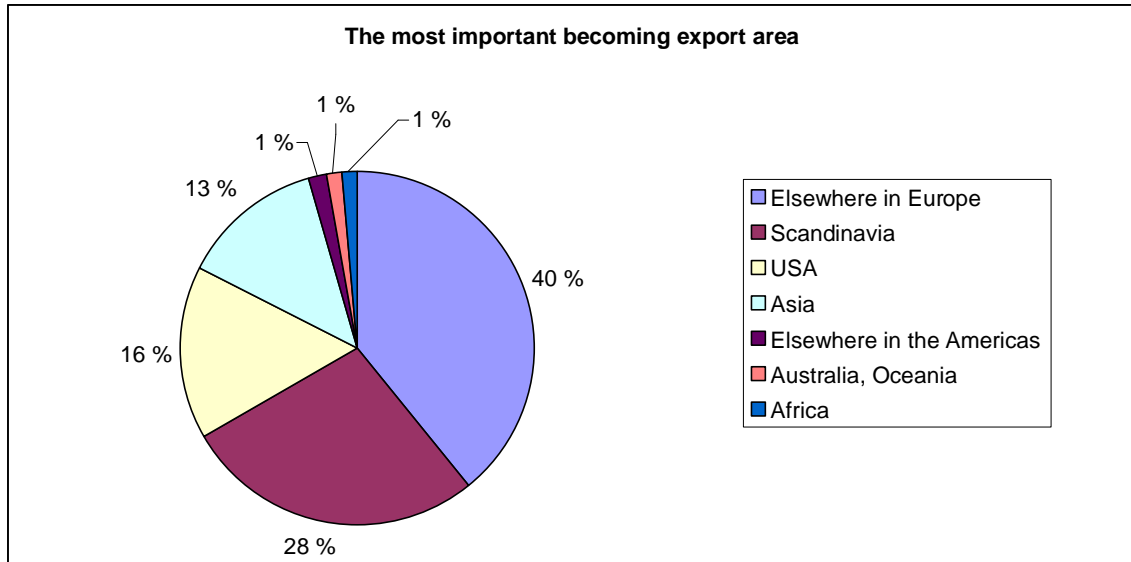


Figure 39. The most important becoming export area (n=25)

Figure 40 shows functional presence of firms in the three most important markets. Although most of the activities are generally organized and taking place domestically due to the generally small size of analyzed firms, many companies report a wide portfolio of functional presence also in their primary foreign markets.

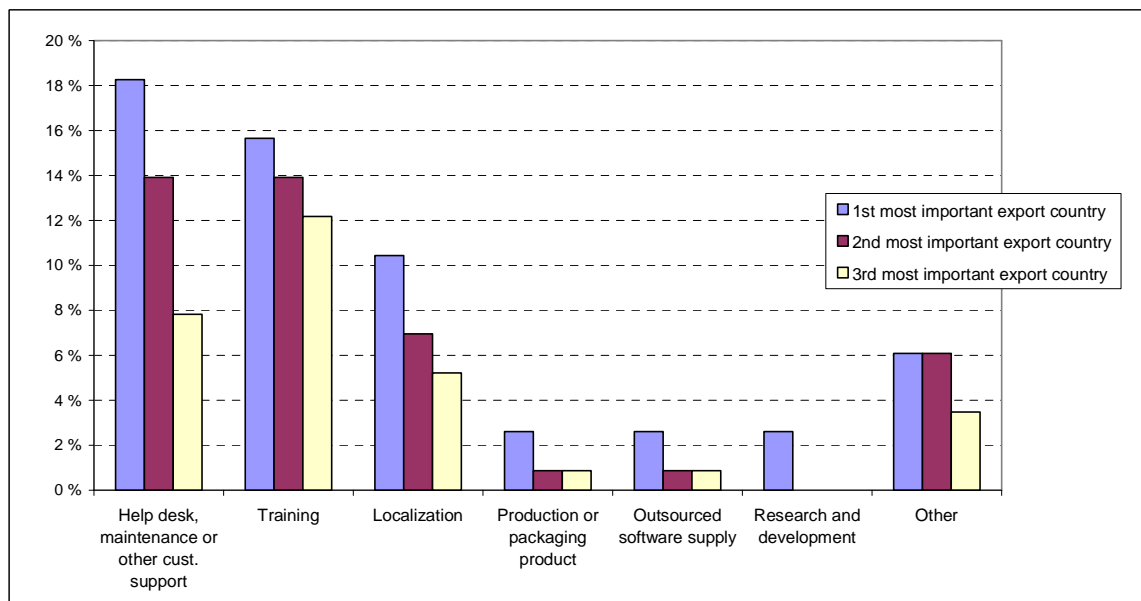


Figure 40. Functional Presence of Firms in Export Markets (n=115)

Help desk, maintenance and other customer support services took place directly in occupied markets in over 18% of the 1st most important export countries in sample firms. It was the most important last year also but then had a share of almost 28%. It was also the most common activity abroad in 2nd most important export countries along with training. Less than 16% of the firms reported training activities and 10% localization activities at their target markets. All these findings are in line with the fact that it is quite common in software industry that additional services including customer training, maintenance and multiple forms of customer support can unlock substantial value and bring corresponding revenue to supplier, and thus they are most often engaged in such activities.

In many areas foreign activity declined markedly from last year. This year only in a bit over 2% of the cases research and development took place in the most important export country, which was the case for almost 6% last year. Production and packaging and software outsourcing was located in less than 3% of cases directly in target market. Over 40% of analyzed firms have none of the above activities abroad. This may reflect the increased share of small firms in the sample.

In functions such as help desk, localization, production and packaging and especially R&D it is noticeable that their share is much higher in the most important market while decreasing with every additional market, in the case of R&D to zero, as it was last year also. This can be assigned to centralization of these on local basis and provided coverage to more than one country.

4.5 International Operation Modes

In order to understand the means different groups of firms were using to direct their products and services to foreign markets, we have analyzed their international operation modes in terms of popularity and consequently built profiles of typical users for most common operation modes.

The most popular operation modes used for foreign sales, same as the year before, were direct export followed by foreign value-adding retailer or agent. Direct sales were reported by half of internationalized firms, which is somewhat less than last year, while about 35% (62% last year) of them made use of retailer or agent.

About 14% of internationalized firms were selling to OEM or under private label and only about every ninth firm had their own foreign subsidiary. Joint ventures, foreign wholesalers and bundle sales with foreign products were in Finnish software product industry used only rarely. The sample firms in general reported lower levels of foreign activities than last year, but the distribution among different operation modes stayed almost unchanged. This may suggest that sample is merely biased to smaller firms in terms of scope of international operations. The level of use of individual international operation modes is shown in Figure 41.

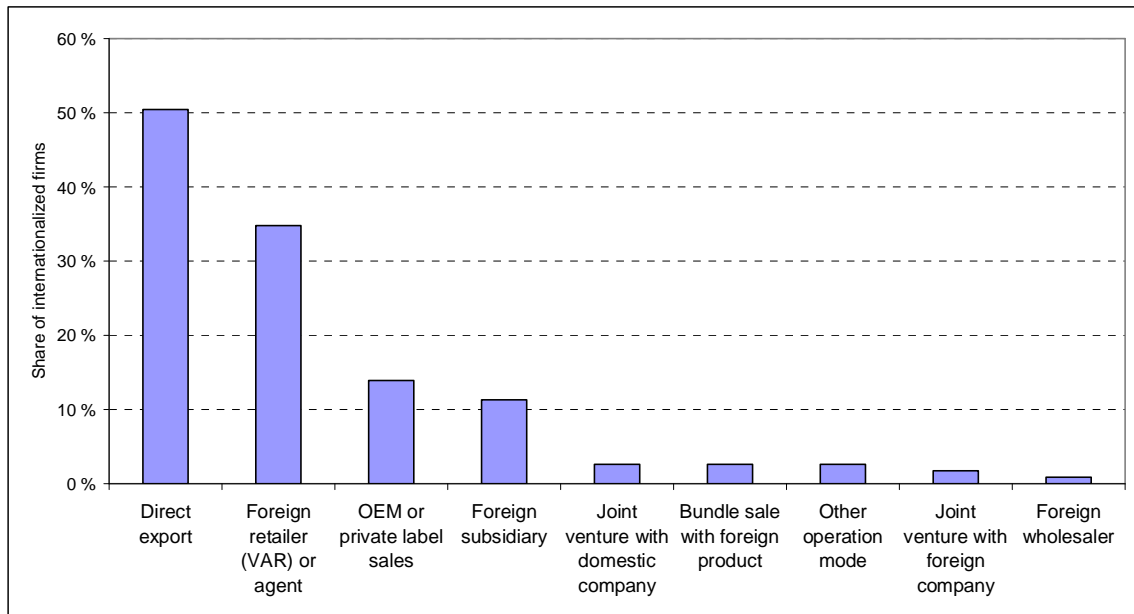


Figure 41. Frequency of Use of Alternative Operation Modes (n=115)

Direct sales was the most popular sales mode targeting on average 7.7 countries, as shown in Table 18. Typical firm using this operation mode was rather small in terms of revenue, had lower expected growth than firms using other operation modes but was already profitable. They were medium size in international operations in terms of both number of markets and share of revenue from them. In general, direct export seems to be a common mean for smaller firms with not fully developed internationalization.

Table 18. Firms' Characteristics by Operation Mode

International operation mode		Operation mode char.		General firm characteristics				Intl. operations firm characteristics	
		Share of firms used by	No. of countries operation mode used in	Revenues (2004) [M€]	Predicted growth (2004-2005)	Profit (2004) [M€]	Age [years]	No. of revenue gener. foreign countries (2004)	Foreign revenue share (2004)
Own direct export	Mean	50 %	7,7	4,3	35 %	0,04	13,2	9,6	31 %
	(n)	(58)	(58)	(55)	(50)	(51)	(57)	(57)	(57)
Foreign retailer (VAR) or agent	Mean	35 %	7,5	5,8	47 %	-0,16	13,7	11,5	41 %
	(n)	(40)	(40)	(37)	(32)	(33)	(40)	(39)	(39)
Own foreign subsidiary	Mean	14 %	6,8	2,7	52 %	-0,66	12,7	5,9	34 %
	(n)	(16)	(16)	(15)	(15)	(11)	(16)	(16)	(16)
OEM or private label sales	Mean	11 %	3,5	14,7	58 %	-0,54	16,7	16,9	57 %
	(n)	(13)	(13)	(12)	(10)	(11)	(13)	(13)	(13)

Foreign retailer or agent was deployed on average in 7.5 revenue generating foreign markets. Typical firm had usually medium revenue, high expected growth, and small losses.

A foreign subsidiary, an operation mode typically used by larger companies, was usually established in a little less than 7 countries. Such firms had high growth expectations, negative profitability and substantive share of international revenue.

The fourth commonly used operation mode, OEM or private label sales, was usually used to cover a large number of markets. Firms using this mode were rather old and had the highest revenue, highly optimistic growth outlook, and a very high share of foreign revenue.

4.6 Resource Fit for Internationalization

The intention of this short subchapter is to analyze resources of sample firms from the perspective of their fit to international operations and to make some findings on general predisposition of Finnish software product industry firms to operate on foreign markets. The firms were asked to grade the fit of selected resources on 7-point Likert scale. The value seven represented a complete fit for international business, while the value of one for domestic one.

4.6.1 Internationalized firms

The chart showing distribution of grading by already internationalized firms is in Figure 42. Highest rating by far, on average 4.0 points, was given to the fit of current products and services for foreign markets, as was the case last year also, even if the grade was now lower than last year's 4.3 points. The question whether most attractive risk-return ratio for existing resources could be achieved domestically or abroad was graded 3.5 points. The question whether the skills and motivation of employees focuses primarily on business on foreign or domestic markets was graded 3.6 points. Last year they were both graded 3.8 points so they were less in favor of international operations this year.

The question whether the current customer and supplier relationships are best exploited in domestic or foreign markets was graded 3.5 so it favored neither international nor domestic markets. Also growing of a business was considered to be equally cheap domestically and internationally as suggested by the 3.5 points it received. Reputation and brands were graded least in favor of international operations receiving just 3.0 points. Last year also they were considered better suitable for domestic operations.

On average all grades apart from the question concerning growing of business fell by 0.2 –0.3 points from last year, which represents a slight decrease in fitness for international operations. However, the distribution of grades remained almost untouched. The distribution of grading in 2004 and 2003 by means is presented in Table 19.

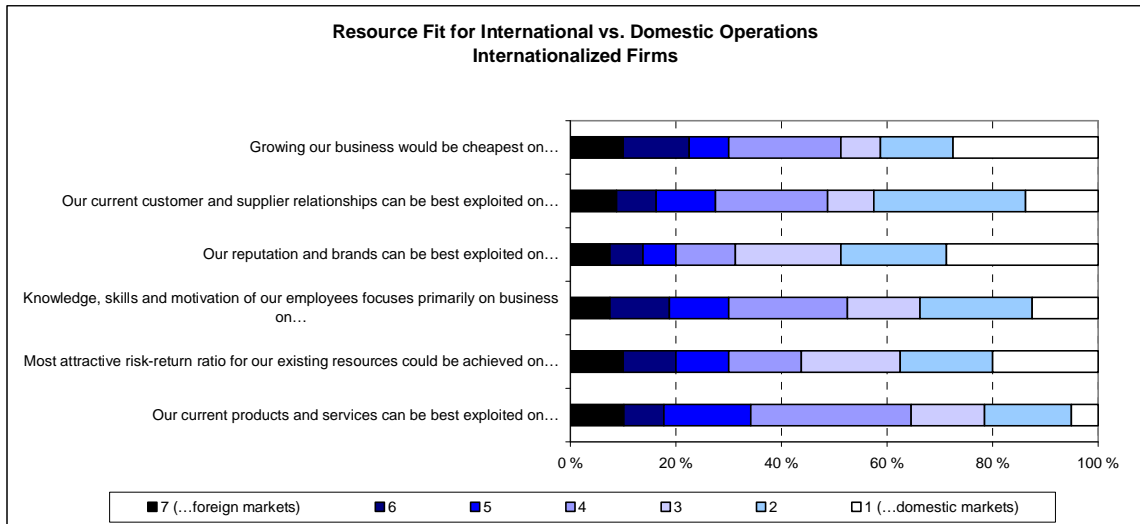


Figure 42. Fit for International Operations by already Internationalized Firms (n=80)

4.6.2 Domestic firms

The distribution of grading by domestic firms differs a great deal from that by internationalized firms, as shown in Figure 43. The highest rating, 2.5 points, was given to the fit of current products and services for foreign markets, as was the case among internationalized firms as well. The question whether the knowledge, skills and motivation of employees focuses primarily on business on foreign or domestic markets was graded second highest, receiving 2.1 points

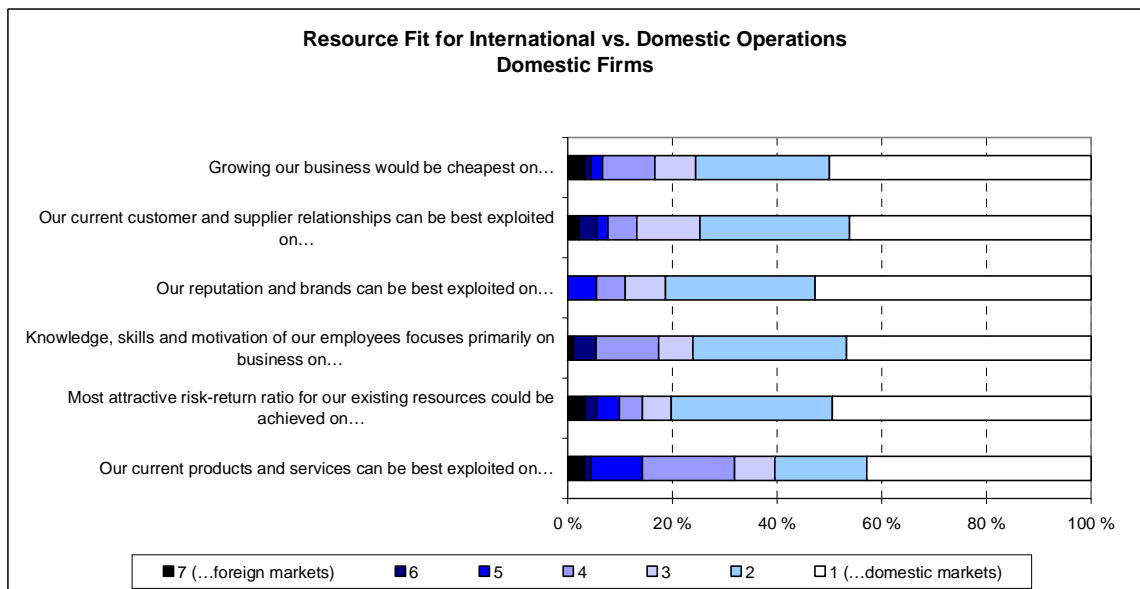


Figure 43. Fit for International Operations by Domestic Firms (n=90)

As suggested by the distribution of grading, the first two resources represent the best potential for internationalization, as the other resources were all graded 2.0 points or less.

Domestic companies find growing of a business cheapest by far domestically. All in all, the estimated order of resources by fitness for internationalization is roughly the same for both internationalized and domestic firms, the difference being that the average ratings by domestic firms are more strongly in favor of domestic operations.

Table 19. Distribution of Grading in 2004 and 2003 by Means ($n_1=80$; $n_2=90$)

<i>Resource</i>	<i>2004</i>		<i>2003</i>	
	<i>Internationalized</i>	<i>Domestic</i>	<i>Internationalized</i>	<i>Domestic</i>
Our current products and services can be best exploited on...	4,0	2,5	4,3	3,0
Most attractive risk-return ratio for our existing resources could be achieved on...	3,5	2,0	3,8	2,1
Knowledge, skills and motivation of our employees focuses primarily on business on...	3,6	2,1	3,8	2,6
Our reputation and brands can be best exploited on...	3,0	1,8	3,2	2,0
Our current customer and supplier relationships can be best exploited on...	3,5	2,1	3,7	2,1
Growing our business would be cheapest on...	3,5	2,1	3,4	1,9

5 FINANCING AND OWNERSHIP

The financing needs of Finnish software product companies are different compared to Finnish companies in general. The whole industry is young, dynamic and global by nature which makes it imperative for companies to internationalize rapidly, influencing the financing needs. These factors contribute to making the software product industry quite specific in terms of the investment opportunities the industry can provide and the resulting financial structures in the industry.

This chapter examines the typical financing sources for software product firms and what is the resulting ownership structure in the industry. We also examine the plans for the future of the firms to acquire external financing.

5.1 Ownership

The largely equity based financing reflected in the financial structure of Finnish software companies differs significantly compared to more established industries. In addition, the presence of different types of shareholders aside from founders can significantly influence strategic choices a firm has. Therefore, this subchapter will examine the typical ownership structure of the firms.

The average structure of ownership, classified according to the type of ownership, is presented in Table 20. The sample used for ownership structure analysis consists of 174 responding companies. The majority of the ownership was held by the founders and their family members, representing on average 73 percent of the ownership. This represents a 4 percent unit increase compared to last year. The second biggest share, about 10 percent, was owned by management and employees followed by corporations with 7 percent. The shares of both management and employees and other corporations are therefore down from last year's 11 percent and 8 percent, respectively.

On average in our sample, less than 5 percent was held by venture capital investors, private or public. Out of this, about 3.7 percent belonged to private venture capitalists and 0.6 percent to government VC investors. The share of business angels was up from last year's 2 percent to a share of 2.6 percent. The remaining share was owned by financial institutions and other investors.

Table 20. Average Ownership Structure as of 31.12.2004 (n=174)

Ownership type	Total
Founders and their family members	73,0 %
Management and employees	9,6 %
External individuals/ business angels	2,6 %
Private VC investors	3,7 %
Government VC investors	0,6 %
Banks, insurance companies and other FIs	1,1 %
Corporations	6,9 %
Other investors and shareholders	2,4 %
Total	100,0 %

From the perspective of the dynamics of the ownership, the strongly increasing share held by VCs noted last year fell back to the level of 2002. VC investors' ownership

increased from the 3% as reported in 2002 to 7% in 2003, and back to 3.7 % this year. This does not support the trend identified last year but instead the findings from previous years' surveys that show a steady but low share of VC ownership in the sample firms. The share of external individuals/business angels was up from last year's 2 percent to 3 percent this year. All other owners' shares decreased from last year but none of them significantly.

In the sample companies' ownership was principally in domestic hands (Figure 44). On average, 95.8% of company ownership was domestic. Of the 176 of sample companies, in 153 there was no foreign ownership at all. When foreign ownership was present, the average share was 32 percent and the median share 20 percent.

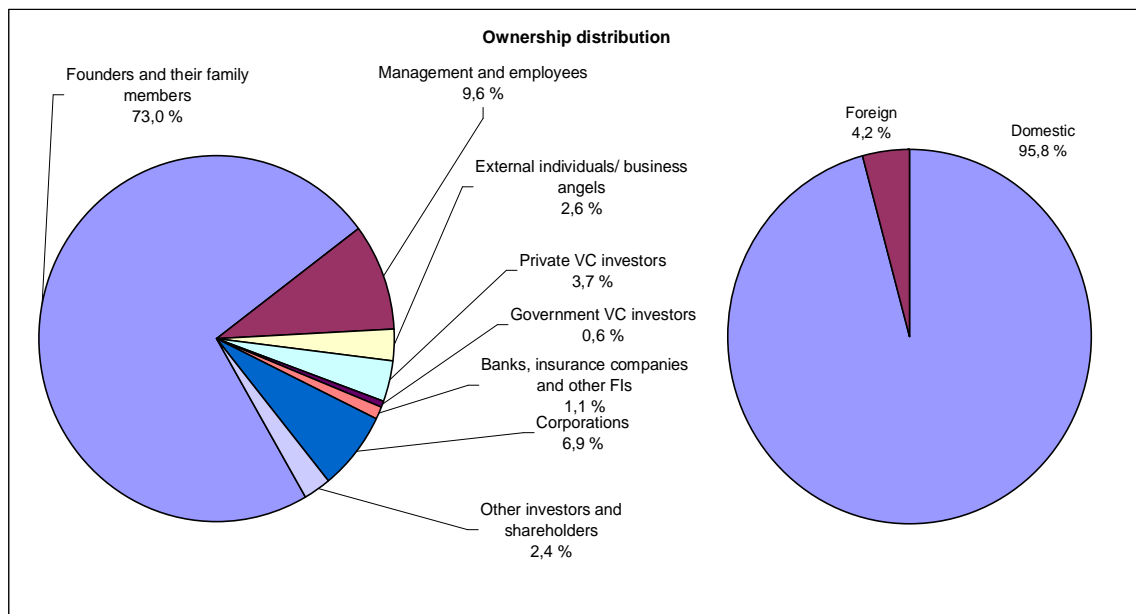


Figure 44. Sample companies' ownership distribution (n=174)

Another useful perspective to study the ownership structure is to group the ownership structures along their age. For this purpose, overall usable sample of 173 firms was divided into five groups according to their age. The sample is somewhat biased towards the older end of firms. The two youngest groups contain only 6.4 and 8.7 percent of the available sample, respectively, whereas the three last groups all contain more than 25 percent of the sample. Figure 45 presents the resulting average ownership structure as distributed along the firms' age.

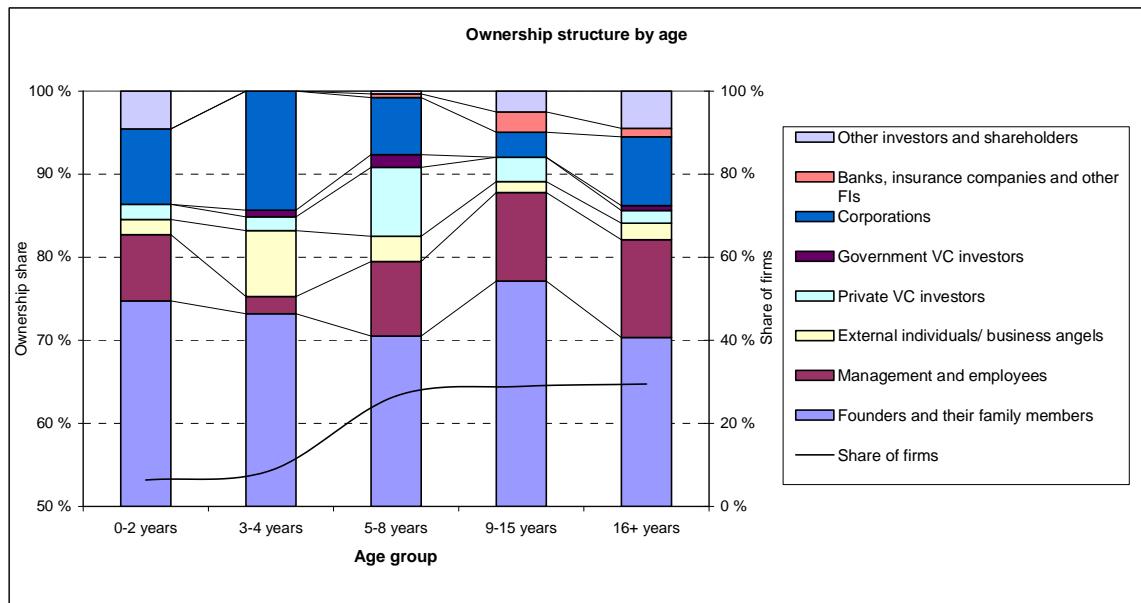


Figure 45. Ownership Structure by Firms' Age as of 31.12.2004 (n=173)

The ownership share held by founders and their family members in Finnish software product firms was strong and highly stable over the whole life cycle ranging from 70 to 77 percent. This is somewhat surprising considering the large share of older firms in the sample. The ownership share of management and employees was also relatively stable over the age groups, ranging from about 8 to 11 percent apart from the second youngest group where the share of management was a mere 2 percent. The shares held by others were more volatile between age groups.

Corporate ownership share was quite unstable in relation with the age of the analyzed firms. Starting from about 3% for the group of the second oldest firms, it went up to 14% in 3 to 4 years old firms. The share of corporate ownership was over two times higher than last year in the two youngest age groups and lower than last year in the three oldest ones. The drop was most significant in the age groups of 5 to 8 and 9 to 15 years dropping from over 10 percent to less than 7 percent and from 6 to only 3 percent, respectively.

The trend of decreasing share of VC ownership when firms mature noted in previous years' surveys, following the logic of risk capital, is less apparent in this year's survey. Instead, the share of private VCs was quite stable. For the companies 5 to 8 years of age, private VC held on average about 8 percent, but in all other age groups the share was between only 1.5 percent and 2.9 percent. Government VC investors had strongest ownership stake in 5 to 8 years of age firms, as it was last year also. The share was 1.5%. In other age groups the share was almost nonexistent varying between zero and 0.6 percent. Last year the ownership of banks and other financial institutions was present in all age groups. This year they only have a stake in the three most mature, and the least risk bearing companies counting for 0.4 to 2.5 percent of ownership.

5.2 Access to Finance

Access to external financing is especially critical for dynamic young innovation-based industries. Most of the firms in the software product industry are young with extensive

investments made into research and development while having yet limited or not any sources of internal financing. At the same time, high pressure on rapid expansion and internationalization even intensifies the urgency of need for external financial backing. Therefore, in this subchapter we will present how accessible firms find external financing, and what are the possible impacts of finance availability problems.

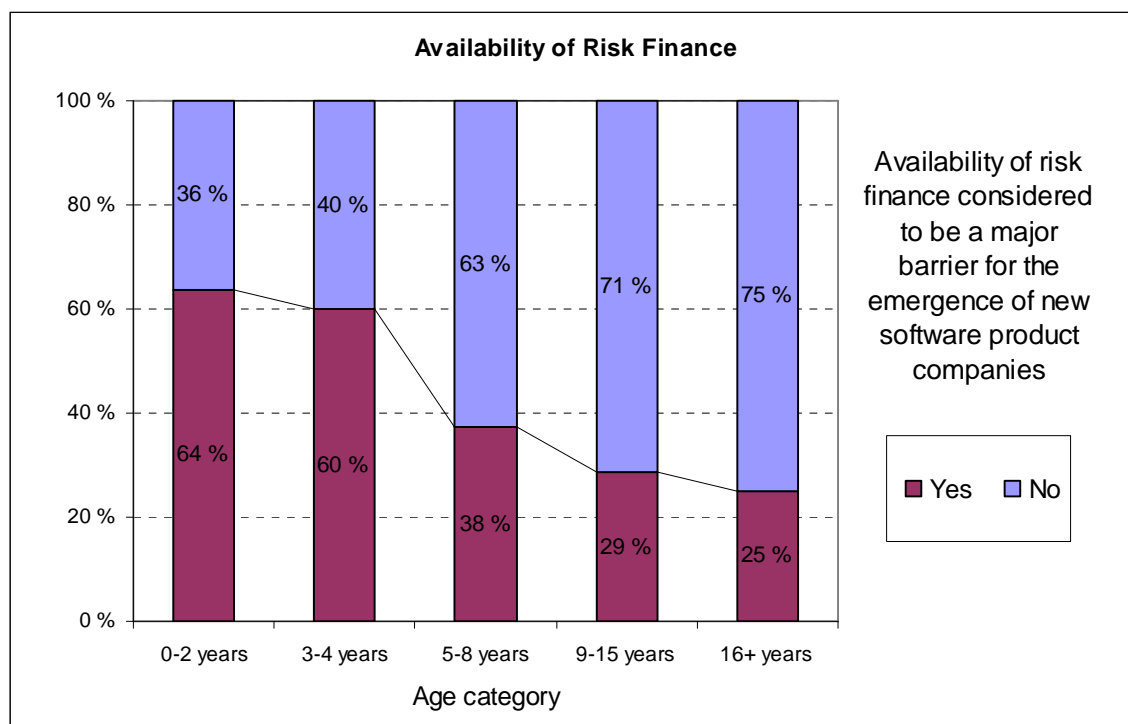


Figure 46. Opinion on the Availability of Risk Capital by Age (n=175)

On average, 35 percent of the 175 firms considered the availability of risk finance to be a major barrier for the emergence of new software companies. This was down from last year's 41 percent by 6 percent units. However, as shown in Figure 46, there were clear differences in this perception based on the firms' age. Almost 65 percent (less than 60 percent last year) of companies 2 years old or younger perceived availability of risk finance as a major barrier, whereas the corresponding figure was only 25 percent for the group of oldest firms.

On average 31 percent of a sample of 176 respondent companies (24% in 2002, 25% in 2003) reported having been forced to significantly change their business plans due to problems in the availability of finance as depicted in Figure 47. For the majority of companies, access to risk capital is not a problem because of low growth orientation and thereby little need for external finance. However, for highly growth-oriented minority of companies that create the majority of growth and employment, access to risk capital is a crucial enabler of productization and internationalization. Of those companies that had to change their business plans because of problems in the access to finance, 67 percent had to reduce product development or productization and 59 percent to significantly reduce internationalization attempts. 24 percent reported some other significant change in business plan.

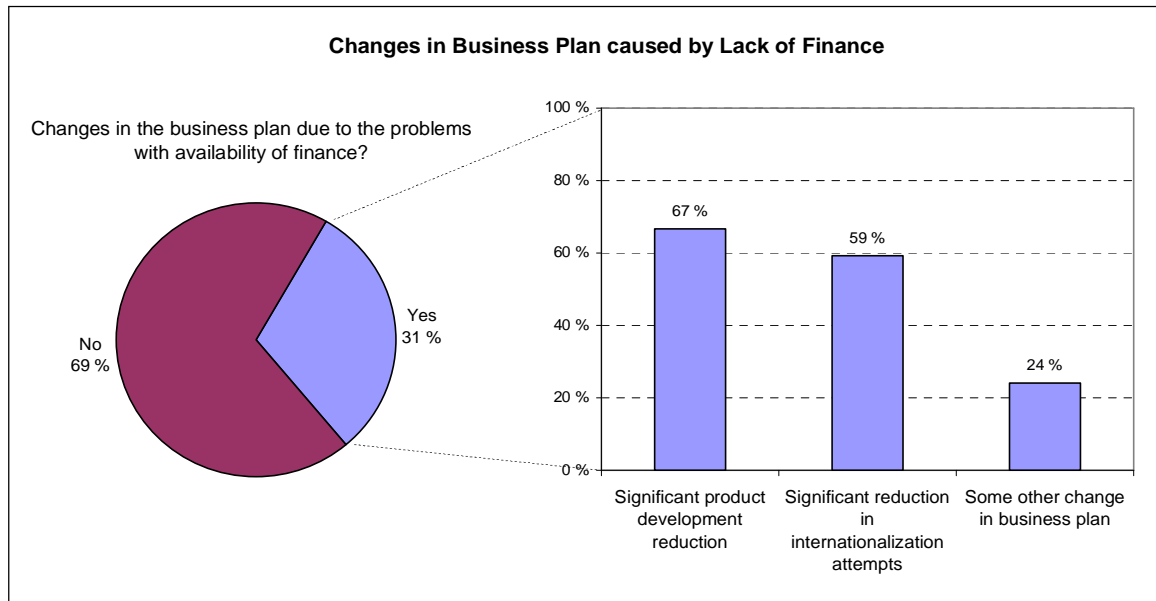


Figure 47. Availability of Finance and Impacts on Business Plan ($n_1=176$; $n_2=54$)

Although evidence from other sources would suggest the problems with access to finance being highest for young companies, the relation is not linear, as illustrated in Figure 48. The share of firms between 5 and 8 years of age reporting changes in business plan due to lack of finance was only 10 percent units lower than that of the youngest group of firms. A potential and worrying explanation is that capable entrepreneurs never started the venture they would have started if the financing were not a barrier. In other words, rather than finding companies of less than two years old complaining the financing problems changing their plans, we may just not observe the companies if they do not exist, i.e., the potential entrepreneurs changed their plans before starting the venture in the first place. The fact that roughly 55 percent of the youngest companies considered the availability of finance as a significant barrier for the emergence of new software product companies may support this explanation.

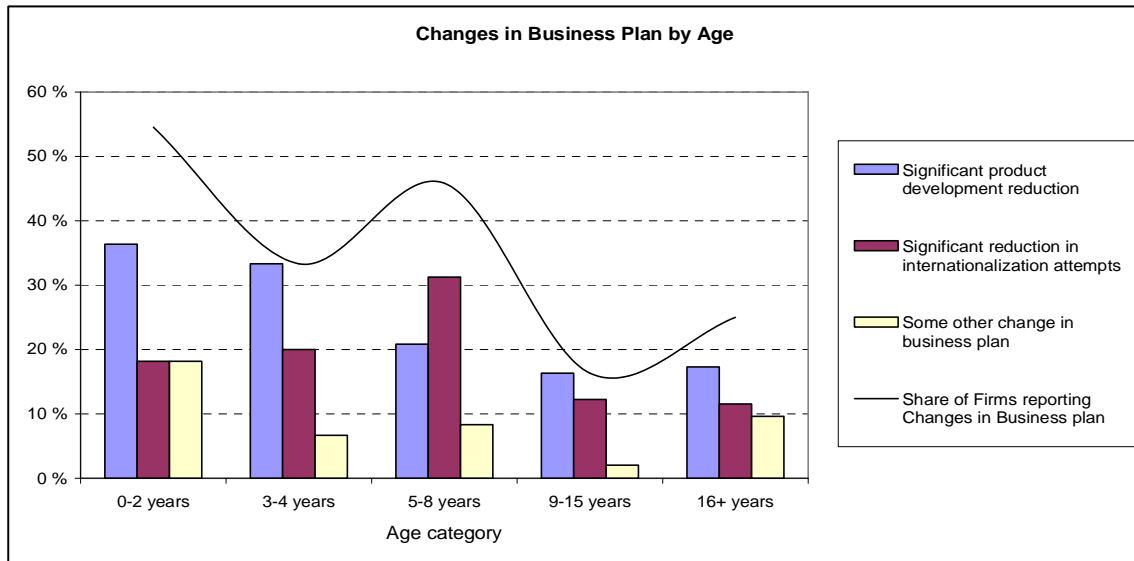


Figure 48. Changes in Business Plan by Age ($n_1=176$; $n_2=54$)

5.3 Financing Plans

The focus of this subchapter is on firms' intentions to seek external financing, structure of financing intended to be sought, how are the financing plans influenced by firms' age, revenue, profitability and growth expectations, and what are the reasons behind recent changes in plans for external financing.

36 percent of the 177 responding firms planned to seek external finance within the next two years (2005-2006) as shown in Figure 49. This represents a decrease when compared with 41 percent year ago and is closer to the 31 percent two years back.

The preferred sources of finance were almost unchanged from last year. Almost 90 percent of firms declaring to seek for financing in the next two years intended to raise additional equity based financing, which is very close to last year's 88 percent. Almost 40 percent of these companies aimed to raise capital loans (42 percent last year) and 43 percent were planning to raise debt finance (42 percent last year). The fragmentation of financing plans was also at the same level as last year. The external financing plans are being exhibited in more detail in Table 21.

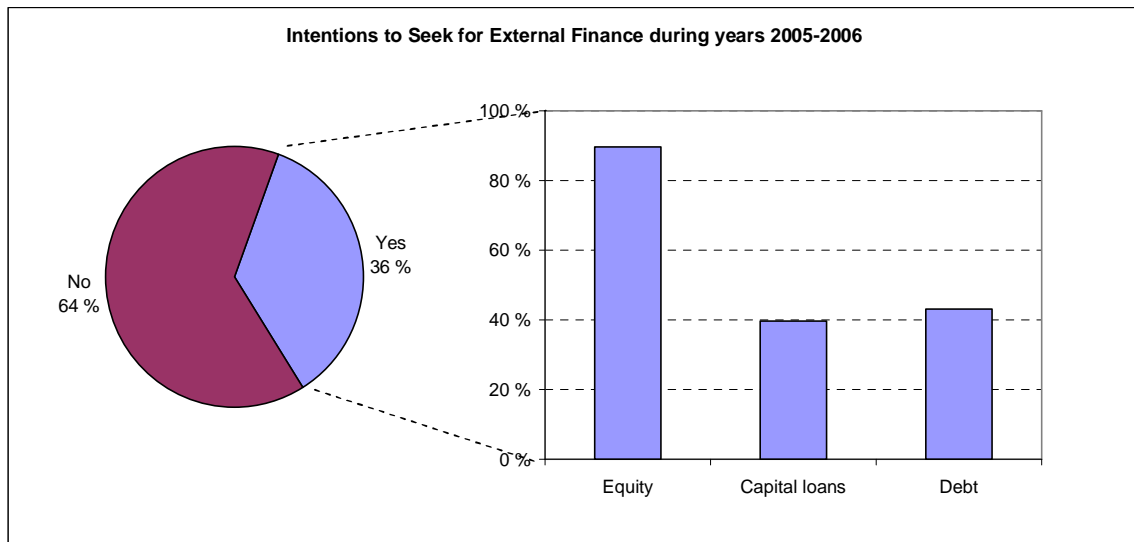


Figure 49. External Financing Plans ($n_1=177$; $n_2=58$)

Average value of equity financing aimed to be raised in years 2005 and 2006 for the companies intending to do so was 1.03 M Euros. This represents an increase of about 100 000 Euros from last year. In the case of capital loans the average value was 450 000 Euros (440 000 Euros last year) and for debt financing about 700 000 Euros (390 000 Euros last year).

Table 21. Detailed External Finance Seeking Structure ($n=57$)

Source of Finance	Percentage
Equity only	35 %
Capital loans only	2 %
Debts only	4 %
Equity and capital loans	19 %
Equity and debts	21 %
Capital loans and debts	4 %
All finance sources	16 %
Total	100 %

In order to understand the typical profile and grouping of firms planning to seek external finance, we have structured firms' by age, revenue, profitability and growth expectations and compared proportions of them intending to seek external finance during 2005 and 2006 as presented in Figure 50.

The highest proportion of firms intending to raise external finance in the horizon of two years, almost 82%, was in the group of firms being two years old or younger. This is very close to last year's 85%. Plans to raise new external finance decreased rapidly and steadily when firms grew older being just 15% for the oldest category of firms.

When categorizing the companies by revenue, the most frequent plans for external financing were in firms having zero to 500 000 Euros of revenue, shared by the firms with a total revenue between zero and 150 000 Euros representing a proportion of over

50 %, and firms having 150 000 to 500 000 Euros of revenue representing a proportion of 46 %. This indicates an increase in willingness to raise external finance already in the earliest stage of development whereas two years ago the most willing companies were in the second category of total revenues. This may indicate an increase in firms' confidence to try to raise external finance without any reference sales. A very significant change was found in the category of firms having over 10M Euros in revenue where the proportion of firms intending to apply for external finance in the horizon of two years rose back from last year's zero to 13%. Nevertheless, in this case it has to be noted that there were only eight responding firms in this category.

Profitability, measured by return on sales, had a slight negative relation with plans to seek for external finance between the first three groups and then a stronger negative relation in the two groups of most profitable firms. Approximately half of the firms from zero to 5 percent profitability, or ROS (Return of Sales), intended to raise external finance, while this was the case for only 27% of those having ROS between 5% and 20%. The share of firms willing to raise external finance with ROS over 20% was only 12% whereas last year it was 39%. This finding supports the negative effect of internally generated financing displacing the demand for external finance that was partially challenged last year.

As expected, the plans to seek for external finance were strongly correlated with growth expectations for 2-year horizon measured by compound annual growth rate. External finance acquisition was planned only by 22% of firms having expected CAGR (Compound Annual Growth Rate) between zero and 15%, while for firms with expected growth of 80% and more p.a. it was over 67%.

Based on these analyses we can conclude that group of firms having highest interest in external financing consists of young firms with small but existing revenue, low profitability and very high growth expectations.

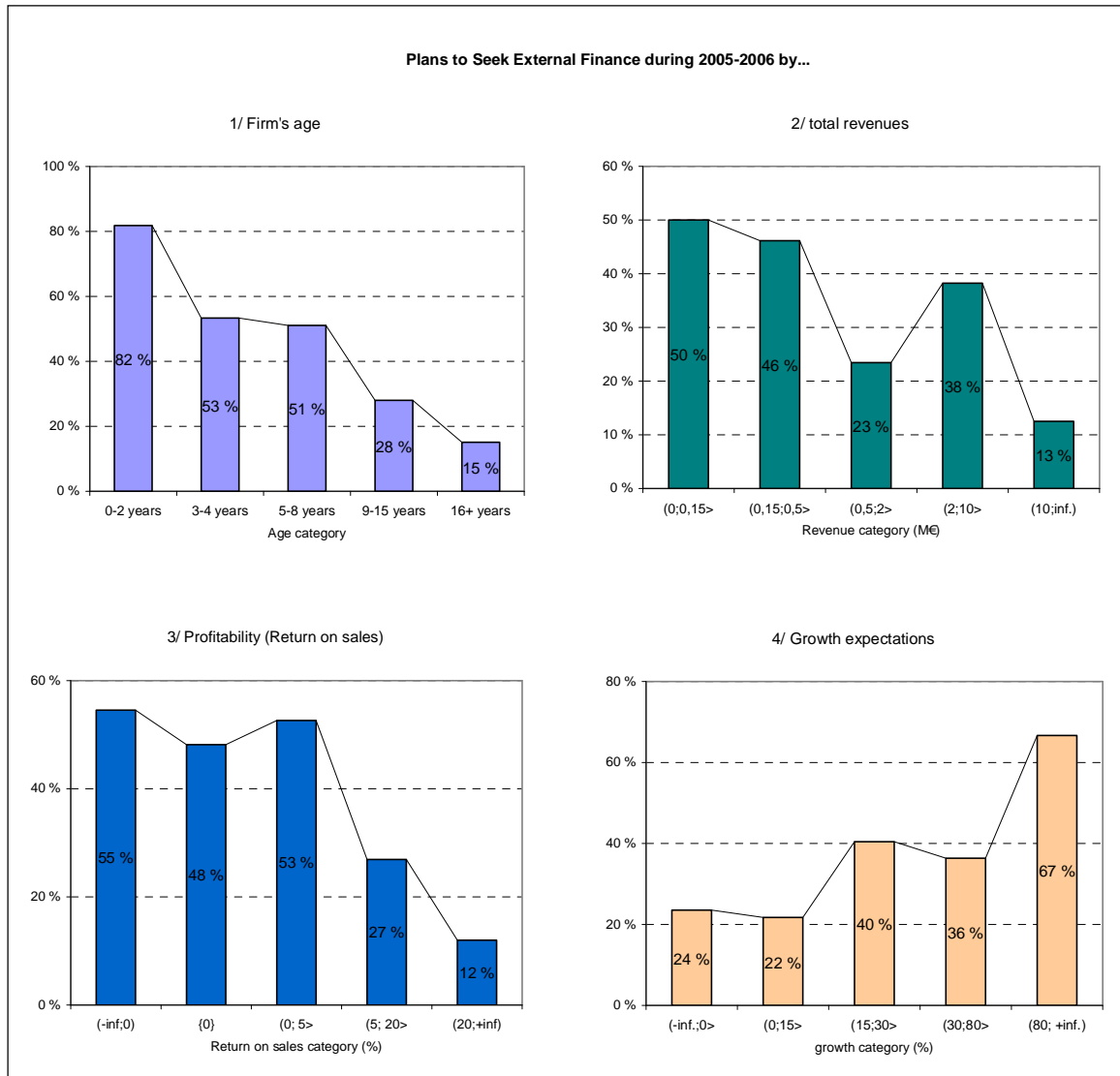


Figure 50. Plans to Seek External Finance by Age, Revenue, Profitability and Expected Growth ($n_1=176$; $n_2=177$; $n_3=145$; $n_4=155$)

When looking at the structure of external finance planned to be sought, we can recognize also some interrelations especially with the revenue, age, and growth expectations of firms. Generally, small and young firms had much higher proportion of planned capital loan financing plans. With increasing maturity and revenue, capital loan plans were continuously replaced by debt financing plans. The equity financing plans seemed to be related to all company characteristics. There was a negative correlation between seeking of equity and company age, revenue and profitability, and a positive one between equity seeking and growth expectations.

Growth expectations appeared to be an important determinant of the appropriate source of finance explaining the seeking of all finance types. Presence of different types of finance in plans for raising external finance based on growth expectations is shown in Figure 51. Last year the data indicated that more stabilized firms with lower growth expectations preferred debt financing. This year equity seems to be the preferred source of finance independent of company age, revenue, profitability or growth. Even if firms

with high expectations for growth had much stronger presence of all financing in their plans, equity was by far the preferred source.

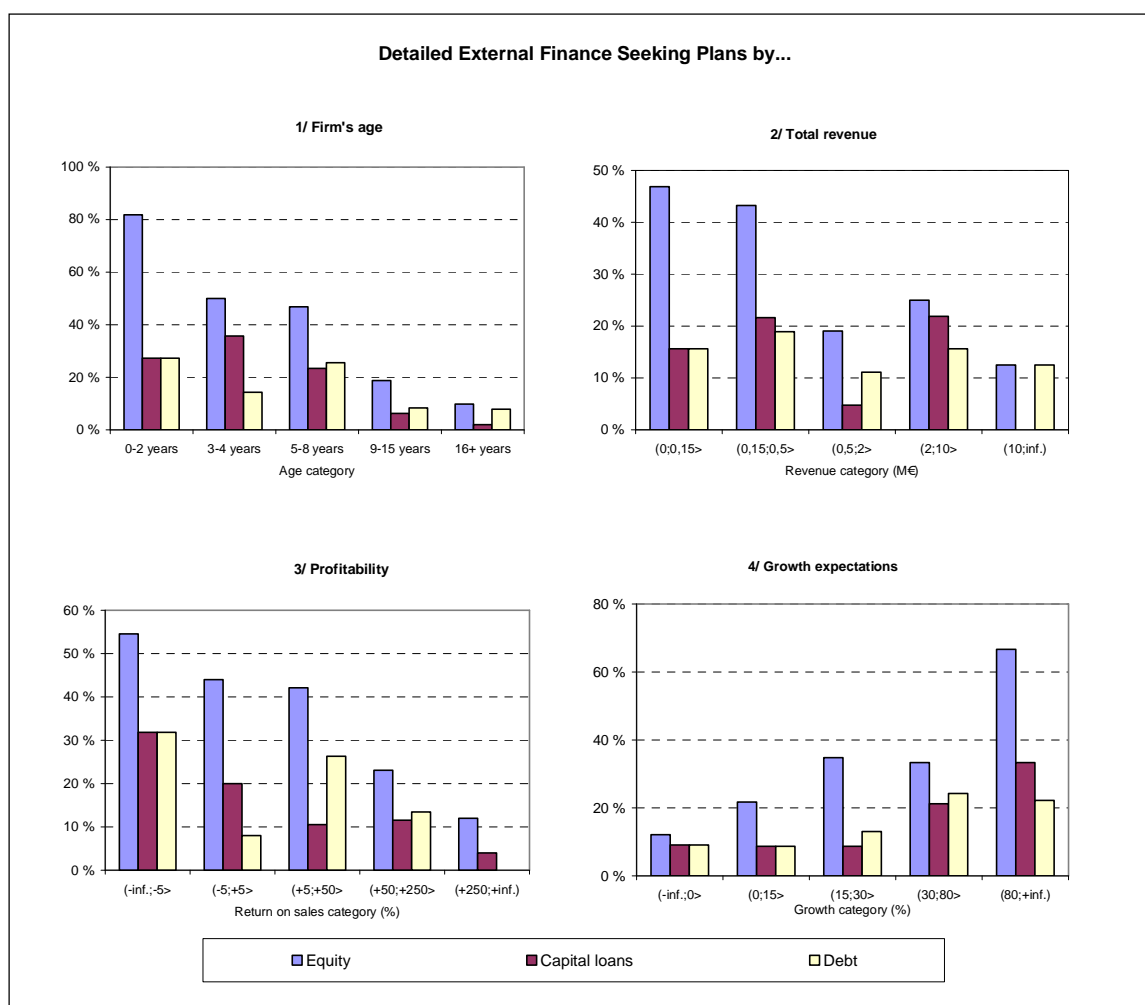


Figure 51. Detailed Plans to Seek External Finance by Age, Revenue, Profitability and Expected Growth ($n_1=171$; $n_2=172$; $n_3=143$; $n_4=153$)

These findings on structure dependence are coherent with financial theories suggesting that more mature and stable firms with lower risk are aiming to utilize financial leverage by employing debt instruments, which are reachable to them. On the contrary to that, highly risky young firms with hopes for rapid growth are limited in their choices and usually seek for financing on equity and capital loan markets. Also, the preference for equity independent of company age, revenue, profitability or growth expectations supports the findings of recent empirical studies suggesting that software companies usually prefer equity to debt financing.

The sample firms reported significantly less frequently their intentions to seek for external finance in two-year horizon when compared with the previous year. The 36% share of firms intending to raise external finance is down from last year's 41% and close to what it was two years ago, a mere 30%. There are two major interpretations for this. Either firms have lower growth expectations and thus need less external financing to support their expansion, or external financing has become less available or more

expensive since last year. The comparison of external financing plans structured by growth expectations as in years 2003 and 2004 is presented in Figure 52.

The comparison chart suggests that both of these interpretations have empirical backing. While firms having prospects of 15 to 30 percent growth changed their consideration for external financing upward, the firms in all other categories limited their plans to raise external finance or kept them roughly at the same level. The situation when firms reduced external financing plans, while having same growth expectations, indicates a decrease in the confidence on the feasibility of raising external finance. In addition to that, as indicated by population distribution curve on the chart, there have been changes in future prospects. The share of firms expecting a growth between 15 to 30 percent increased heavily while the share of firms with highest growth expectations significantly reduced. The general adjustment has lead to decrease of expansion financing demand and consequently to less external finance including plans, as noted before.

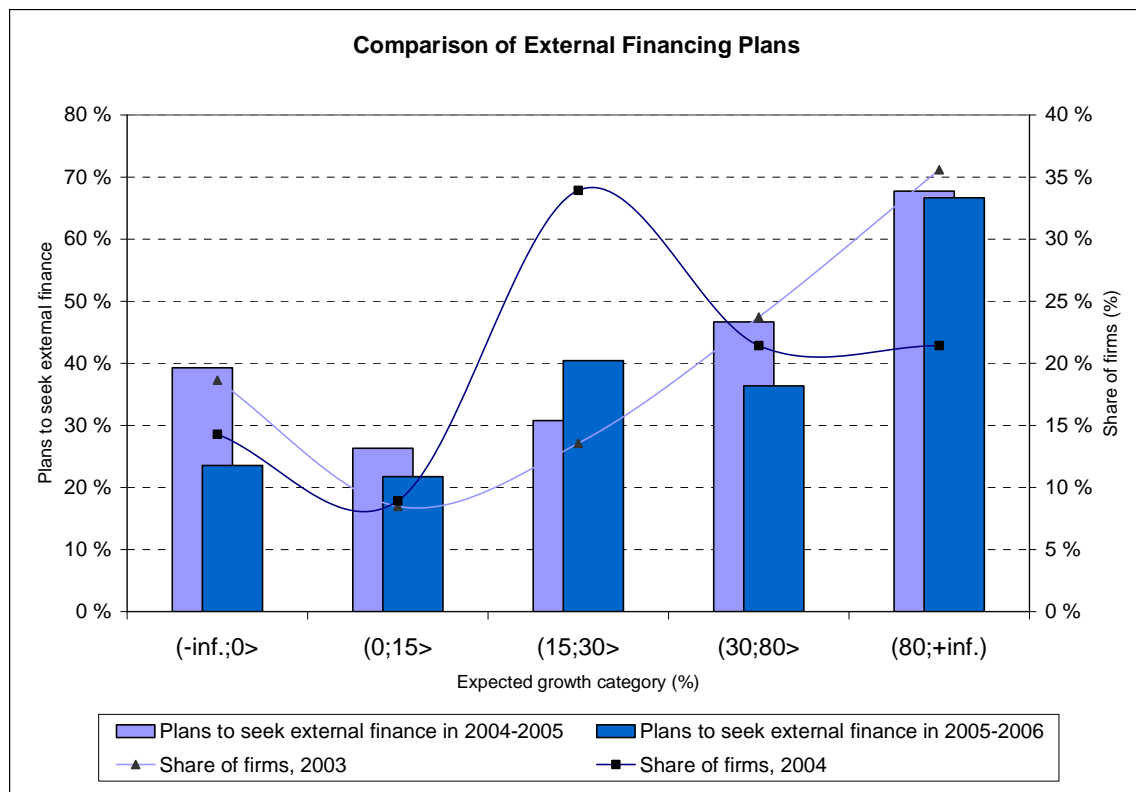


Figure 52. Comparison of Financing Plans between 2003 and 2004
($n_{2003}=59$; $n_{2004}=56$)

6 BUSINESS MODELS OF THE COMPANIES

One of the most important decision issues that software product companies face is the choice of business model with respect to various important attributes, such as the degree of productization and the still timely issue of how services are used to support the sale of products. In this section of the report, we describe those of our findings that relate to the types of business models that companies use.

6.1 Categorization of the Companies

To enable understanding the various business models that are in use, we categorized companies into four major groups based on degree of productization and the source of revenue (e.g. Hoch et al. 1999, Rajala et al. 2001, and Cusumano 2003).

6.1.1 Categorization Variables

We conducted the process of categorizing the companies according to two variables. The first was the degree of productization of the software offering; the second was the share of pure product business from all business, i.e., the percentage of revenue acquired from product licenses.

We asked the companies about the degree of their main offering's productization by asking how well the main product could be duplicated without customer-specific work. The degree of pure product business was measured by asking about customer billing: how many percents of total billing of an average customer delivery were based on product offering.

Based on answers to these two questions, we categorized companies to four classes depending on the type of the business they practiced. We labeled these categories as *product licensors*, *product integrators*, *solution consultants*, and *product tailors* as shown in Figure 53.

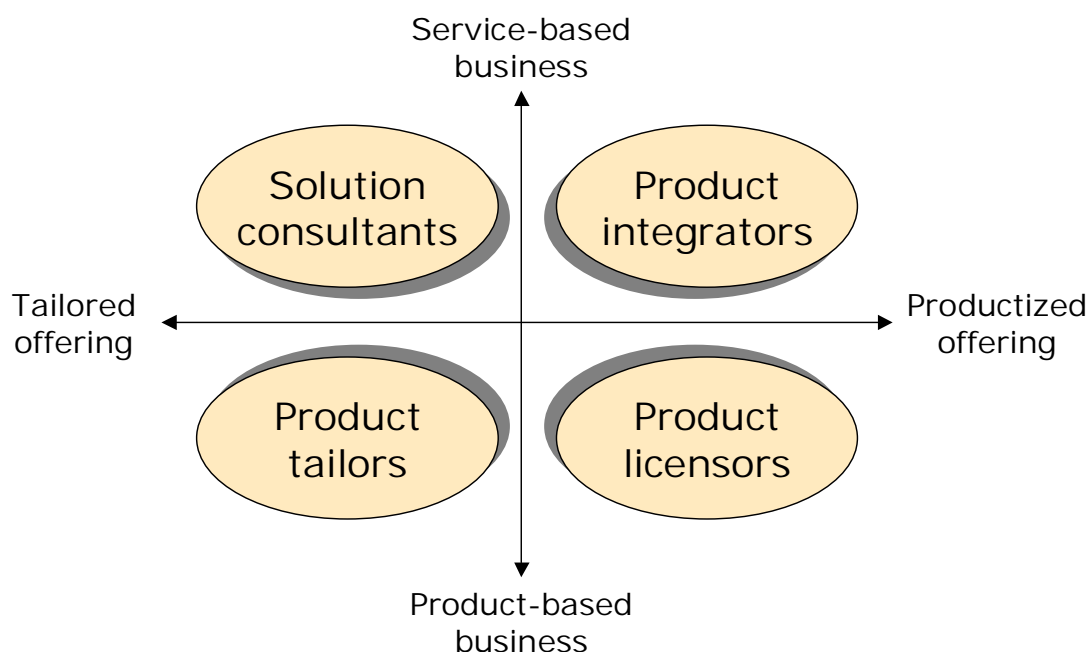


Figure 53. Categorization of Companies

We categorized each company to one of these four groups. Finally, we had obtained a division to 38 product licensors, 41 product integrators, 36 solution consultants, and 26 product tailor companies.

6.1.2 Categorization Criteria

In our definition, product licensor companies consist of those that had (1) more than 60% of their product business revenue acquired from product licenses and (2) whose product could be duplicated to customers without customer specific tailoring work "quite often", "often", or "always". Product licensor companies base their product business on product that is highly productized and most of the revenue is obtained through licenses, thus the title "product licensor".

We considered a company a product integrator if it had (1) 60% or less of their product business revenue acquired from product licenses and (2) products that could be "quite often", "often", or "always" duplicated to customers without customer specific tailoring work. Product integrator companies' customers are mainly enterprises and they emphasize services in their offering and often integrate their offering to customer's environment. This is why they are named "product integrator" companies.

We considered a company a solution consultant (1) if it had less than 40% of its product business revenue acquired from product licenses and (2) if its product "could not be at all", "could not be almost at all", "could be only very limitedly" or "could be only in some extent" duplicated to different customers without customer specific tailoring work. Solution consultants had more revenue acquired from services than product, thus the name "solution consultants".

Contrary to solution consultants, product tailors were defined to (1) earn 40 % or more from product licenses and to (2) have equally low level of productization of their offering as solution consultants. Thus both solution consultants and product tailors had to do customer specific tailoring work to duplicate the product to different customers. Because the main revenue of product tailors comes from products, but still they had to do tailoring work, we labeled them "product tailors".

6.1.3 Description of Categories

Based on variables according to which we performed the categorization, we can describe the groups on a high level as follows:

- Product licensor companies are companies that have a highly productized software offering and that focus their business to develop and sell the product. These companies are in the "purest" end of software product business and often expected to have high growth potential.
- Product integrator companies also have highly productized software, but the software is only the core of the offering, services being the main part of it. Services consist of user training and maintenance to name but a few.
- Solution consultants have product with low degree of productization and, thus, they have to do much tailoring work for each customer. Thus their business is in the "impurest" end of software product business. Solution consultants are counted as product business because the core of their solution is based on product.

- Product tailors are companies whose business revenue is based on product licenses but whose product still has a low degree of productization. Thus, some of their revenue still base on product tailoring and customer specific projects.

To find out more interesting characteristics about these groups, we outline their differences in following chapters based on the survey data.

6.2 Key Figures

6.2.1 Revenue and Profit

When considering the results presented in Table 22, we see that companies with a high degree of productization have, on average, higher revenue. This fact is notably most imminent in the case of product integrators; this is probably because several large IT houses reside in this group. The revenue per employee of the companies with a high degree of productization is about the same as that of those companies with a lesser degree of productization.

In 2004, we observed that when comparing median revenue in categories with same degree of productization (i.e., comparing product licensors to product integrators and solution consultants to product tailors), the categories with more emphasis on services had more revenue. This trend was recently noted by key authors of the software business area, including Cusumano (2004). However, the situation has in 2005 been reversed in the case of the two groups with a small degree of productization. Regarding the issue of profitability, there are initial traces that profitability would be higher in the high degree of productization group *on average* (compared with the low degree of productization group), even though the product licensor group has less good profitability than the solution consultant group. When comparing the service business group to the product business group, there is a notable difference in profitability in the advantage of the service group. However, it is very important to notice that *these figures provide only an initial view into profitability*, because they do not take into consideration the size of the company. Looking at the median revenue, we also note that in all groups except product integrators, companies are relatively small. There has been growth of about 20% in the figures for each group in one year, except for the product tailor group, where the growth has amounted to about 50%.

Table 22. Revenue and Profit

Company type	Average revenue (M Euros)	Average revenue (M Euros)/ employee	Median revenue (Euros)	Median profit (Euros)
Product licensor (n=38)	1.99	0.094	725 000	26 000
Product integrator (n=41)	5.81	0.124	1 200 000	70 000
Solution consultant (n=36)	1.05	0.075	515 000	30 000
Product tailor (n=26)	1.31	0.071	735 000	10 000

The fact that the revenue per employee ratio is relatively low in each group may mirror that in each group, there is a high number of companies that are still in the first product development phase, and this lowers the figures.

6.2.2 Personnel and Ages of Product Businesses

Table 23 indicates that company categories with productized offering have, on average, more personnel than companies with lower degree of productization, especially in the case of product integrators, the group where the large IT houses reside. Compared with 2004, the solution consultant group has dropped by about 25% and the product tailor group has experienced rise of 50%, product tailors rising to be larger companies by this measure than solution consultants.

The median number of personnel is relatively small in each category, with the highest number occurring in the product integrator category, which has been typical during the previous years. The median numbers of personnel were close to exactly the same in 2004.

In 2003, an interesting result was that businesses whose income is product-based were youngest companies both in median age of company as well as in median and average age of product business. This is no longer true in 2004 or 2005; now product-based and service-based businesses are mixed in terms of these age results. However, a single group with a product-based business – product tailors – is clearly the youngest again in 2005. (In 2004, it continued to be quite young, but not having distinctly the position of the youngest group with each measure.)

Table 23. Number of Personnel, Age of Company, and Software Product Business

Company type	Average number of personnel	Median number of personnel	Median age of company	Median age of software product business	Average age of software product business
Product licensor (n=38)	21	8	11.5	10.5	10
Product integrator (n=41)	47	15	12	10	11
Solution consultant (n=36)	14	7	10.5	5.5	8.5
Product tailor (n=26)	18	10	6	4.5	6

In 2004, the product integrator and product tailor companies were the youngest groups in terms of the median age of software product business, whereas previously this position used to be held by product licensor companies. In 2005, the positions of the groups have again been changed, which leads us to conclude that there is either temporary fluctuation or a longer-term shift ongoing within the industry.

6.3 Actual and Estimated Growth

We studied realized and estimated growth based on common data from years 2004 and 2005 which made our sample small as indicated in the following figures. Thus, results in this subchapter are directional.

In Figure 54 and Figure 55, we show average and median growth of sample product businesses from our 2003 figures to 2004 figures and from our 2004 figures to 2005 figures. Note that the two tables differ in the scales of their vertical axes. In 2003-2004, the growth of the low-productization companies was very small and that of high-productization companies was much higher. Especially product licensors grew a lot in terms of average (compared with median), indicating that the largest companies were largely responsible for the substantial growth.

For 2004-2005, the growth figures are generally speaking much larger than for 2003-2004. An exception is that for product integrators (the group with the large IT houses), there has not been growth from 2003-2004 growth to 2004-2005 growth. Comparing the four groups with each other, we find that product licensors here too exhibited much larger growth in terms of average than median, and that again, this implies that the largest companies are most responsible of the growth. For 2004-2005, the solution consultants group also exhibited growth compared with the growth of 2003-2004. This growth was most significant in median, indicating that smaller companies were responsible for main growth in 2004-2005. For product tailors, growth has picked up since the 2003-2004 figures in both median and average.

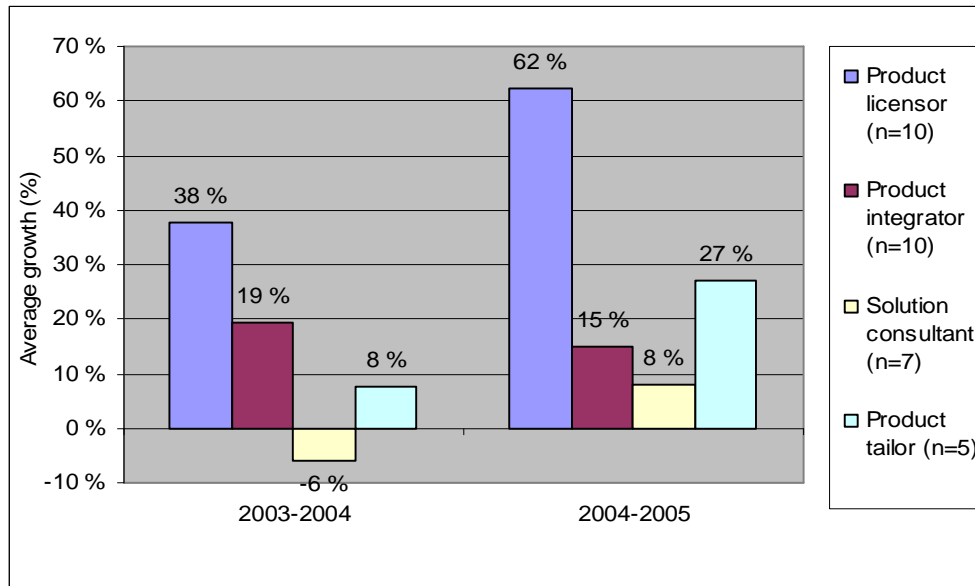


Figure 54. Actual and Estimated Average Growth of Sample Businesses between 2003 - 2004 and 2004 - 2005

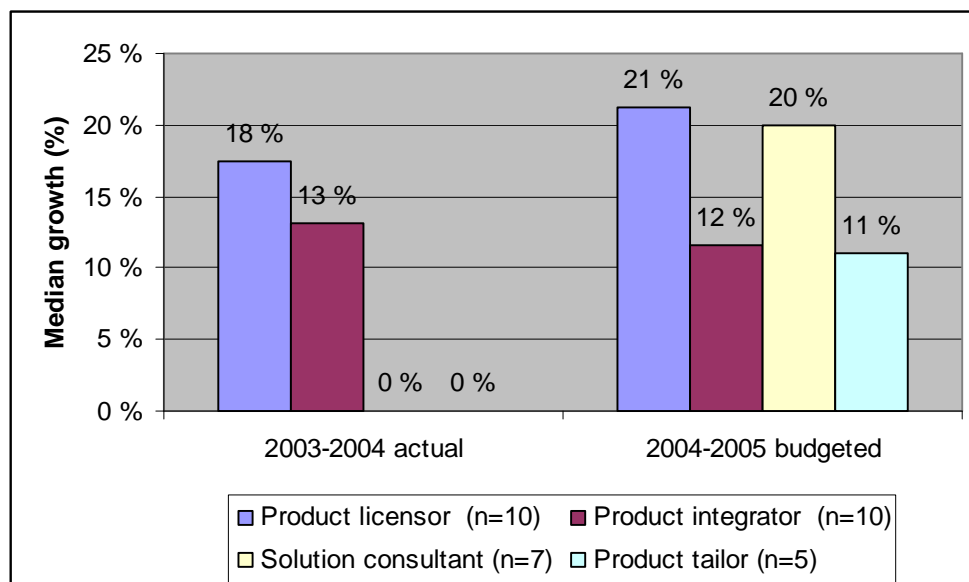


Figure 55. Actual and Estimated Median Growth of Sample Businesses between 2003 - 2004 and 2004 - 2005

6.3.1 Actual and Estimated Profit Margin

The median company in each group has had a positive profit margin figure, with product tailors rising to the positive in 2004 from their 0% figure in 2003. The first three groups had almost equal profitability in 2004. All groups saw their future positive and believed to be able to raise profit margins – even up to 14% by product licensor companies. Especially the product licensor companies see a large surge in their profitability from 2004 to 2005, while last year (2003 to 2004), especially product integrators and product tailors estimated large rise. Finally, the expectations that companies had in 2004 for their final 2004 figures did not materialize very well: the groups had in 2004 predicted profitability of 11%, 10%, 13%, and 13%, in the respective order. The materialized figures are, as shown below, 8%, 7%, 6%, and 2%. Especially product tailor companies' profitability was enhanced much less than such companies had estimated.

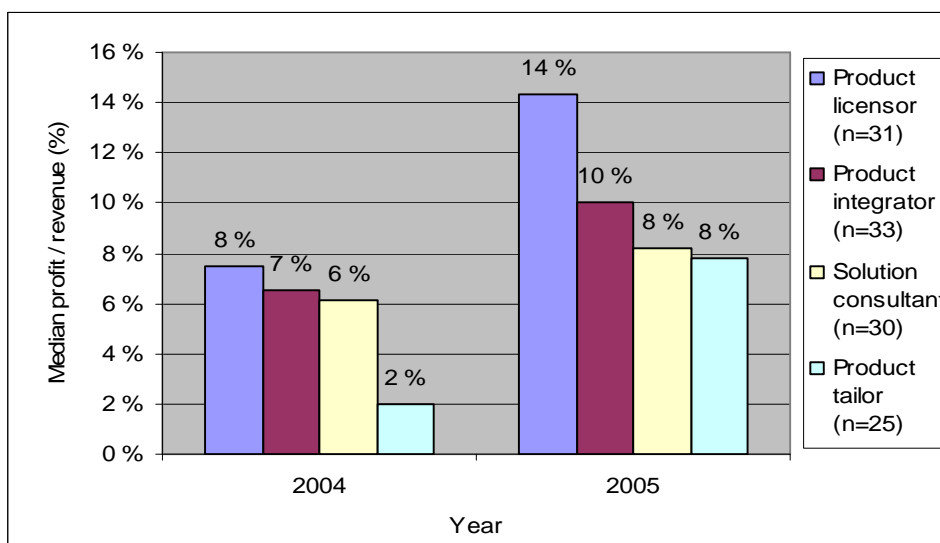


Figure 56. Actual Median Profit/Revenue for 2004 and Estimated Median Profit/Revenue for 2005

6.4 Further Descriptive Figures

6.4.1 Revenue

The following description illustrates the composition of a typical delivery format of the main product; expectedly, the formats largely correspond to the types of business models. Product licensor companies have on average more than 78% of their total revenue acquired from license selling and renting whereas product integrator companies' business is less than 40% product-based. This figure is less than 20% and more than 50% for solutions consultants and product tailors, respectively. These figures are very close to those from 2004. With product integrators, solutions consultants, and product tailors, the share of customer projects and tailoring of the total revenue is substantial: 20% or more with each group. With solutions consultants, this figure is in fact more than 45%.

Solution consultant companies obtain only about 17% of their revenue from license sales, their main source of revenue being product based customer projects and tailoring. Compared to product integrators and solution consultants (the groups labeled as having a service-based business model in this report), product licensors and product tailors expectedly obtain a high share of their total revenue from license selling and renting. The

difference between product integrators and product tailors has been somewhat cut down since 2004. Breakdown of main product's sales revenues is presented in Figure 57.

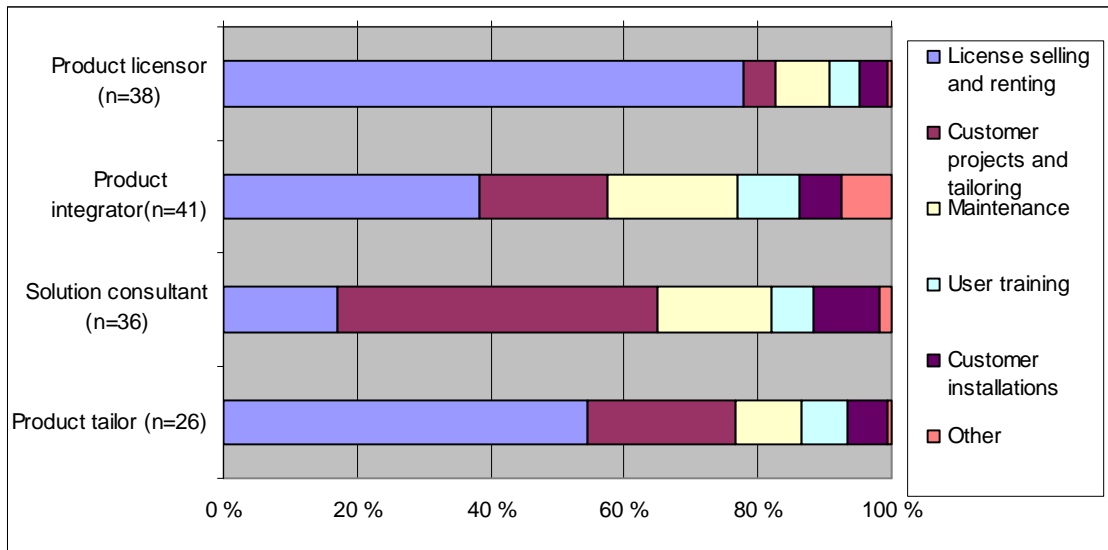


Figure 57. Composition of a Typical Delivery of the Main Product by Software Product Business Revenue in Different Groups

It is worth mentioning that in software business, new or newish ideas for revenue logic models are possible. However, there were only a few cases indicating the use of a nontraditional revenue logic.

6.4.2 Personnel

Studying companies' business revenue provides traces about the allocation of personnel to the functional areas of companies. Below, Figure 58 presents the share of personnel of the studied companies that works in the sales and marketing function. The relative standings of the four groups have changed since 2004 so that for product tailors, the share of personnel in sales and marketing has dropped in relation to the other groups; this group's standing was second of the four groups in 2004.

Figure 59 reports the share of personnel working abroad. This figure is notably low – only about 1% – for solution consultants. For other companies, the figure is somewhat more than 5%.

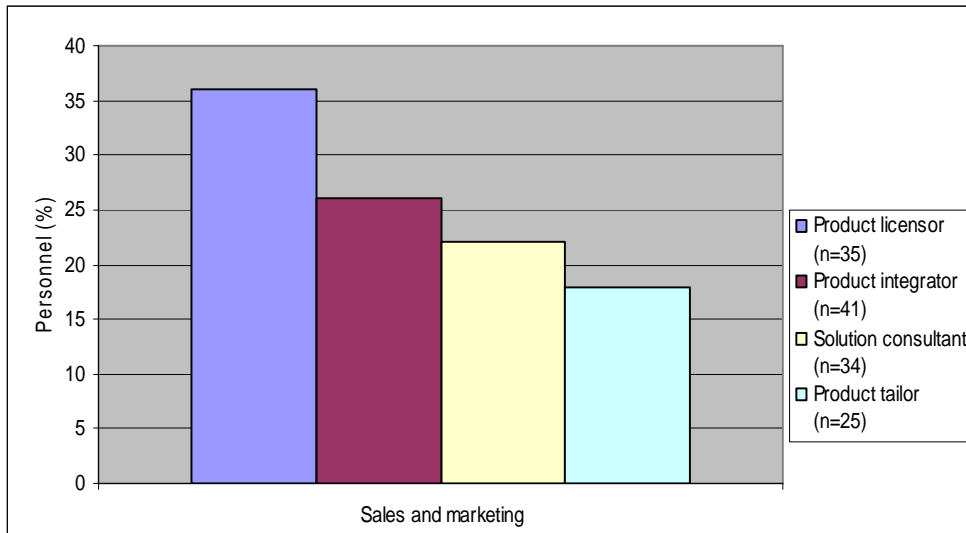


Figure 58. Percentage of Personnel in Sales and Marketing

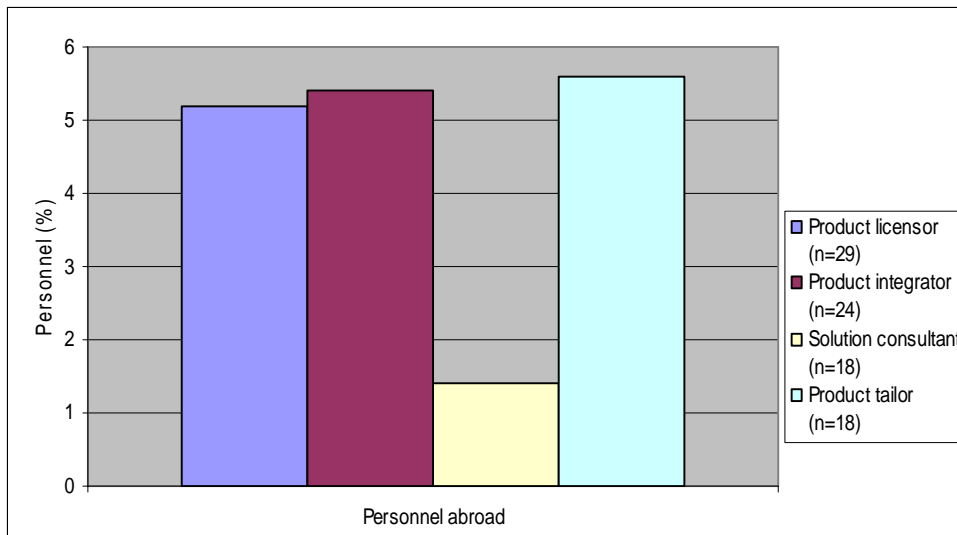


Figure 59. Percentage of Personnel Abroad

6.4.3 Sales and Distribution

All groups used direct selling very often. Using resellers and agents was also quite common. Using a reseller's brand to sell the product or selling product as a part of reseller's product was only used in few cases and the same holds true with bundling and wholesalers. A majority of companies in all categories did not use the last-mentioned sales channels in any situation. The results for sales channels are very closely the same as the results for 2004. Figure 60 presents our results.

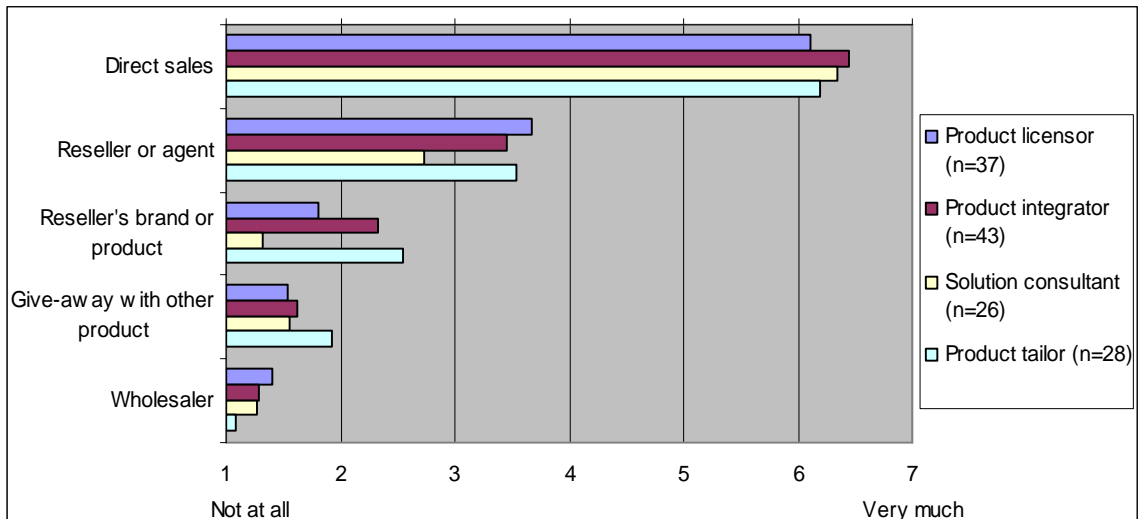


Figure 60. Average Sales Channel Use by Each Category

Electronic delivery through the Internet appears to be more popular than delivery on a CD-ROM. With the exception of product tailors in electronic delivery, businesses having a high level of productization used electronic and CD-ROM delivery more often than businesses with a low level of productization. Figure 61 introduces our results.

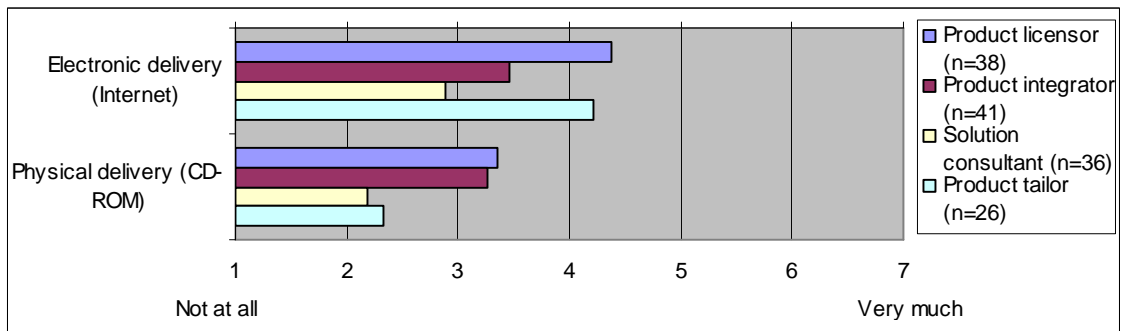


Figure 61. Average Use of Internet and CD-ROM Delivery by Each Category

6.4.4 Customers

The majority of the business is conducted with other companies and public administration in every group whereas private consumers are the most unusual customers.

Table 24. End Users by Different Groups (Dichotomy Label)

End user	Type of the company			
	Product licensor	Product integrator	Solution consultant	Product tailor
Micro Enterprise	34 %	17 %	14%	12 %
Small Enterprise	53 %	46 %	50 %	31 %
Medium Enterprise	47 %	56 %	72 %	42 %
Large Enterprise	42 %	49 %	47 %	62 %
Public Administration	55 %	46 %	28 %	42 %
Private consumer	18 %	12 %	0 %	8 %
Total	249 %	226 %	211 %	197 %
Number of cases	38	41	36	26

Companies with a lower degree of productization were most dependent on their key customers: product tailors had 29% and solution consultants on average 27% of their revenue acquired from their largest customer. Product licensor companies had an average of 19% and product integrator companies just 17%. These figures are lower than previous year, thus in general companies are less dependent on their key customer which can be seen as a positive trend.

6.4.5 Financing

In 2004, lack of financing had affected on average 31 % of software product businesses. More specifically, we asked the companies if the lack has affected their product development, international efforts, or something else. Substantial reduction in both internationalization ability and product development ability were observed as can be seen in Figure 62.

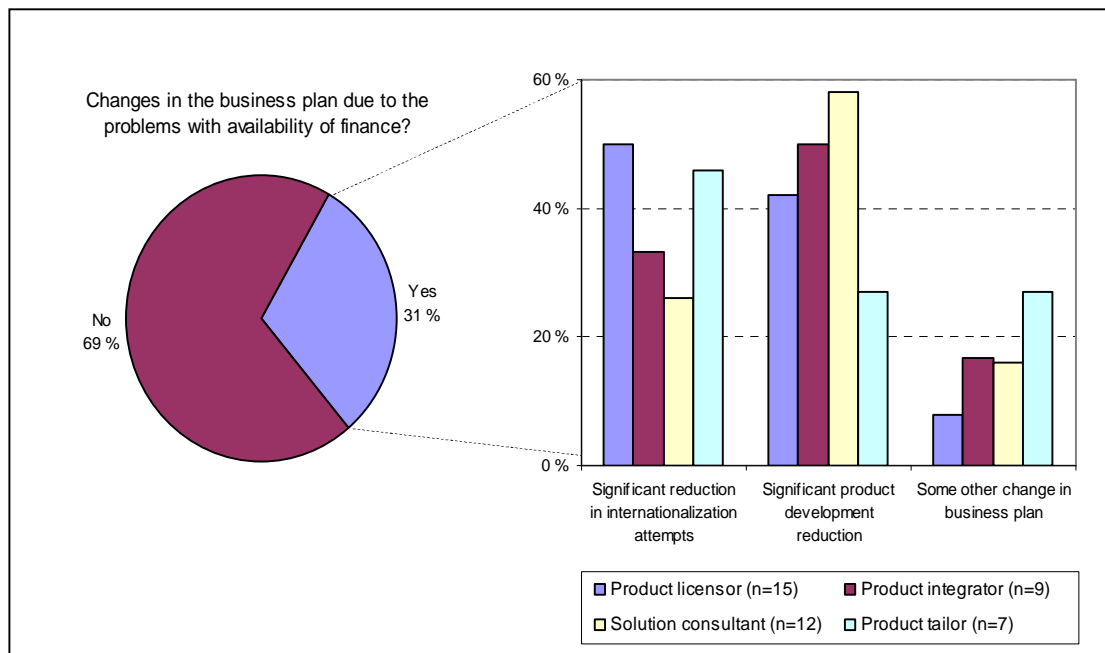


Figure 62. Consequences of the Lack of Financing

In 2003, the degree of productization appeared to be closely linked to the internationalization capabilities of a company so that companies with a highly productized offering had significantly reduced their attempts at internationalization. In 2004 however, no such observation differentiates the groups with high and low degrees of productization.

6.5 Main Product

6.5.1 Characteristics of Main Product

In 2004, the most considerable differences in characteristics of the main products' business were that products with high productization degree were most often associated with leveraging that productization. For 2005, the difference has notably settled down with those companies defined here as low-productization ones thriving at higher levels of productization than before.

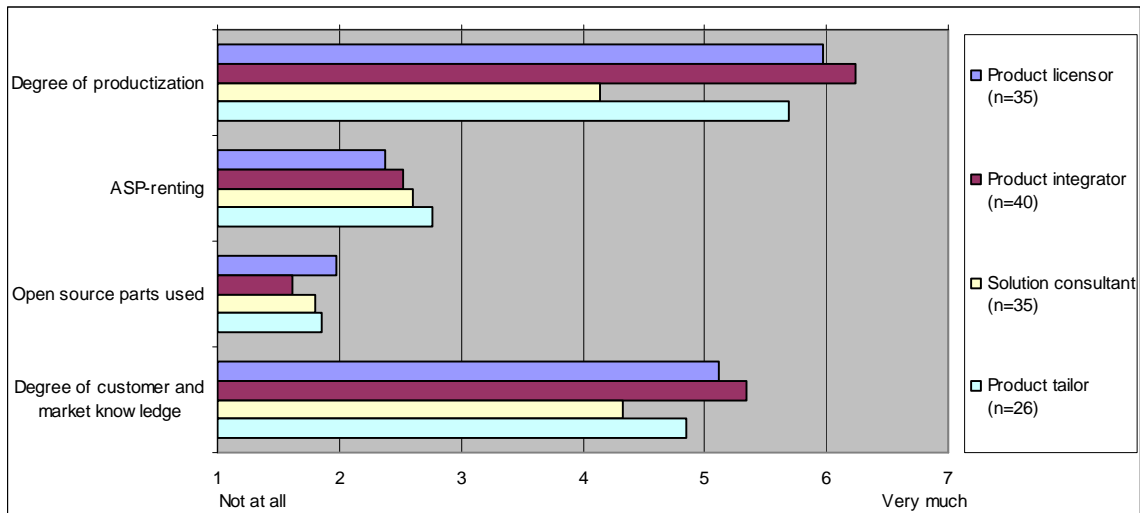


Figure 63. Characteristics of the Main Product's Business

6.5.2 Releases

As in 2004, releases of the main product were most often conducted based on customer need in the case of companies with a low productization degree, and on a pre-defined basis by high productization degree companies. Expectedly, low productization degree companies were those that often stated that they release "in every customer delivery". Solution consultants, expectedly, only rarely did releases on a pre-defined basis. The basis of release was asked at a dichotomy label and the reason for a release is often a combination of several factors. Release strategies are presented in Figure 64.

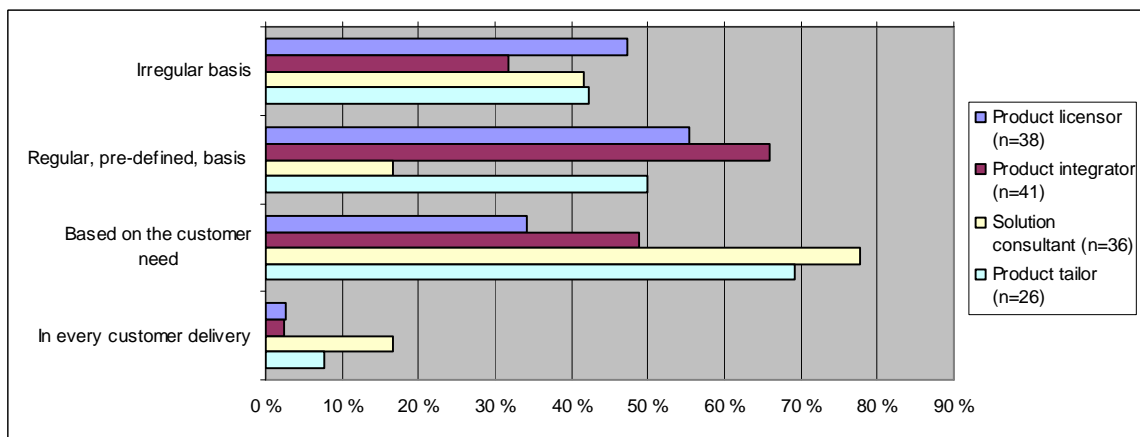


Figure 64. Release Strategies for Main Product by the Groups (Dichotomy Label)

6.5.3 Product Development Investments

Very large differences are expectedly present in investment to product development between categories and especially between companies: for instance, in 2002 a product licensor company had invested two times and another product licensor company four times their revenue to product development. This is natural, as some product licensor companies are heavily financed by venture capitalists, and may thrive for a longer period, doing product development without having income finance.

Product licensor companies and product tailors, companies that get most revenue from product, were also the companies with the largest share of total revenue invested into

product development. The realized figures for 2004 are roughly the same as those realized in 2003 expect that in 2003, product tailors' figure was nearly 50%.

Compared with the realized figures for 2004, the estimate for 2005 suggests a rebalancing between product licensors and product tailors standings.

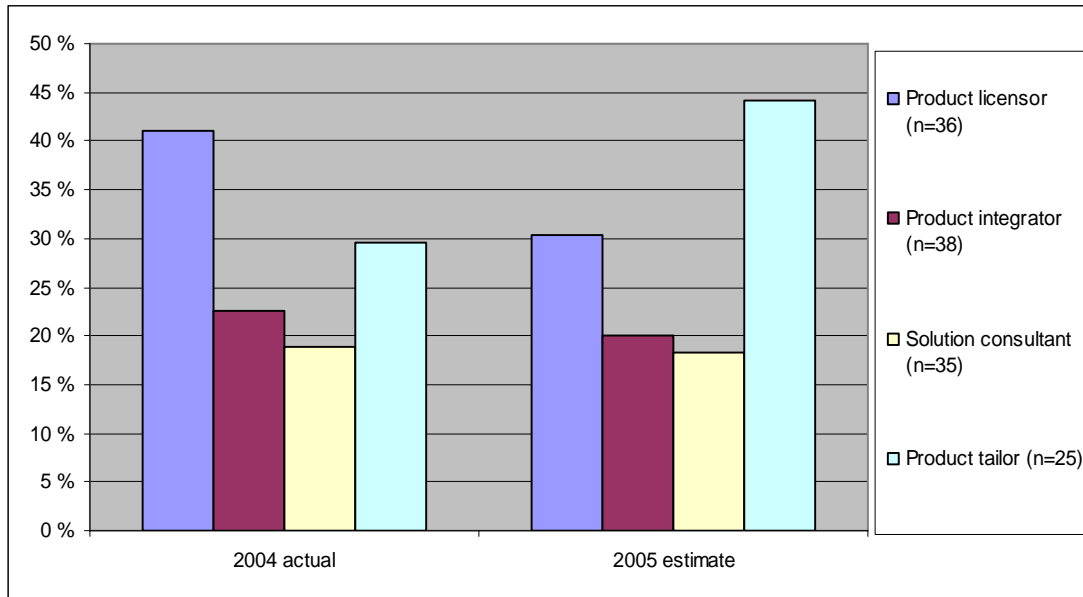


Figure 65. Product Development Costs as Percentage of the Total Revenue

6.6 Internationalization from a Business Model Viewpoint

6.6.1 Number of Countries

As in 2004, more than half of the companies in each category except product licensors were domestic in their product business. In 2004, all groups had roughly 30% of companies in which the number of foreign countries where the company ran operations was one to five. Now, the share of such companies has declined for solutions consultants and increased for product licensors and product tailors. In the product licensor category, the share of companies that had product business in more than five countries abroad has slightly fallen from about 30% in 2004. In the rest of the categories, less than 15% of the companies had product business in more than five countries abroad. The observation that product licensor companies are the most international ones has been often documented in prior studies.

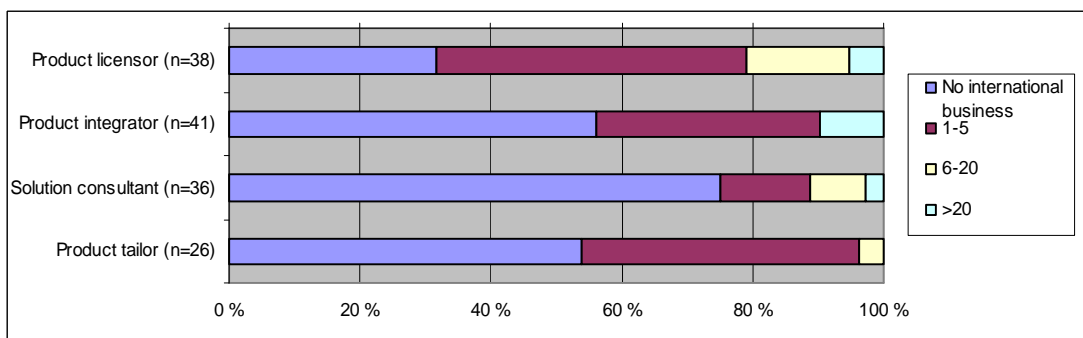


Figure 66. The Number of Foreign Countries in which the Company is Running Product Business

6.6.2 Internationalization Strategy

A direct sale, most used in domestic sales, was the most often used sales strategy in international markets in all categories. Reseller or agent was the second most used sales strategy. The strategies of selling under a reseller's brand or product, and subsidiary and joint venture were only rarely used compared with the two strategies mentioned above. This ordering of the five strategies as they are classified here has been commonly observed in this study. It is a notable issue that with product integrators, the share of companies employing the two most common sales strategies has fallen substantially since 2004, even to the extent that the reseller or agent strategy only barely holds onto its second position in front of selling under a reseller's brand or product.

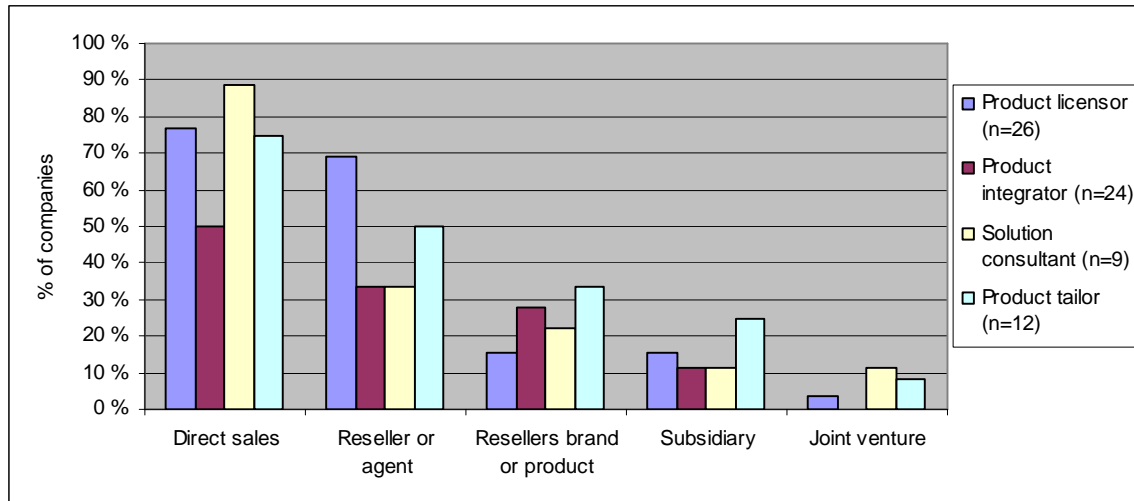


Figure 67. Selection of Sales Strategies in International Markets

6.7 Conclusions

Taken together, the underlying logic of this chapter has been to classify companies by two dimensions (to four groups) according to their business model. The dimensions are the degree of productization employed and the share of product-based business (versus service-based business) of total business. The labels that we employed for the four resultant groups of companies are product licensor companies, product integrator ("standard solution") companies, solution consultant companies and product tailor companies. Common characteristics of the four groups are outlined in Figure 68.

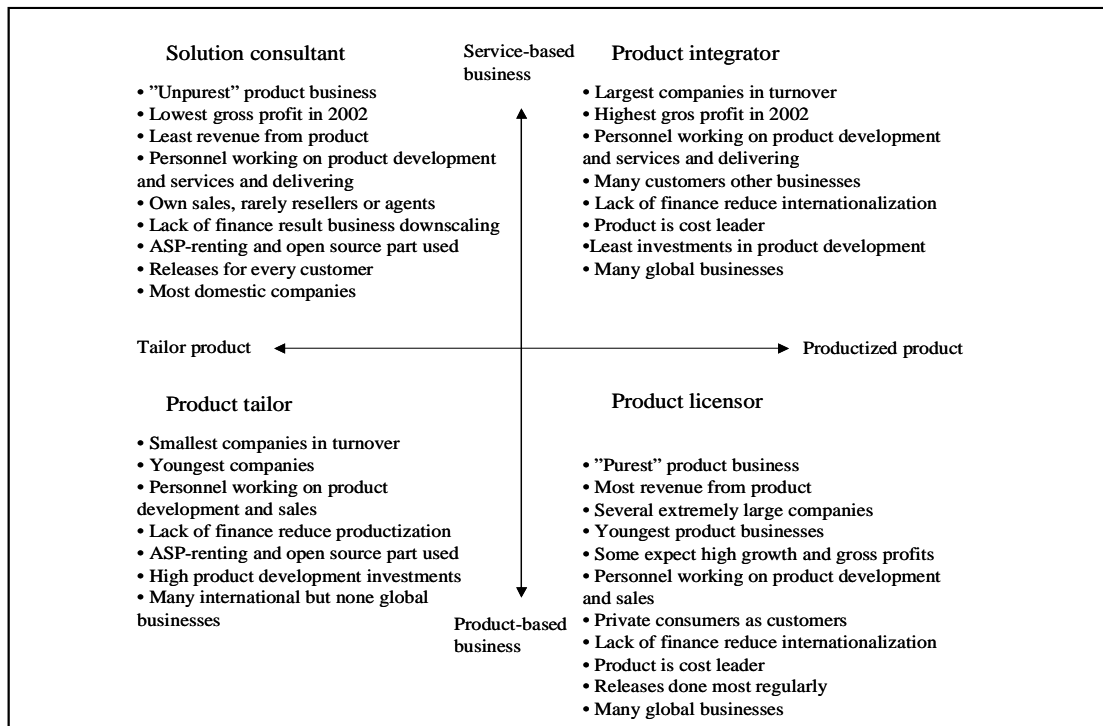


Figure 68. Categorization of Software Product Businesses

The four groups are internally diverse: each has both small and large companies and both profitable and non-profitable ones. However, the groups have their special characteristics that underlie this fourfold clustering and that were important to our analysis in this chapter.

7 SUBCLUSTERS

7.1 GENERAL

The aim of the software product industry cluster study is to define a system of classifying the software product companies. The classification is done by categorizing the companies according to their software product types and by the target customer markets the companies are selling their products in. These two categorizations produce a matrix where the companies are positioned according to their software product types and target markets. From this classification it is possible to identify promising clusters and companies in the clusters based on a variety of criteria including high growth, profitability, degree of internationalization etc.

In the survey the companies were asked to provide information of up to three of their main SW products with each product possibly having multiple target customer markets i.e. the company can belong to more than one sub clusters at the same time. The companies are included in the analysis for each sub cluster they belong to. This being the case, the same company's revenue might be included into more than ten different sub clusters. This unfortunately causes bias to the results especially if a large company with large revenue is included in the figures of each target market it sells its products to. On the other hand this can also show that for this particular target customer market and for this particular software type also the large companies are focusing on. In addition, these large companies and their resources can be vital in the creation and development of successful software product clusters in Finland.

7.1.1 Software Classification

The software is categorized according to the modified North American Product Classification System (NAPCS) system. Applying an existing SW classification makes it possible to adopt a system which has been found practical in other countries and at the same time this facilitates easier comparison between international researches on software industry clusters.

The two main classes of software type in the NAPCS are the System software and Application software types (see the definitions below). These are then further divided into various subcategories.

System software is defined as:

“The low-level software required to manage computer resources and support the production or execution of application programs but which is not specific to any particular application”.

Application software is defined as:

“Software program that performs a specific function directly for the end user”

The companies were asked to provide information of up to three of their main products. The type of software was specified for each of these products. Thus one company can belong up to three different software type classes. Table 25 below presents the modified NAPCS classification system.

Table 25. The Modified NAPCS classification

1. System software	2. Application software
1.1 Operating systems software	2.1 General business productivity applications
1.2 Network software	- Office suite applications
- Network management software	- Word processors
- Server software	- Spreadsheets
- Security and encryption software	- Simple databases
- Middleware	- Graphics applications
- Other network software	- Project management software
1.3 Database management software	- Computer based training software
1.4 Development tools and programming languages software	- Other business productivity software
- Software testing tools and testing software	2.2 Home use applications
- Program development tools	- Games
- Programming languages software	- Reference
- Other development tools software	- Home education
1.5 Other systems software	- Other home use application software
	2.3 Cross-industry application software
	- Professional accounting software
	- Human resource management software
	- Customer relations management software
	- Geographic information system software
	- Web page/ site design software
	- Other cross industry application software
	2.4 Vertical market application software
	2.5 Utilities software
	- Compression programs
	- Antivirus
	- Search engines
	- Font
	- File viewers
	- Voice recognition software
	- Other utilities software
	2.6 Other application software

7.1.2 Target Market Classification

The other dimension in the cluster matrix is the target customer markets. Target customer markets are the markets the companies are targeting with their product. While there are huge number of possible target markets, for this study the target markets were chosen so that they fit to the economic and IT market situation in Finland.

Each company was asked to provide the target markets for each of their software product. For one particular product there can be more than one target customer market and thus one company can belong to many different sub clusters at the same time. The companies were also asked to provide the allocation of the revenue for each target market and the product associated with it. The reason behind this was that we wanted to find out the exact revenues for each individual sub cluster. Table 26 provides a list of the target markets.

Table 26. Target Market Classification

Target customer market
No specific industry segment (horizontal application)
Electronics and high technology
Communication technology: Telecom and mobile
Aviation and defense industry
Research and science, biotechnology, nanotechnology and chemistry
Banking, financing, insurance and legal services
Energy
Construction
Manufacturing
Wholesale and retail sales
Real estate and maintenance
Transportation and logistics
Agriculture and forest industry
Health services
Traveling and tourism
Public sector
Education and training
Media, entertainment and games
Some other target market

7.2 FREQUENCY

The companies were asked to provide information of up to three of their main software products. The companies provided the type of software of their main products and the target markets these products are sold to. At the top level, it can be seen that application software is almost three times more popular than system software (see Table 27). This is reasonable as developing system software is more complex, slower, and more expensive than developing application software. In addition, the markets for application software products typically have higher volumes and are easier to reach than the markets for system software products.

The most popular software type is Cross-industry application software, which is designed to perform and manage a specific business function or process that is not unique to a particular industry. In other words this includes horizontal applications i.e. software that is not industry specific. On the other hand, the vertical market application software is also popular. It is software that performs a wide range of business functions for a specific industry such as manufacturing, retail, healthcare, engineering, restaurants etc. Also general business productivity application software was common.

Among system software the most popular type is Network software. The following tables present the frequency of software types and target markets.

Table 27. The Number of Companies per each Software Type

Software types	Number of companies
System software:	44 (total)
Operating systems software	4
Network software	28
Database management software	5
Development tools and programming languages software	9
Other systems software	2
Application software:	121 (total)
General business productivity applications	34
Home use applications	3
Cross-industry application software	54
Vertical market application software	31
Utilities software	5
Other application software	16

When looking at the target markets (Table 28), it is clear that most companies prefer the “No specific industry segment”, which is software that can be used by all segments. The Manufacturing, Telecom, Health services, and the Public sector are very popular target markets. The least popular target markets are the Agriculture, Research, Aviation, and Travel.

Table 28. The Number of Companies per each Target Market

Target market	Number of companies
No specific industry segment (horizontal application)	56
Electronics and high technology	9
Communication technology: Telecom and mobile	24
Aviation and defense industry	4
Research and science, biotechnology, nanotechnology and chemistry	4
Banking, financing, insurance and legal services	15
Energy	12
Construction	15
Manufacturing	32
Wholesale and retail sales	17
Real estate and maintenance	11
Transportation and logistics	15
Agriculture and forest industry	2
Health services	24
Traveling and tourism	5
Public sector	24
Education and training	11
Media, entertainment and games	10
Some other target market	16

Naturally those categories that are very popular, e.g. Cross-industry application software and in the target markets the No specific industry segment, have large revenues and high number of personnel because so many companies' figures are included into these sub clusters' figures.

7.3 REVENUE

7.3.1 Total Revenue

The total revenue and the software product business revenue varies significantly across the various sub clusters, the types of software, and the target markets (Figure 69). Note however that in the following figures one company can be part of up to three different software classes and it can also participate in multiple target markets. In other words, if company is a member of more than one sub cluster, its revenues are added to each one of those sub clusters. Out of the different software classes the Cross-industry application software and the Network software had the largest total revenue.

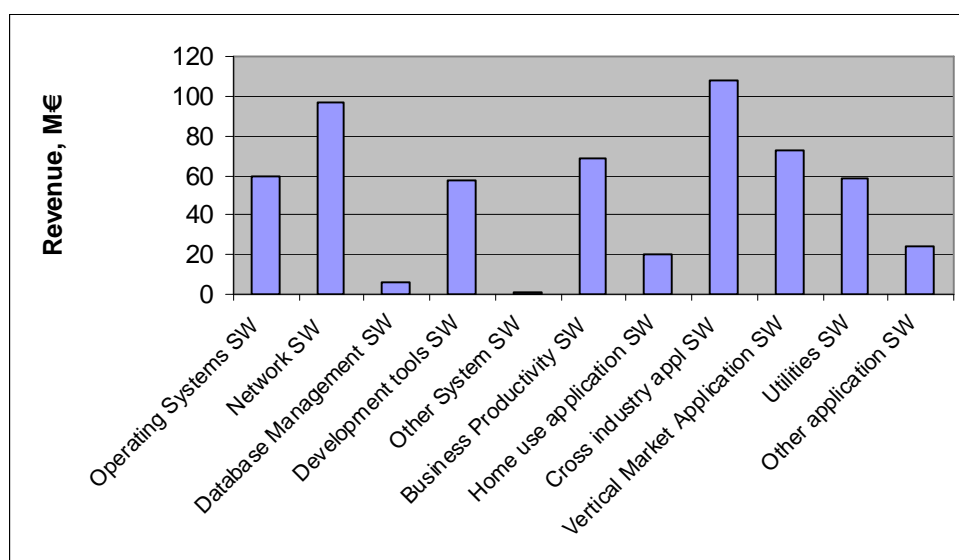


Figure 69. Total revenue by software sub clusters

From the target markets, the Telecom had the greatest total revenue while the No specific target market and Banking had high revenues as well (Figure 70). On the other hand, Aviation, Science, Agriculture, Traveling, and Education have very low revenues. These sub clusters lack large companies and therefore the total revenue figures are very low.

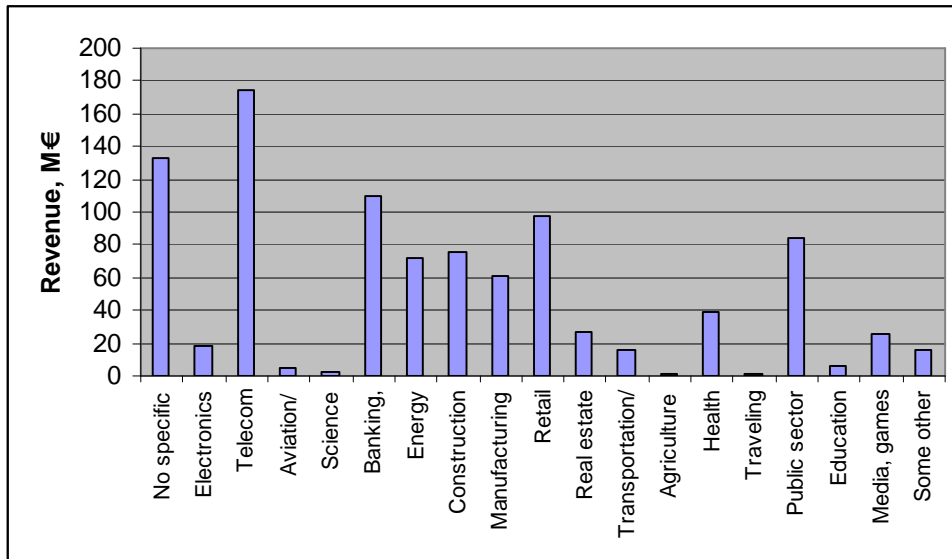


Figure 70. Total revenue by target markets

When looking at the revenue per employee figures (Figure 71), the situation is quite different. The greatest revenue per employee figures are in the Operating system software and Development tools software sub clusters.

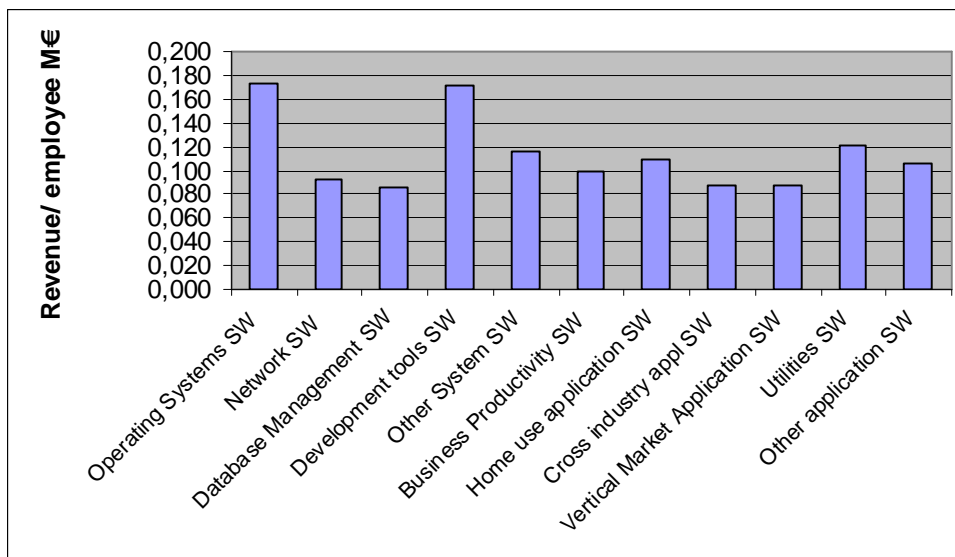


Figure 71. Total revenue per employee by software sub clusters

As for the target markets (Figure 72), the greatest revenue per employee is in the Banking cluster followed by Telecom, Aviation, Construction, and Retail. The figure for Aviation and defense can be biased because only four companies are included in this target customer market.

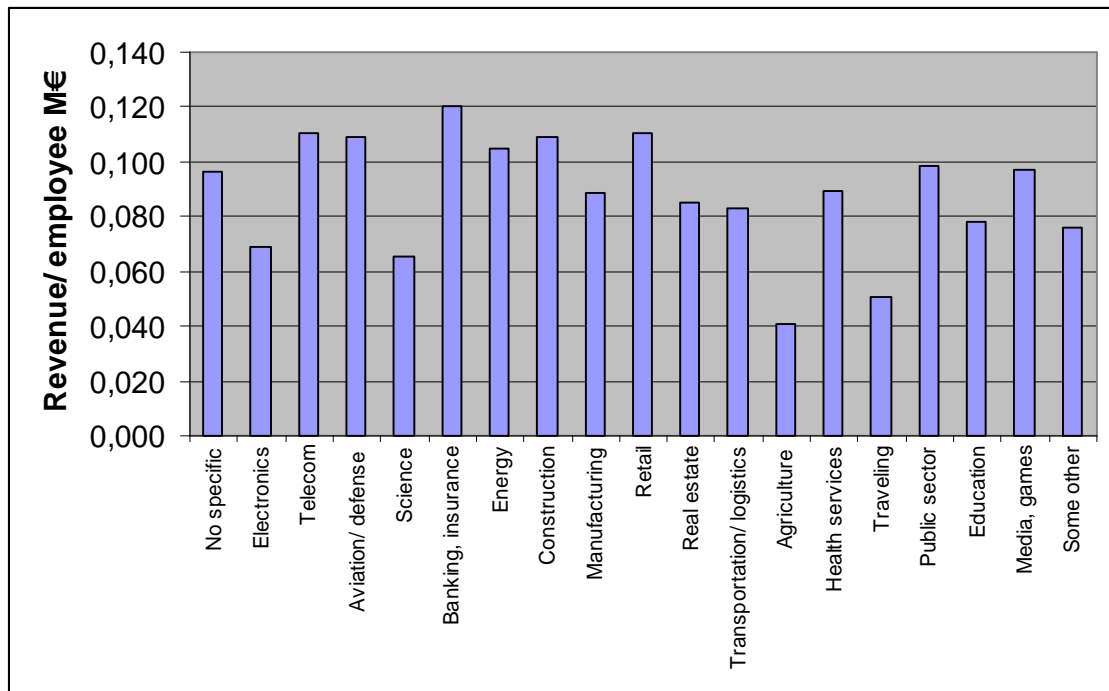


Figure 72. Total revenue per employee by target markets

7.3.2 Software Product Revenue

The companies were also asked to divide their software product revenue accordingly between the different sub clusters. They were asked to provide the software product revenue for each target market and for each product. This would give an exact figure of how large each sub cluster is in terms of revenue. Thus a company that has two products and four target markets the first product might bring 60% of the revenue from only one target market, the second product might bring 30% from one target market, 5% from the second, and 5% from the fourth adding up to 100% for all products and all target markets.

Unfortunately many companies misunderstood this question item and divided the revenue in such a way that they marked 100% revenue for each product. In these cases we have used the following reasoning: for companies with two products, the first product brings in 70% and the second product 30% of the revenue. For companies with three products, the first product brings in 60%, the second 30% and the third 10% of the revenue.

The results show that the Telecom sector is clearly the largest sub cluster according to revenue (Figure 73). The next largest ones are the No specific target market and the Banking and financial services. Surprisingly the results also show that the Media, entertainment and games sector is larger (in terms of revenue) than the Health services and the Public sector, which are on the other hand more popular target markets. This result is biased by the fact that typically the software products for the public sector are provided by the largest companies and these companies unfortunately have not in the survey informed what their target markets are. Thus we were unable to get responses to these questions from most of the largest companies. However, the survey managed to capture all or almost all of the large software game companies which increases the

revenue of the game software sub cluster. According to the responses the Electronics, Aviation, Science, Agriculture, Traveling, and Education are smallest sectors.

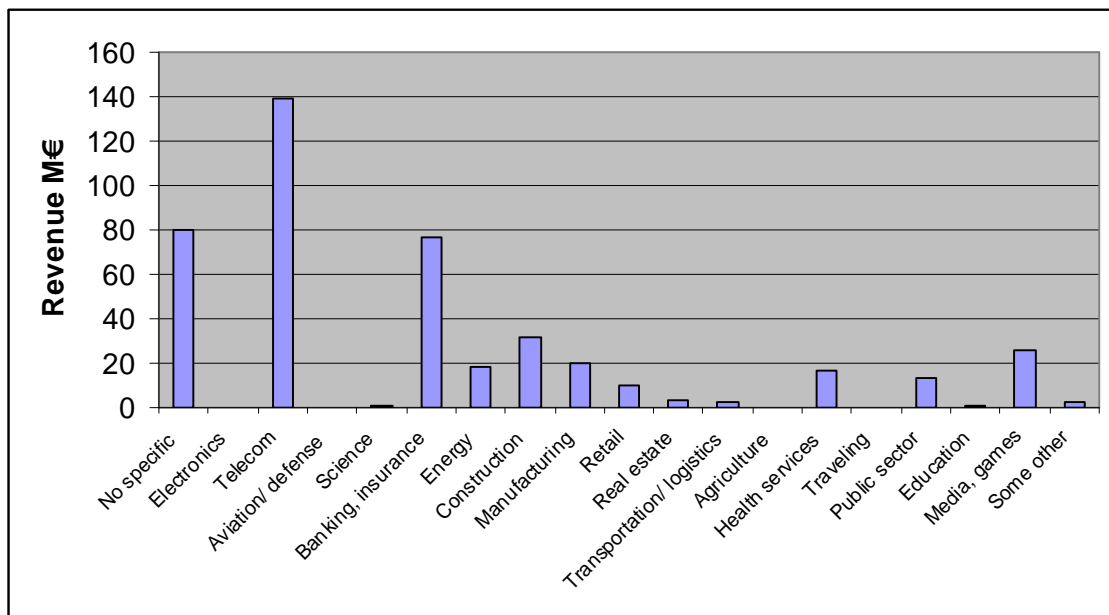


Figure 73. Software Product revenue by target markets

7.3.3 Sub Cluster Revenue - Conclusions

The Figures 66-70 show clearly that the Telecom and the Banking and finance are large sub clusters when measured by their revenues. This comes as no surprise as the Telecom sector is generally known to be very large in Finland. On the other hand, it is interesting to note that the Construction and the Media, entertainment and games sectors also have high total revenues. The No specific target market sub cluster naturally had high revenue as there are so many companies targeting this market (i.e. they make horizontal applications). Of the software sub clusters the largest total revenues are in the Cross industry application software and the Network software, which also are the most popular ones.

7.4 PERSONNEL

The number of personnel was also examined in the software sub clusters and target markets (Figure 74). The companies in the Cross industry application software and the Network software employed more people than the others. Also the companies producing Vertical market application software employed over 800 people. Again it has to be noted that one company can be in more than one sub cluster and therefore its personnel is added up to all of these sub clusters which it belongs to.

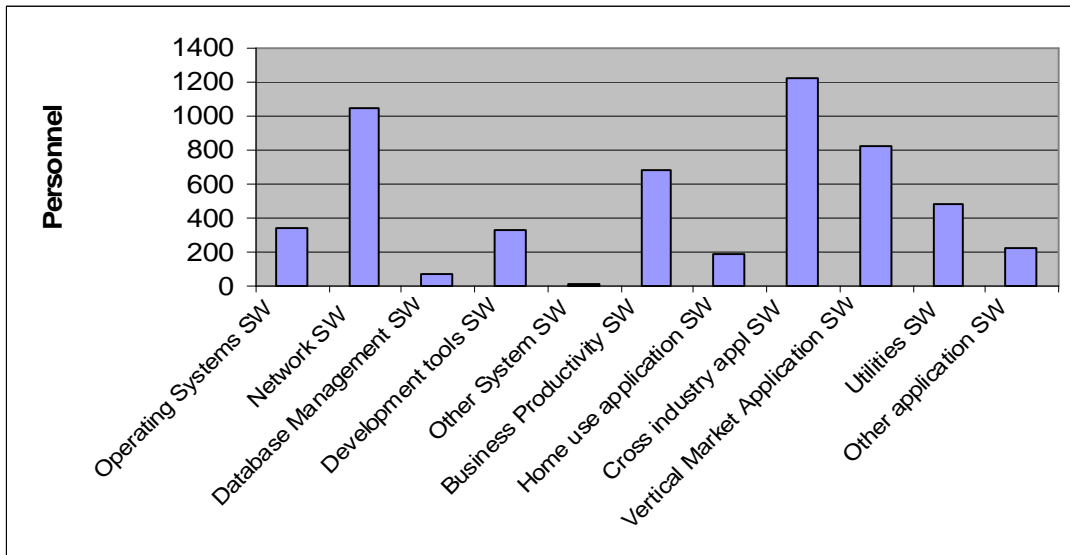


Figure 74. Total personnel by software sub clusters

When looking at the target markets, the companies that focus on the Telecom or on the No specific target market have the highest amount of personnel (Figure 75). There are many large companies in the Telecom sub cluster, which also explains the high number of personnel.

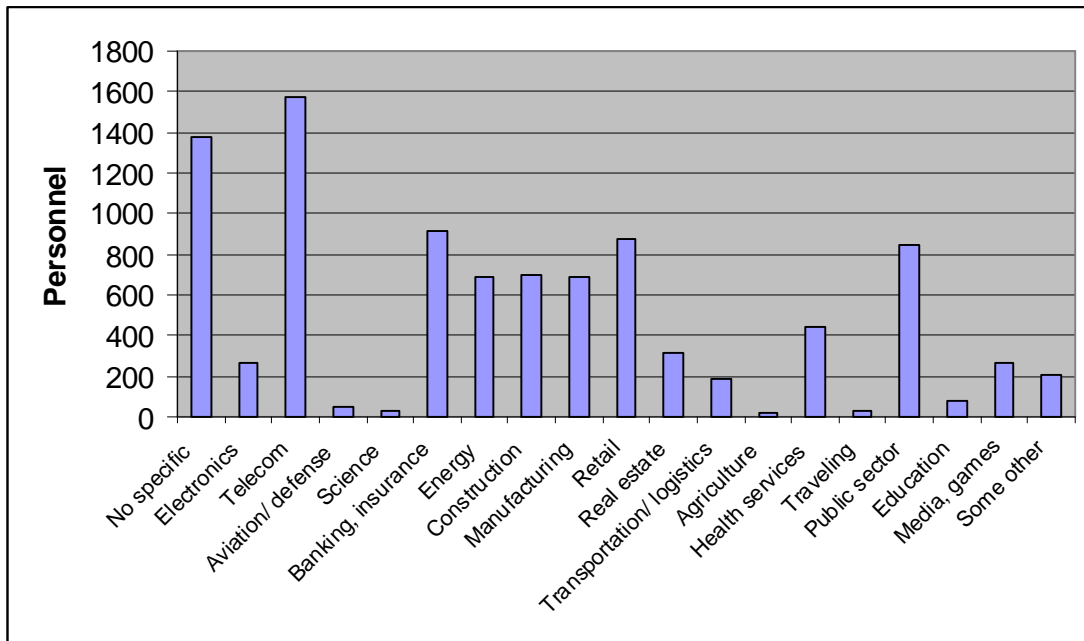


Figure 75. Total personnel by target markets

7.5 PROFITABILITY

The total profit for each sub cluster varied a lot between the sub clusters (Figure 76). For example, the average profits for the Utilities software products and the Operating system software sub clusters were very good while the Home use application software and the Network software sub clusters were not profitable.

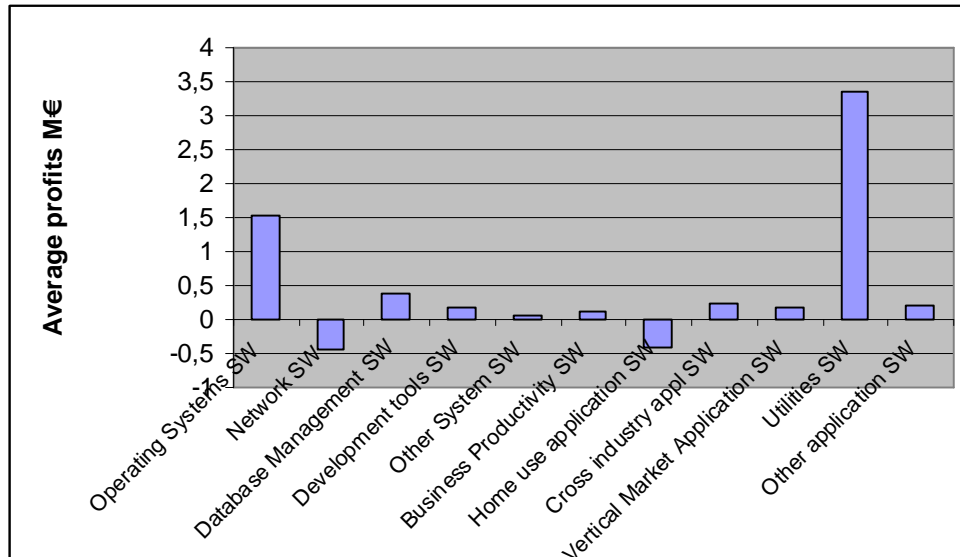


Figure 76. Average profits by software sub clusters

As for the target markets (Figure 77), the Telecom, Energy, Construction, and Retail sub clusters were quite profitable while the Electronics, Banking, Transportation, Public sector, and Media, entertainment and games sub clusters were creating losses. In case of the game companies, since they are new, they invest heavily on research and development, and these two things combined made them unprofitable.

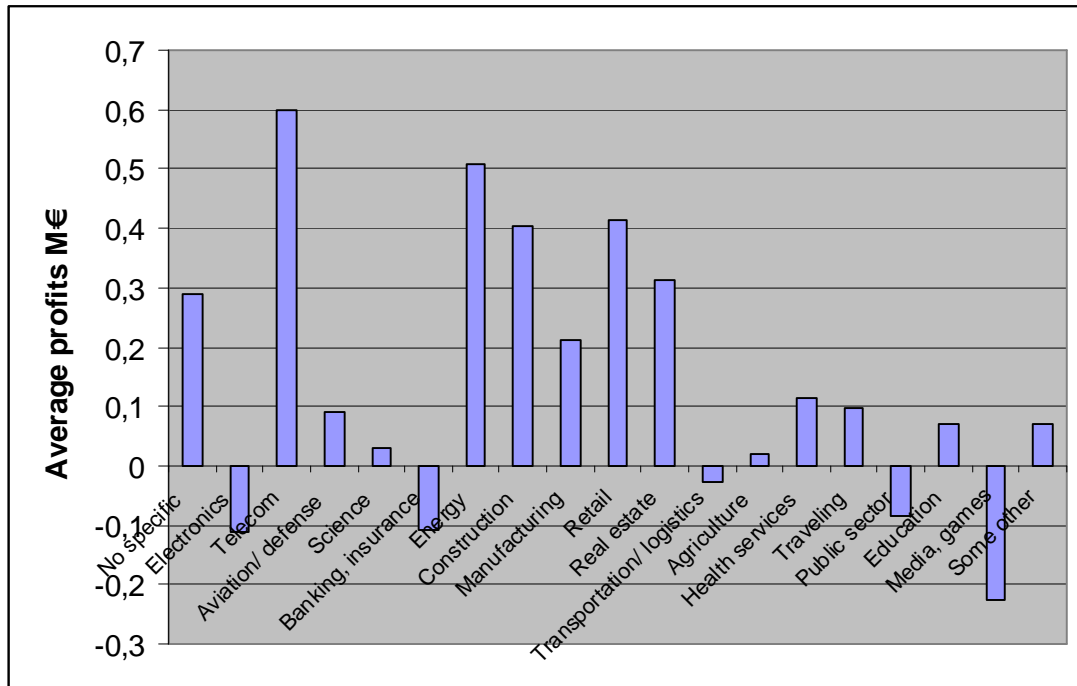


Figure 77. Average profits by target markets

The profitability was reported as the profit of software product business in relation to the revenue of software product business show that the Database management software and the Utilities software sub clusters had high profitability (Figure 78).

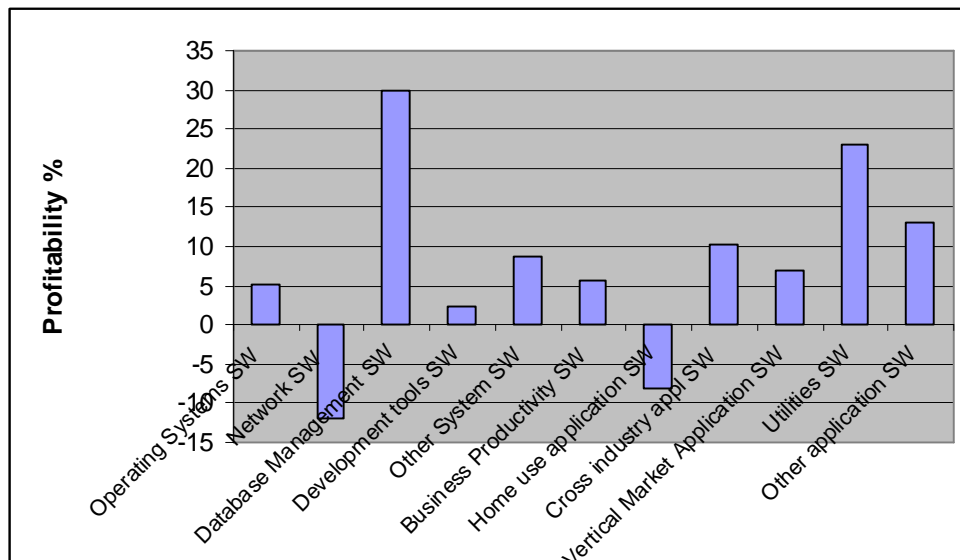


Figure 78. Profitability as profits/ revenue by software sub clusters

As for target markets the following showed high profitability: No specific target market, Education, and Real estate (Figure 79).

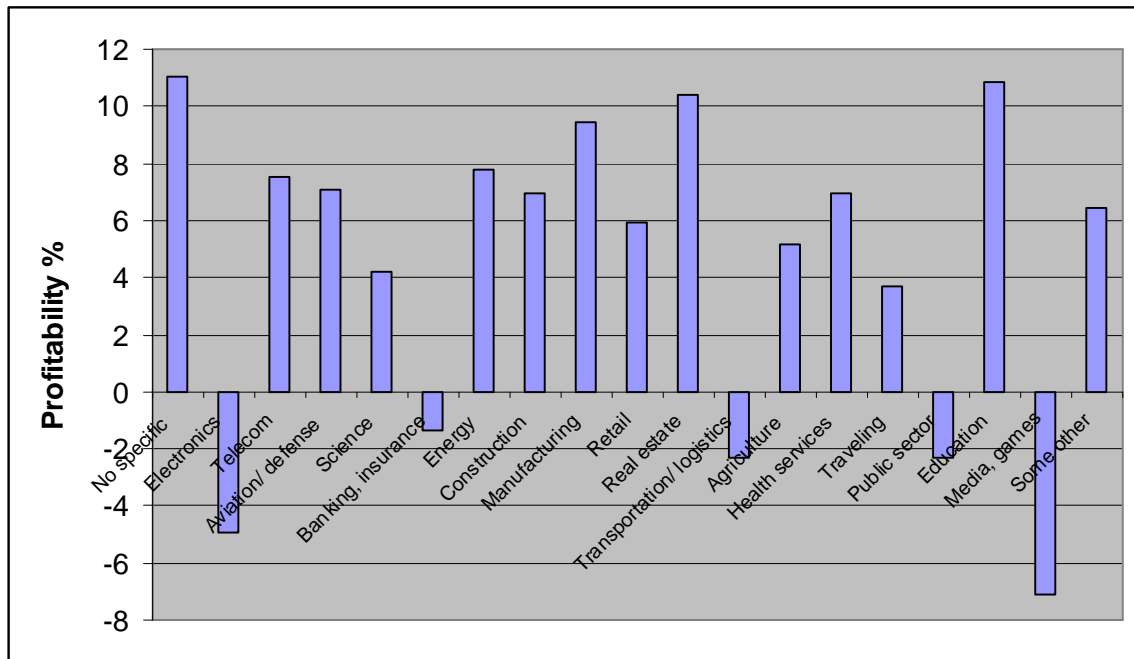


Figure 79. Profitability as profits/ revenue by target markets

7.6 RESEARCH AND DEVELOPMENT

The levels of research and development in relation to the revenues were studied in the chapter 3. In this chapter we look at how this figure is dependent on the sub cluster.

The Home use application software – which includes also games – has the highest level of R&D investments as percentage of the revenue (Figure 80). Again this can be explained by the young age of the game companies. Young high tech companies typically have very high level of R&D expenditure, as the Figure 26 in the chapter 3 shows.

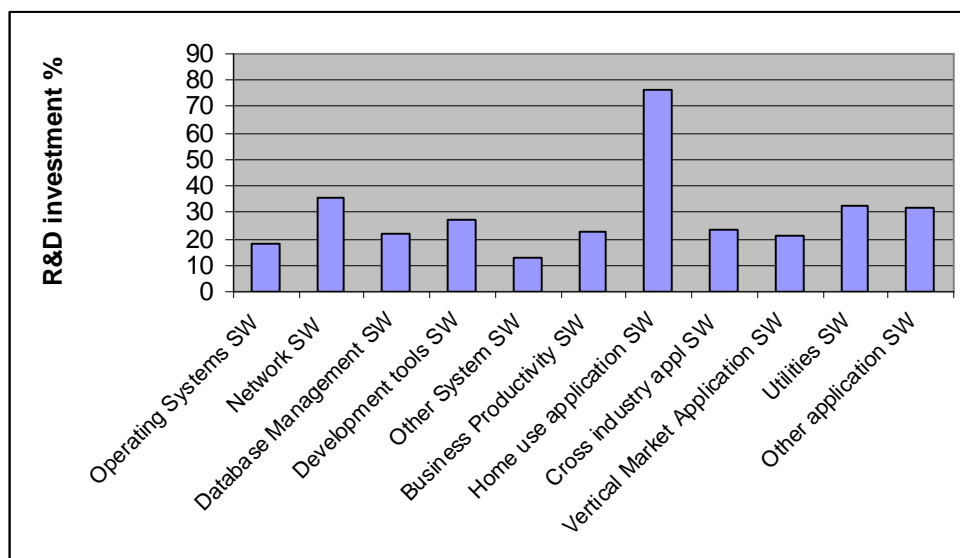


Figure 80. R&D investments as percentage of the revenue by software sub clusters

When looking at the R&D investments by target markets it can also be seen that the Media, entertainment and games sub cluster has very high R&D investment percentage and this is also has by far the highest figure out of all the sub clusters. Since from this Media, entertainment and games sub cluster the largest companies tended not to answer the question about their R&D investment levels, this number is biased and probably too high. However, as noted earlier, these companies are young and therefore their R&D investment levels tend to be high.

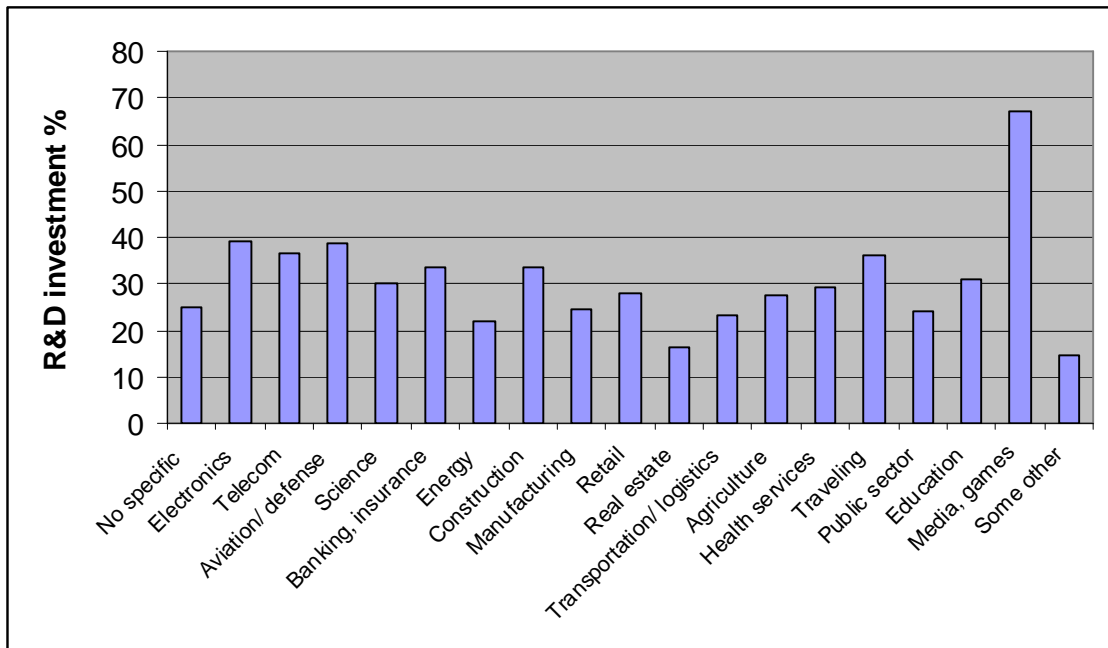


Figure 81. R&D investments as percentage of the revenue by target market

7.7 INTERNATIONALIZATION

The level of internationalization was measured by two factors: how large percentage of the companies' revenue comes outside of Finland and in how many countries the company's products are sold to. Measured by the percentage of revenues from abroad the Home use application software was the most internationalized sub cluster followed by the Utilities software (Figure 82).

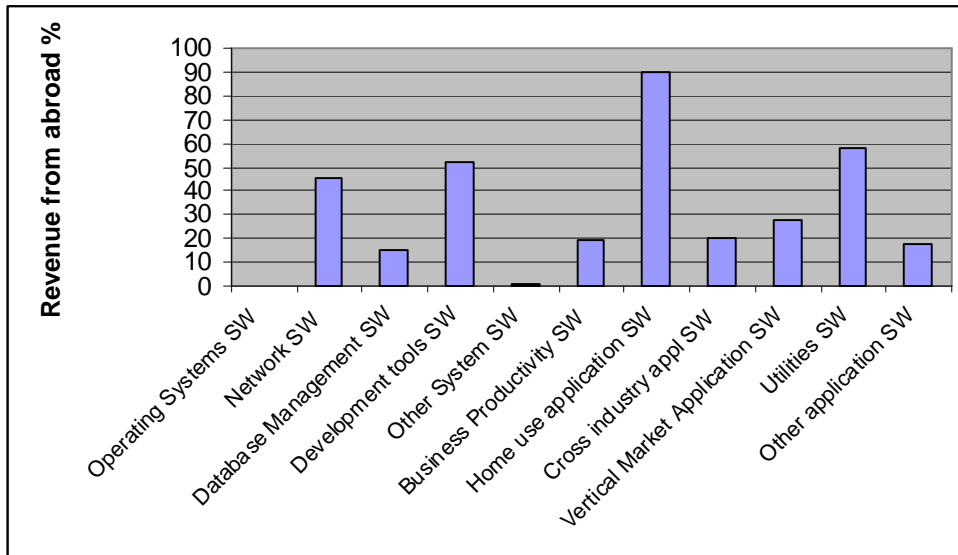


Figure 82. Revenue from abroad as percentage of total revenue by sub clusters

For the target markets the game sector was the most internationalized followed by traveling (Figure 83). For the game companies, the typical strategy is to focus directly on international markets. Markets in Finland are too small and for minor additional effort the companies can create international versions of their game software. Also the Telecom and Science receive high percentage of their revenues from abroad.

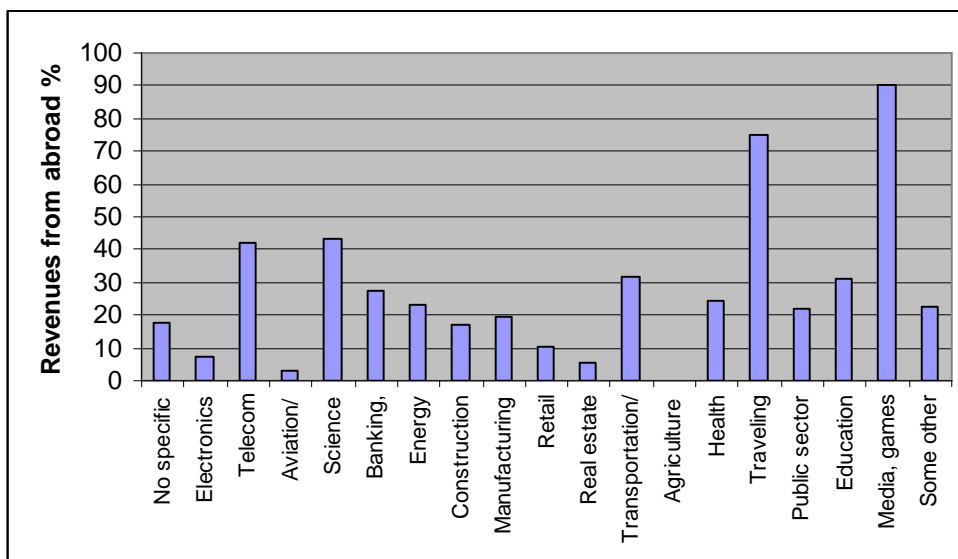


Figure 83. Revenue from abroad as percentage of total revenue by target markets

When looking at the number of export countries, some sub clusters had very high figures (Figure 84). This can be explained by the fact that there are companies, which sell their product only through the Internet. In these cases the companies are able to sell to multiple countries without (physical) presence in these foreign countries and therefore

with very little overhead. The highest number of export countries is in the Utilities software sub cluster followed by Network software.

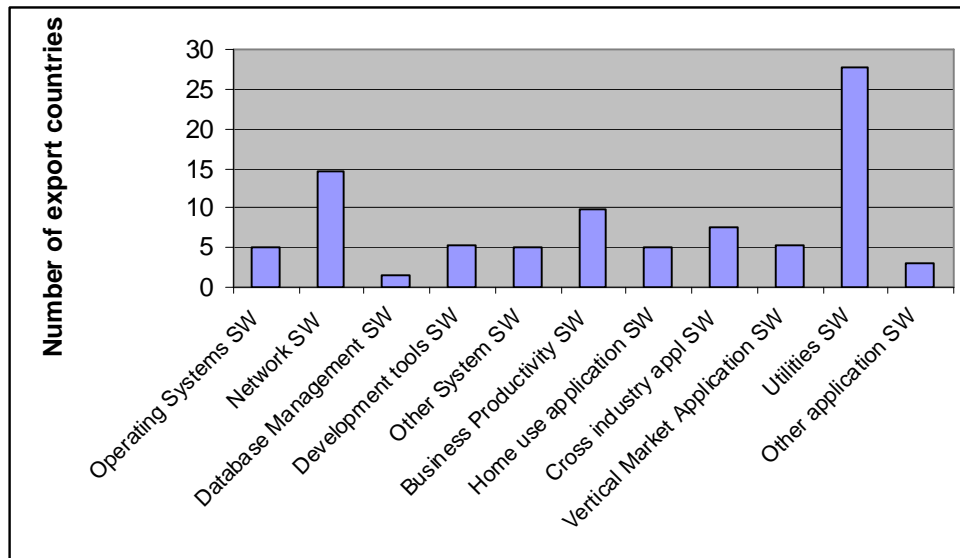


Figure 84. Number of export countries by target markets

When considering the target markets, Science, Construction and Traveling had the highest number of export countries (Figure 85). Clearly, Banking is one sub cluster that focuses mainly to the domestic markets.

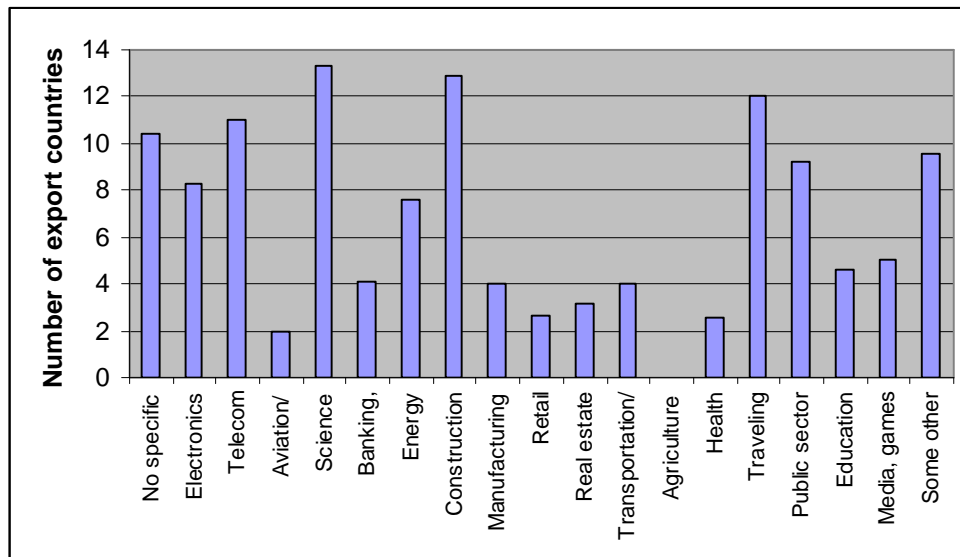


Figure 85. Number of export countries by target markets

7.8 COMPANY AGE

Companies' ages were counted by using the companies' founding year (Figure 86). On average the Home use application software companies were the youngest, which is explained by the fact that game software belongs to this sub cluster. For the companies making game software, the average founding year was 2002. The Other application software and the Vertical market application software companies were the oldest.

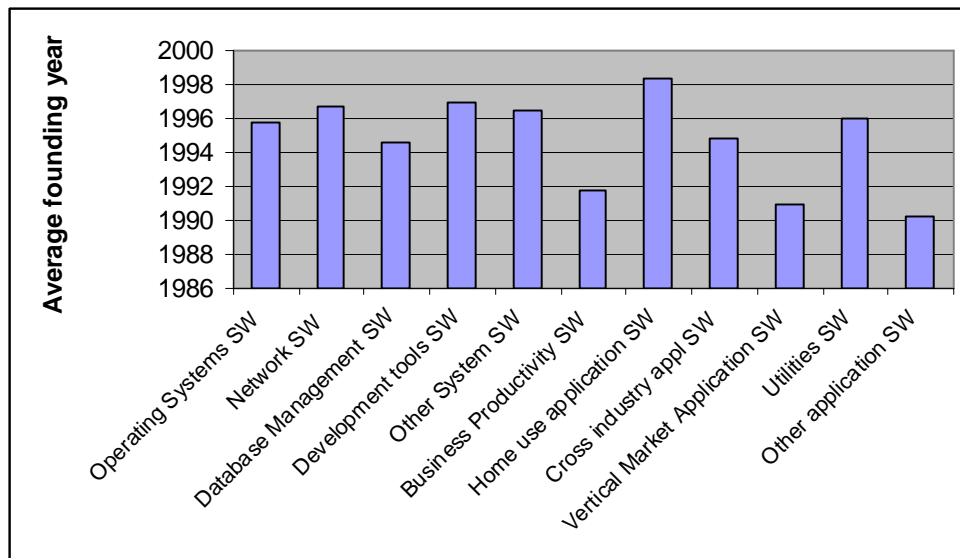


Figure 86. Average company age by target markets

The Media, entertainment and game companies were the youngest when looking at the target markets (Figure 87). The Construction, Aviation, and Energy sub clusters were the oldest.

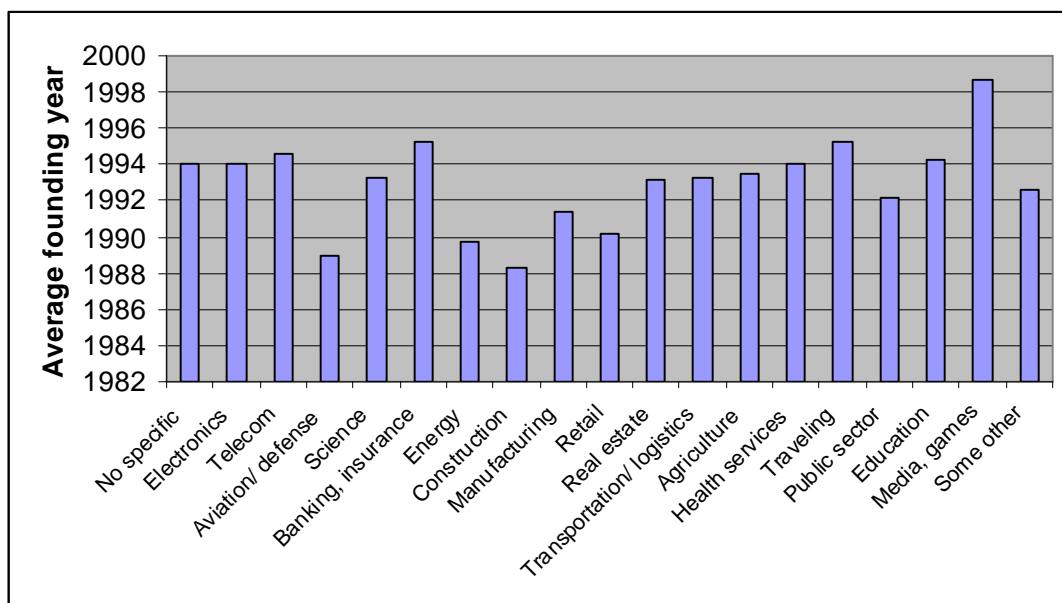


Figure 87. Average company age by target markets

7.9 CONCLUSIONS FROM THE SUB CLUSTER STUDY

The sub cluster research brings out many differences between the sub clusters. Unfortunately some of these sub clusters have only limited number of companies which limits the usability of information for these sub clusters. Still the research brings out new issues and questions.

On the software sub cluster side, the Cross industry application software is most popular and also has the highest revenue. In case of the target markets, the No specific target market is the most popular followed by the industrial Manufacturing sub cluster.

When looking at the revenue and personnel, the Telecom sub cluster is very large. There are many large companies working on this area and these companies also have high revenues and the number of personnel. Banking has also high revenues and the highest revenue per employee figure. Clearly the above-mentioned sub clusters provide revenues for a large number of companies and employment for people. While the Banking sub cluster companies focus more on the domestic market, the Telecom sub cluster can be in the forefront in helping the small and medium-sized companies to start their international operations.

Education had the highest profitability of the target markets. This shows that the companies can create good profits on areas that are not fashionable or high on media attention. The game software companies were the youngest companies, they had largest percentage of revenue from abroad and they had highest investment levels to R&D. This explains the fact that they are not profitable but making loss.

As this is the first year the sub cluster research was conducted, unfortunately we cannot present any comparisons of these results to previous years' numbers. However, it can be seen already from these figures that the sub cluster research provides interesting results. For example, it is now possible to e.g. identify profitable sub clusters and highly internationalized sub clusters. This information allows us to pick out more promising areas and sub clusters. On the longer term the main objective is to find out the fast developing new sub clusters very early on.

8 CONCLUSIONS

8.1 The Current State of the Finnish Software Product Industry

The Finnish software product industry's revenue grew to 1.19 billion Euros in 2004 representing 21% growth from 2003. In 2005, the companies are still expecting their revenues to continue to grow and the expectations for the future are regarded more positive than a year ago. Companies' profitability increased from the previous year (2.2% on average) and the amount of employees in software product business also increased by 3.3%. In addition, international business grew by 7.1% amounting to 405 M Euros. Growth was evident in small, medium-sized, and large companies. The main points of this survey are summarized in Table 29.

We have observed many positive signs of development of the Finnish software product industry in 2004. However, we have observed also that Finnish software product industry has still the same main challenges as in previous years. Despite the fact that there are already some fully internationalized and mature companies, majority of the companies are still rather immature. This can be seen in moderate revenue, in low revenue per employee ratio, and in low degree of productization. According to this survey, many companies are still in a relatively early stage of product development and majority of internationalized companies have a very low share of revenues coming from abroad.

Raising the degree of productization is still one of the most important issues for software product companies. At the difficult economic times, this is especially challenging, as companies have to find a balance between long-term productization aims and short-term need for cash (often done by customizing and customer-specific projects). In order to find a balance, good and clear vision and strategy for the products and business is needed in addition to suitable and flexible software production processes.

Table 29. Current State of the Software Product Industry

Current state of the software product industry in Finland	
§	The change for the better has come: turnover has strongly increased from the previous year <ul style="list-style-type: none">○ The software product turnover grew 21% reaching 1.19 billion € in 2004○ International sales increased also by 7% amounting to 405 million € in 2004○ Revenue per employee is still low compared to the most successful countries: the average revenue per employee was 111 000 € (113 000 € in 2003)
§	The profitability of the software product business improved <ul style="list-style-type: none">○ Profitability increased from the previous year's 0.1% to 2.2% in 2004○ 27% of the companies had profitability over 15% of turnover (24% in 2003)
§	The number of personnel has also increased <ul style="list-style-type: none">○ Employment increased by 3.3% from previous year to 12 400 software professionals○ Companies are planning to recruit more personnel in 2005
§	Increasing the internationalization rate is still a challenge <ul style="list-style-type: none">○ Less than half of the companies (46%) have international operations and most of them receive only a small share of their revenues from abroad
§	Financing situation is still very challenging for young firms and for companies planning internationalization <ul style="list-style-type: none">○ Significant number of the companies (31%) seeking external financing had to change business plans due to problems with availability of financing (25% in 2003)○ Young firms still find availability of risk finance as a significant barrier for the emergence of new software product companies (64% of less than 2 year old firms)

Current capital market situation is particularly limiting the operational possibilities for young companies that are developing their first software product. However, software products are difficult to produce without capital, which enables companies to focus on developing the product instead of doing customer projects. An increase in external financing plans due to the increased growth prospects emphasizes even more the crucial role of the venture capitalists and the public capital.

Sub cluster research provided new insight into the Finnish software product business. The companies were classified according to the type of software in their products and the target customer markets. There was a great variety from one sub cluster to another when the revenues, personnel, profitability, level of research and development, age and the level of internationalization were studied. As for target markets, the most popular were No specific target market followed by the industrial Manufacturing sub cluster. This first sub cluster research provides a good platform for next year's research. We hope that with this research we can identify the fast growing new sectors very early.

Table 30 presents the background information of the companies that responded to the survey.

Table 30. Background Information of the Respondents

Background information of the companies who responded to the survey	
§	Geographic distribution of the respondents <ul style="list-style-type: none"> ○ 86% of the companies are located in the proximity of technology centers and universities ○ 52% of the companies are located in Uusimaa, 70% of the larger companies (SW product business turnover over 3 million €)
§	Profitability has improved <ul style="list-style-type: none"> ○ 27% of the companies had profitability over 15% of turnover (24% in 2003) ○ 14% of the responding companies were unprofitable (20% in 2003)
§	Age of the companies <ul style="list-style-type: none"> ○ Employment increased by 3.3% from previous year to 12 400 software professionals ○ Companies are planning to recruit more personnel in 2005
§	Size of the companies <ul style="list-style-type: none"> ○ 31% of the companies generated less than 200 000 € on SW product business in 2004 (34% in 2003, 38% in 2002) ○ Average share of SW product business was 58% of turnover (55% in 2003) ○ Average revenue per employee was 111 000 € (113 000 € in 2003) ○ 31 % of the companies employed five or less people (27% in 2003)
§	Financing and ownership <ul style="list-style-type: none"> ○ 73% of the companies are owned by founders and their family members (70% in 2003) ○ Share of VC ownership (3.7%) and of foreign ownership (4.2%) are low ○ 36% of firms intended to seek external financing in 2005-2006 (41% in 2003)

8.2 Implications of the Findings and Points for Consideration

The study brought up some issues that we think need further discussion. These included financing, raising the degree of productization and mastering product development, networking, and internationalization. In the following sections we discuss each of these issues and suggest some recommendations or implications for the policy makers and

government (titled *Policy Implications*) and for the management of software companies (titled *Management Implications*).

8.2.1 Financing and Ownership

Finnish software product companies have very conservative financial structures with little debt or outside equity especially compared to Finnish biotech companies. While good for survival, such conservative capital structures are not optimal for rapid growth and internationalization, which is crucial for the long-term viability and growth of the industry. A negative sign is that the percentage of software product companies seeking external finance (36%) has decreased compared to the year 2003 (41%). Overcoming the barriers for growth and internationalization success is crucial for tapping the growth and job creation potential of the industry.

Problems in the availability of external finance are most serious for growth-oriented, young, small, and negative cash-flow companies. These companies would need it most. These companies are significantly more pessimistic than older companies concerning the lack of financing preventing the emergence of new software product companies. The current financial environment discourages capable potential entrepreneurs from starting new growth-oriented ventures or existing entrepreneurs from investing in growth. Public policy measures should be targeted to make the environment more rewarding for growth-oriented new ventures and their investors.

Internationalization success is imperative for growth, wealth creation and successful exits for investors, which are necessary conditions for them to make risky investments in software product companies. Foreign investors appear to provide highly valuable internationalization support for their portfolio companies, thus complementing in a valuable fashion domestic investors. However, foreign investments are still relatively minor in Finnish software product companies. In addition to adding to the supply of risk capital, attracting more foreign investors in Finnish software product companies could help the industry also by improving the internationalization success leading to both increasing growth expectations and subsequently increasing supply and demand for domestic risk capital. The participation of foreign investors in creating globally successful Finnish software product companies should be encouraged.

Based on the above discussion, we are suggesting the following implications:

FINANCING AND OWNERSHIP	
<i>Policy implications</i>	<i>Managerial implications</i>
<ul style="list-style-type: none"> • Improving the tax and legal environment and other support for private value added investors to stimulate the functioning of the risk capital market • Removing the barriers for foreign investors to invest in Finnish venture capital funds and ventures 	<ul style="list-style-type: none"> • Improving the capability and willingness to take risk and target growth markets, as well as accept external investors to support the growth • Developing the 'investment readiness' of the companies, i.e., making the companies more professional and accessible by external investors

8.2.2 Productization and Product Development

As this study shows, the majority of the companies still suffer from an inadequate productization level, a problem that is unfortunately typical for the European software industry. Raising the level of productization is a complex and challenging issue that

influences most aspects of a software product company, from business models to internal processes and to technologies and architectures used. It is interesting to notice that productization and product development remain as one of the most important improvement areas. In particular, many young companies seem to have an inadequate conception of the productization process. Finding the appropriate delivery channels, ways of marketing the product and positioning the product to the markets are some of the areas that have been neglected. In order to help companies in understanding the effort and time needed for productization, e.g., industry statistics, productization and internationalization workshops as well as models of how to manage the productization issues are needed.

The problem of making the product features meet customers' requirements and needs economically and fast are still the very core competencies of any high-technology firm. Even though the most efficient way to increase the level of the R&D project management and product management is to have experienced people taking care of them, there are also other possibilities for improvement. For example, by collecting information of the industry best practices and distributing the findings to the other companies (especially to young and small) in Finland can also help them to manage their products and R&D better in order to grow their SW product business. Table below contains the most important issues concerning product development related issues.

Table 31. Product Development and Productization

Product development and improvement issues	
§	R&D investments of young firms increased again in 2004, mature companies' R&D investments have fallen
○	Companies with age of software product business 1-2 years invested in R&D on average 30% of turnover (25% in 2003)
○	Companies with age of software product business 3-10 years invested in R&D on average 15% of turnover (30% in 2003)
§	The most important focus areas of the R&D were development of the degree of productization and development of value-added services
○	The most significant focus area of smaller companies was the degree of productization
○	The significant focus area of larger companies was the development of value-added services
§	Improvement areas
○	Focus of the small companies was in networking, product development and productization
○	Focus of the large companies was in international sales and marketing
○	Improvement of personnel skill and knowledge has risen amongst the large companies
§	Policy implications
○	Assistance and support in finding distribution channels and partners
§	Managerial implications
○	Preparation for fast growth: early and sufficient investment and preparation for growth and international operations
○	Emphasizing the marketing perspective in productization: total offering and delivery concept
○	Market information: use already in the early phase of product development and venture capital information

8.2.3 International Operations

46% of Finnish software product firms reported to be present and have sales on foreign markets. However, only quite a low share of revenue came from abroad on average. Moreover, when looking at the distribution of foreign revenue share, there is a significant gap between initial sales abroad and full internationalization.

Internationalization correlates with high growth potential. Internationalized firms reported higher revenue and growth expectations compared to their counterparts limited by the small domestic market. However, internationalization is also highly risky. Despite of the average profitability of domestic and international firms being similar, there were significant differences in their distributions. While domestic firms reported relatively balanced profitability, internationally operating ones formed two clusters of well profitable ones and ones in losses. Our analyses suggest that early internationalization can be very rewarding in terms of growth, but there is also high risk associated with it.

Generally, firms in Finnish software product industry find their products and services suitable for international markets and foreign markets attractive. The problems preventing most of them from internationalization are the costs and risks associated with international expansion and the availability of financing for internationalization.

Overall, internationalization resembles a chasm for many of the firms. Crossing it can significantly expand growth potential and also enable access to new resource markets. However, a firm can also fall during this crossing into serious financial instability endangering its viability.

The software product business is volume based and international expansion is necessary step for every ambitious and growth oriented firm. Necessity of internationalization accelerated by industry dynamics and saturation of Finnish market, combined with the risk associated with it indicates how crucial this step is for further viability of business. With respect to these, targeted internationalization programs oriented on financial bridging and risk redistribution should be considered.

Based on the above discussion, we are suggesting the following implications:

INTERNATIONAL OPERATIONS	
<i>Policy implications</i>	<i>Managerial implications</i>
<ul style="list-style-type: none">• Need for a practical internationalization model that can be applied to firms in different business situations• Promoting the Finnish software product industry internationally in key markets to enhance overall credibility of Finnish companies	<ul style="list-style-type: none">• Position immediately to global markets and operations requirements• Right productization for the international markets• Presence in international markets: being close to customers• Finding right markets for the product & company

8.3 Concluding Remarks

Three large exporting countries, India, Israel and Ireland are examples of very successful software exporters. One thing all these countries have in common is that there has been a national strategy to promote their software industries generally and software exports in

particular. All these countries have actively promoted and facilitated the internationalization of software product companies. The existence of a national strategy for software exports can, therefore, be recognized as an important part of software export success (Heeks and Nicholson 2004).

The detail of strategies for achieving the visions set varies. Common strategies have been governments acting to stimulate the supply of working and venture capital to software firms. All these three countries have used a raft of tax breaks, marketing subsidies, grants, loans, and a combination of both liberalization and promotional intervention. Also, all three countries have invested in software-related research and development directly via government and indirectly via tax breaks for private sector R&D.

In addition, a comparison to other software exporting countries that have not succeeded that well, to Russia, China and the Philippines revealed that either these countries had no national strategy at all or it had no focus.

Finland is a country of limited resources. Therefore, it would be vital for the industry to create a focused strategy to support activities of software product companies. According to the results of this survey, the focus of government strategy could be towards companies creating highly productized software. There have also been some initiatives towards this kind of approach in order to support the software industry.

Productization, risk capital, and internationalization are three interrelated, critically important issues that should be simultaneously improved to enable growth and creation of wealth and employment.

- Without sufficient availability of risk capital, it is hard for software product companies to focus on productization if their operations need to be financed by customer projects.
- Without success in internationalization, which is imperative for growth, wealth creation, and successful exits for investors, private investors will not have incentives to invest risk capital in software companies.
- Without sufficient level of productization, it is hard to enter and conquer global markets.

Public and private sector should work closely together with their international counterparts to remove the barriers for internationalization success of the Finnish software product companies.

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APPENDIX I: RESEARCH METHODOLOGY

Sampling

Since software product business is not classified as a line of business or industry in Finland, defining the target group was a challenging task. According to the estimates of different industry and research institutions there were approximately 1 100 software product companies in Finland at the end of 2004 (1 100 in 2003). We used following approaches in order to reach the companies in our target group.

In 2003, we used a commercial company Mailer Oy for selecting appropriate industry codes, which assumedly contained software product companies. We used Mailer instead of e.g. Statistics Finland, because Mailer provided industry codes on five-digit scale instead of the normal three scale. The selected industry codes were checked and approved by experts.

Table. Industry Codes Selected for the Mailing

Industry code	Explanation
642021	Data transferring service companies
642022	Tele communication companies
64203	Software transfer service companies
72100	Computer hardware consulting companies
722001	Computer software companies
722002	Other computer service companies
722003	Computer consulting companies
723001	Computer service centurms
723002	Computer recording companies
724001	Database companies
724003	Network service companies

In the earlier surveys (until the year 2001), the target group was defined by a company database gathered by the Centre of Expertise for Software Product Business. However, since it is uncertain how well this database represents the Finnish software product business companies in Finland, we opted for another approach. In the year 2001 survey we used Statistics Finland lists to gather addresses of Finnish software companies. This approach resulted in mailing the questionnaire to 4 452 companies, because Statistics Finland has the industry codes on three-digit scale (72 200 software developing, manufacturing and consulting).

This year we combined the contact addresses gathered by the Centre of Expertise for Software Product Business with the addresses received from Itella's company classification list. We mailed the questionnaire to all companies that were listed under the industry codes presented in Table above. However, since software product companies can be found under several industry classification codes (e.g. software design, databases, telecommunication etc.) we checked out the company lists and in addition in order to reduce "double-mailings" we removed listings where the same company had two or more addresses. All in all, we mailed the invitation to participate in yhe survey to 2 480 companies.

Conducting the Survey

The implementation of this survey can be divided into four phases: planning the survey, gathering the data, analysis of the data, and porting the results.

Planning the Survey

Planning of the survey was done in December 2004-March 2005. The questionnaire used in the survey was designed in March-April 2005. Several software product business specialists were involved in the process of forming the questionnaire. The questionnaire was tested in March 2005.

Gathering the Data

Gathering of the data was done in May-June 2005. The invitation to web-survey was mailed in April and a follow-up emailing which was carried out in April 2004. Companies with incompleting survey questionnaires were also contacted by phone in order to increase the response rate. Unfortunately, most of the large enterprises had not answered the survey because of the legislation of public limited companies. Extra effort was made in order to gather at least the numerical data of these major companies, they were contacted by phone and/or their annual reports were studied. Information of 20 companies was gathered in other ways, mostly by phone but also using the Internet and companies' annual reports.

We received responses from 220 software product companies i.e. from ca. 20% of the companies in the industry. We estimate that the responding companies generated over 65% of the whole industry's revenues in 2004 and over 87% of the revenues received from international operations.

Analysis of the Data

The analysis was done August-September 2005. SPSS (Statistical Package for Social Sciences) 13.0 for Windows software was used in the statistical analysis. We performed the statistical analysis by collecting descriptive information (sums, averages, distribution, and correlations etc.) on the collected variables. For example we used correlations to describe linear dependencies of the variables: we used Pearson correlation if variables were measured at least on interval scale and Spearman correlation if variables or only one of them was measured on ordinal scale. We also performed some exploratory factoring as well as regression analysis among other statistical analysis tools.

Reporting the Results

Preliminary results were presented to the press in August and this final report was written in August-September 2005.

Questionnaire

The web-based questionnaire contained 56 items. The questionnaire consisted of seven background questions (respondent demographics) and the rest of the questions were divided into 6 sections: 1) the main software product business, 2) international business, 3) corporate financing and ownership, 4) general company information (revenue, personnel and business development), 5) corporate strategy, product development and networking, and 6) software product industry customer clusters

The first part focused on the main software product and the business related to this product. We asked questions related to the number of customers, the degree of customizing, markets and end users, as well as the business models used by the companies. The international business section asked on the importance of international business, as well as the most important export countries. The amount of personnel in foreign countries, internationalization strategies and distribution channels were also covered. We also asked the companies about their intention to grow their business in domestic or international markets. The ownership and financing section asked on the ownership distribution of the company. We also asked the intention of the company to acquire funding in 2005-2006.

In order to get basic statistics on the companies, we asked for information on revenue as well as profits and product development investments. We also asked about the allocation of personnel and possible

challenges in recruiting. In addition, we asked about most and least important areas of development in the business. In the corporate strategy, R&D and networking section, we asked questions about common strategy, importance of the product business and about the R&D activities. Finally, we asked for information on the respondent, including position, tenure, and share in the company, as well as contact information.

We tested the questionnaire with seven industry experts before mailing it. We learned that it took some 25-35 minutes to fill in the questionnaire. We changed the wordings of several questions, as well as shortened the questionnaire based upon the feedback from the testing.

Evaluation of the Results

Reliability of the Study

The reliability of the construct was strengthened by several systematic checks that answers are logical and in line with other answers of the company. Because of the relatively large amount of companies, it is quite hard to verify the answers companies have given. Often companies want to give more positive views of their situation than the actual condition is. Also, companies often tend to have very optimistic views on future that may not always be quite realistic. In order to overcome these problems and the possible bias in the data, we gathered the TOP50 (ranked in the order of their revenue) companies' financial figures from e.g. their annual reports. In addition, in order to assist in the interpretation of the data we have presented the data and findings to industry experts in order to understand the phenomena better and validate the conclusions. These experts are consultants and analysts with many years of experience in the study of the ICT field.

Validity of the Study

Validity relates to how well questions asked measure the actual phenomenon and not something else. Questions that were not understood homogenously in the testing phase of the questionnaire were changed or removed. Also, we obtained secondary assessments of knowledge intensity from industry experts in order to reduce the chance of a systematic error. Overall, we believe that the validity of the study is relatively good. However, it seems that in the survey we did not reach very well companies of very small size for some reason. This can bias the results, since companies that are not able to grow their business have not responded the survey and, therefore, the results may have seen too optimistic (or positive) in general.

Response Rate

Overall, we received 285 (last year 275) responses, of which 220 (last year 196) did software product business in 2004. According to professional estimates, there were about 1 100 Finnish software product companies at the end of 2004. Therefore we approximately reached 20% of the industry as a whole. However, this sample is not a direct cut from the whole industry: the amount of large companies is oversized because of more accurate searching and response rate of the large companies. In addition, we did not reach the smallest companies as well as expected.

Suggestions for Future Research

The findings and limitations of this research suggest several areas where further research would be interesting and beneficial. First, this study is based on quantitative survey, where a typical respondent is at high executive position. This naturally narrows the areas covered in the survey, e.g. software engineering and product development processes were hardly covered in this study. Also, the method of using quantitative survey does not enable to gain deeper understanding of actual processes and drivers in the companies, with case studies this knowledge could be dramatically improved. This kind of data could be compared to other software product industry surveys conducted abroad, where further

conclusions of the current state of the Finnish industry could be formed. The Software Business Laboratory of the Helsinki University of Technology is currently working actively with universities in different European countries in order to conduct this survey also abroad.

The original idea for the need of the software product industry research came in the mid 1990s and one of the main reasons behind this survey was to prove that the software product industry is an actual industry with national significance or at least has the potential to become one. A question could be stated, whether the goals of this kind of survey should be refocused in the near future. In addition, the current questionnaire is both quite demanding and takes about an half an hour to complete and therefore the response rates have been low. This could be overcome by gathering the basic statistical information such as revenue and personnel amount from other resources (this would basically require an industry code of its own) and then this survey could focus more on "in depth" topics and hopefully gather a more detailed information on the Finnish software product business.

APPENDIX II: RESEARCH PROJECTS RELATED TO THE FINNISH SOFTWARE PRODUCT INDUSTRY AND OTHER INTERNET LINKS

Research projects

- § The Annual Finnish Software Industry Survey (OSKARI)
<http://www.sbl.tkk.fi/oskari/>
- § Internationalization capabilities, processes, and support mechanisms for creating successful global new ventures
<http://www.tuta.hut.fi/units/Isib/research/cgs/cgs.php>
- § Freeway to Internationally Competitive Software Product Business (FRISBEE)
<http://www.sbl.tkk.fi/frisbee/>
- § Capabilities and Infrastructure of the Software Product Industry (CAPISTUS)
<http://www.sbl.tkk.fi/capistus/>
- § Organization and Management of the Software Development Process
<http://www.sbl.tkk.fi/research/projects.html>

Upcoming research projects

- § The Emerging Field of Software Business: Laying Foundations for Research
<http://www.sbl.tkk.fi/foundations/>
- § Dynamic Capabilities in Software Product Development
<http://www.sbl.tkk.fi/research/projects.html>

Other Internet links

- § Finnish Software Business Cluster
<http://www.swbusiness.fi/>
- § Software Business Laboratory (SBL)
<http://www.sbl.tkk.fi/>
- § BIT Research Centre
<http://www.bit.hut.fi/>
- § National Technology Agency (Tekes)
<http://www.tekes.fi/>



Finnish Software Product Business 2005

This report contains the findings of the 8th national software product industry survey. The software industry survey is an annually conducted survey and the objective of the survey is to provide basic information about the current state of the Finnish software product business. The survey focuses on software product companies i.e. companies that sell software products they themselves design, develop, and maintain. The purpose of the survey is to:

- § Provide information on the software business: sales, R&D, personnel etc. since this information is not available from other sources
- § Understand the ways Finnish software product companies conduct business
- § Identify the main challenges of the Finnish software product companies
- § Identify the actions that the different public stakeholders can take in order to support Finnish software product companies



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