



HELSINKI UNIVERSITY OF TECHNOLOGY



Finnish Software Product Business: Results of the National Software Industry Survey 2007

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Olli-Pekka Mutanen, Jyrki Kontio

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Helsinki University of Technology

Teknillinen korkeakoulu

Finnish Software Product Business: Results of the National Software Industry Survey 2007

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FOREWORD

This year marks the 10th anniversary for the survey of the software product-based industry in Finland. Again, as quite consistently over the last 10 years, the industry is growing steadily. This survey, complemented by other studies and the insights of industry insiders, has helped the industry to define strategies and directions to support the growth of the industry.

The software product industry in Finland shows signs of maturing. This is reflected in our study through more balanced R&D spending, focus on development of complementary services and products, as well as focus on improving personnel competencies and internal operations. The software firms in Finland are more capable, more focused, and more internationally competitive than ever.

There is one common downside to more mature industries: the growth rate tends to decline. While the growth rate of the Finnish software product-based industry remains quite high, the revenues are not growing at a rate that is needed for the industry to become a prominent sector of the economy. In particular, the international sales are a cause for concern: they grew at “only” less than ten per cent per annum. While this is higher than the global ICT growth, it is less than the growth of the domestic software business. It is also way short of the industry’s target growth rate of over twenty percent per annum.

On the one hand this is puzzling. The foundations for competitiveness are in good shape. Finland has skillful workforce, good international reputation, and plenty of technological know-how. Regarding the weaknesses – lack of experience in international sales and markets, lack of capital funding, and resource and competence gaps of small companies – these have been addressed by several focused development programs. While software product industry in Finland is a prime example of joint focused planning and action to support the industry, and these actions have clearly helped the industry, the substantial growth impact has been less than targeted. Further, some benchmark countries such as Ireland and Israel have been even more successful.

We suspect that there are real impediments for higher growth beyond the factors addressed by existing programs. Factors that may contribute include the taxation system, societal attitudes toward risk taking and entrepreneurship, the social consequences of failure, the environment for international investment in software firms, the management approaches of venture capitalists, the business sophistication of entrepreneurs, the targets and level of government research funding, and others. There should be a great payoff in further understanding any remaining obstacles and taking actions to overcome them.

The global software industry is continually undergoing change and addressing new challenges, creating great business opportunities for Finnish firms. The current “convergence of convergences” will make the world more online, more mobile and more dependent on software of all kinds. Not only is this a great opportunity to create economic activity and jobs, but Finland needs to support and expand its successful software industry to take full advantage of these convergence opportunities.

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LISÄÄ KASVUHAKUISIA OHJELMISTOYRITYKSIÄ

Suomi on teknologioiden luvattu maa. Meiltä löytyy osaamista ja koulutettua työvoimaakin vielä toistaiseksi. Mutta miten jatkossa voimmme olla maailman halutuimpien teknologioiden suosikkimaa ja houkutella eri alojen osaajia ja sijoittajia maahan?

Tarvitsemme lisää kansainvälistyviä ohjelmistoyrityksiä, joilla on riittävästi halua ja kykyä kasvaa kansainvälisiin mittoihin ja luoda innovatiivista liiketoimintaa. Suomi tarvitsee tulevan kilpailukykyä säilyttämiseksi alan innovaattoreita ja pellepelottomia, jotka osaavat yhdistää uutta teknologiaa tutuksi tulleisiin tuotteisiin ja palveluihin ennennäkemättömällä tavalla.

Suomen ongelma tällä hetkellä on, että meillä on kyllä hyviä ohjelmistoyrityksiä, mutta joko halua tai rahaa kasvaa ei ole riittävästi. Suomalaisen ohjelmistoliiketoiminnan liikevaihto kasvoi 13 prosenttia viime vuonna ja oli yhteensä 1,4 miljardia euroa. Kotimaisen liiketoiminnan osuus oli yli 60 prosenttia. Huomioitavaa on se, että suurin osa yrityksistä on pieniä tai keskisuuria yrityksiä. Ohjelmistoyrityskartoituksen mukaan Suomessa on tuhat alan yritystä, mutta lähes puolella näistä yrityksistä liikevaihto jää alle 300 000 euron. Valtaosa on alle viiden hengen yrityksiä.

Suomeen tarvitaan aggressiivisen kasvun ohjelmistoyrityksiä, jotka hakeutuvat kansainvälisille markkinoille. Tähän tarvitaan monien eri alojen osaajien apua. Ensimmäisenä kasvun vauhdittajana on tietenkin halu yrittää. Suomen tulee nostaa yrittäjyyden arvo sille kuuluvalla tasolla. Yrittämisestä on tehtävä haluttu vaihtoehto lahjakkaille henkilöille.

Toiseksi yrittäjyyttä on tuettava erilaisin keinoin, joista yksi on rahoitus ja sen riittävyys. Kansainvälistyminen vaatii rahoittajilta sitoutumista ja pääomaa. Pääomasijoittajien tarve kasvaa. Myös yksityistä pääomasijoittamista olisi tuettava verohelpotuksin. Yhtiöiden listaaminen esimerkiksi pörssiin on tehtävä helpommaksi ja yksinkertaisemmaksi kuin mitä se on tällä hetkellä. Hyville ohjelmistoyrityksille on saatava toimivat markkinat, jotka entisestään rohkaisevat uusia liiketoiminnan kehittäjiä eteenpäin. Lontoon AIM -markkinapaikan kaltainen listaus olisi oltava mahdollista myös Suomessa. Kevyt raportointivelvoite ja sijoittajien verohelpotukset lisäävät kiinnostusta toimialaan.

Jotta ohjelmistotuotealasta kasvaa Suomen uusi tukijalka, kasvun tukeminen vaatii myös panostusta osaamiseen. Uusi innovaatioylijipistoaloite on yksi konkreettinen esimerkki, mitä koulutuksen puolella on tehty. Teknologiateollisuus on vahvasti sitoutunut hankkeen edistämiseen, koska poikkitieteellinen osaaminen ja koulutus ovat tulevaisuuden kilpailukykyyn rakennusaineita.

Tarja Virkala

viestintäjohtaja

Teknologiateollisuus

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FOR THE READER

This report presents the results of the tenth annual Finnish software product industry survey. This research study, which to our understanding is the only one addressing the software product industry as a whole, is used to assess the current state of the industry, especially in terms of growth and internationalization.

The study was implemented as a mail and web based survey and covers roughly one third of the estimated one thousand software product firms in Finland. The survey was implemented in several stages between April and July 2007, and data analysis was carried out between August and October.

During 2007, the sampling strategy for the study was changed as to cover the whole industry more thoroughly. The improved coverage of the sampling frame to better include the companies of smaller size, as well as more rigorous data collection process, resulted in almost doubling the amount of respondents, as compared to the previous year. Generally, this is a merit for the study, but when one of the objectives is to compare the results between different years, it creates a challenge with comparability of the results. Contrary to the previous studies in this series, this study is not biased towards the larger companies but presents true cross section of the industry. Due to smaller bias in regarding the size of firms, the distribution of the respondents is different and this should be kept in mind when interpreting the results.

In all, the software industry grew approximately 13.1 % and generated 1.41 billions of euros in revenue. The domestic revenue was estimated to have grown 15.3 % to 894 million euros, and the international revenue grew 9.8 % resulting in 514 million euros. The outlook of the industry remains positive, but the rate of growth is expected to decline. The firms consider improving service organization and internationalization as the most important development areas, and seek external financing mainly to facilitate international growth.

This years report consists of three sections, of which the first one functions as a standalone executive report. The second and the third section focus on the composition and development of the software product business in Finland. Finally the body of the report ends with conclusions. The structure of the appendixes has been revised for this year. The new appendixes give a thorough explanation of how the study was conducted and give further analysis of the quality of the findings. The purpose of these additions is to improve the quality of the report while maintaining the readability of the findings for non-research oriented audience.

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SECTION 1: OVERVIEW OF THE FINNISH SOFTWARE PRODUCT INDUSTRY

1 THE FINNISH SOFTWARE PRODUCT INDUSTRY: CURRENT STATE AND FUTURE PROSPECTS

1.1 Introduction

This report presents the results of the tenth annual Finnish software product industry survey. This research study, which to our understanding is the only one addressing the software product industry as a whole, is used to assess the current state of the industry, especially in terms of growth and internationalization.

Software product industry is a challenging industry for survey research due to the pervasive nature of software: software is a key component of many modern technology products, and can be also used as an integrated element when producing services. It has been argued that the software product industry should not be studied in isolation, but as combination with other information product industries (Seppänen, Käkölä, Pitkänen, Sulonen, & Sääksjärvi, 2001).

In this study, we did not attempt to explicitly define the boundaries of the industry; rather, we contacted a large set of firms in the focal and adjacent industries, and measured the amount of software product business done in these firms. This implicit approach suits studies where the population to be surveyed is not known prior to the study. In this study, we defined software product business as follows:

Software product business is business based on selling software owned by the company either as licenses or as services, and all other services which are tightly linked to this business.

With this approach, we hope to capture the multitude of software product businesses in Finland, and especially to address firms that do not consider themselves as software product firms, but practice software product business as a secondary area.

1.2 Implementation of the Survey

The survey was conducted during May-June 2007 using paper and web form questionnaires. Invitations to participate in the survey were sent to 2 616 companies, which were selected from a database compiled for this study survey. It is estimated that there were 1000 software product companies in Finland at the end of 2006. We received responses from 287 (184 in 2005¹) software product companies i.e. from ca. 29 % of the companies in the industry. The collection of primary data was complemented with secondary data from public sources, which enabled us to estimate the size of the industry regardless of not getting responses from some of the largest firms. Altogether, we estimate that the companies analyzed in this study generated over 77 % of the whole industry's revenues and over 84 % of the international revenues. Based on our analysis², we conclude that the results of this research study well represent the Finnish software industry in general. However, due to missing answers, some analyses were performed with a subset of the responses. The amount of data used is clearly described in the tables and figures. The methodology, sample selection, data collection, and analysis and estimation techniques as well as the different sources of secondary data are described in Appendix 1.

This year, the sampling strategy was changed to get a better coverage of the smaller firms. Larger sampling frame and including email and letter contact for each firm resulted in larger sample, which is generally a positive factor for survey studies. However, the response rate did not increase evenly

¹ Figures for year 2005 include firms which did not respond to the survey but for which secondary data was available. For this year, only real responses are reported in this figure.

² See Appendix 2 for analysis of the reliability and validity of the results.

throughout the population, but focused more on the previously underrepresented smaller firms. As a result, the distribution of this year's sample is different from previous years. Naturally, this affects also several of the result figures in the study. Statistical techniques have been used to make the samples more comparable. However, several of the results are affected by this change in the design causing some of the results to be incomparable to previous years. It is clearly indicated when this is the case. The sampling strategy is described in Appendix 1.

1.3 Overview of the Results

1.3.1 Industry Total Revenue

Companies were asked about their revenue for the latest completed fiscal year, which in a majority of the cases closely match the year 2006, and their budgeted revenue for the next year. In addition, respondents were instructed to describe how their software product business revenue is divided between domestic and the international markets. Based on responses, we extrapolated the overall value of the industry and its distribution between domestic and international sales in the following way. The industry size was estimated by first stratifying the sample according to revenue class, after which all firms in the largest strata that had not reported revenue figures were checked from secondary data. The rest of the strata were estimated by calculating the average figures from the respondents falling in each stratum and using a linear extrapolation method to estimate the total amount of revenue generated as explained in Appendix 1.

In 2006 the overall value of the industry, in terms of generated revenue, was 1 408 million euros and the value of exports was 514 million euros. It is worth mentioning that the revenue generated by the 51 largest companies alone was 1004 million euros of which 481 million euros came from exports. Thus, over 93% of the export came from the 51 largest companies.

Table 1 Industry Composition³

<i>Revenue class</i>	<i>Number of firms analyzed</i>	<i>Average revenue</i>	<i>Average age</i>	<i>Average number of employees</i>	<i>Estimated number of firms in class</i>
< 0.4 M€	128	0.15 M€	9.6	4	522
0.4 - 3 M€	111	1.0 M€	10.4	12	351
3 - 10 M€	51	5.4 M€	11.6	44	87
10 < M€	25	132 M€	15.7	1172	40
Total	315				1000

The software product revenues grew by 13.1 %⁴ in 2006 (9.2 % in 2005) reaching 1.408 billion euros. The estimated growths in domestic 15.3 %² (1.4 %) and international sales 9.2% (24.4%), although substantially different from the estimates in last year's study, does not significantly differ from the long term trend amounting to 894 million euros for domestic revenue and 514 million euros for international revenue. The development of the industry revenue is presented in Figure 1. Since the figures prior to this year were calculated using a different estimation approach, they are not directly comparable to this year's figure.

³ This figure shows total revenue instead of revenue from software product business. Total revenue was used because data for this figure was available from public sources and it was hence possible to classify non-respondent firms as well.

⁴ See Appendix 2 for further analysis.

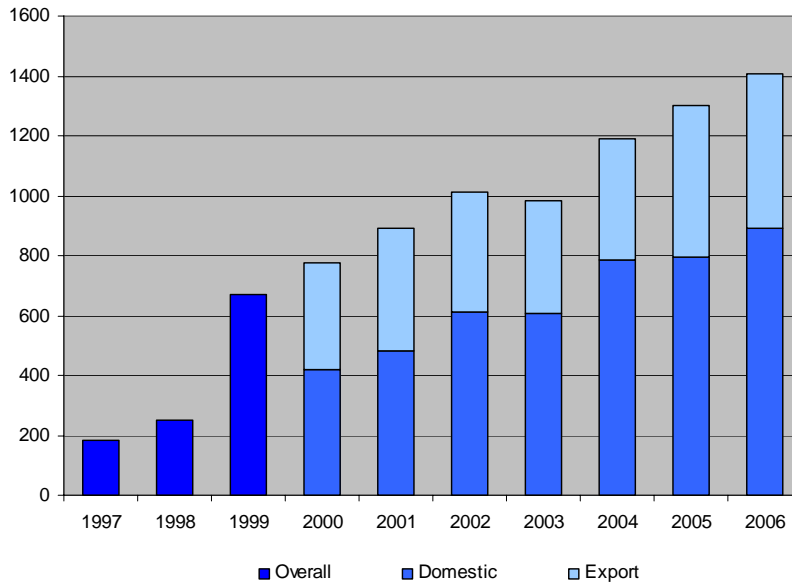


Figure 1 Development of the Revenue at the Industry Level from 1997-2006

Revenue growth rates are presented in Figure 2. Possible explanation for the variation in these figures over the years may be a result of statistical error or anomalies, such as extra ordinary events in the data rather than real changes in the industry⁵.

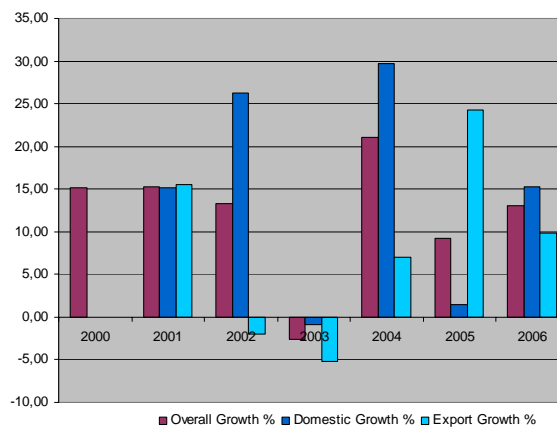


Figure 2 Revenue Growth Rates 2001-2006

Figure 3 shows the budgeted figures that are the estimated values of the industry (based on the responding companies) given in the software industry survey the previous year. From the figure we can see a trend showing that the companies' budgeted revenues have increased for the past four years, but the growth estimates have decelerated this year. As actual revenues have followed the budgeted figures, this predicts a slight growth also for the year 2007, but the growth rate may become slower. We can also see from Figure 3 that changes in the economic situation after the year 2000 have also made the companies more realistic in estimating their growth prospects in the recent years. Quite naturally young and small firms expect growth, but other than that, there are no statistically significant differences of growth expectations when comparing different age or revenue classes, or past growth.

⁵ See Appendix 2.

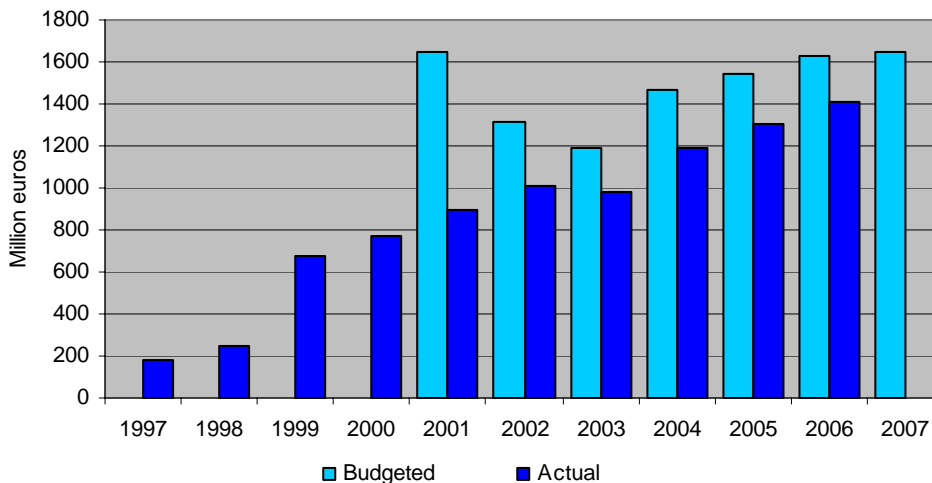


Figure 3 Development of the Revenue (Budgeted and Actual) 1997-2007

The analyzed software product companies had an average total revenue of 11.1 million euros (16.9 million euros in 2005) and a median revenue of 0.6 (0.9) million euros in 2006. The average software product business revenue was 3.92 (4.1) million euros and the median revenue was 0.35 (0.5) million. The difference between the averages and medians is explained by the number of large companies that raise the average figures upwards. Also, this year's lower figures can be explained by current survey's better coverage of smaller companies than in previous years. As can be seen by studying the medians, most of the companies are relatively small. Distribution of the responding companies' total revenue in 2006 is presented in Figure 4. The large number of small companies does not directly indicate that there would be a large number of young companies in Finland. Only one in three of the smallest companies is less than five years old. In all, it seems that a large part of the industry is occupied by firms that are small, and seem to have no intentions to grow.

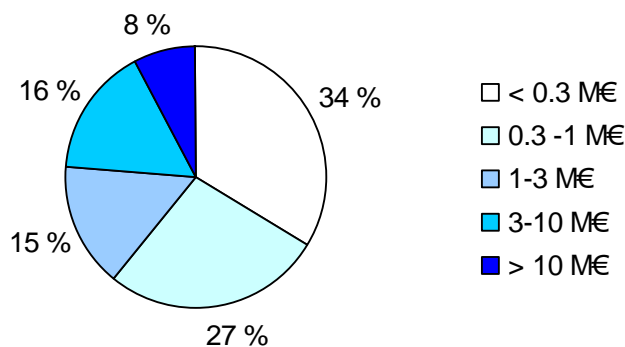


Figure 4 Responding Companies' Distribution by Total Revenue in 2006 (n=280)

In order to shed more light regarding the business focus of the respondent companies, Figure 5 shows the percentage of the companies' own software product business revenue in relation to the overall company revenue. On average, the respondents received 71 % (71 % in 2005) of their total revenue from their own software product sales and the median was 90 % (90 %). As Figure 5 shows, the responding companies' core business of this survey often was the software product-based business. This is quite understandable, since the mailing was targeted at these companies, and since these companies

are probably more eager to participate in this survey with the hopes of improving the conditions of the Finnish software product business environment.

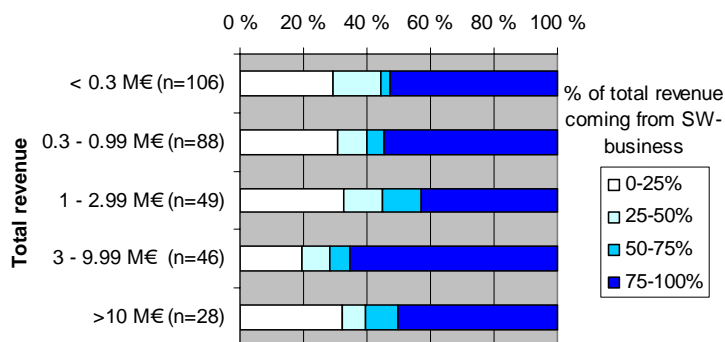


Figure 5 Percentage of Companies' Total Revenue from Company's Software Product Business in 2006 (n=275)

Figure 6 shows the distribution of the responding companies based on their revenue from the companies' own software product business. We can see that the majority of the responding companies are rather small as 38 % of the companies generated less than 200 000 euros and 71 % of the responding companies' software product business revenue (62 % in 2004) did not exceed 1 million euros in 2006.

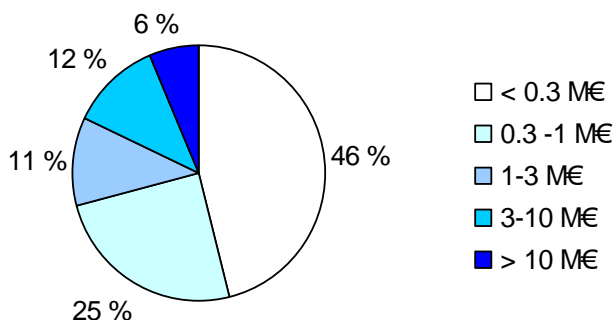


Figure 6 Responding Companies' Distribution by Software Product Business Revenue in 2006 (n=278)

The total revenue and number of employees working for the companies that responded to the survey were calculated and the resulting figure revenue per employee was ca. 110 000 euros (109 000 euros in 2005). However, the number of the large companies strongly influences this ratio. When we calculated the revenue per employee ratio as an average of the per company revenue per employee ratios, the ratio is 90 000 (87 000) euros per employee. When we studied the development of the revenue per employee ratio based on the time that the companies had been in the business, we found that the ratio was typically higher for those companies that had been in the business for a longer period of time. Regression analysis, however, revealed that age is a poor direct predictor for profitability, but this relation is mediated by the amount of revenue⁶. In other words, companies that generate more revenue are naturally more profitable, and younger companies are generally smaller than their older counterparts.

⁶ Statistical power of 1% vs. 10% with .02 and .0001 significance levels respectively

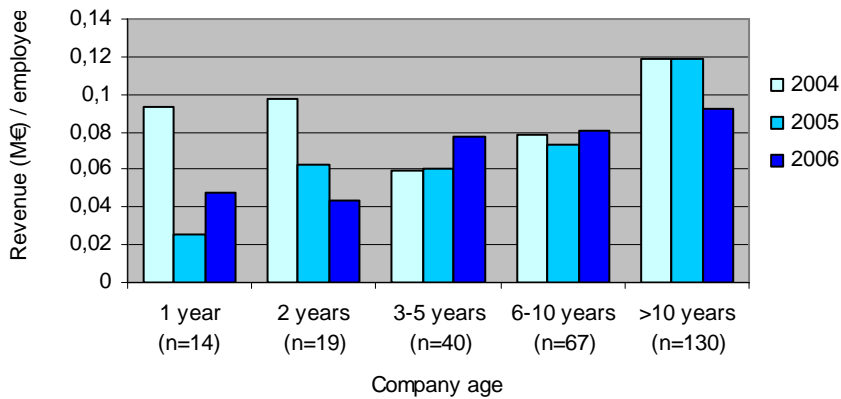


Figure 7 Development of Revenue per Employee Grouped by the Age of the Company

When we take a closer look at how the revenue collected from software product business affects the revenue per employee ratio, we can see that the companies with software product business revenue exceeding 1 million euros reach the ratio of over 100 000 euros per employee. However, regression analysis indicated that age does not explain the revenue per employee ratio. An alternative explanation, which is supported more strongly by the data ($R^2=.67$, $p <.001$), is that firms which are larger generate more revenue per employee, and older firms are larger. Figure 8 shows the development of revenue per person in the industry when mapped against the revenue of the firm. The revenue per employee is naturally strongly dependent on the amount of revenue ($R^2=.87$, $p <.001$).

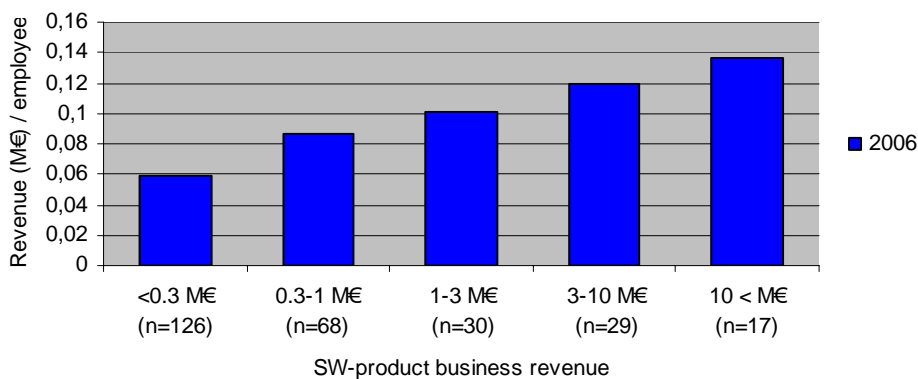


Figure 8 Development of Revenue per Employee Grouped by Software Product Business Revenue

The companies were asked about their budgeted figures for the next year and it seems that the smaller software product companies expect the fastest growth rate in their software product business revenue for the year 2006. These figures are probably caused by some individual companies who are just about to launch their products to market, but in general the amount of revenue explains only 18 % of the share of the variance in the data. However, it is worth noting that a relatively small amount of all of the responding companies answered 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 that did not see the future positively. Therefore, the figures in Table 2 should be interpreted with caution.

Table 2 Expected Annual Growth of Software Product Business for the Year 2006 (n=229)

	<i>Revenue from companies' own software product business in 2006 (million euros)</i>				
	<i><0.3</i>	<i>0.3-0.99</i>	<i>1-2.99</i>	<i>3-9.99</i>	<i>10<</i>
Amount of companies	72	58	42	31	10
Mean	23,56 %	41,12 %	31,93 %	21,32 %	7,39 %
Median	13,39 %	31,18 %	23,52 %	11,54 %	0,00 %

To complement this analysis, the growth of individual companies was analyzed by comparing data between this and previous years to see how the companies have actually grown from the year 2005 compared to their growth estimates for the year 2006. Unfortunately the number of companies for which this comparison could be made is relatively small (n=73). On average, the companies had expected an annual growth of 133 % (81 % in 2005, 161 % in 2004 and 259 % in 2003) but the actual growth was 58 % (24 % in 2005, 271 % in 2004 and 181 % in 2003). The expected median growth was 38 % (25 in 2005, 47 % in 2004 and 33 % in 2003) and the actual median growth 25 % (5 % in 2005, 7 % in 2004 and 20 % in 2003). 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 a decline in their revenue. The expected and actual medians and averages are presented in Table 3.

Table 3 Expected and Actual Growth in Software Product Business in 2006 (n=73)

<i>Annual growth in 2006</i>	<i>Revenue from companies' own software product business in 2006 (million euros)</i>					
	<i><0.2 (n=18)</i>		<i>0.2-1.0 (n=25)</i>		<i>1< (n=30)</i>	
	<i>Mean</i>	<i>Median</i>	<i>Mean</i>	<i>Median</i>	<i>Mean</i>	<i>Median</i>
Expected (in 2005)	247.7 %	72.5 %	133.4 %	66.7 %	66.5 %	29.4 %
Actual	20.2 %	12.7 %	59.3 %	22.2 %	79.3 %	38.0 %

1.3.2 Regional Distribution of the Companies

The software industry is geographically very concentrated in Finland, since 88 % of the companies are located in the proximity of technology centers and universities. In addition, 58 % of all the companies and 72 % of the large companies (i.e. companies, whose software product business revenue is over 3 million euros) are located in the capital district (Pääkaupunkiseutu). Tampere and Jyväskylä were the other districts with a minimum of 20 companies. Together, these three provinces hosted 74 % (70 % in 2006) of the responding companies. The regional distribution could indicate the reasons for “centralization” of the companies: six provinces representing the highest number of the responding companies have universities, which provide high-level technological education and technology centers in the population centre. The geographic distribution of the companies is presented in Table 4.

Table 4 Location of the Software Product Companies and Their Revenue Distribution (n=277)

<i>Province</i>	<i>Revenue from companies' own software product business in 2005 (million euros)</i>					<i>Total</i>
	<i><0.2</i>	<i>0.2-0.99</i>	<i>1-1.99</i>	<i>2-2.99</i>	<i>3<</i>	
Capital region	55	49	10	10	36	160
Tampere district	9	8	3		5	25
Jyväskylä district	11	8	1	1		21
Turku district	4	5	3		1	13
Oulu district	4	3		1	3	11
Kuopio district	2	5			1	8
Joensuu district	3	1	1			5
Lahti district	2	3				5
Pori district	1	1			1	3
Hämeenlinna district	1	1	1			3
Lappeenranta district	1	2				3
Seinäjoki district	2	1				3
Pieksämäki district	2	1				3
Kouvola district	3					3
Rauma district	1	1				2
Mikkeli district	2					2
Savonlinna district					1	1
Vaasa district					1	1
Maarianhamina					1	1
Kokkola district			1			1
Kajaani district		1				1
Kemi district	1					1
Kotka district	1					1
Total	105	90	20	12	50	277

The companies' revenue from their own software product business and their geographical distribution is shown in Table 4. From Table 4 we can see that 72 % of the companies with revenue exceeding 3 million euros from their own software product business are located in the capital district. The relatively high number of companies with over 3 million euros of revenue compared to the other companies is explained by the fact that these companies were systematically contacted if they had not responded to the survey in time. This was done in order to estimate the industry volumes more precisely.

When we take a closer look at the locations of the respondents, it is noticeable that the software companies are usually located very close to the technology centers. Despite a good infrastructure that enables telecommuting, and excellent communication networks, software product companies are still mostly located in the largest cities. The seven most popular Finnish cities, listed in Table 5, hosted 208 companies, which represents 75 % (71 % in 2005) of all of the respondents. The most popular cities were the same as in the previous year's survey. In Table 5 we present the software product companies divided into five groups according to their revenue in these seven cities. The 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 2005 (million euros)					Total
	<0.2	0.2-0.99	1-1.99	2-2.99	3<	
Helsinki	28	27	7	4	18	84
Espoo	18	13	3	3	15	52
Tampere	5	8	3		4	20
Jyväskylä	7	7	1	1		16
Turku	4	5	3		1	13
Vantaa	3	3		3	3	12
Oulu	4	3		1	3	11
Total	69	66	17	12	44	208

A possible explanation for the geographical concentration of software product companies is the importance of technology centers and universities, which often enable networking and supporting services, highly valued by the software product companies.

1.3.3 Age of the Software Product Companies

The age of the responding 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 is a large number of companies, which were founded in the late 1980's - early 1990's, as well as several companies that were founded after 1999. The average age of the responding companies was 11 years (13 in 2005) and the median age was 10 years (11 in 2005). The share of young companies (age under 3 years) is 9 % (3 % in 2005, 5 % in 2004). This year's clearly greater share of young companies is a consequence of the more thorough coverage over small (usually young) companies in the sampling frame than previous years. The age distribution of software companies is presented in Figure 9.

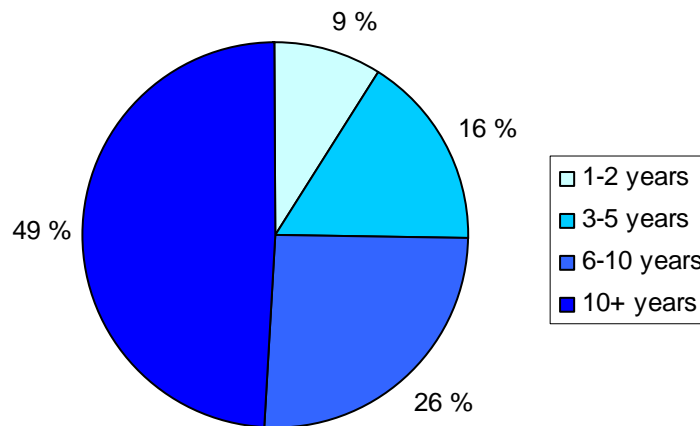


Figure 9 Age Distribution of Software Product Companies (n=312)

1.3.4 Personnel⁷

The companies analyzed in this study employed approximately 28 000 people working in 277 companies (28 091 people working in 184 companies in 2005). Most of the employees, approximately 91 % (85 % in 2005), work in companies with at least 3 million euros revenue originated from their own software product business. Out of these 28 000 employees, about 8 000 worked in software product business. When this is extrapolated to the industry level, the number of employees working in software product business was about 13 000 in the year 2006 (12 340 in 2005). This extrapolation was made in the same way as the extrapolation for the revenue. On average, there were ca. 98 employees per firm (median 7 employees) and of them 33 people were working in the software product business (median 6 employees).

When we take a closer look at the distribution of the personnel in the software product firms that responded to the survey, it can be seen that 41 % (32 %) of the companies have fewer than six employees. On the other hand, only 7 % (11 %) of the firms employ more than 100 people. As mentioned before, the large companies are overrepresented in our sample since they were systematically approached in the data collection phase of the study. Figure 10 shows the distribution of the companies' personnel.

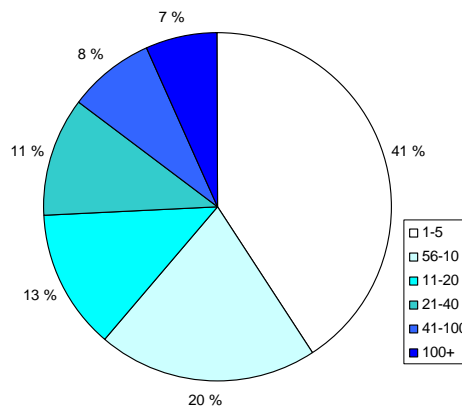


Figure 10 Distribution of Companies by Overall Personnel (n=287)

At the industry level, the total number of software professionals increased by 5.1 % from last year. The companies had a positive outlook for recruiting in 2006, as they budgeted for a 15 % increase in the software product business personnel. This growth is mainly based on the small companies' budgeted recruitment, as the larger ones estimated their personnel count will stay at almost same level in 2007. Development of the software product business personnel in 1999 - 2006 and budgeted estimates for 2002 - 2007 are presented in Figure 11.

⁷ Personnel figures are presented with the accuracy of two significant digits due to the large impact of the use of secondary data on these figures.

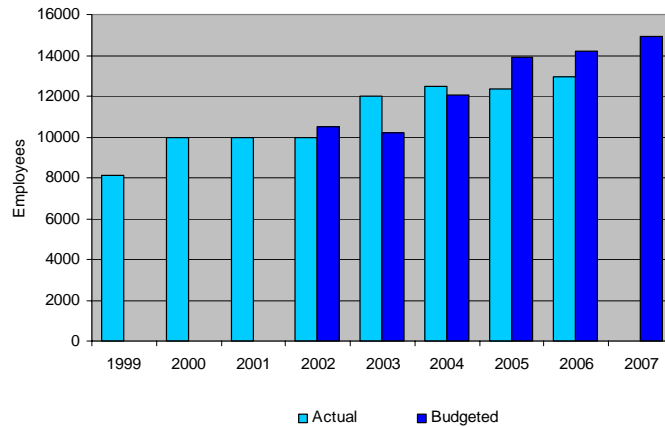


Figure 11 Development of the Number of Personnel at the Industry Level

1.3.5 Profitability

For the software product companies, 2006 seems to have been a good year. Although it is possible that this increase is attributed to the statistical error caused by more profitable companies answering this year than the previous year, it can be said that profitability probably increased slightly in the industry, Table 6 shows that 2006 was generally speaking a good year.

Table 6 Companies' Average Profits

<i>Revenue from companies' own software product business in 2006 (M€)</i>	<i>Mean</i>	<i>Median</i>	<i>Sum</i>	<i>n</i>
< 0.3	0.00	0.00	0.40	122
0.3-0.99	0.05	0.03	3.12	66
1-2.99	0.21	0.20	6.56	31
3-10	0.74	0.33	24.33	33
10 >	13.43	5.50	201.43	15
Total	0.88	0.02	235.83	267

Altogether, the companies that responded to the survey generated 235 million euros of profits (2005: 316 M€, 2004: 170 M€). Moreover, the companies with software product business revenue less than 3 million euros generated in total 10.0 (2005: 6.2, 2004: 5.3) million euros of profit. In addition, it has to be noted that 267 of 314 software product companies (169 out of 184 in 2005) reported their profits for 2006. We suspect that there is a tendency for companies doing relatively well to report their profits, although this was not analyzed in detail.

From Table 7, we can see that only 2.7 % (5.9 %) of the companies generated larger losses than 0.5 million euros in 2006. 74.7 % (54.5 %) of the companies were in the range of from 0.5 million euro losses to 0.1 million euro profits. However, around 25 % of the companies (32 % in 2005) generated larger profits than 0.1 million euros as can be seen in Table 7. This change in the figure can best be explained by more thorough coverage of the smaller companies in the survey.

Table 7 Companies' Profits in 2006

<i>Profit (M€)</i>	<i>Frequency</i>	<i>Share of firms (%)</i>	<i>Cumulative share(%)</i>
<-0.5	8	2,7	2,7
-0.51 - 0	76	25,9	28,7
0.01 - 0.1	135	46,1	74,7
0.11 - 1	57	19,5	94,2
1 <	17	5,8	100,0
Total	293	100,0	

Figure 12 presents the companies' profits in relation to their revenues (profitability) in 2006. The average profitability was 5.6 %. There were no significant differences in the profitability based on the companies' revenue sizes: the majority of the companies have remained profitable. Moreover, regression analysis revealed a somewhat strong ($\beta = .15$, $p < .05$) relationship between the amount of revenue from software product business and total profit, but adding the total revenue as control variable revealed it to be 8 times stronger and statistically more significant ($p < .001$) predictor for profitability. Hence, we cannot conclude that the amount of software product business does have a direct effect to company profitability.

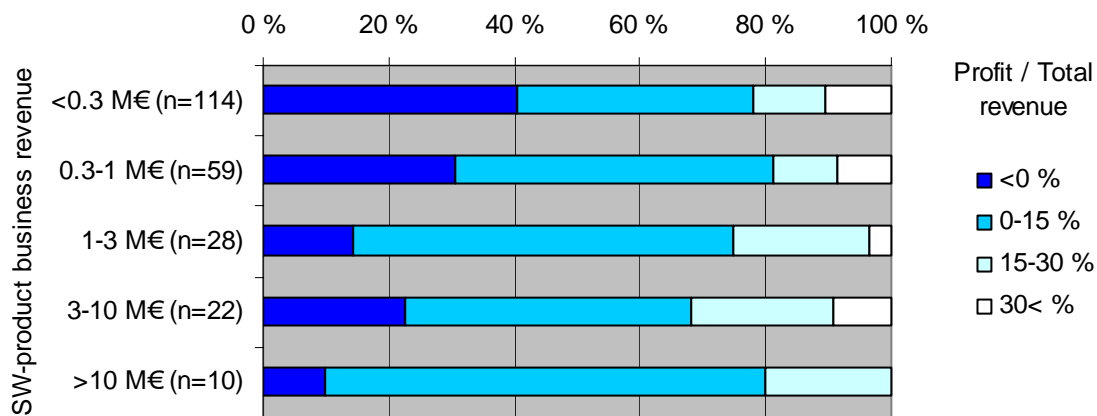


Figure 12 Companies Profit per Revenue (n=233)

1.3.6 International Operations

Overall, 150 (48 %) of the 313 firms had some revenue streams from foreign markets in 2006, and thus can be considered as operating internationally. This represents a significant decrease from the 59 % reported a year ago (46 % in 2005). This decrease can be attributed solely to the better coverage of the industry by this year's study when compared to the previous years. Firms in the largest two revenue classes are significantly more international than other firms ($p < .001$), and the smallest revenue class is significantly less international than other classes ($p < .015$). This year, the sampling strategy resulted in a sample that represents the whole industry better⁸. This year data seems to indicate that the industry was thought to be more international than it actually was.

The distribution of internationally operating firms, as well as the distribution of their foreign revenue share, is presented in Figure 13. 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. In fact, 28 % of the

⁸ See Appendix 2 for analysis of the reliability and validity of the study

responding internationalized firms had 5 % or less of their revenue coming from abroad. On the other hand, almost one fifth of the firms generated 75 % or more of their revenue abroad. The share of firms receiving 25 to 75 % of their revenues from abroad decreased slightly from last year (27 %) to 25 %.

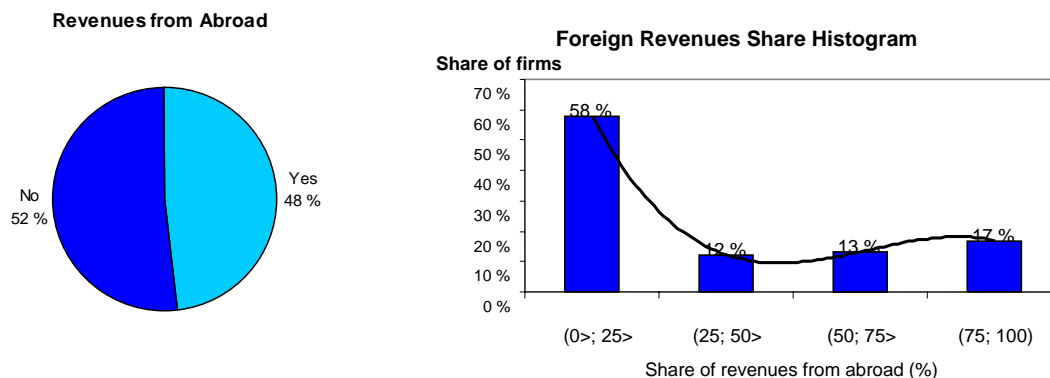


Figure 13 Firms with Revenue from International Operations ($n_1=313$ and $n_2=106$)

1.3.7 Profile of Internationally Operating Firms

The basic indicators of international operations and their averages from 2006 and 2003 for responding internationalized firms are presented in Table 8. The average number of foreign markets targeted in 2006 was 9.9. This represents a significant growth in geographic coverage, as the corresponding figure was just 6.84 in 2003. Last year, the corresponding figures were 7.8 and 3.9. Also the median number of export countries had grown significantly: from 1.5 export countries in 2003 to 4.0 in 2006. The corresponding figures from the year 2005 were 1.5 and 3.0. This indicates that software product firms are internationalizing roughly at the same pace as before but this year's sample consists of relatively fewer internationalized companies than the one last year.

Probably the most important internationalization indicator, the share of foreign revenue, shows that on average 33 % of revenue (23 % in 2003) was generated abroad in internationalized software product companies. However, about a half of the firms gained only 15 % or less of their revenue from international operations. Hence, the corresponding median is 16 percent units lower, at 17 %. Also, the median for export share in 2003 was just 5 %. The figures indicate a significant increase in the share of foreign revenue among the sample firms during the last three years both in terms of mean and median figures. These average numbers do not differ much from last year's results. The mean shares of revenues from abroad last year were 33 % in 2005 and 21 % in 2002, and the corresponding medians 20 % and 5 %.

On average, internationalized firms had employees in 2.0 countries excluding Finland and 55 % of the firms did not have any employees abroad. A little less than one quarter of the effort by employees (including those based in Finland) focused on export business. Again, the corresponding median value is only 5 % (2 % in 2003). The strong increase since 2002 suggests that many companies today assign significantly more employees to foreign operations than they did three years ago. However, these figures are almost an exact match to those in last year's sample. 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 8 Indicators of International Operations

<i>Indicator</i>	<i>2006</i>			<i>2003</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	9.9	4.0	110	7.0	2.0	63
Share of revenues from outside of Finland (%)	33 %	17 %	106	23 %	5 %	62
Share of revenues from own SW product business from abroad (%)	29 %	13 %	109			
Number of countries where company had employees, excl. Finland	2.0	0.0	97	2.0	0.0	55
Share of employees focusing full-time on foreign operations (%)	24 %	5 %	71	17 %	2 %	39

A comparison of some key descriptive statistics between internationally and domestically operating companies is presented in Table 9. The average total revenue of internationalized firms was 22.5 million euros in 2006. 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 almost five times bigger than the average domestic software company. The findings are close to those from last year's results. Last year the average total revenue for an internationally operating firm was 25.5 million euros. There is a large difference in domestically operating firms' average total revenue when compared the 5.2 million euros reported last year to this year's 0.8 million euros. Also, the median dropped 33% from 0.3 million to 0.2 million this year. Again, this can be attributed to the better coverage of the sampling frame used in the study.

All mean values are greatly influenced by some large companies' figures. For instance the average profitability of internationalized companies in 2005 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 differences in most 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 stronger growth during the next three years. On the other hand, they may be less profitable as domestically operating firms, which yet again tells about the risky nature of internationalization.

Table 9 Profile of International vs. Domestic Firms in 2006

<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>
Total revenue in 2006 (M€)	22.5	1.4	141	0.8	0.2	140
Predicted growth rate 2006-2007	32 %	20 %	101	26%	17 %	112
Proportion of revenues in 2006 from own SW products	73 %	96 %	138	69 %	90 %	136
Age of company	11.8	11.0	149	8.9	7.0	163
Number of employees in 2006	204.1	18.0	140	8.5	4.0	148
Profit in 2006 (M€)	1.7	0.07	135	0.05	0.009	132
Profitability (%)	3.8 %	6.4 %	118	7.2 %	4.0 %	131
R&D per revenue in 2006 (%)	25 %	18 %	106	24 %	15 %	120

1.3.8 Product Development

Figure 14 shows the medians of R&D investments according to the maturity of the software product business. The young companies (age of software product business 2 years or less) R&D investments dropped dramatically from last year. However, this may be explained mainly by a different respondent group composition. In year 2005 this group had only 10 companies but this year we have 28

respondents. In general it may seem that the R&D investments show a slightly descending trend in last five years. However, if we disregard the results from 2006 and 2001, the trend seems to be stable. These changes can be attributed to methodological differences between the years 2001, 2006 and the four years between them⁹.

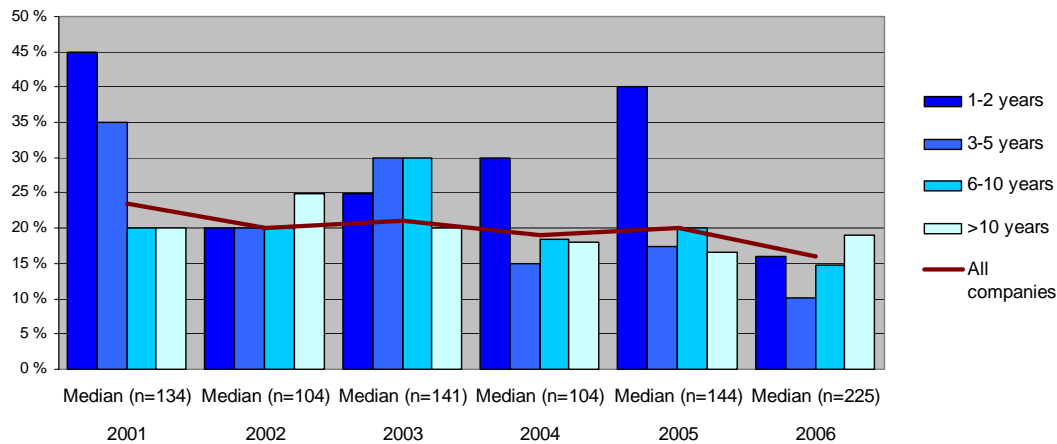


Figure 14 R&D Investment (% of total revenue) According to the Maturity of the Software Product Business in 2001-2004

1.3.9 Improvement Areas

In this survey, we asked about twelve possible improvement areas that companies can focus on in the next three years, as presented in Figure 15. The companies were asked to assess the importance of each improvement area on a 7-point Likert scale. 82.7 % of companies thought that “further development of existing products” was an extremely or very important. Next was “personnel competence development” at 68.2 %. Moreover, *the development of value added services around main product* was the third most important area with 61.5 % rating it very or extremely important. It is also interesting to note that only around 30 % of the companies rated *totally new product development* or *acquiring financing* as very or extremely important improvement areas.

⁹ A different sampling strategy has been used for the studies that described the industry in 2001 and 2006. This result is further analyzed in Appendix 2.

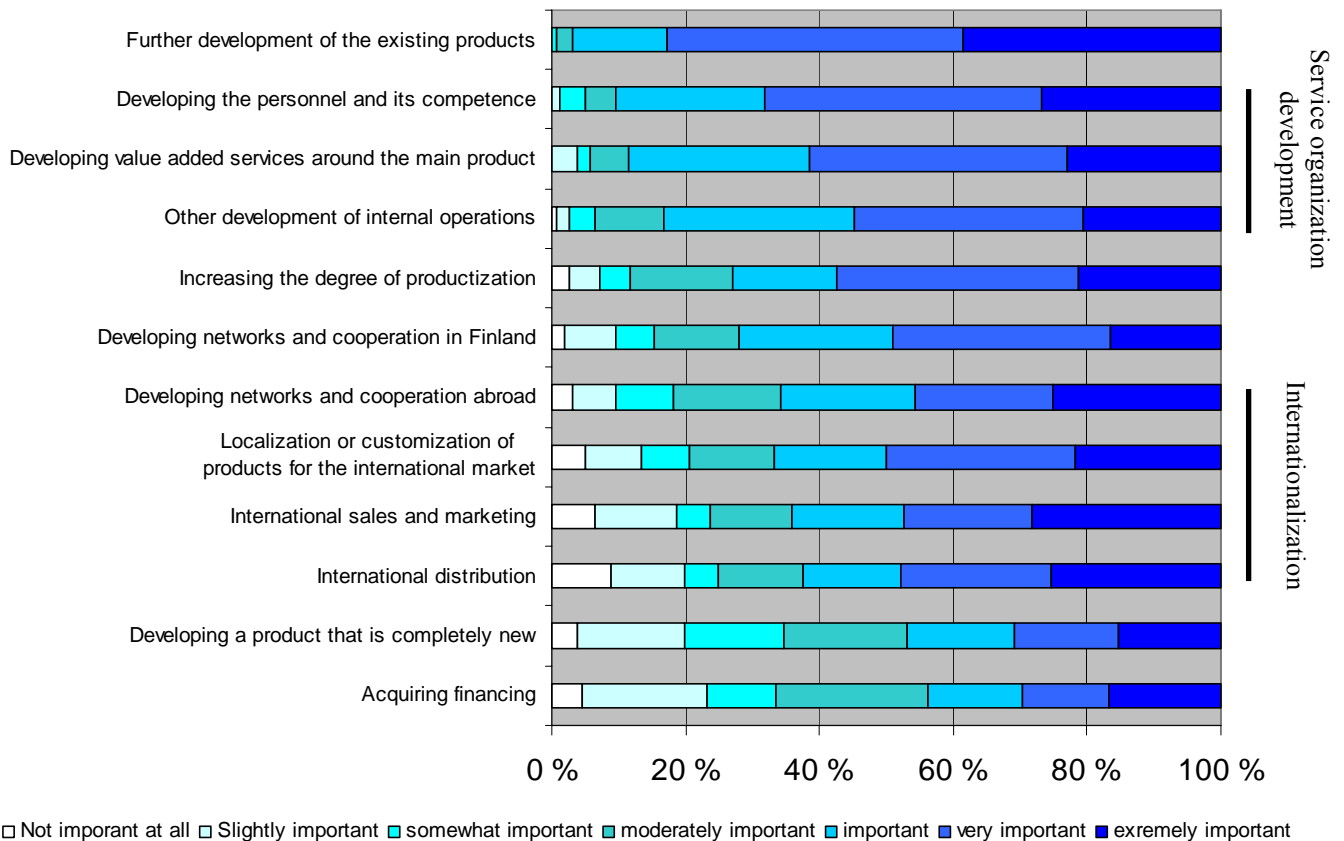


Figure 15 Most Important Improvement Areas 2007-2009 (n=155-157)

The data presented in Figure 15 was analyzed using factor analysis to see what if the items form groups that would be jointly explained by one factor. Two factors labeled “internationalization” and “service organization development” were discovered. To analyze what kinds of firms focus on these factors, we formed summated scores ($\alpha=.92$ and $\alpha=.75$) and used regression analysis to see if the age, degree of productization or firm size explained what firms focus on. We found a significant ($p < .05$) relationship between the firm size and internationalization efforts ($\beta=.55$), but no other significant interrelationships for these factors. Larger firms focus more on internationalization than smaller firms.

Size of the company affects the responses significantly ($p < .001$). Outside the effect of the internationalization factor, we found that smaller companies consider *networks in Finland* and *acquiring financing* clearly more important than larger ones. *Improvement of personnel knowledge* was also an important improvement area for the larger companies. Despite the company’s size in general, the most important improvement areas seemed to relate to the very fundamentals of the software product business i.e. *further development of existing product* and *increasing the degree of productization*. The mean values of answers by the size of the company are presented in Figure 16.

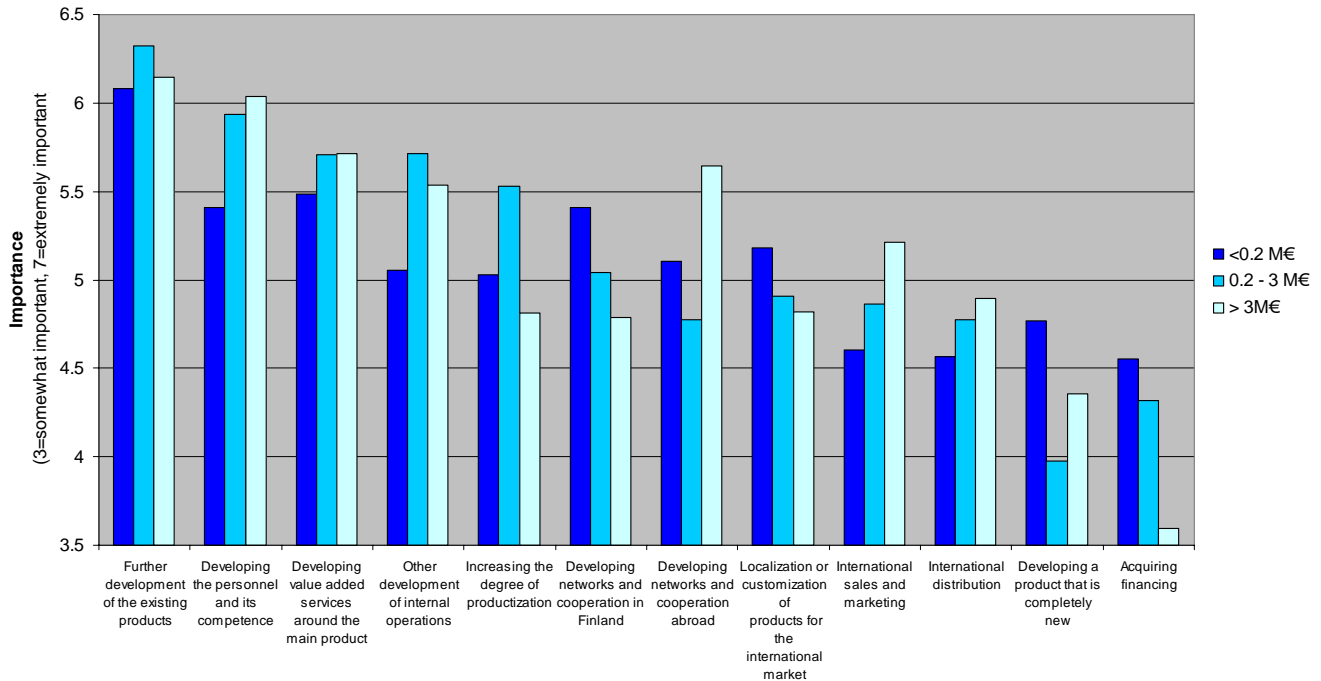


Figure 16 Mean Values of the Importance of Improvement Areas 2006-2008 Grouped by the Software Business Revenue (n=140-142)

We also studied how a company's age affected the importance of the improvement areas. As expected, the youngest companies saw *acquiring financing* and a *new product developing* as far more important than the older ones. Somewhat unexpectedly, younger companies also emphasize the importance of *localization for international markets*, *international sales and marketing*, *international distribution* and *network development abroad* as remarkable more than the older companies. However, this finding is not statistically significant (.82) and can hence attributed to the statistical error caused by relatively small number (N=2) of firms in the youngest group. In Figure 17 we can see a clear difference in importance between the youngest group (1-2 years) and the rest, but surprisingly there is not a big divergence among the other age groups.

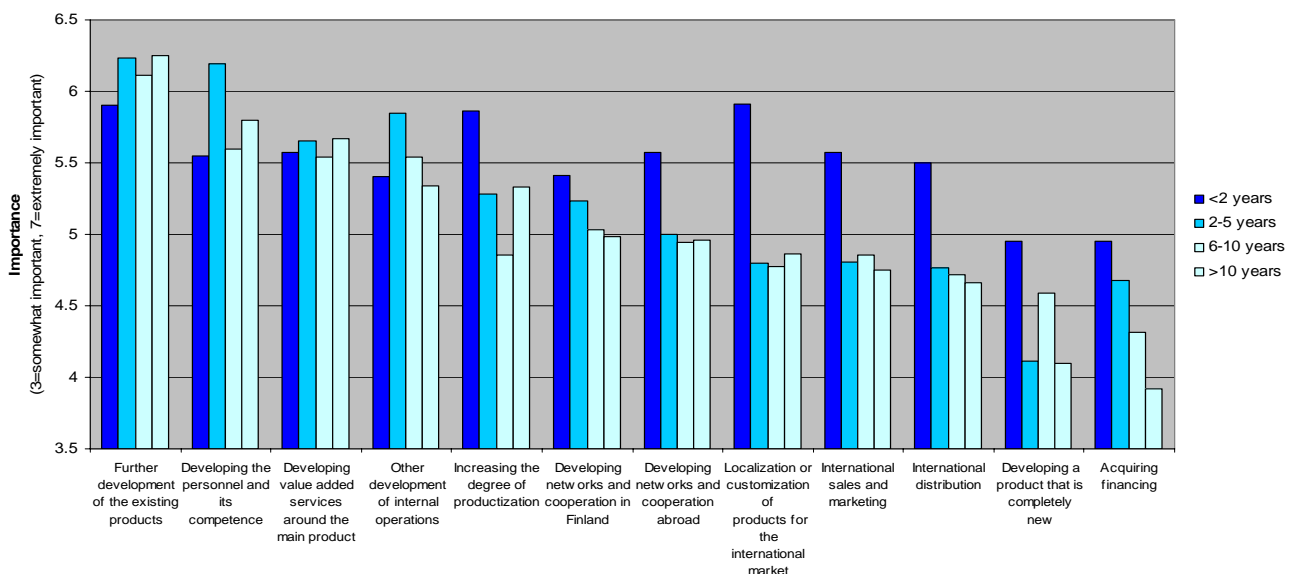


Figure 17 Mean values of the Importance of Improvement Areas 2006-2008 Grouped by the Age of the Company (n=154-156)

1.4 Conclusions

This summary report of the results of the tenth national software industry survey clearly communicates one message: the software industry grows and internationalizes, but does not surprise. What we find more interesting is the composition of the software product industry. When comparing this study to the previous studies we present a somewhat different picture of the industry in terms of the average size and growth orientation of the firms.

Compared to previous studies the sampling strategy and analysis of non respondents was more systematic, and as a result we now have data from the previously little covered segment of smaller software firms. In addition, based on our analysis, which is presented in Appendix 2 of the main report, the distribution of the firms in our sample closely matches that of the population. It seems that the software industry, if considered through the number of firms, is dominated by very small businesses. In addition, not all of these smaller firms are start-ups, but established firms. A more detailed analysis shows that a large amount of these firms fall into two categories: small firms that produce software products to support their main business, or firms that offer a very specialized product for a niche market. A typical example of the first category is a media house that produces its own web publishing platform.

Some interesting issues were also found when examining the minority of the industry that corresponds to the stereotype of growth firms in software product business. It is clear that Finnish firms grow through internationalization. Also, the willingness to acquire external financing was clearly dependent on internationalization efforts. Based on these findings, it does not come as a surprise that most of the fastest growing companies were financed through private venture capital. Hence, we conclude that the product development oriented funding by Finnish governmental bodies could improve the growth of the industry more if the focus was widened from product development to internationalization. This argument is supported by the fact that investments from the public sector do not significantly affect the growth rate of firms.

SECTION 2: COMPOSITION OF FINNISH SOFTWARE PRODUCT INDUSTRY

2 CHARACTERISTICS OF THE BUSINESS

2.1 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 product development methods used by the Finnish software product companies, we asked them various questions related to e.g. development, end-users, and product development investments. In the following sections we present our findings regarding e.g. composition of the sales revenues, revenue models, use of open source components, sales channels, and delivery methods.

2.1.1 Composition of the Sales Revenue

The companies were asked about the composition of their sales revenue from their main product. We asked how their revenue was divided between the following categories: software license sales or renting; customization, integration and software development projects; customer installation and implementation; user training; maintenance, updates and support; and other. Figure 18. shows the mean values of for the reported percentages for all respondents. From this figure, we can see that on average 47 % (49 % in 2005) of the sales revenue came from licenses. Customization and tailoring accounted for the second largest amount, 23 % (22 % in 2005) of the revenues. Installations accounted for 7 % (14%), maintenance for 11% and user training for 6 % of the customer revenues as a whole.

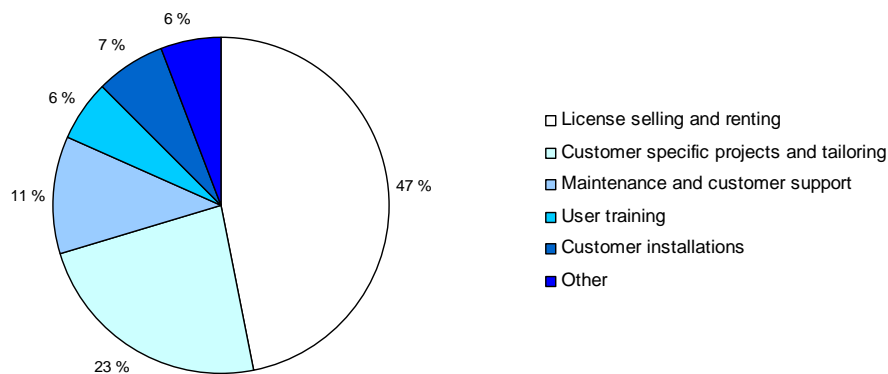


Figure 18 Composition of a Typical Customer Sales Revenues of the Main Product (n=251)

Figure 19. shows the main product's composition of software product sales in 2006 according to the software firms' own software product business revenue. License sales make up from 36 % to 53 % of the typical delivery of the software products.

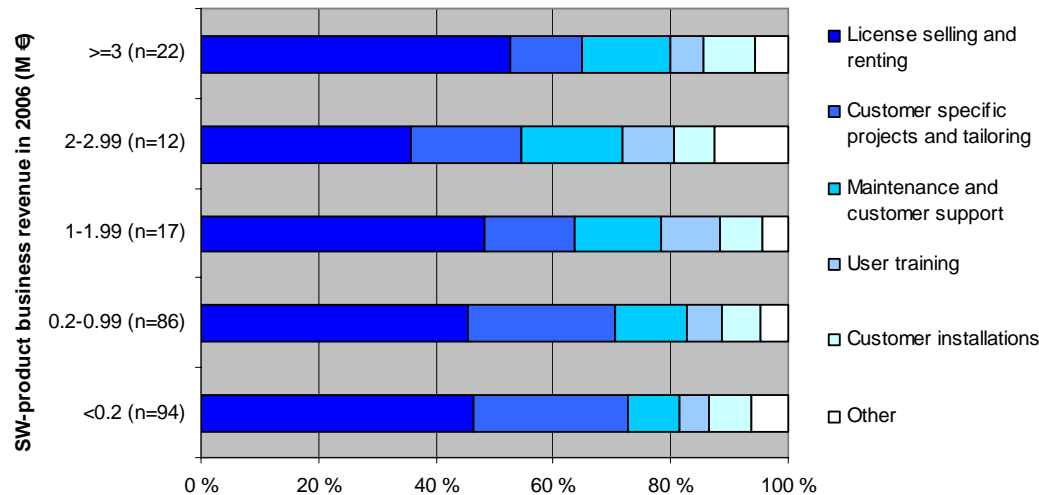


Figure 19 Composition of Business Revenue According to Software Firm’s Size

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 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 software product and services companies find it difficult to divide their sales revenues into the above-mentioned categories, i.e. the line between the products and services has become more blurred.

2.1.2 Sales Channels and Product Delivery Methods

We asked the companies what different sales channels they preferred to use in their main software product sales and how the actual product was being delivered. As in previous years, again the most common way of reaching the customer was through software firms’ own direct sales. Internet distribution, and resellers and agents were the second most popular sales channels. When compared to last years study, there are no significant changes in the use of channels. Internet distribution was included this year, so no data is available for comparison. The other sales approaches were seldom used, as can be seen from Figure 20.

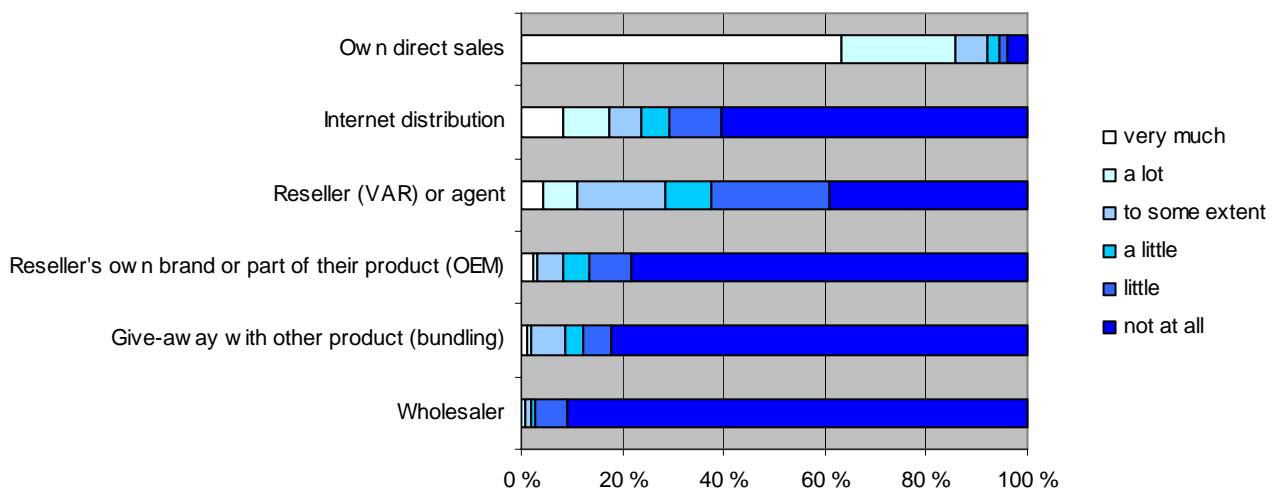


Figure 20 The Different Sales Channels and Their Usage (n=257)

2.1.3 End-Users and Market Segments

We asked the companies to identify their main product's typical end-users. We categorized the different end-users into six groups according to their size and whether they were organizations or consumers. The categories were 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 firms' products are sold to enterprises and to the public sector, and few software products are solely targeted towards the consumers. In the previous years, only from 5 % to 10 % of the Finnish software companies have responded that they target consumers as the typical end-users of their products. This year's result with 9 % of 244 companies targeting private consumers is not different. From Table 10. we can see that the share of micro enterprises was not much higher. It has to be noted that since one company can (and usually does) have customers in more than one customer segment, the overall sums of the percentages in individual columns in Table 10 can reach over 100 %.

Table 10 End-Users in Different Market Segments

<i>End users</i>	<i>Revenue from companies' own software product business in 2006 (million euros)</i>				
<i>End-user</i>	<i>< 0.2</i>	<i>0.2-0.99</i>	<i>1-1.99</i>	<i>2-2.99</i>	<i>3 <</i>
Micro enterprise	16%	10%	0%	8%	8%
Small enterprise	45%	40%	39%	50%	25%
Medium enterprise	47%	55%	39%	42%	38%
Large enterprise	40%	57%	39%	83%	75%
Public sector	25%	35%	44%	33%	42%
Private consumer	12%	7%	0%	17%	8%
Number of cases	102	88	18	12	24

2.1.4 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, 43 % (68 % in 2005) of them release a new version without a pre-defined cycle. In the case of the larger companies (software product business revenue more than 0.2 million euros), 30 % (35 % in 2005) of them indicated that their version releases were not based on a pre-defined cycle. 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 the customers' needs. Popularity of basing the release of the new versions on a fixed, predefined schedule has decreased from last year as 45 % (54 % in 2005) of the larger companies responded doing so. The version release basis of the respondent companies is presented in Table 11.

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

<i>Release cycle</i>	<i>Revenue from companies' own software product business in 2005 (million euros)</i>	
	<i>< 0.2 (n=73)</i>	<i>0.2 < (n=102)</i>
	<i>% of responses</i>	<i>% of responses</i>
In every customer delivery	11.0 %	7.8 %
Without a pre-defined cycle	42.5 %	30.4 %
Based on the customer need	45.2 %	38.2 %
On a fixed schedule	16.4 %	45.1 %

Both small (software product business less than 0.2 million euros) and large companies (software product business revenue more than 0.2 million euros) on average released new versions of their main

software product annually. However, in overall the differences in the release frequency of the new versions between the small and large software companies were little.

Table 12 Version Release Interval of the Main Product

<i>Version release interval</i>	<i>Revenue from companies' own software product business in 2006 (million euros)</i>	
	<i>< 0.2 (n=94)</i>	<i>0.2 < (n=133)</i>
Monthly or more frequently	7.4 %	2.3 %
Every second month	6.4 %	3.8 %
3-4 times a year	12.8%	26.3 %
2 times a year	25.5 %	27.0 %
Annually	26.6 %	29.3 %
Less frequently	21.3 %	11.3 %
Total	100.0 %	100.0 %

2.2 Research and Development

On average, in 2006, the software product companies invested 24 % (2005: 32 %, 2004: 31 %) of their revenue on R&D. The R&D investments were decreased slightly in all company size categories comparing with previous year. Also the R&D investment difference between small and large companies was decreased¹⁰. This year there is not clear declining trend in R&D investments from small to large companies as there was in last year. In Table 13 we present the average and median product development investment (percentage of the revenue) for the year 2006 of those companies whose software product business revenue is known.

Table 13 Product Development Investments in 2006 (% of Total Revenue)

<i>Revenue from companies' own software product business in 2006 (million euros)</i>	<i>Mean</i>	<i>Median</i>	<i>n</i>
< 0.3	25,6 %	15,0 %	111
0.3–0.99	24,0 %	16,7 %	65
1 – 2..99	18,8 %	16,7 %	26
3 <	23,9 %	17,5 %	24
Total	24,2 %	16,0 %	226

Table 14 presents the product development investments based on the company age. In 2005, on average, the less than two-year-old companies invested 26.9 % of their revenue in R&D. The investments in 2006 were 30.5 % respectively. R&D investment shares remained almost invariant in all age groups besides six-to-ten year old companies, which were reported for the year 2005 as enormous 37.9 % mean investments in R&D.

Table 14 Product Development Investments in 2006 in Relation to the Age of the Company

<i>Company age (years)</i>	<i>Mean</i>	<i>Median</i>	<i>n</i>
< 2	30,5 %	16,0 %	28
3–5	25,6 %	10,2 %	35
6 – 10	18,6 %	14,8 %	58
10 <	25,3 %	19,0 %	104
Overall	24,3 %	16,0 %	225

¹⁰ It is possible that this is a result of the better coverage of the study. See Appendix 2 for details.

Figure 14 shows the medians of R&D investments according to the maturity of the software product business. The young companies (age of software product business 2 years or less) R&D investments dropped down dramatically from last year. However, this may be explained mainly by a different respondent group composition. In 2005 this group had only 10 companies but this year we have 28 respondents. In general level it seems that the R&D investments have been in a slightly declining trend in last five years.

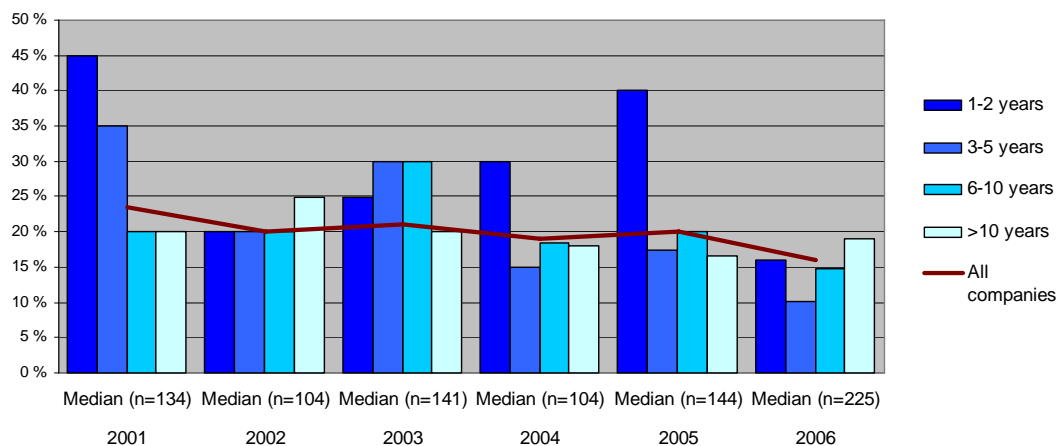


Figure 21 R&D Investment (% of total revenue) According to the Maturity of the Software Product Business in 2001-2004

We also studied how the focus of the product development has changed amongst the respondent companies from 2001 to 2006 illustrated in Figure 22. During these years, most product development emphasis had been placed on increasing the degree of productization and on creating value-adding services. In 2006, the order of the emphases remained exactly same than previous year. We suspect that the variation of the figures is more due to statistical error than real changes in the industry, but this was not analyzed in detail. The most important R&D focus areas for both small and large companies were the development of value-added services and increasing the degree of productization.

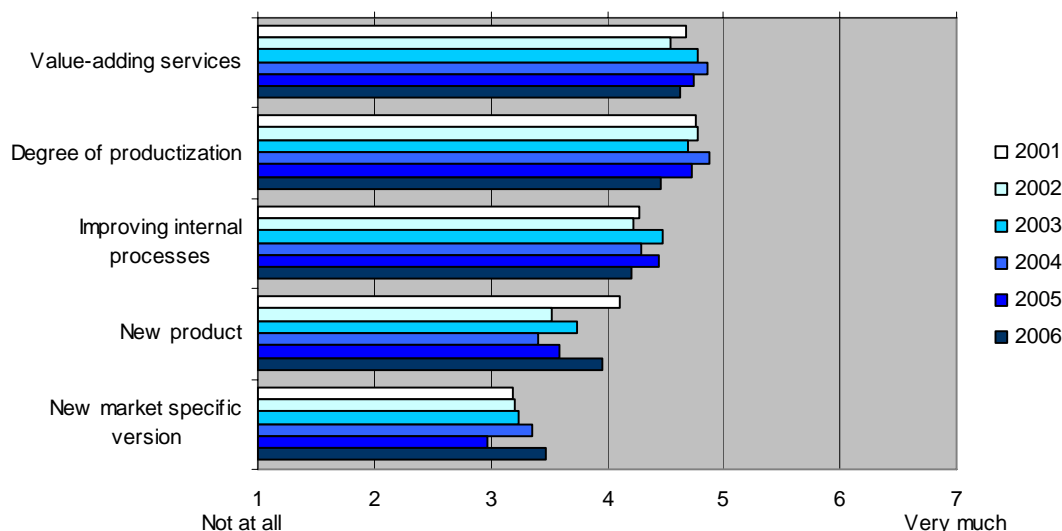


Figure 22 Product Development Emphasis 2001-2006 (n=98-102)

Unlike 2005, in 2006 the companies that have been in the software product business for less than six years did not emphasize improving the *degree of productization* more than older companies. There is not observable difference between younger and older companies in *value-adding services*. However both *improving internal process* and *new product development* are considered more important among older companies. Furthermore *new marker specific version* is seen more important among smaller companies. Product development emphasis sorted by the age of software product business can be seen in Figure 23. However, none of these differences are statistically significant.

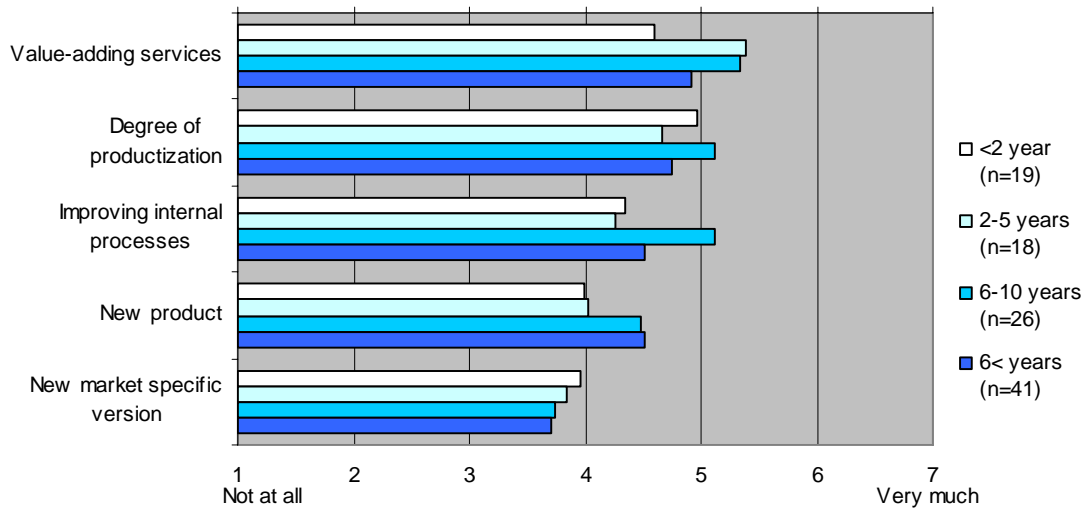


Figure 23 Product Development Emphasis Based on the Age of Software Product Business in 2006

2.3 Product Development Processes

We asked companies about their product development processes and 22.8 % of the companies answered that they do not systematically set milestones in their product development projects (given a value between 1 to 3 on a 7-point Likert-scale). The averages of the used approaches in product development are depicted in Figure 24.

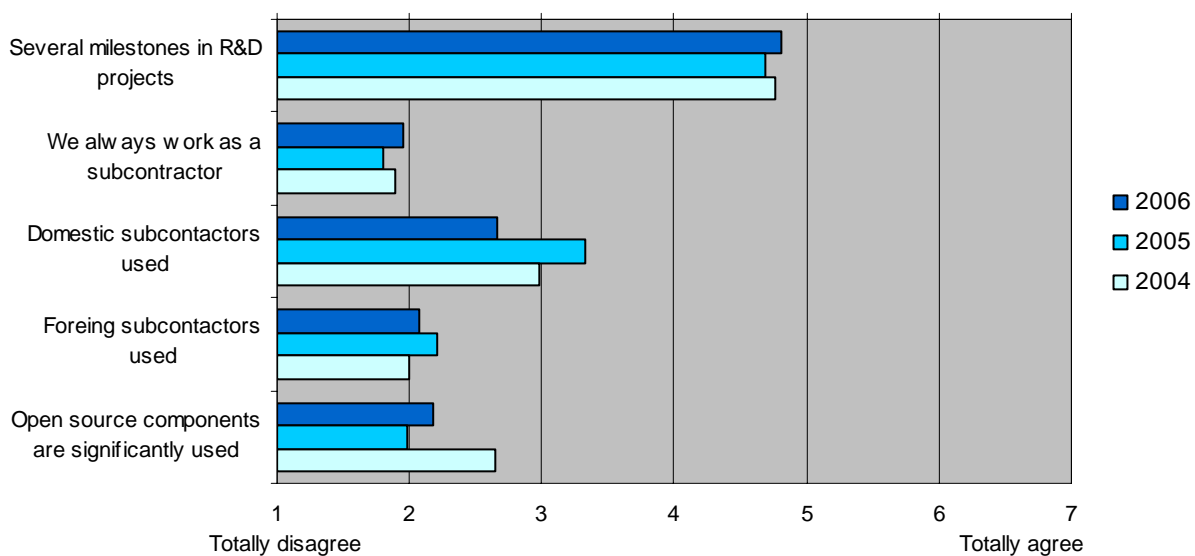


Figure 24 Describing Factors of the Product Development Process

Companies were also asked about the usage of open source components in their software product development. The results showed that 15.0 % (2005: 12.1 %, 2004: 19.9 %) of the companies used open source components significantly in their software product and its development (given at least a value of 5 on a 7-point Likert scale). Most of these companies were still rather small, only 5.4 % (2005: 15.9%. 2004: 26.7%) of the companies that reported about the usage of the open source components had software business revenues over 1 million euros, see Figure 25.

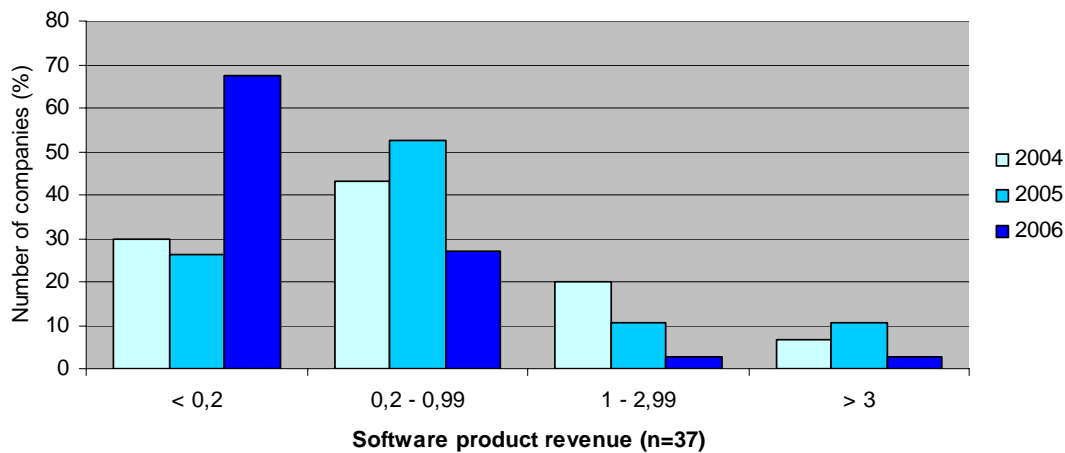


Figure 25 Distribution of the Companies Using Open Source Components Significantly

When we take a look at the age of these companies 45 % (2005: 37%, 2004: 40 %) of them were less than six years old. Evidently, also the older companies use open source components and six to ten years old companies were still barely the biggest group that uses open source components as can be seen from Figure 26.

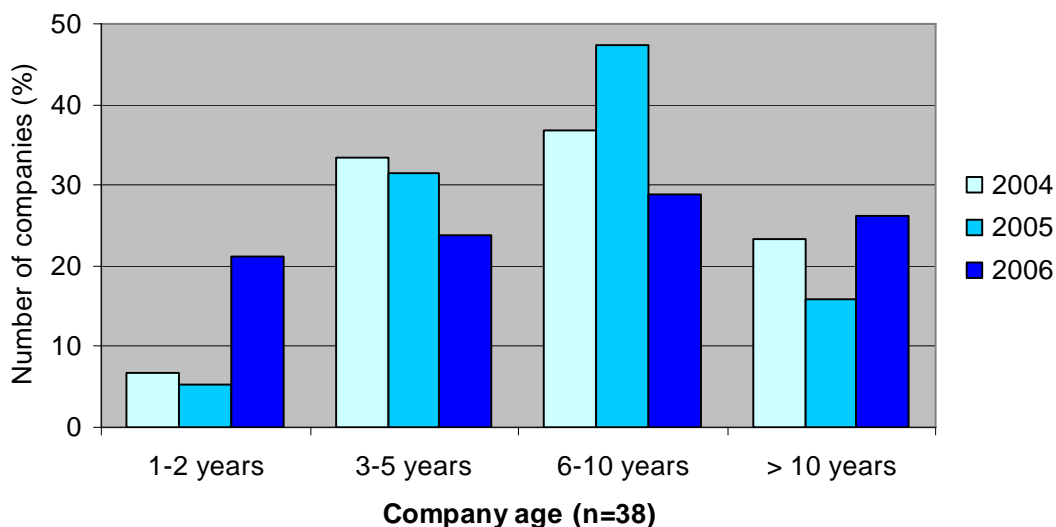


Figure 26 Distribution of the Companies According to Age Using Open Source Component Significantly

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 about customer/end-user needs is gathered and how the decisions concerning the development of new products is done, see Figure 27. 54.1 % of the companies (67.5 % in 2005) 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-point Likert scale). In addition, 36.0 % of companies (39.2 % in 2005) released versions of their new products based on a fixed time schedule (given no more than a value of 3 on a 7-point Likert scale).

On the other hand, 31.4 % of the companies (42.4 % in 2005) were including almost all of the product’s planned features despite the delays in the product release (given at least a value of 5 on a 7-point Likert scale). Moreover, Figure 27 indicates that companies use evenly both temporal and event based product release strategies. Furthermore, the majority of the companies gathered requirement and feature needs from their customers whereas the market research was more rarely used, as only 7.3 % of the companies (36.5 % in 2005) indicated doing so (given at least a value of 5 on a 7-point Likert scale).

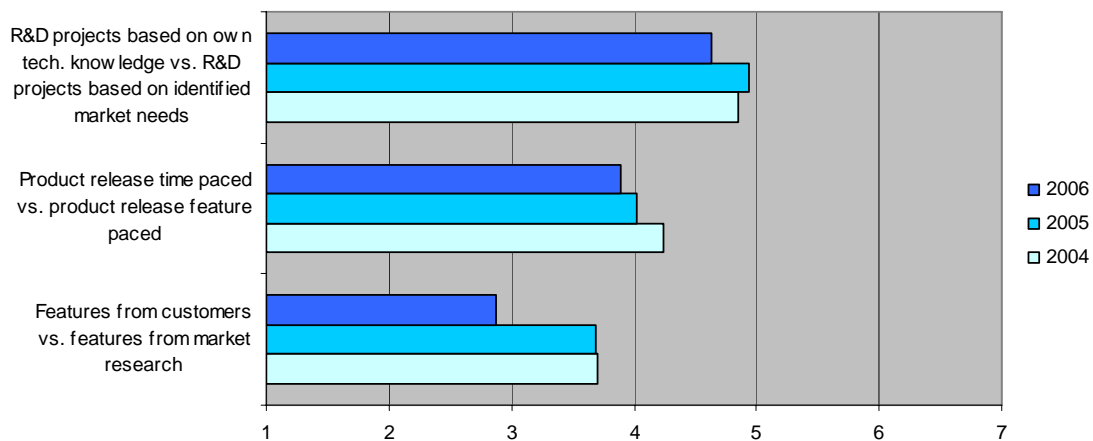


Figure 27 Characterizing Factors of the Product Development Process

3 TYPES OF FIRMS

Firms that offer software products are certainly not a homogeneous population. In order to analyze how different types of firms differ in key dimensions examined in this study, we have categorized the firms by two essential dimensions, the degree of productization and the ratio of software product business revenue to the total revenue of the firm. In this section of the report, we describe our findings related to the types of business models that companies use.

3.1 Categorization of the Companies

In order to understand better the various business models that are used, we have categorized the companies into three major groups based on the degree of productization and the source of revenue (Cusumano, 2004; Hoch, Roeding, Purkert, & Lindner, 2001).

3.1.1 Categorization Variables

We categorized the companies according to two variables. The first was the degree of productization of the software offering; the second was the share of product business from overall business, i.e. the percentage of revenue acquired from software product business versus overall firm revenue.

We asked the companies about the degree of their main offering’s productization by asking how well their main product could be duplicated without customer-specific tailoring. Details for calculating this index can be found in Appendix 3.

Based on the values of these two indices the firms were categorized into three clusters. The cluster solution was chosen partly because hierarchical cluster analysis suggested three cluster solution, and partly because software firms are often categorized into three clusters: product businesses, services businesses and hybrid businesses (Cusumano, 2004). The three clusters resulting in the analysis are shown in Figure 28.

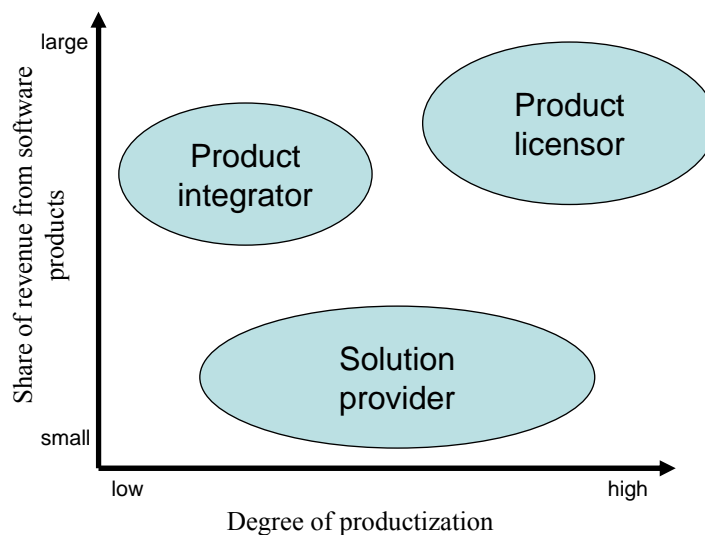


Figure 28 Categorization of the Companies

3.1.2 Description of the Categories

After the clustering was completed we took a sample of each cluster and three researchers independently developed a description of each sample. After this, the group met and decided on the following labels and descriptions of the clusters.

- **Product licensor** are companies that have a highly productized software offering and that focus their business to develop and sell ready-made, off-the-shelf software product. These companies are in the “purest” end of software product business and often expected to have high growth potential.
- **Product integrator** can have a productized software, but it is usually sold with a certain amount of service or as a service. These companies emphasize their role as a service provider and the pricing is more often based on usage of service or customer perceived value addition. Although their service offering usually includes also other parts than just software for instance special content or consultation work, the software is still the core part of their offering.
- **Solution providers** have product with low to moderately-high degree of productization or a such complicated product (e.g. comprehensive business applications like ERP and CRM solutions) that every delivery is accompanied with a unique delivery project including typically some customization, training and possibly customer-specific tailoring. Typically, a large amount of their revenue comes from customization and consulting work, but still their own software product is the essential part the all customer-deliveries.

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

3.2 Key Figures

3.2.1 Revenue and Profit

When considering the results presented in Table 15, we can see that on average the product licensors and solution providers have higher revenues. The average revenue per employee of the companies with a high degree of productization is lower than the companies with a lower degree of productization. However, these differences do not seem to be statistically significant (all p-values >.3)

Table 15 Revenue and Profit

<i>Company type</i>	<i>Average revenue (million euros)</i>	<i>SW-business revenue (million euros)</i>	<i>Average revenue per employee (euros)</i>	<i>Average profit (million euros)</i>	<i>Average profitability</i>
Product licensor (n=85)	2.95	2,76	75 400	0,24	3,6 %
Product integrator (n=108)	2.82	2,33	78 800	0,25	5,1 %
Solution provider (n=43)	1.84	0,278	83 400	0,10	5,9 %

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 immature and in their first product development phase. The more mature companies unfortunately did not answer to these questions and therefore these figures are lower than figures describing the whole software industry.

3.2.2 Personnel and Ages of Product Businesses

Table 16 shows the product licensor and the product integrator have the highest average (and median) number of personnel, the groups where the large IT houses reside. The median number of personnel is relatively small in each category. But again, these results do not gain statistical significance (p=.8)

Table 16 Number of Personnel, Age of Company, and Software Product Business

Company type	Average number of personnel	Median number of personnel	Average age of company	Median age of company
Product licensor (n=85)	26	6	10	9
Product integrator (n=108)	26	7	10	9
Solution provider (n=43)	17	10	10	10

3.3 Additional Descriptive Figures Revenue

The following description illustrates the composition of the typical delivery method of the main product; expectedly, the methods largely correspond to the three business models types. The product licensor companies have on average more than 74 % of their total revenue acquired from license selling and renting whereas product integrator companies’ business is only around 28 % product-based. Breakdown of the main product’s sales revenues is presented in Figure 29. Revenue distributions for the three first classes of revenue reach high level of significance ($p < .001$), but the difference in training, maintenance and other sources of revenue are not statistically significant.

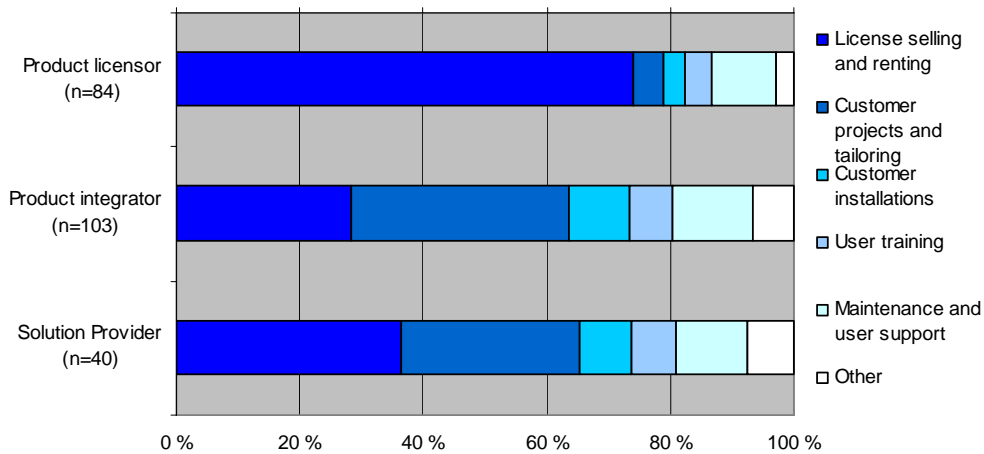


Figure 29 Composition of a Typical Delivery of the Main Product by Software Product Business Revenue in Different Groups

3.3.1 Personnel

By studying the companies’ business revenues, we can find traces of the allocation of personnel according to the functions in the companies. Below, Figure 30 presents the share of personnel of the companies that work in the sales and marketing function Figure 31 shows the share of personnel working abroad. The differences in the marketing are significant ($p < .05$), but the figures for personnel abroad are not.

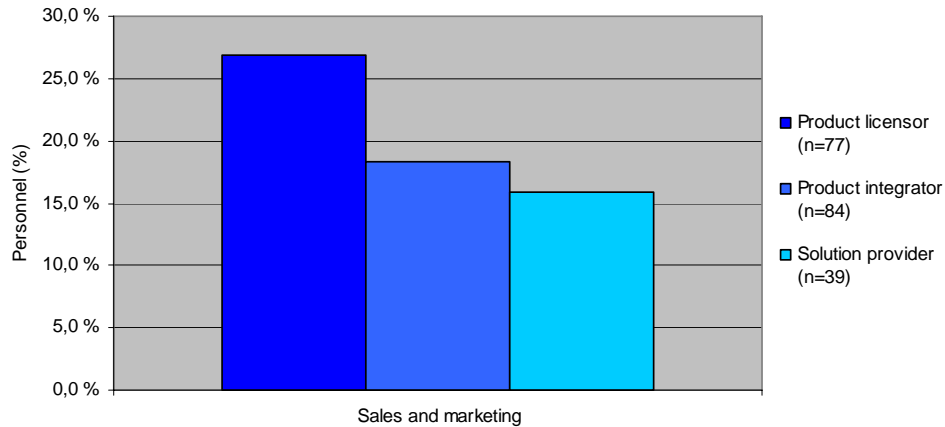


Figure 30 Percentage of Personnel in Sales and Marketing

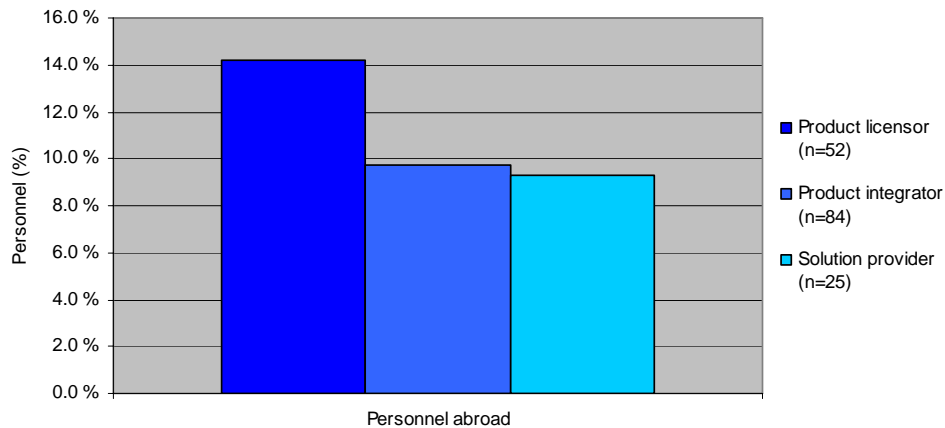


Figure 31 Percentage of Personnel Abroad

3.3.2 Sales and Distribution

Direct sales channel was the most commonly used sales channel in all groups. Using resellers and agents was also quite common. Internet was used as often as resellers and agents among product licensors, but was not as common in product integrators and solution providers group. Using a reseller's brand to sell the product or selling product as a part of reseller's product was only used in a few cases and the same holds true with bundling and wholesalers. The majority of the companies in all categories did not use the last-mentioned sales channels in any situation. The findings related to sales channels are very closely the same as the findings in the previous year, see Figure 32. The differences for reseller and internet are significant ($p < .05$), but others are not.

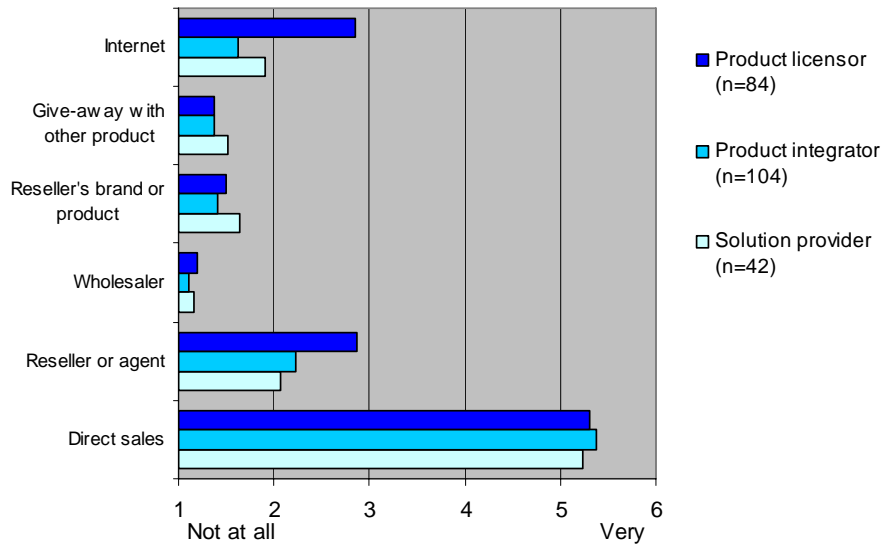


Figure 32 Average Sales Channel Use by Each Category

3.3.3 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. There are clear differences between the customers each cluster targets.

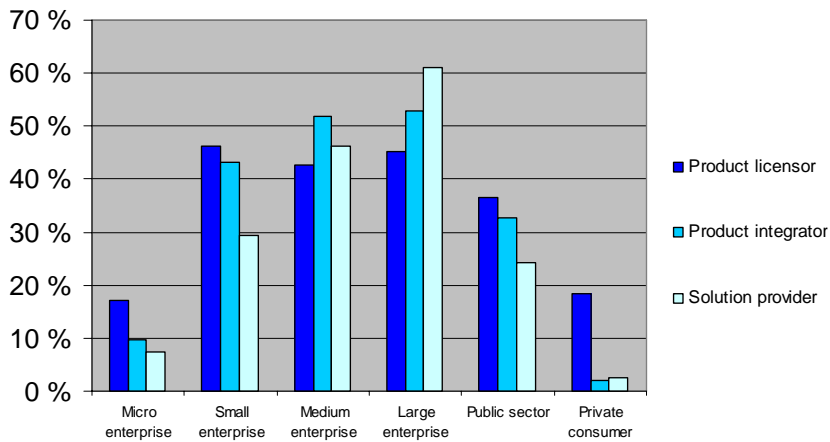


Figure 33 Types of Customers for each Category

3.4 Main Product

3.4.1 Characteristics of the Main Product

The most noticeable and natural difference in the characteristics of the main products' business were in need for installation project or amount of consultation work in delivery. Open-source components were more often used by solution providers than product integrators or licensors. Main products suitability for SaaS (Software as a Service) business was thought almost equally in all groups. Larger differences in means are also statistically significant ($p < .05 - p < .001$).

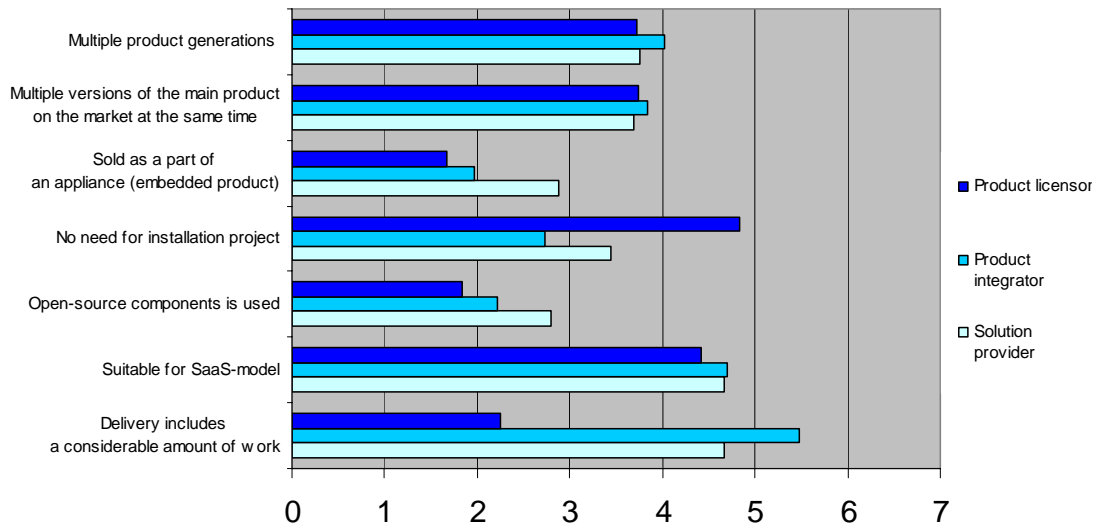


Figure 34 Characteristics of the Main Product's Business

3.4.2 Version Releases

Different release strategies used for the main product by different clusters are presented in Figure 35.

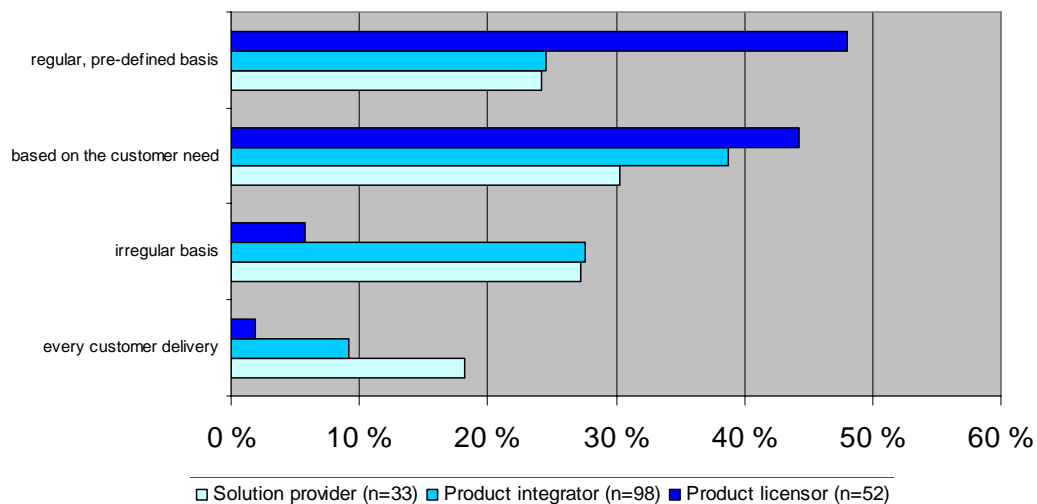


Figure 35 Release Strategies for the Main Product by the Groups

3.4.3 Product Development Investments

Some noticeable differences are present in the investments to product development between the categories. The product licensors have clearly higher investments to product development than the other groups. The product licensor group's investment share is 33 %, whereas product integrators' investment is 23 % and solution providers' only 12 %. Compared with the realized figures for 2006, the estimate for 2007 suggests that all other groups, except product integrator, will reduce their investments into product development which is in line with the fact that R&D investments in the industry are in descending trend in all around Europe. However, the differences are not statistically significant ($p = .5$).

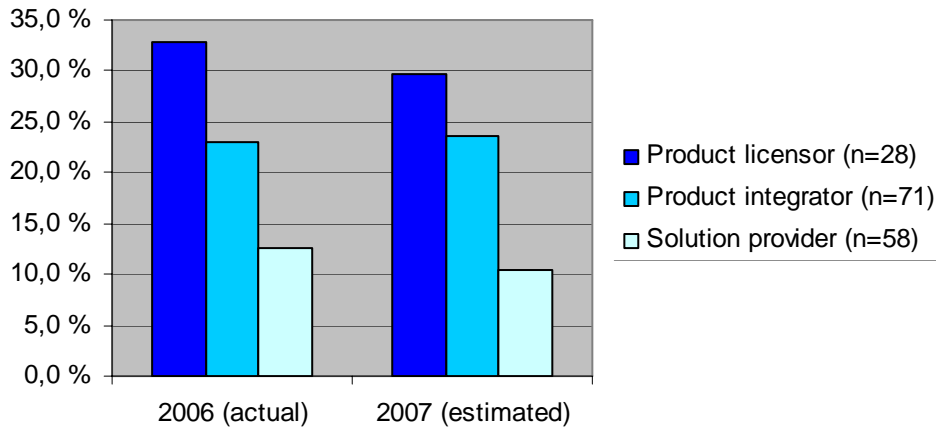


Figure 36 Product Development Costs as Percentage of the Total Revenue

3.5 Internationalization from the Firm Type Viewpoint

3.5.1 Number of Countries

In all groups, for roughly 30 - 40 % of companies, the number of foreign countries where the company ran operations was from one to five. In the product licensor group, the share of companies that had product business in more than five countries abroad is about two times larger than in the other groups. The observation that product licensor companies are the most internationalized ones has been often documented in prior studies and result is rather self-evident ($p < .10$).

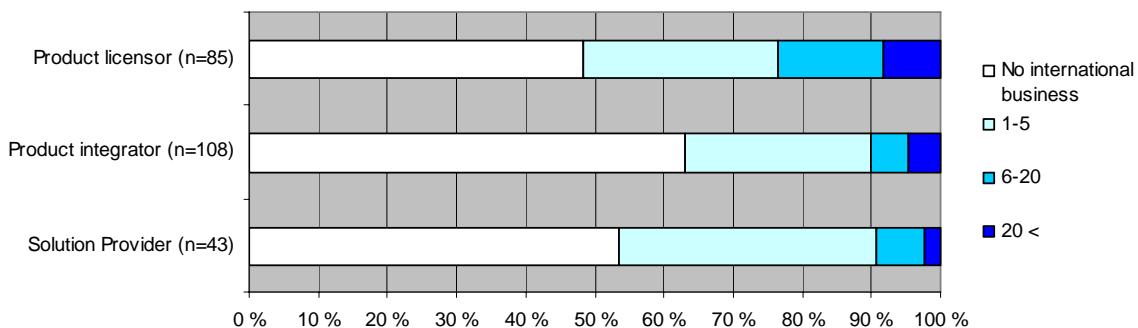


Figure 37 The Number of Foreign Countries in which the Companies Operate

3.5.2 Sales Channels and Strategies

Direct sales and reseller were the two most often used sales channels in international markets in all categories. The channel strategies of selling using a reseller's brand or product, through subsidiary, and via joint venture were only rarely used compared with the two strategies mentioned above. However, the use of internet was used significantly especially by product licensor. This ordering of the five strategies as they are classified here has been commonly observed in this study. Large differences in means are also statistically significant ($p < .05$).

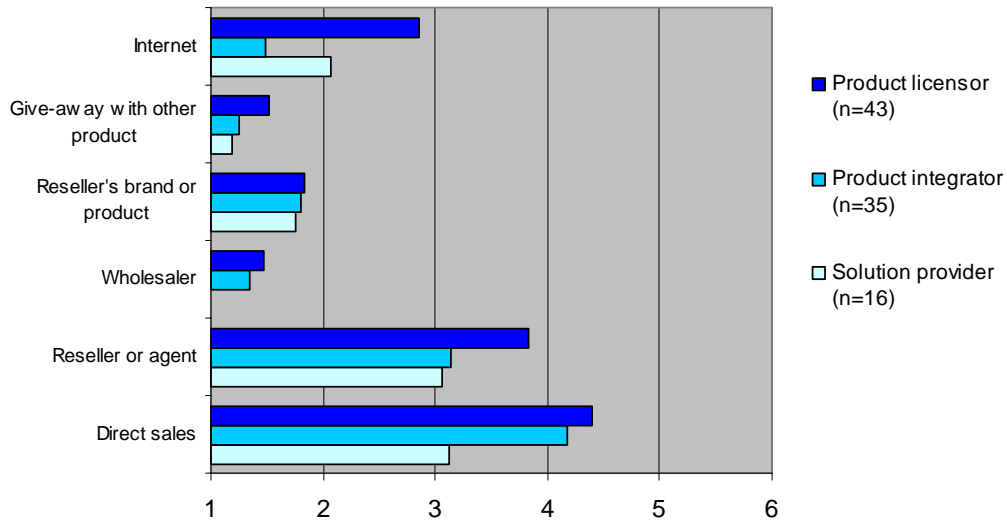


Figure 38 Selection of Sales Strategies in International Markets

3.6 Conclusions of the Firm Type Analysis

The cluster study shows that while there might be differences in the clusters, a large number of these are not captured in this study. Somewhat surprisingly, there does not seem to be differences in the level of profitability between the clusters.

The strongest findings are also more self-evident: Product licenses are sold through different channels than products requiring installation projects and solutions requiring projects are targeted more towards larger firms.

4 INDUSTRY CLUSTERS

4.1 General

One of the aims of the software product industry cluster study is to define a system of classifying the software product companies. In this report, 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 their main software product. The companies are included in the analysis based on the categories they belong to. However, in this report we do not report results of the categories with less than six companies due to reasons related to the confidentiality of the respondent companies.

4.1.1 Software Classification

The companies were categorized according to the modified North American Product Classification System (NAPCS 2003). Applying an existing software 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 research studies 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 their main product. Table 17. presents the modified NAPCS classification system.

Table 17 The Modified NAPCS classification

<i>1. System software</i>	<i>2. Application software</i>
<p>1.1 Operating systems software - All client and network operating systems</p> <p>1.2 Network software - Network management software - Server software - Security and encryption software - Middleware - Other network software</p> <p>1.3 Database management software - Includes all DBMSs</p> <p>1.4 Development tools and programming languages software - Software testing tools and testing software - Program development tools - Programming languages software - Other development tools software</p> <p>1.5 Other systems software</p>	<p>2.1 General business productivity applications - Office suite applications - Word processors - Spreadsheets - Simple databases - Graphics applications - Project management software - Computer based training software - Other business productivity software</p> <p>2.2 Home use applications - Games - Reference - Home education - Other home use application software</p> <p>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</p> <p>2.4 Vertical market application software</p> <p>2.5 Utilities software - Compression programs - Antivirus - Search engines - Font - File viewers - Voice recognition software - Other utilities software</p> <p>2.6 Other application software</p>

4.1.2 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 identify the main market for their software products. Table 18. provides a list of the target markets. This classification has been developed over the years within the context of this study. The classification is loosely based on the Finnish TOL 2002 industry classification.

Table 18 Market Classification

Target customer market

We sell little products or services to corporate customers
No specific industry segment (horizontal application)
Electronics and High Technology
Information and Communication technology (ICT)
Telecom
Mobile Business
Aviation and Defense Industry
Research and Science
Nanotechnology
Biotechnology
Chemistry
Banking, Financing, and Insurances
Legal services
Business Consulting and Services
Energy
Construction
Manufacturing
Mining Industry
Retail and Wholesale Trade
Real Estates and Maintenance
Transportation and Logistics
Agriculture and Forestry
Health Care
Traveling and Tourism
Public Sector
Communities
Education
Training
Media and Entertainment
Games and Animations
Affluent Services
Some other target market

4.2 Distribution of the Companies

The companies were asked to provide information of their main software product. The companies selected the type of software of their main product and the main target market their product is sold to from the lists. At the top level, it can be seen that application software group is almost four times more popular than system software, see Table 19.

The most popular software type is general business productivity 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. 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, or restaurants.

Among system software, the most popular type was network software. The following tables present the distribution of the respondent companies according to their software type and target market.

Table 19 The Number of Companies per each Software Type¹¹

<i>Software types</i>	<i>Number of companies</i>
System software:	52 (total)
Operating systems software	3
Network software	14
Database management software	15
Development tools and programming languages software	5
Other systems software	15
Application software:	214 (total)
General business productivity applications	93
Home use applications	13
Cross-industry application software	39
Vertical market application software	44
Utilities software	2
Other application software	23

Table 20 The Number of Companies per each Target Market

<i>Target customer market</i>	<i>Number of companies</i>
We sell little products or services to corporate customers	5
No specific industry segment (horizontal application)	76
Electronics and High Technology	3
Information and Communication technology (ICT)	37
Telecom	11
Mobile Business	7
Aviation and Defense Industry	2
Research and Science	2
Nanotechnology	0
Biotechnology	0
Chemistry	1
Banking, Financing, and Insurances	9
Legal services	0
Business Consulting and Services	3
Energy	6
Construction	2
Manufacturing	21
Mining Industry	0
Retail and Wholesale Trade	17
Real Estates and Maintenance	0
Transportation and Logistics	4
Agriculture and Forestry	3
Health Care	12
Traveling and Tourism	2
Public Sector	11
Communities	2
Education	4
Training	1
Media and Entertainment	9
Games and Animations	4
Affluent Services	2
Some other target market	14
Total	270

¹¹ Before year 2007, the classification was presented in English. This year we translated and simplified the description. This probably causes some bias in all results that compare differences between years.

When we take a look at the target markets, see Table 20, it is clear that most companies prefer the “No specific industry segment”, which is software that can be used by all customer segments¹². The ICT, Manufacturing, Retail and Health Care were also very popular target markets. The least popular target markets were Nanotechnology, Biotechnology, Legal Services, Mining and Real Estates, in which none of the respondents operated.

4.3 Revenue

4.3.1 Total Revenue

The total revenue and the software product business revenue vary significantly across the various clusters: the types of software and the target markets (Figure 39). Out of the different software types the Business productivity software, Vertical market application software and Other application software had by far the largest total revenue.

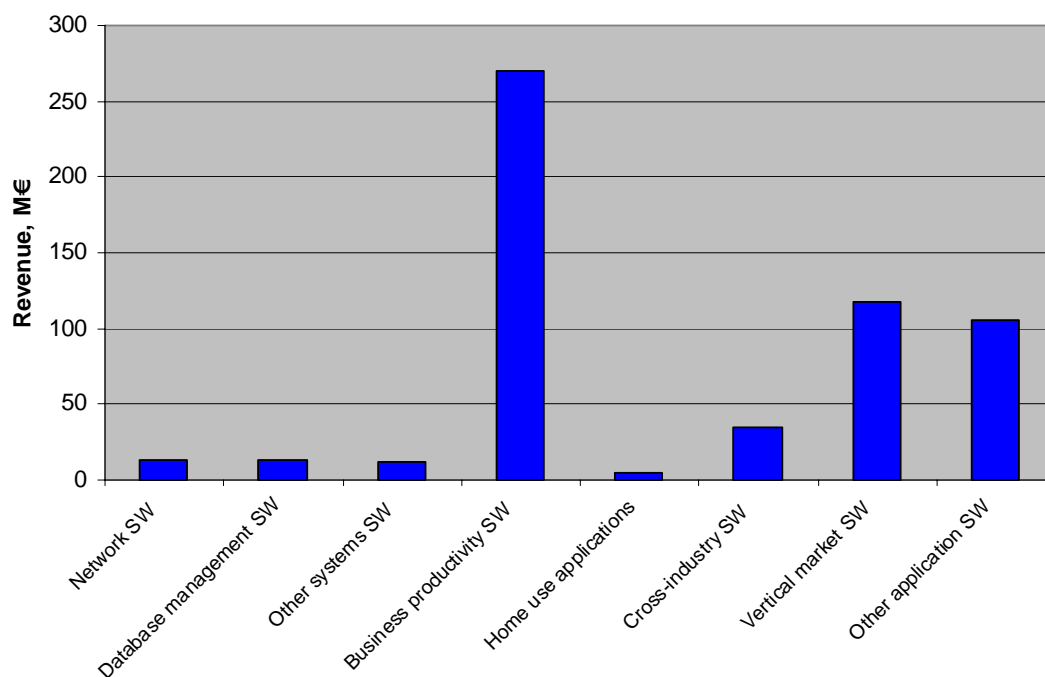


Figure 39 Total Revenue by Software Type

From the target markets, the Horizontal application (No specific industry segment) and Retail had the largest total revenues mainly because they contain some of the largest companies. The ICT, Mobile, and Banking had relatively high revenues as well (Figure 40.). On the other hand Manufacturing, Public Sector and Media and Entertainment have rather low revenue figures. These clusters lack large companies and therefore the total revenue figures are very low. In addition, a possible source for bias is that not all of the Finnish companies that belong to these categories answered to this survey and therefore the total revenue numbers should be treated as indicating only.

¹² It is also possible that firms chose this option if they considered that their offering did not fit into the classification.

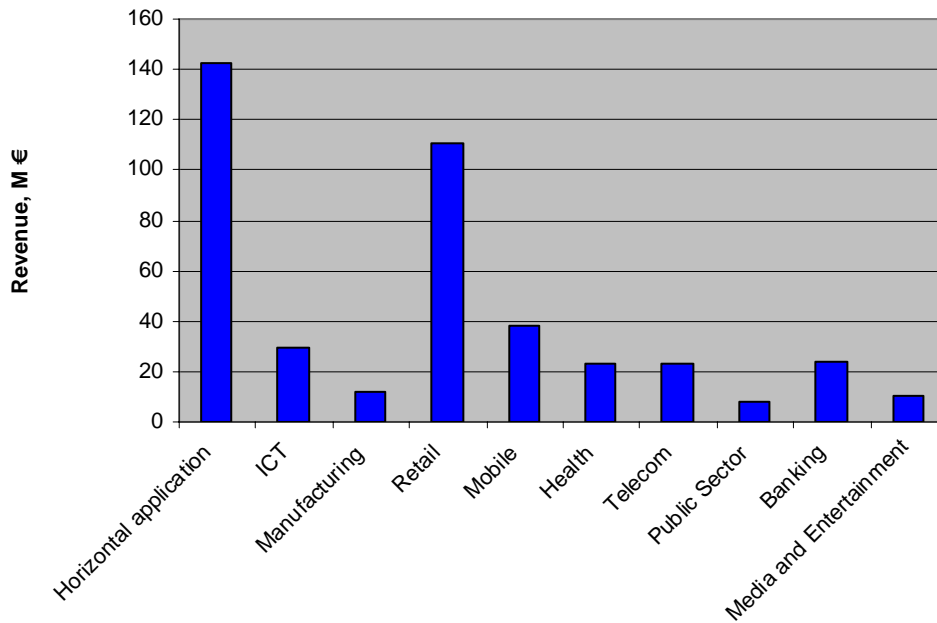


Figure 40 Total Revenue by Target Market¹³

However, when we take a look at the average revenue per employee figures (Figure 41), the situation is quite different. The largest average revenue per employee figures are in the Vertical market software and Business productivity software clusters. Home use applications had by far the lowest revenue per employee figure, less than a half of the overall industry's figure of 90 000 euros per employee. However, these findings are not statistically significant.

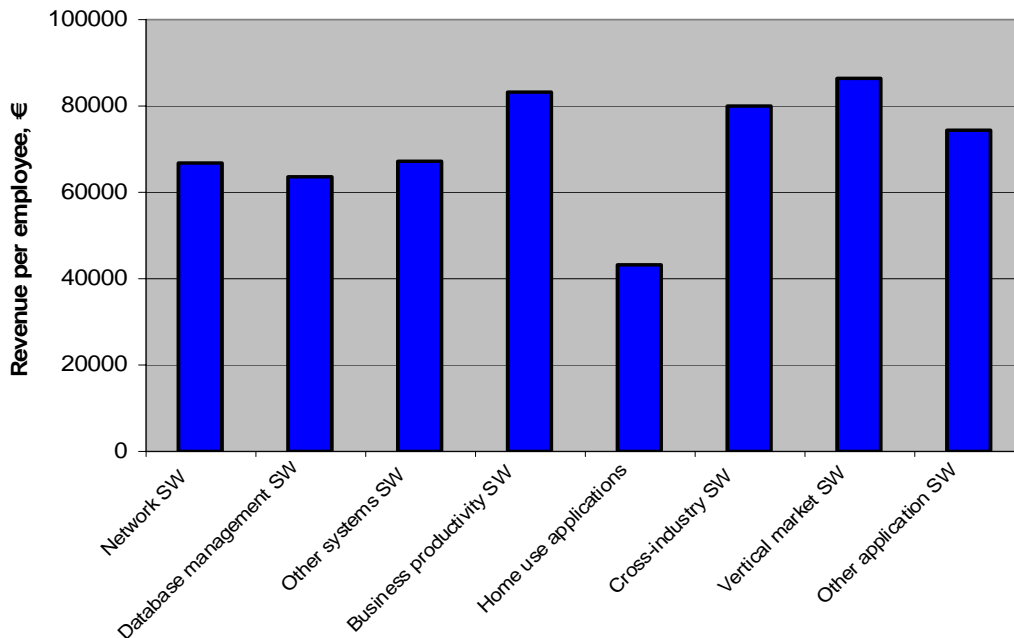


Figure 41 Total Revenue per Employee by Software Type

¹³ Only ten most popular markets are presented.

As for the target markets (Figure 42), the largest revenue per employee figures were in Banking and Manufacturing. On the other hand, the figures for Media and Entertainment and Public Sector were low, only around 60 000 euros. Again, the results are not statistically significant.

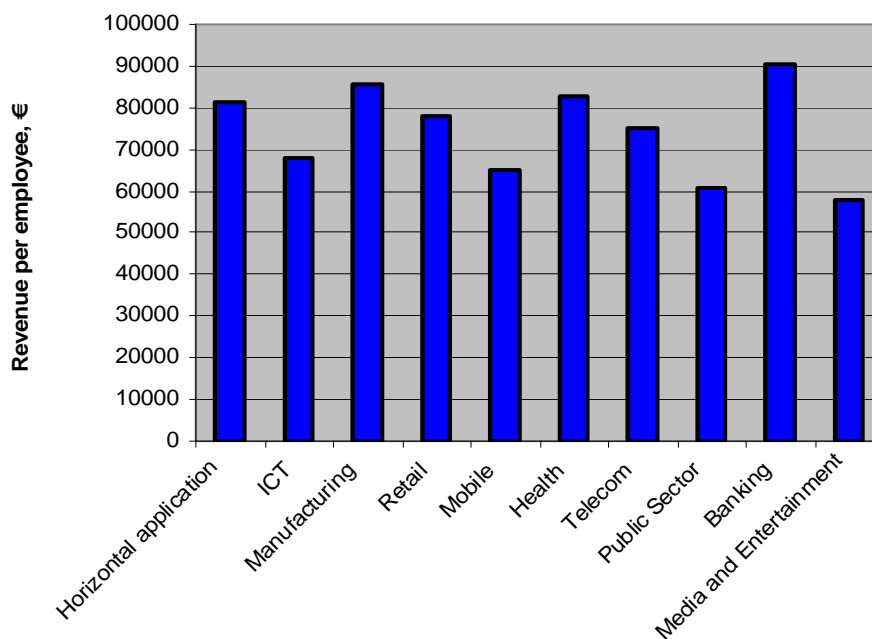


Figure 42 Total Revenue per Employee by Target Market

4.3.2 Software Product Revenue

As Figure 43. shows, Mobile and Retail were clearly the largest clusters according to average software revenue. The next largest was Banking. According to the responses Public Sector, ICT and Manufacturing are the smallest sectors. This, however, does not indicate that these would be the largest clusters in Finland, but that this year there were a couple of large firms that decided to respond to the survey and increased the figures for these clusters.

Of the software types, the largest total revenues were in the Business productivity software and Vertical market application software which also were the most popular categories.

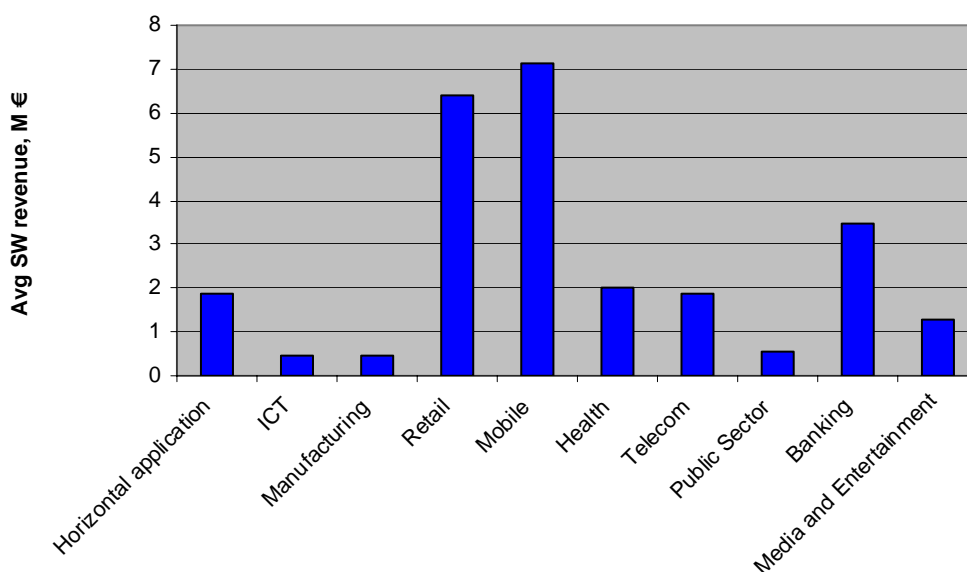


Figure 43 Average Software Product Revenue by Target Market

4.4 Profitability

The average total profit and profitability of each cluster varied a lot between the categories, see Figure 44. For example, the average profits for the Other application software, Vertical market software and Business productivity software clusters were very good while the Database management software cluster was on average unprofitable. However these figures are not statistically significant.

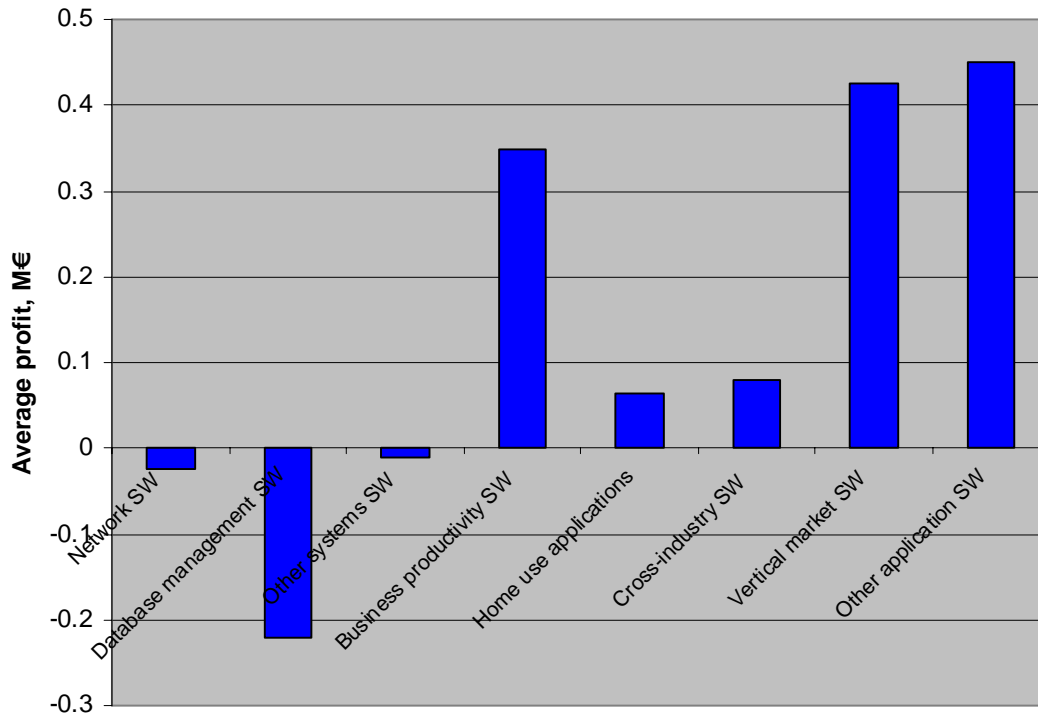


Figure 44 Average Profits by Software Type

As for the target markets (Figure 45), categories including Retail, Health and Horizontal applications were on average quite profitable while the Telecom and Mobile clusters were creating losses. The other sectors hardly made profit at all. The findings are significant ($p < .001$), but this is probably due to over fitting by dividing a relatively small number of cases over relatively large number of categories.

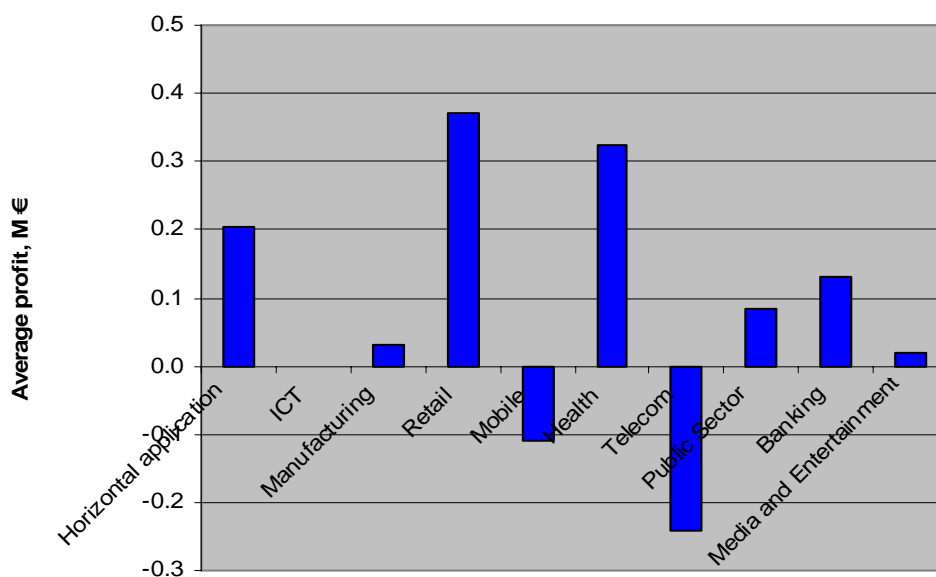


Figure 45 Average Profits by Target Market

The profitability was reported as the total profit in relation to the total revenue and these figures show that on average the Other application software had almost 15% profitability and the Business productivity software, Home use applications and Cross-industry software clusters had over 6% profitability, see Figure 46. These are very good figures compared to overall industry's profitability of 5.6%. However, these findings are not statistically significant.

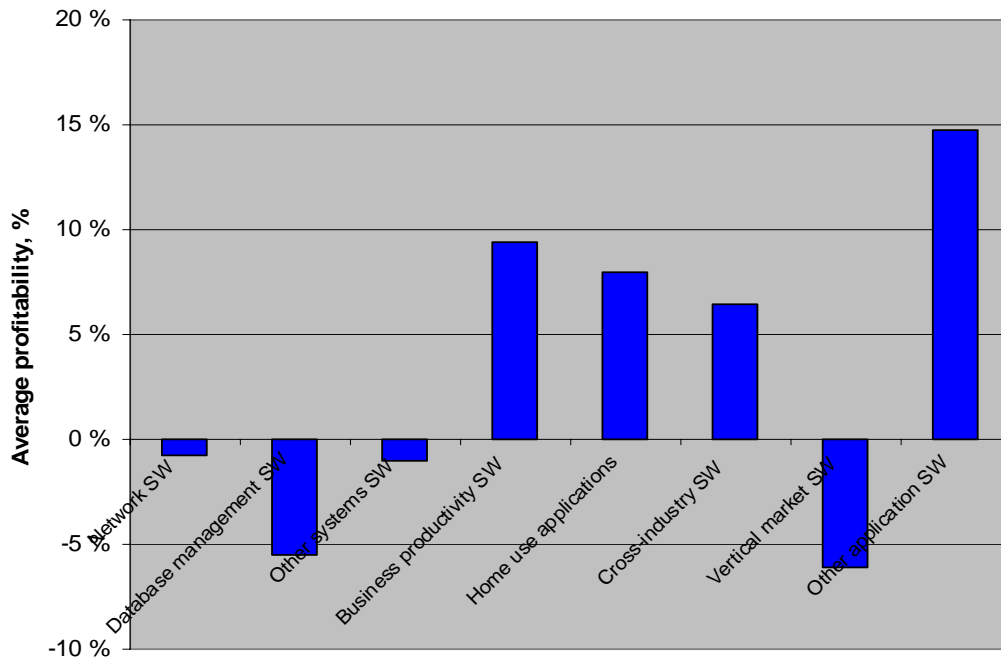


Figure 46 Profitability (Profit per Revenue) by Software Type

As for target markets, Horizontal applications and Manufacturing showed high profitability, see Figure 47. On the other hand, the Health cluster was on average highly unprofitable. The results are almost significant ($p < .15$)

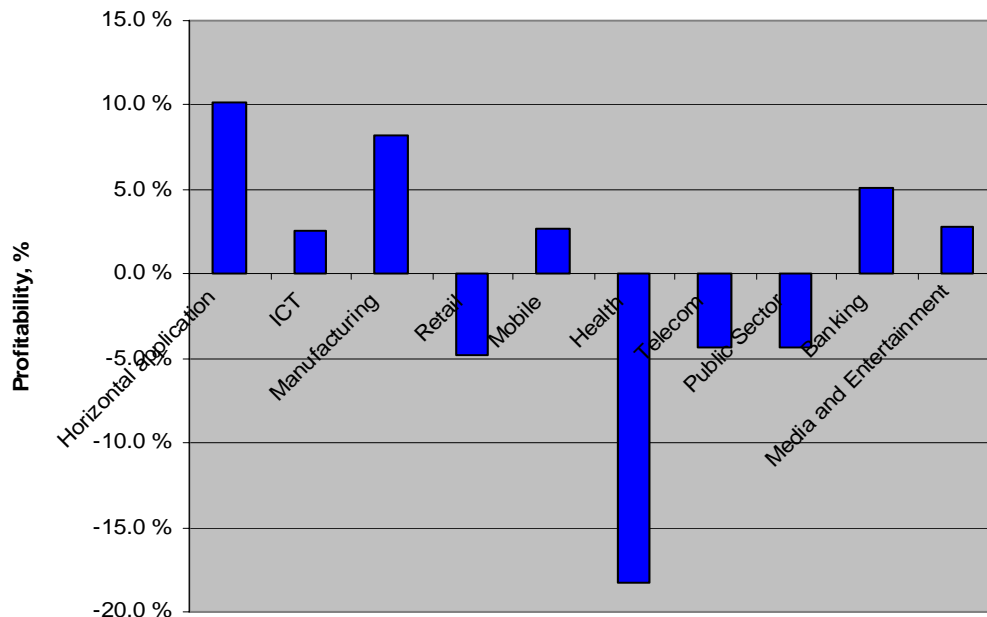


Figure 47 Profitability (Profit per Revenue) by Target Market

4.5 Internationalization

The level of internationalization was measured by what percentage of the cluster's companies received revenue from abroad, i.e. had international business. From Figure 48 we can see that the Finnish companies reached 40% internationalization rate in four software type categories.

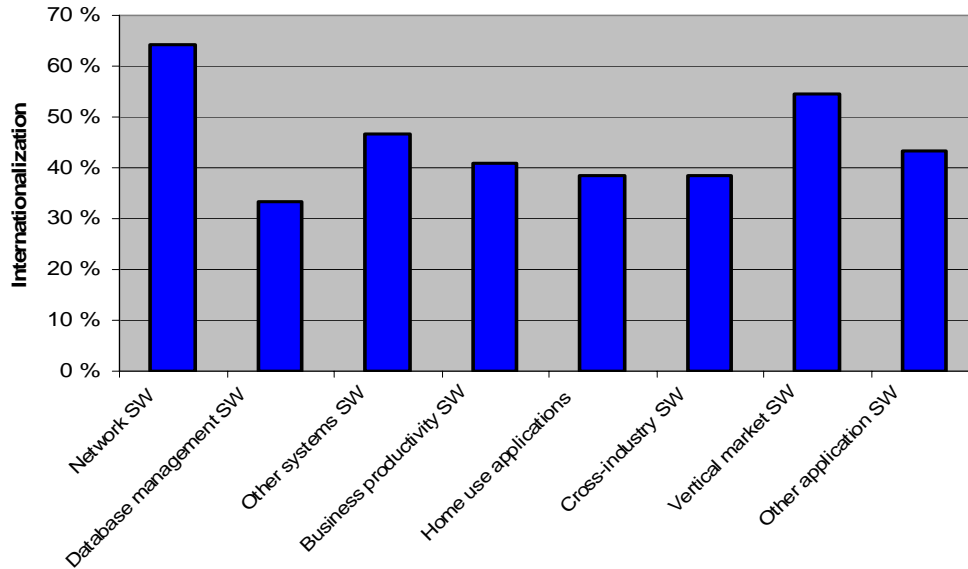


Figure 48 Percentage of Companies with International Business by Software Type

For the target markets, the Mobile and Banking sectors were clearly the most internationalized with the other clusters somewhat behind (Figure 49).

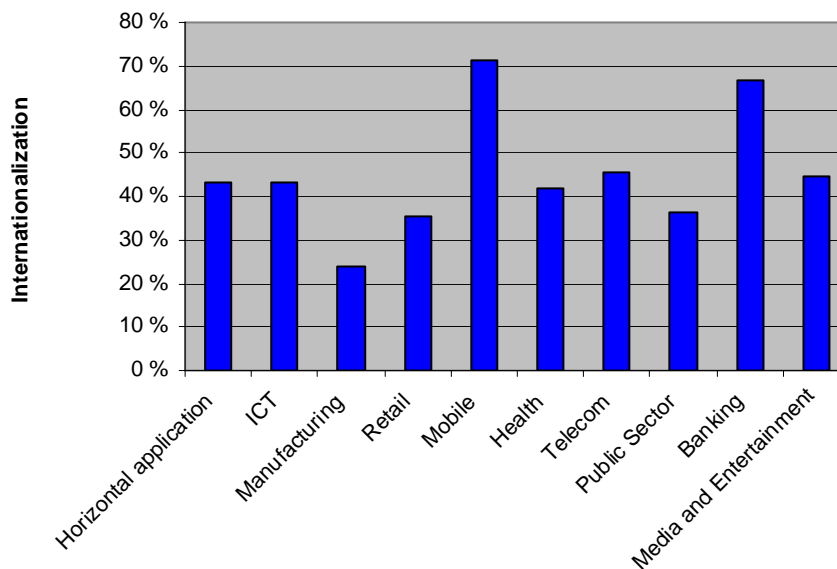


Figure 49 Percentage of Companies with International Business by Target Market

4.6 Conclusions from the Cluster Study

The software industry cluster research brings out many differences between the categories. Unfortunately many of these clusters have only limited number of companies in them, which seriously

restricts the validity of the findings. Still this research brings out some new issues and questions. On the software type side, the General business productivity software was the most popular and had the highest revenue. In case of the target markets, the No specific industry segment (horizontal application) was by far the most popular followed by the ICT and Manufacturing clusters. When looking at the revenue, the Horizontal application category is very large. There are many large IT companies in it that have high revenues.

The results of the cluster study should be interpreted with caution. While the differences between industries were statistically significant, the fine grained nature of the classification causes chance to play a large role in the results. Majority of the clusters that qualified in the ten largest clusters that were investigated in detail did so due to one single large company responding with that market. When comparing the results of cluster study across years it is easy to see that the variance in the results is caused by different companies responding during different years. As a conclusion, large part of the findings presented in the cluster study can be attributed more to statistical error than real variation between industries.

SECTION 3: DEVELOPMENT OF INDUSTRY

5 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 ca. 0.5 % of the world software market.

This section 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.

5.1 Scale of International Operations

Overall, 150 (48 %) out of the 313 firms had some revenue streams from foreign markets in 2005, and thus can be considered as internationally operating. This represents a significant decrease from the 59 % reported a year ago (46 % in 2004). However, this difference is largely attributed to the different distribution of firms in this years study. The distribution of internationally operating firms as well as the distribution of their foreign revenue share is presented in Figure 13. 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. In fact, 28 % of the responding internationalized firms had 5 % or less of their revenue coming from abroad. On the other hand, almost one fifth of the firms generated 75 % or more of their revenue abroad. The share of firms receiving 25 to 75 % of their revenues from abroad decreased slightly from last year (27 %) to 25 %.

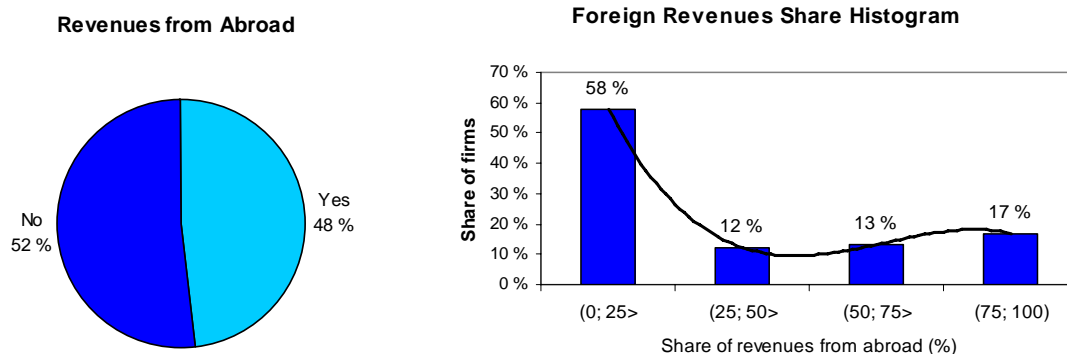


Figure 50 Firms with Revenue from International Operations ($n_1=313$ and $n_2=106$)

5.2 Profile of Internationally Operating Firms

The basic indicators of international operations and their averages from 2006 and 2003 for responding internationalized firms are presented in Table 8. The average number of foreign markets targeted in 2006 was 9.9. This represents a significant growth in geographic coverage, as the corresponding figure was just 6.84 in 2003. Last year, the corresponding figures were 7.8 and 3.9. Also the median number of export countries had grown significantly: from 1.5 export countries in 2003 to 4.0 in 2006. The corresponding figures from the year 2005 were 1.5 and 3.0. This indicates that software product firms are internationalizing roughly at the same pace as before but this year's sample consists of relatively less internationalized companies than the one last year.

Probably the most important internationalization indicator, the share of foreign revenue, shows that on average 33 % of revenue (23 % in 2003) was generated abroad in internationalized software product

companies. However, about a half of the firms gained only 15 % or less of their revenue from international operations. Hence, the corresponding median is 16 percent units lower, at 17 %. Also, the median for export share in 2003 was just 5 %. The figures indicate a significant increase in the share of foreign revenue among the sample firms during the last three years both in terms of mean and median figures. These average numbers do not differ much from last year's results. The mean shares of revenues from abroad last year were 33 % in 2005 and 21% in 2002, and the corresponding medians 20 % and 5 %.

On average, internationalized firms had employees in 2.0 countries excluding Finland and 55 % of the firms did not have any employees abroad. A little less than 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 5 % (2 % in 2003). The strong increase since 2003 suggests that many companies today assign significantly more employees to foreign operations than they did three years ago. However, these figures are almost an exact match to those in last year's sample. 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. However, there is one issue that is not reflected in the figures and can cause bias: Every year some of the more successful and international Finnish software product firms are bought by other companies. This causes these companies to become excluded in the study. Hence, a more correct interpretation of the data might be that Finnish firms included in this study tend to internationalize, but that does not necessarily affect the overall degree of internationalization in the markets.

Table 21 Indicators of International Operations

<i>Indicator</i>	<i>2006</i>			<i>2003</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	9.9	4.0	110	7.0	2.0	63
Share of revenues from outside of Finland (%)	33 %	17 %	106	23 %	5 %	62
Share of revenues from own SW product business from abroad (%)	29 %	13 %	109			
Number of countries where company had employees, excl. Finland	2.0	0.0	97	2.0	0.0	55
Share of employees focusing full-time on foreign operations (%)	24 %	5 %	71	17 %	2 %	39

A comparison of some key descriptive statistics between internationally and domestically operating companies is presented in Table 22. The average total revenue of internationalized firms was 22.5 million euros in 2006. There was a significant difference in total revenue between internationalized and domestic firms both in terms of mean and median values. Last year the average total revenue for an internationally operating firm was 25.5 million euros. Domestically operating firms' average total revenue decreased from 5.2 million euros reported last year to this year's 0.8 million euros. The median, however, dropped only by 0.1 million from 0.3 million to 0.2 million this year. Also the median of total revenue by international firms fell from 1.6 million euros to 1.4. However, these changes are solely due to better coverage of smaller firms in the sampling frame and should not be interpreted as changes in the industry.

Table 22 shows the profiles of international and domestic firms. All differences in means except for growth and profitability are statistically significant. This is somewhat surprising, since internationalization is believed to increase the growth rate of the firms. One plausible explanation is that while internationalization increases the absolute growth, it does not affect the relative (percentage) growth. Another alternative explanation is that internationalization increases growth initially, but once the firm is international, the growth rate decreases.

One clear finding in the table is that international firms are older and larger than the purely domestic comparison group. This can be interpreted that for a large number of firms, internationalization is a natural part of the firm life cycle.

Table 22 Profile of International vs. Domestic Firms in 2006

Indicator	International			Domestic			p
	Mean	Median	N	Mean	Median	N	
Total revenue in 2006 (M€)	22.5	1.4	141	0.8	0.2	140	.05
Predicted growth rate 2006-2007	32 %	20 %	101	26 %	17 %	112	.40
Proportion of revenues in 2006 from own SW products	73 %	96 %	138	69 %	90 %	136	.01
Age of company	11.8	11.0	149	8.9	7.0	163	.005
Number of employees in 2006	204.1	18.0	140	8.5	4.0	148	.10
Profit in 2006 (M€)	1.7	0.07	135	0.05	0.009	132	.05
Profitability (%)	3.8 %	6.4 %	118	7.2 %	4.0 %	131	.80
R&D per revenue in 2006 (%)	25 %	18 %	106	24 %	15 %	120	.05

In order to analyze the differences in the distribution of revenue between international and domestic firms, we have used a modified histogram¹⁴, which is presented in Figure 51. It shows that domestic firms tend to have lower revenue 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 almost four times as big as that of internationalized firms. On the other hand, only 7 % of domestic firms have revenues exceeding 3 million euros whereas 41 % of the internationalized firms belong to that revenue category. All in all, there seems to be a strong relation between internationalization and larger revenues.

The average profits of both domestic and international firms are close to zero. Median of internationalized firms was about 50 000 euros and of domestic firms just 9 000 euros. Approximately 70% of domestic firms have profit between 0 and 100 000 and just 5 % report profit in excess of 300 000.

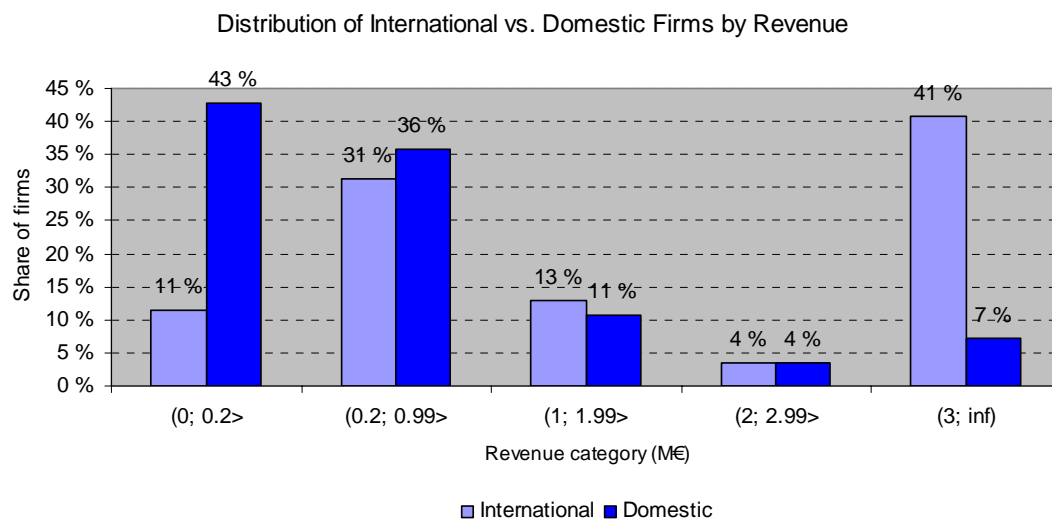


Figure 51 Distribution of International vs. Domestic Firms by Revenue (n=280)

¹⁴ 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.

The following analysis focuses on profitability (profit divided by total revenue). The distribution of international and domestic firms is presented in Figure 52.

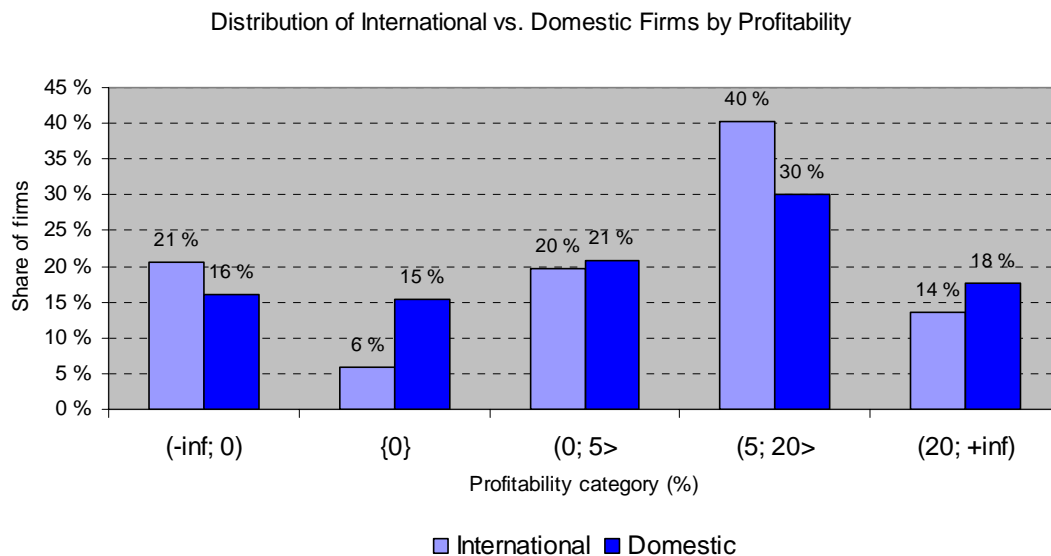


Figure 52 Distribution of International vs. Domestic Firms by Profitability (n=247)

Somewhat surprising is the finding that age, both in terms of mean and median, is almost identical for both international and domestic firms. This would suggest that the decision to start international business is more dependent on other criteria than age. Some firms start international sale from the day zero, and other firms build their business solely on the domestic markets. Even closer examination of age distribution, as presented in Figure 53, does not uncover any significant differences between the age structure of international and domestic firms.

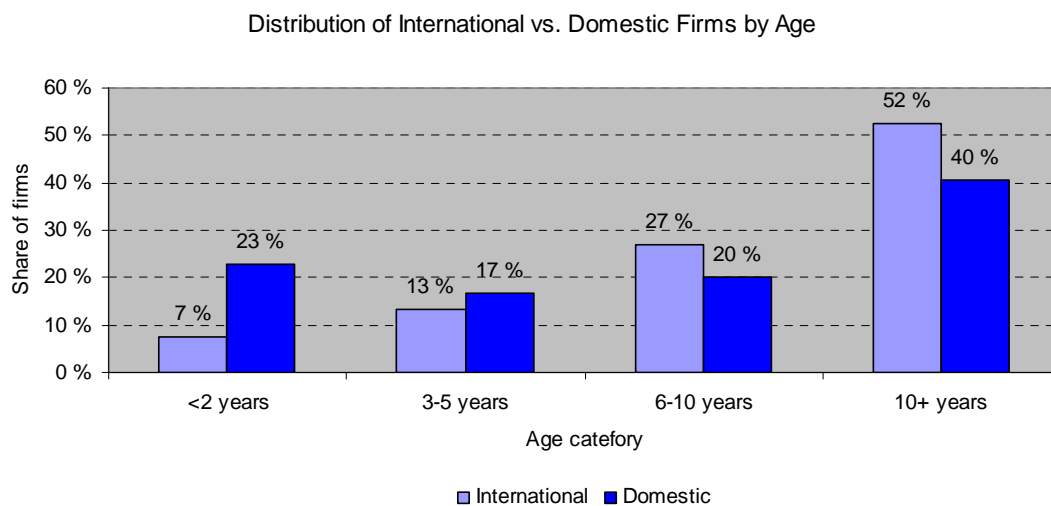


Figure 53 Distribution of International vs. Domestic Firms by Age (n=312)

5.3 Improvement Emphasis

The next issues of our interest are the differences in emphasis on key improvement areas. The importance of twelve areas for the horizon of three years as perceived on average by international vs. domestic firms is presented in Figure 54. The average internationalized firm in our sample finds as key

areas for improvement further development of the existing products, knowledge and competence of personnel and international sales and marketing.

The findings are well in line with those of last year. Last year also the most important improvement area by internationalized firms was considered to be international sales and marketing, followed then by knowledge and skills of personnel and networking and co-operation. There were no drastic changes as the five most important areas are the same apart from their order having been changed slightly.

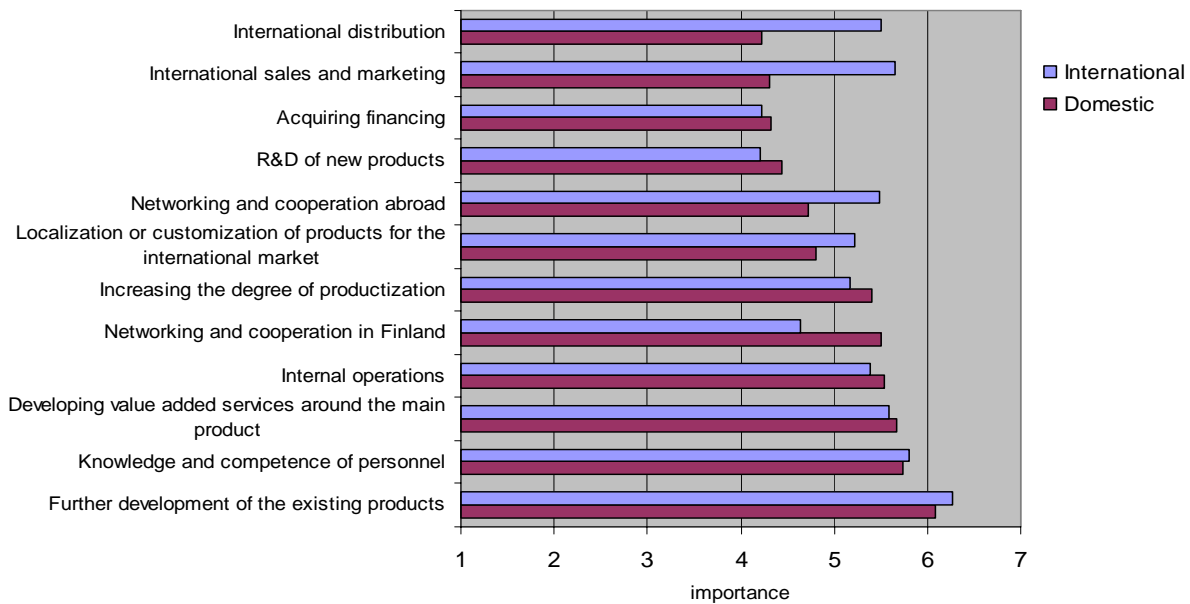


Figure 54. Improvement Emphases by International vs. Domestic Firms for 2007-2009 (n=152-154)

The most significant differences in importance perception between internationally and domestically operating firms are in international sales and marketing; networking and cooperation abroad and in international distribution, which are found significantly ($p < .10$ - $p < .001$) more important by international companies. The results indicate that for many currently domestically operating firms, internationalization is not currently issue of high priority.

While further development of the current products, skills and competence of personnel, and developing value added services around the main product are the top three improvement areas for domestically operating firms, about a third of them found international sales and marketing important or very important.

Product localization for international markets was felt to be more important by international firms than domestic ones. This finding is opposite from the finding of the previous year. Due to the low significance level ($p > .20$) of the result, we suspect that the difference is caused by statistical error. Unfortunately significance statistics are not available for the last years study.

5.4 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 23. Sweden, USA and Germany have been reported as one of the three most important markets most often. As other most important markets were mentioned the UK, Estonia, Holland, Norway, Denmark and Russia.

Table 23 The Three Most Important Markets

Rank	1st export country <i>n = 111</i>		2nd export country <i>n = 81</i>		3rd export country <i>n = 62</i>		1st-3rd export country* <i>n = 254</i>	
1	Sweden	31 %	Germany	21 %	UK	15 %	Sweden	20 %
2	USA	21 %	Sweden	12 %	Norway	11 %	USA	13 %
3	Estonia	9 %	Netherlands	10 %	Sweden	10 %	Germany	11 %
4	UK	6 %	USA	9 %	Germany	10 %	UK	9 %
5	Germany	5 %	UK	7 %	Netherlands	6 %	Estonia	7 %
6	Denmark	4 %	Estonia	7 %	USA	6 %	Netherlands	5 %
7	Russia	4 %	Poland	5 %	France	5 %	Norway	4 %

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

The concentration in the most important foreign market has increased a little since last year. In the sample of 91 firms, on average 68 % of the export volumes came from the most important foreign market compared to last year's 61 %. The three most important countries now stood for 90 % of all exports. The concentration of exports for 2006 is shown in Figure 55..

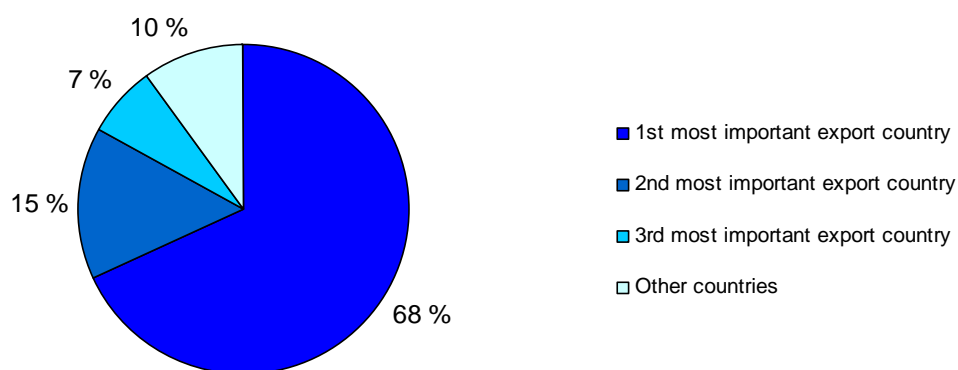


Figure 55 Concentration of Exports (n=91)

Figure 56 shows functional presence of firms in the three most important markets for those who ticked at least one of the functions. Although most of the activities are generally organized and taking place domestically due to the generally small size of analyzed firms, many companies report on wide portfolio of functional presence also in their primary foreign markets.

For the sample firms help desk, maintenance and other customer support services took place directly in the occupied markets in 58 % of the first most important export countries. It was also the most common activity abroad in second most important export countries. 37 % of the firms reported localization activities at their primary target markets, and 33 % training activities. 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 functions such as help desk, training 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 close 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.

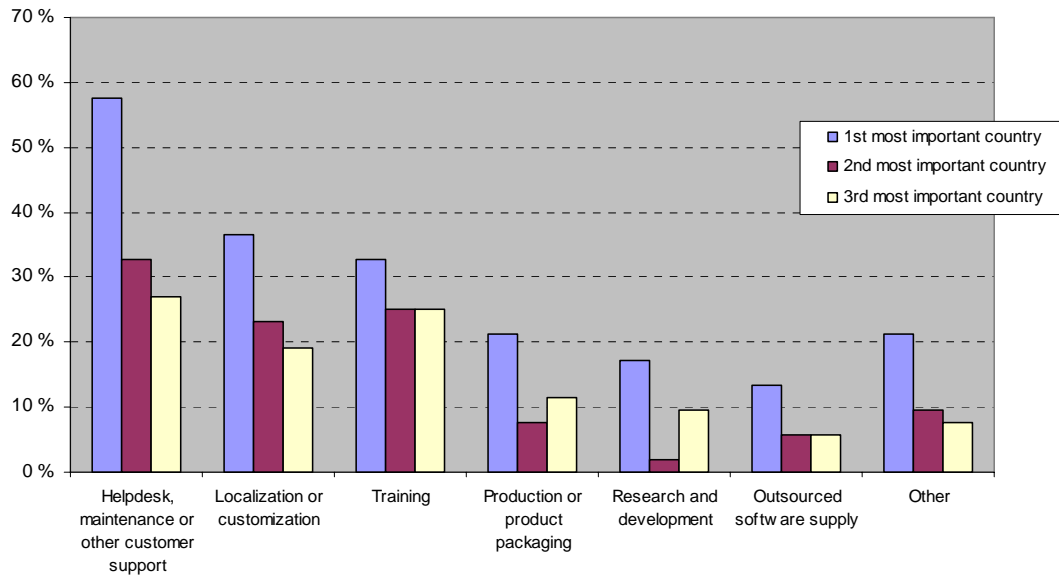


Figure 56 Functional Presence of Firms in Export Markets among Responding Firms (n=52)

5.5 International Sales Channels

By far the most popular channels used for foreign sales were own direct sales followed by foreign value-adding retailer or agent. Direct sales were reported to be used to some extent, a lot or very much (4 - 7 on likert scale) by 70 % of responding internationalized firms, while about 54% of them made use of retailer or agent. 26 % of the firms used Internet distribution as a sales channel abroad and about every fifth firm was selling to OEM or under reseller’s own brand. Foreign wholesalers and bundle sales with other products were used only rarely in Finnish software product industry. The frequencies of using individual sales channels to some extent, a lot or very much is shown in Figure 57.

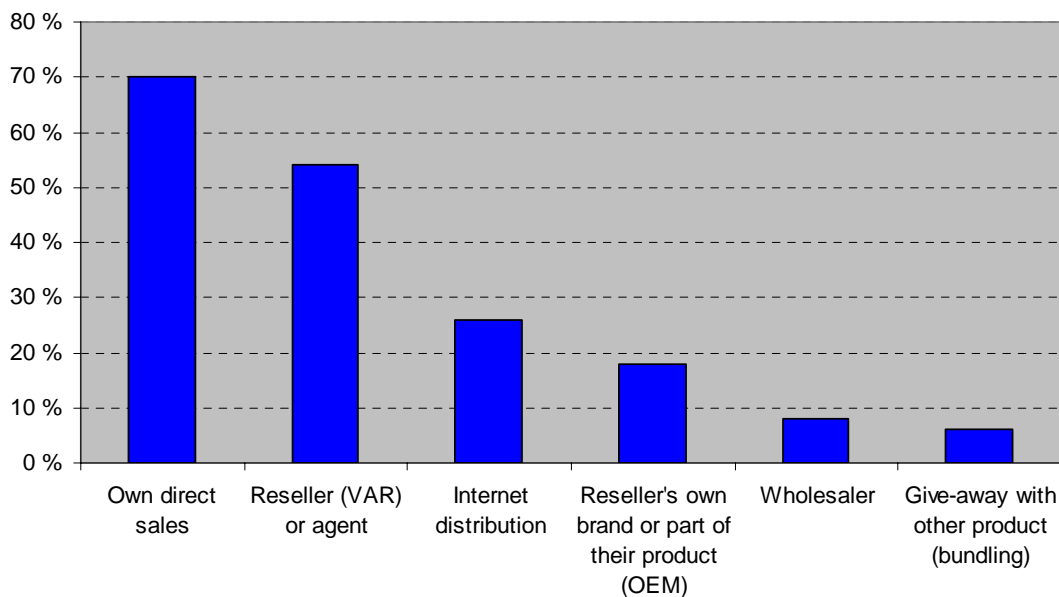


Figure 57 Frequency of Use of Sales Channels Abroad among Responding Internationalized Firms (n=100)

Some characteristics of firms using the most popular sales channels are shown in Table 24. As said before, the most widely used sales channel abroad was own direct sales. The use of different sales channels does not seem to be significantly related to profitability, growth expectations or firm age.

Table 24 Firms' Characteristics by Sales channel

<i>Sales channel</i>		<i>General firm characteristics</i>				<i>Intl. operations firm characteristics</i>		
		<i>Total revenue (M€)</i>	<i>Revenue from own SW product business (M€)</i>	<i>Predicted sales growth (%)</i>	<i>Profit (M€)</i>	<i>Age</i>	<i>No. of countries</i>	<i>Foreign revenue share</i>
<i>Own direct sales (n=70)</i>	<i>Mean</i>	5.5	4.6	39 %	0.47	11.1	10.5	37 %
	<i>Median</i>	0.9	0.7	28 %	0.02	11.0	4.0	23 %
<i>Reseller (VAR) or agent (n=54)</i>	<i>Mean</i>	6.8	5.6 [†]	36 % [†]	0.77	12.6	13.0 [†]	39 % [†]
	<i>Median</i>	1.1	0.9	22 %	0.07	12.0	4.5	28 %
<i>Internet distribution (n=26)</i>	<i>Mean</i>	7.1	6.5	39 % [†]	0.92	12.8	14.6	40 %
	<i>Median</i>	0.4	0.4	27 %	0.03	12.5	6.5	25 %
<i>Reseller's own brand or OEM (n=18)</i>	<i>Mean</i>	3.3	2.2	52 %	-0.21	11.7	10.4	41 %
	<i>Median</i>	1.4	0.9	34 %	0.00	11.0	6.0	25 %

[†] = p < .10

6 FINANCING AND OWNERSHIP

The financing needs of the Finnish software product companies are different compared to Finnish companies in general. The whole industry is dynamic and global by nature, which makes it imperative for companies to internationalize rapidly. 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 section 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.

6.1 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 Figure 58. The sample used for ownership structure analysis consists of 183 responding companies. The majority of the ownership was held by the founders and their family members, representing on average 73 % of the ownership. This represents a 4 percent unit increase compared to last year. The second biggest share, about 9 %, was owned by management and employees followed by corporations with 8 percent.

From the perspective of the dynamics of the ownership, there was a significant increase in the share owned by corporations from last year's 4.8 % to the year's 7.5 %. The most significant decrease was in the ownership share of private venture capital (VC) investors that fell from last year's 6.1 % to 3.5 %. Also the shares of management, business angels, financial institutes and other investors and shareholders were slightly smaller than last year.

In our sample, companies' ownership was principally in domestic hands (Figure 58.). On average, 92.6 % of company ownership was domestic. Of the 156 sample companies, in 136 there was no foreign ownership at all. When foreign ownership was present, the average share was 58 % and the median share 50 %, which represents a considerable increase compared to last year's figures.

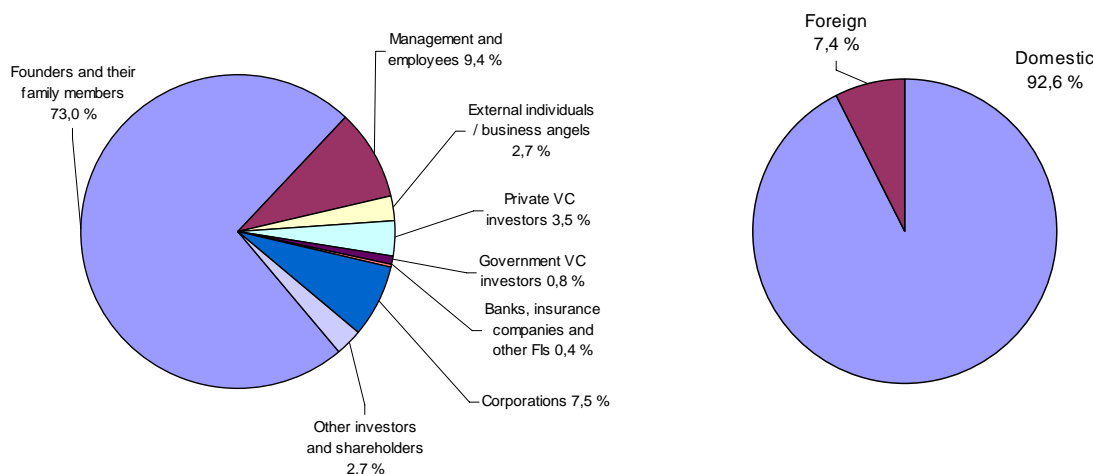


Figure 58 Ownership Distribution (n1=183; n2=156)

Another useful perspective to study the ownership structure is to group the ownership structures along their age. For this purpose, the overall usable sample of 182 firms was divided into four groups according to their age. The sample is somewhat biased towards the older end of firms. The two youngest groups contain altogether about 38 % of the available sample, which leaves 62 % of the firms to the two oldest groups. The three first groups are, however, almost the same size. Figure 59 presents the resulting average ownership structure as distributed along the firms' age

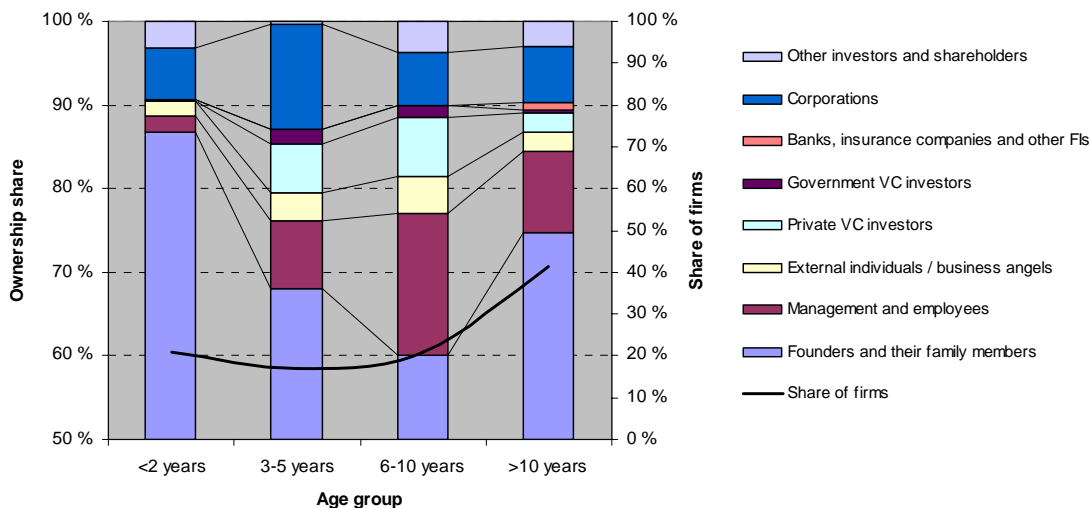


Figure 59 Ownership Structure by Firms' Age as of 31.12.2006 (n=182)

The ownership share held by founders and their family members in Finnish software product firms was strong and relatively stable over the whole life cycle ranging from 60 % to 87 %. This is somewhat surprising considering the large share of older firms in the sample. The ownership share of corporations was also relatively stable over the age groups with its value around 6 % apart from the second youngest group where the share of corporations was as high as 12.5 %. The other shares were on average rather more volatile between age groups, except perhaps the share of business angels, which ranged from 1.8 % to 4.3 %.

The ownership share of management and employees was quite unstable in relation with the age of the analyzed firms. Starting from just 1.9 % for the youngest group, it went up to 17 % in 6 to 10-year-old firms. The most significant drop from last year was probably the share of ownership of private VC investors in the first age group decreasing from last year's 15 % to 0 %. In addition, the trend of the decreasing share of VC ownership when firms mature noted in previous years' surveys, following the logic of risk capital, is even less apparent in this year's survey as last year. The ownership of banks and other financial institutions was present only in the most mature age groups, and the least risk bearing companies counting for 0.9 % of ownership. The detailed firm ownership structure by age is also represented in Table 25.

The figures for founders and family members, and management and employees as owners are statistically significant ($p < .01$), but other forms of investment are not. It seems that after the initial owners there is no clear trend of ownership change in the sample.

Table 25 Ownership Structure by Firms' Age as of 31.12.2006 (n=182)

	<2 years	3-5 years	6-10 years	>10 years
Founders and their family members	86.7 %	68.1 %	60.0 %	74.6 %
Management and employees	1.9 %	8.1 %	17.0 %	9.9 %
External individuals / business angels	1.8 %	3.4 %	4.3 %	2.1 %
Private VC investors	0.0 %	5.9 %	7.2 %	2.3 %
Government VC investors	0.3 %	1.7 %	1.5 %	0.4 %
Banks, insurance companies and other FIs	0.0 %	0.0 %	0.0 %	0.9 %
Corporations	6.1 %	12.5 %	6.2 %	6.8 %
Other investors and shareholders	3.2 %	0.3 %	3.7 %	3.0 %
Share of responding firms	20.9 %	17.0 %	20.9 %	41.2 %

6.2 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 the possible impacts of finance availability problems are.

On average, 35 % of the 223 firms agreed or fully agreed the availability of risk finance to be a major barrier to the emergence of new software companies. However, as shown in Figure 60., there were clear differences in this perception based on the firms' age. Older firms were on average less likely to perceive the availability of risk finance a major barrier for the emergence of new software companies except for the group of oldest firms of which 40 % considered lack of risk finance a barrier.

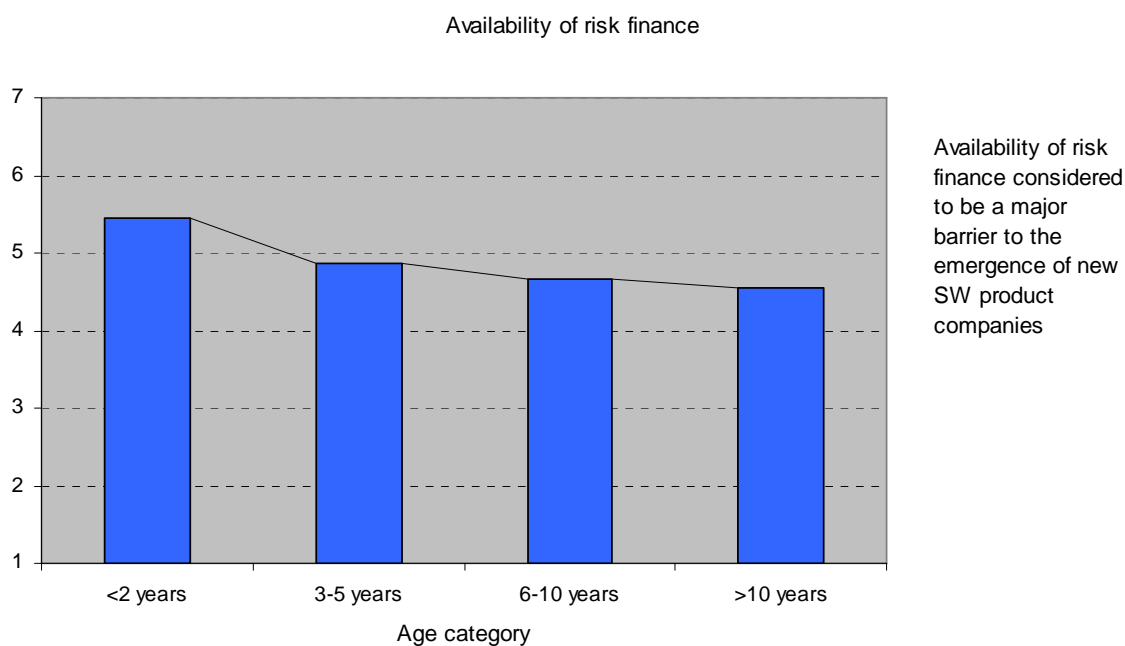


Figure 60 Opinion on the Availability of Risk Capital by Age (n=222)

6.3 Financing Plans

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

39 % of the 274 responding firms planned to seek external finance within the next two years (2007-2008) as shown in Figure 61. This represents an increase of 3 percent units compared to the share as last year. About 75 % of firms declaring to seek for financing in the next two years intended to raise additional equity based financing, which is less than last year's almost 90 %. Over 43 % of these companies aimed to raise capital loans (40 % last year) and 31 % were planning to raise debt finance (43 % 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 26.

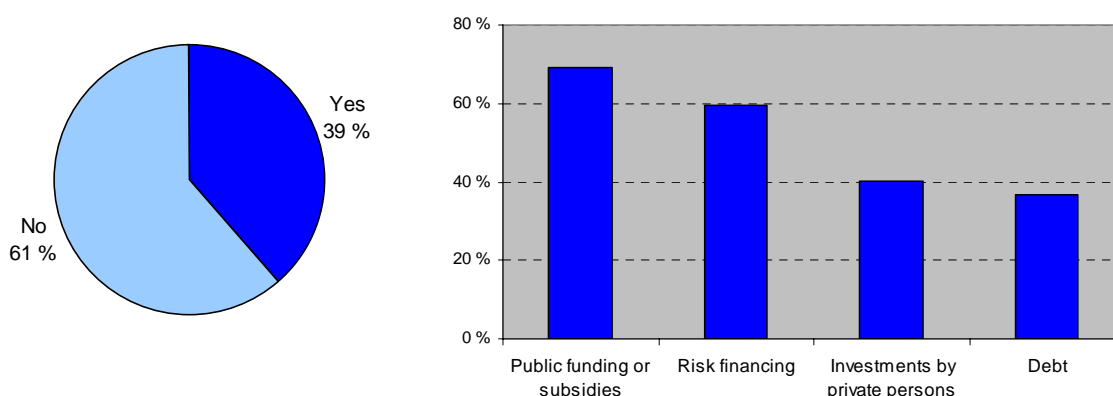


Figure 61 External Financing Plans ($n_1=274$; $n_2=52$)

Average value of equity financing aimed to be raised in years 2006 and 2007 for the companies intending to do so was 1.81 million euros (median was 1.0 million euros). This represents an increase of about 780 000 euros from last year. In the case of capital loans the average value was 990 000 euros (450 000 euros last year) and for debt financing about 870 000 euros (700 000 euros last year). The corresponding median values for both capital loans and debt were 500 000 euros. Altogether external finance was sought approximately 300 million euros as equity, 80 million euros as capital loans and 60 million euros as debt.

Table 26 Detailed External Finance Seeking Structure ($n=54$)

Source of Finance	Percentage
Equity only	35%
Capital loans only	13%
Debt only	9%
Equity and capital loans	20%
Equity and debt	11%
Capital loans and debt	2%
All finance sources	9%
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 2007 and 2008 as presented in Figure 62.

The highest proportion of firms intending to raise external finance in the horizon of two years, 61 %, was in the group of the youngest firms. Last year the highest proportion of firms by age was in the group of firms aged from 3 to 4 years, mainly due to the small amount of firms younger than 2 years in

the sample. Plans to raise new external finance decreased rapidly after the first age class but remained almost unchanged at a little over 30 % for the other age groups.

When categorizing the companies by revenue, the most frequent plans for external financing were in the two lowest categories, that is in firms having zero to 1 million euros of revenue. In both categories the share of firms intending to raise external finance was 43 %. This indicates an increase in willingness to raise external finance already in the earliest stage of development. This may indicate an increase in firms' confidence to try to raise external finance without any reference sales. The same trend was found in last years' survey. A notable change was found in the category of firms having over 10 million euros in revenue where the proportion of firms intending to apply for external finance in the horizon of two years fell back to zero from last year's 13 %. Nevertheless, in this case it has to be noted that there were only seven responding firms in this category. Hence the difference is caused by just only one firm changing their financing plans, which clearly labels this difference as a statistical error.

Profitability, measured by return on sales, had a clear negative relation ($p < .01$) with plans to seek for external finance. Approximately a half of the firms from negative to 5 percent profitability, or ROS (Return of Sales), intended to raise external finance, while this was the case for only 34 % of those having ROS between 5 % and 20 %. The share of firms willing to raise external finance with ROS over 20 % was 19 % whereas last year only 8 %. The findings support the negative effect of internally generated financing displacing the demand for external finance.

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 10 % of firms having expected CAGR (Compound Annual Growth Rate) from negative to zero and by 29 % of firms having growth expectations between zero and 15 %, while for firms with expected growth of 80 % and more per annum it was 65 %.

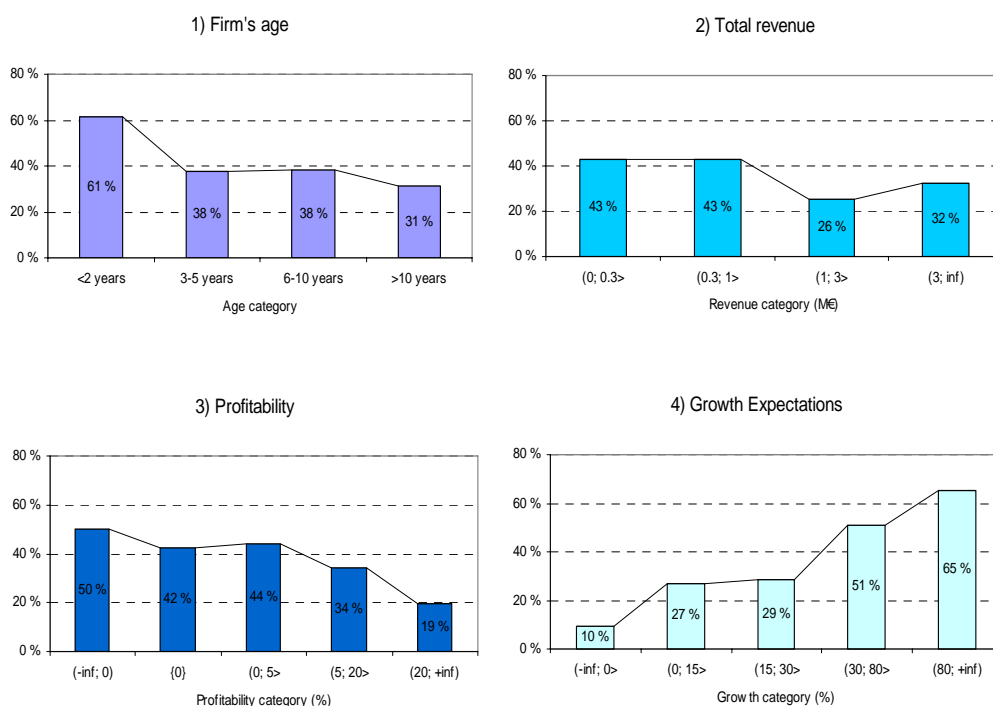


Figure 62 Plans to Seek External Finance by Age, Revenue, Profitability and Expected Growth ($n_1=273$; $n_2=244$; $n_3=230$; $n_4=224$)

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. However, only firm age was a significant predictor of financing plans ($p < .01$). Generally, small firms had higher proportion

of planned capital loan financing plans. With increasing maturity, debt financing plans become most popular.

Equity was, like last year also, by far the most popular type of external finance independent of company age, revenue, profitability or growth. Unlike earlier, however, equity financing plans seemed to be rather stable over all company characteristics as in this year's sample there was no clear correlation between seeking of equity and company age, revenue, profitability or growth expectations. The detailed financing plans of firms by age, total revenue, profitability and sales growth expectations are presented in Figure 63.

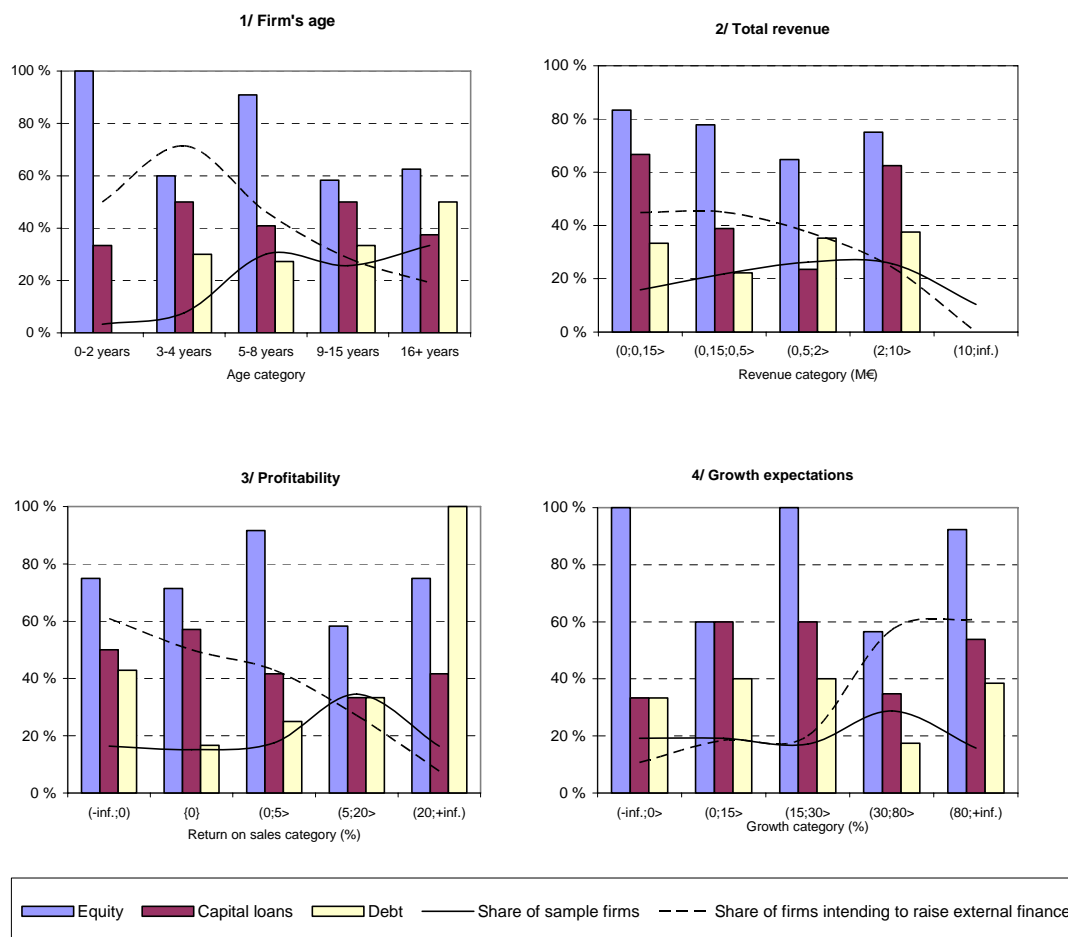


Figure 63 Detailed Plans to Seek External Finance by Age, Revenue, Profitability and Expected Growth ($n_1=55$; $n_2=55$; $n_3=55$; $n_4=49$)

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 36 % share of firms intending to raise external finance in 2006 remained constant from 2005. The comparison of external financing plans structured by growth expectations as in years 2005 and 2006 is presented in Figure 64.

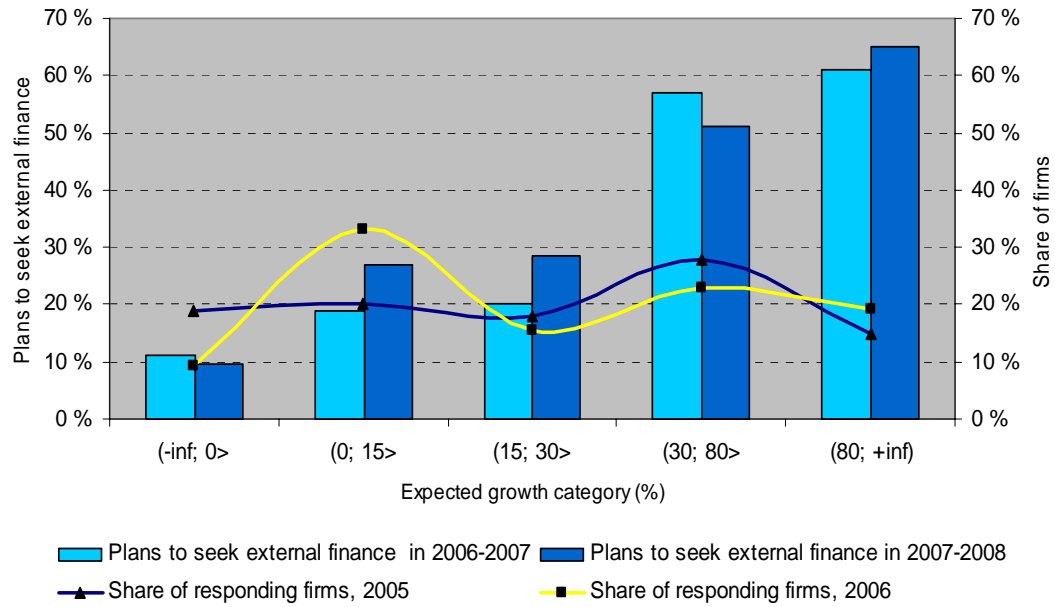


Figure 64 Comparison of Financing Plans between 2005 and 2006 ($n_{2005}=146$; $n_{2006}=224$)

7 CONCLUSIONS

7.1 The Current State of the Finnish Software Product Industry

In 2006, the Finnish software product industry's revenue grew to 1.41 billion euros representing 13.1 % growth from 2005. International business grew 8.9 % amounting to 514 million euros. When comparing this to last years figure of 24,4 % it is easy to interpret this as declining internationalization rate. However, we believe that the difference is mostly a statistical error, which is analyzed further in Appendix 2. Furthermore, companies' profitability increased from the previous year's 2.8 % to 5.6 %. In 2007, expectations for the future are positive, but slightly less so than during the previous years. This can be interpreted either as a signal for declining growth, or as a result of different sampling and analysis techniques utilized.

The main results of the survey are summarized in Table 27.

Table 27 Current State of the Software Product Industry

Current state of the software product industry in Finland

Software product revenue continued to increase

- The software product revenue grew 13.1 % (9.2 % in 2006) reaching 1.41 billion euros in 2006
- International business increased by 8,9 % (24.2 %) amounting to 514 million euros
- Domestic revenue grew by 15.3 % (1.4 %) and was 894 million euros.

The amount of personnel increased from previous year

- The industry employs ca. 13 000 software professionals (12 340 in 2004)
- Companies are planning to recruit more personnel in 2007, but mainly the smaller firms aim to recruit.

Profitability has improved from last year's 2.8% to 5.6%

- 22 % of the companies had profitability over 15 % (24 % in 2005)
- 13 % of the responding companies were unprofitable in 2006 (15 % in 2005)

Internationalization rate has decreased

- Little less than half of the companies (48 %, 59 % in 2005) have international operations but 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 seeking internalization

- Young firms still find the availability of risk finance as a significant barrier for the emergence of new software product companies (34 % of less than 2 year old firms, 67 % in 2005)

In 2006, we observed many signs of positive development in the Finnish software product industry. However, we also noticed that the Finnish software product industry still continues to struggle with the same main challenges as in the 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 the moderate revenue figures, in the low revenue per employee ratio, and in the low degree of productization. Raising the degree of productization continues to be one of the most important issues for the software product companies. At difficult economic times, this is especially challenging as companies have to find a balance between the long-term productization aims and short-term need for cash, which is often acquired by doing 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. Moreover, according to this survey's findings, many of the companies are still in a relatively early stage of their product development and only low share of the majority of the internationalized companies' revenues come from abroad. However, in 2006 software companies placed productization, product development, and international sales and marketing as their main areas for improvement that they focus on.

7.2 Implications of the Findings and Points for Consideration

The study brought up some issues that we think need further discussion. These issues included financing, raising the degree of productization and mastering product development, networking, and internationalization. In the following sections we discuss each of these issues based on the findings of this year's survey.

7.2.1 Financing and Ownership

Finnish software product companies have very conservative financial structures with little debt or outside equity especially compared e.g. to the Finnish biotech companies. While good for survival, such conservative capital structures are not optimal for rapid growth and internationalization, which are important for the long-term viability and overall growth of the industry. 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 very serious for the growth-oriented, young, small, and negative cash-flow companies as these companies would need it the most. These companies are significantly more pessimistic than the older companies concerning the lack of financing, which they see is preventing the emergence of new software product companies. The current financial environment seems to discourage 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 the necessary conditions for them to make risky investments in the software product companies. Foreign investors appear to provide highly valuable internationalization support for their portfolio companies and in doing so complementing the domestic investors (Mäkelä & Maula, 2006). However, the amount of foreign investments and ownership in Finnish software product companies is very small. In addition to adding to the supply of risk capital, attracting more foreign investors into investing in the 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.

7.2.2 International Operations

This year, 48 % of the Finnish software product firms reported receiving revenues from abroad, which is a significant change to last year's 59 %. However, on average only a low share of their revenues came from foreign markets. Moreover, when looking at the distribution of foreign revenue shares, there is still 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. Furthermore, internationally operating firms were bigger both in terms of revenue and number of employees as well as profits than their domestically operating siblings. However, internationalization is

also highly risky. While domestic firms reported relatively balanced profitability, internationally operating ones may be less profitable as domestically operating firms which yet again tells about the risky nature of internationalization. Our analyses suggest that early internationalization can be very rewarding in terms of growth, but there is also high risk associated with it.

In general, firms in the Finnish software product industry find their products and services suitable for the 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. However, the software product business is volume-based and international expansion is a necessary step for companies that are growth-oriented. Necessity of internationalization accelerated by industry dynamics and saturation of the Finnish market, combined with the risk associated with it indicates how crucial this step is for further viability of business.

7.3 Concluding Remarks

Three large software 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 in general and software exports in particular. All of 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. In a comparison to other software exporting countries that have not succeeded that well, e.g. to Russia, China, and the Philippines, revealed that either these countries had no national strategy at all or it had no focus.

The detail of strategies for achieving the visions set varies. Common strategies have been that governments have acted 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.

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. Based on the results of this survey, we identified the following crucial development areas:

- Increasing the internationalization rate of their business is a challenge for most of the companies
 - Further improvement of the knowledge and skills related to internationalization is needed especially in case of the SMEs
- Improvement of the knowledge and skills needed in software productization and product management
- The support efforts should be concentrated on the most promising firms in order to develop internationally capable and competitive companies
 - The strengthening and development of networks and supporting services especially in case of small companies is important

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

- 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 grow in the global markets

The Finnish public and private sector should work closely together with their international counterparts in order to help to remove or lower the barriers for internationalization of the Finnish software product companies.

APPENDIX 1 STUDY DESIGN AND RESEARCH METHODS

Data collection

Data for this study was collected from the Finnish Software industry using a multi mode survey design. The data, which consists of 342 firms were collected following the tailored survey design method presented by Dillmann (2007). Instead of drawing a sample of the population we opted for a census approach, where each firm in the population is contacted for the survey. Currently there is no comprehensive list of all Finnish software companies, and due to this significant effort was put into constructing the mailing list for the survey. Coverage is a general problem in this kind of studies, and a general solution is oversampling, which refers to sampling also firms from adjacent populations (Groves et al., 2004, pp. 70-75), in this case for example from the media and information processing industries. We estimate that the sampling frame, which included 2616 firms, was oversampled 1 to 3, for each three firms in the frame we estimate that there was one software firm.

Data for the sampling frame was collected from three different sources: First, we included all firms which had answered this survey previously and all firms in the frame used in this study in the year 2006. This frame, which is described in (Lassila et al., 2006) resulted in the inclusion of 1863 firms. Second, we contacted the commissioner of the previous years study, The Center for Expertise of Software Product Business for their list maintained at [www-portal www.swbusiness.fi](http://www-portal.www.swbusiness.fi), resulting in the inclusion of 1111 firms. Last, we included all firms with Finnish industry code¹⁵ 722001 and all firms with more than four employees in adjacent industry 722, 723 and 724 from a commercial database. After removing of duplicates based on company identification codes and imputation of the missing identification codes using Finnish trade register and the commercial database, the contact information for the firms in the sample frame were update using the commercial database. Missing e-mail addresses were collected from company www-sites. The address data contained a contact person for each firm, and the highest whose name was available to us in the company data was chosen as a contact person. Typically, this was the CEO of the firm. If personal email of the contact person could not be found, we used a general emailing address, for example the sales email, for the firm. In all, this resulted in the inclusion of 2616 firms

The sample was stratified on three criteria: the size of the firm based on the revenue, the previous year when the firm had responded to the survey and whether the firm was a public company or not. The sizes of the strata are described in Table 28 below.

Table 28 Sizes of Strata in the Sampling Frame

<i>Stratum</i>	<i>Size of stratum</i>
All companies	2616
Revenue over one million euros	573
Responded in 2006	170
Responded in 2005	70
Public company	30

The survey was implemented in two stages. First, a pilot survey with 15 % of the firms was contacted at the second half of April 2006. This sample, which contained 291 firms, was chosen from the firms which had never responded to the survey and had complete contact data. The purpose of the pilot study was to eliminate any errors in the survey design or the survey instrument and it was considered more appropriate to use firms that had not responded during previous years so that in the rare case of design error, the objective of collecting time series data on firm level would not be compromised. In all, 66

¹⁵ Finnish industry codes are equal to NACE codes.

firms provided usable responses to the pilot study, and 59 firms reported that they were out of scope of this study. Post hoc evaluation of the sample revealed that this sample contained a significant amount of firms which were out of scope of the study. Due to the small amount of usable responses, the data from pilot study were not analyzed using statistical techniques, but feedback from the respondents was used to improve the design of the survey. All non respondents (excluding the firms which informed us that they were out off scope) were included in the main survey, which was sent to 2550 firms.

Both of the surveys were implemented following a modified version of the tailored survey design method (Dillman, 2007). First, the contact person of each respondent was sent a pre-notice letter explaining the purpose of the survey and why participation of the firm was desirable. To convince the informant of the importance of the survey, several organizations closely linked to the software industry were asked to endorse the survey. Signatures of high ranking persons and logos of these organizations were used as a sign of endorsement. In addition, we promised to provide company specific reports of the responses to further increase the response rate. See Appendix 9 for an example report.

Two days after the pre-notice letter, the main survey package was sent to the respondents. The package contained a cover letter containing the content of the pre-notice letter and instructions on how to participate in the survey, an 8 page A4 size questionnaire booklet containing 6 pages of questions and a prepaid return envelope. Two days after the mailing, the respondents were sent an email about the survey containing a link to a www-version of the questionnaire. The printed questionnaire contained instructions on how to answer the survey using the www-form and the email contained instructions on how to obtain a printed copy of the survey instrument. Each respondent was identified with a 4 digit code and a verification letter. The respondents were instructed to return a blank questionnaire if they felt that they were out of scope of the survey, or if they were unwilling to reply.

In addition, a press release was released at the time to of mailing the main survey package informing about the start of this annual survey and encouraging firms not included in the sample frame to respond.

Two weeks after the mailing of the survey package the respondents were contacted with a reminder email containing a link to the www-questionnaire and instructions how to obtain a new copy of the paper form. This email also prompted the recipients to reply if they were not software product firms.

In the main survey, we also included a fourth contact two weeks after the third contact: this was a second email reminder to all non-respondents having similar content to the previous reminder. However, two key differences were included: first, this reminder set an explicit deadline for the responses indicating that the survey was coming to an end. Second, we classified the firms into two categories: main and priority. A firm qualified for the priority category if it filled one of the following two conditions: The firm had responded to the survey in the previous two years and had an estimated revenue more than one million euros, or the firm had an estimated revenue of more than three million euros. In all, 573 firms were labeled in the priority category. Extra effort was spent to get the attention of these firms: First, several members of the research team scanned through the list of companies and identified firms in which they had personal contacts, and sent personal emails to these potential informants as well as the original informant. For the rest of the firms approximately two more contacts were identified from the firms' www-pages and a tailored email informing about the study were sent on average to three people per firm. To avoid duplicate replies, one email for three recipients was used instead of three emails to one recipient.

Last, after the final email reminder was sent, we called through the list of priority firms to increase the response rate. Also, we offered these firms an option to reply to the most important questions by telephone, but none of the contacted firms utilized this option. Due to tight schedule of the research the amount of firms contacted by telephone was 65. During the emailing of the research we were informed of several firms who had moved, whose contact person was not employed by the firm, or who were not operating as an independent company any more. The non-response caused by changing contact persons was remedied by addressing the person primarily through his position, so that a new person holding the

position would open our mailing. All undelivered postal mail and email was analyzed, and where possible, the contact was repeated using new contact information of the firm. Table X contains summary information about the amount of contacts and undelivered mails.

Table 29 Summary of Contacts and Undelivered Contacts

<i>Contact</i>	<i>Method</i>	<i>Firms</i>	<i>Undelivered emails</i>	<i>Undelivered postal mails</i>
Pre-notice letter for pilot study	Postal mail	356		30
Main survey package for pilot study	Postal mail and email	356	144	16
Reminder for pilot study	Email	N/A		
Pre-notice for main study	Postal mail	2324		160
Main survey package for main study	Postal mail and email	2620	369	149
First reminder for main study	Email	N/A		
Second reminder for main study	Email	N/A		
Third reminder for main study	Telephone	65		

The data collection period of the study lasted from April 2007 to beginning of July 2007.

All together, the survey produced 287 usable responses. The primary data was complemented by secondary data which contained financial information. This data was obtained in two different ways: First, the commercial database was checked against the list of respondents and financial information from the data base was combined to our data. Second, we tried to obtain the annual reports of all software product companies with revenue of more than three million euros. Based on these reports, we estimated total revenue, software business revenue, export share of revenue and number of employees for the all non-respondent companies with revenue of more than three million euros. In total data for 27 firms were estimated. Estimation methods are described later in this appendix.

The primary survey was accompanied by two secondary surveys sent to a subset of the respondents of the primary survey. The sampling frame for this survey was chosen by including all respondents who had completed the primary survey, identified themselves as software product firms, and had at least five employees. Altogether, 123 firms from the 287 respondents providing usable data qualified for the secondary surveys. The secondary surveys were aimed at marketing and product development functions of the respondents using the heads of the functions as informants. The informants were identified using data collected in the primary survey and contacting the firms by telephone. If the same person was nominated as the head of marketing and product development, as was often the case in smaller firms, he was instructed to name of his subordinates as an informant for another one of the surveys. Analyses of these data could not, however, be completed in the timeframe of the project; we thus chose to report the results of the secondary surveys at a later date.

Development of the survey instrument

Survey instrument was developed using the questionnaire from the previous year as a starting point and closely following the instructions by Dillman (2007). for questionnaire development. For some of the new scales, scale development protocol as presented by DeVellis (2003) was followed. Unfortunately, the pilot study did not provide sufficient data for scale purification and we had to use unpurified scales in the main study.

The development of the survey instrument proceeded as follows: First, based on the feedback from the previous years we decided to make the instrument considerably shorter. Six-page questionnaire was decided on since it can easily be printed on an A4 size booklet with front and back covers. All items which were not considered significant for the purpose of the survey – to describe the current state of the Finnish software industry – were eliminated. Item which had been included for more than 3 consecutive years were retained for the purpose of measuring change over time in these items.

Second, the research group implementing the survey was asked to generate new questions that would be of interest for them. Two researchers submitted questions which were included in the working version of the survey instrument. This practice differs from previous years and was adopted to offer the implementing research group a chance to get data from the survey for their own research projects. The new practice was seen as a needed one, since this year the study did not start as a commissioned research but as an internal project of Helsinki University of Technology.

All new scales were constructed as follows: first, the researcher interested in submitting questions developed several items measuring the specific traits of firms that he was interested in. Then these long lists of items were discussed in the research group and all items which were considered to have poor face validity were eliminated.

All scales adapted from previously published international research were translated to Finnish using double blind translate and back-translate procedure (Brislin, 1970), where two members of the research team first translated the original items from English to Finnish and two other people then translated these translations back from Finnish to English. The translators were instructed to translate also the context of the items, if the content validity was considered poor by the translator. After these four translations, the results were compared and the final translations were chosen.

Appendix 3 describes the scales that were adopted from external sources and used when performing analyses for this report or the respondent reports.

After the initial round of developing new items, the existing items were checked against the criteria for good survey questions presented in Dillman (2007). In case of ambiguous items, these were discussed in the research team and corrections were made. In all, we applied the following changes:

- All items that had been previously asked in English were translated in Finnish.
- Several grammatical errors were corrected.
- Several items considered ambiguous were clarified.

The layout of the questionnaire was enhanced by adding arrows and instructions to help navigating through questions which cause the questionnaire to branch. In addition, items which were asked using rating scales were combined to larger panels, and anchors were included for each option in the rating scale. The aim for this was to make it easier to answer the survey.

After the first working version of the questionnaire was ready, several questions not considered important were removed to make the 6 page limit. Also, some layout changes were applied.

When the 6 page survey form was ready, it was submitted to the research group for critique and several corrections were made based on the feedback. Second round of feedback was collected after presenting the survey instrument to the steering group of this research project. As a last check for clarity and content validity of the items, we sent the survey form to several managers of Finnish software product companies and asked for comments.

Www-version of the survey instrument was developed simultaneously with the paper version. This questionnaire was intended to be as close of a copy of the paper form as possible. Due to an unfortunate error, some items in the www-form were different from the paper form causing item level non response in the data.

After the pilot study all forms were revised to better categorize the respondent into software product firms and software firms, or out of scope of the research. The need for this was seen based on the results of the pilot study, which was considered to be too discriminative in the categorization and resulted in misclassification of several software companies as out of scope of the research. Also, during the pilot project a need to have the survey form in English was realized and the www-version was translated by one researcher and later checked by another.

Regardless of the special attention paid to the development of the survey instrument, we could not eliminate all errors. However, this is not uncommon in survey research. The errors, their impacts and applied remedies are discussed in Appendix 2 which discussed the reliability and validity of the study.

The final version of the survey instrument is included as Appendix 8.

Data preparation and analysis

Data analysis was carried out using SPSS 14.0 for descriptive statistics and data preparation and Intercooled Stata 8.0 for analytical multivariate statistics.

Before starting data analyzes, the data were systematically inspected for errors. All metric variables were examined visually using box plots and stem and leaf plots for both the raw variables as well as key ratios (e.g. revenue/personnel) in order to find and eliminate clear errors, mostly resulting from typing errors. Personnel and revenue figures were inspected for inconsistencies, such as a company's software product revenue exceeding its total revenue, or the amount of personnel working in different functions adding up to more than the total amount of personnel. Inconsistent personnel figures were scaled to be in line with the total amount when it could be reasonably assumed that it described the actual situation of the responding company. Responses to questions containing multiple fields with percentages, like those concerning the composition of the sales revenue and ownership, were also inspected to make sure the variables did add to exactly one hundred percent. In case they did not, all the figures were scaled maintaining the ratios of the individual variables. In addition to the first elimination of clerical errors and outliers, we performed separate elimination of outliers for each analysis performed. In addition, where possible, pair-wise elimination was used instead of list-wise elimination.

All measures reporting ratios of different variables were purified against errors caused artificially high values caused by small denominators by eliminating each value that was more than 4 standard deviations away from the mean value. Due to the large effect of these values to the mean and standard deviation, this rule was applied iteratively until no more value was eliminated. In normal distribution, this corresponds roughly to eliminating one out of thousand observations. The amount of data used in each analysis is presented with the results after outliers have been eliminated.

Descriptive analyses were carried out using SPSS 14.0 and consist mainly of calculating means and medians of the data. All classifications of respondents to groups for comparison purposes were conducted using univariate statistics. The decision criteria used are reported with the results. In the case of rating scales with ordered items, we treated these items as interval scales. While this is strictly speaking not correct, it provides the most straight forward way to describe the data in the report and is in line with the reports from the previous years. All 'I do not know'- responses were treated as missing data.

The statistical significance of mean comparisons was analyzed using t-test and one way analysis of variance. This method analysis method was applied because mean comparison is sensitive to statistical error and does not provide ways to assess the robustness of the findings. If the difference in means is caused by just a handful of influential observations, analysis of variance will reveal that the finding is probably caused by chance than a real difference.

Exploratory factor analysis and multiple regression analysis were used to examine the dependencies between variables in the data. Factor analysis is a statistical technique calculates the amount of shared

variance between variables and groups the variables to several factors. These groups are called factors and they are considered to represent an underlying latent dimension in the data measured by the items as indicators (Hair, Anderson, Tatham, & Black, 2006). In this study principal factor analysis was applied since we were more interested in the underlying dimensions than the shared variance.

Several items forming a factor were combined as constructs using linear combination of standardized values of the variables. Convergent validity was measured with Cronbach's alpha coefficient. All constructed composite scales are presented in Appendix 3.

For factor analysis, Bartlett test of sphericity and Kaiser-Meyer-Olkin measure of sampling adequacy (MSA) were used to test for the suitability of the data for factor analysis. In cases where the data were in violation with the assumptions of factor analysis, items with the lowest MSA were iteratively removed from the analysis until acceptable values were produced. All analyses which violated the assumptions of factor analysis were discarded from the report.

After generating the constructs with factor analysis and variable transformation, OLS regression or logistic regression was applied to investigate the relationships between the variables. The purpose of regression analysis is to estimate if there are linear statistical dependencies in the constructs. In the context of this study, regression analysis was used to examine empirical validity of interpretations made on the basis of descriptive statistics.

Assumptions of regression analyses were examined visually with the help of stem and leaf plot and scatter plot matrix, and analytically using variance inflation factors. While these tests do not exhaustively test for the appropriateness of the data for regression analysis, we consider this level to be sufficient due to the small role regression analyses play in the report. All analyses which violated the assumptions were discarded from the report.

The results of all confirmatory multivariate analyses are reported as *p*-values. The practical interpretation for *p*-value is the likelihood of the difference in means to be purely a coincidence rather than real difference in populations. For example if means of two groups are compared and the resulting *p*-value is .5, this indicates that the likelihood of getting similar difference of means is 50 % if the data were assigned to the groups randomly rather than using a pre-specified criterion. Commonly the value of .1 is considered the highest that can be considered to be statistically significant.

Non-response is a significant source of error, especially with census designs (Groves et al., 2004). In this study the effect of non-response to the results was attempted to minimize by maximizing the response rate. The effect of non-response was tested in two ways: First, we compared the composition of our sample to our sampling frame and secondary data to see if there was a systematic pattern of non-response that might threaten the validity of the study. Second, we did a comparison of early and late respondents: We split the data in half according to the response data and performed an analysis of variance for the key variables of the study to see if the early and late respondents gave systematically different answers. The results of non-response analysis are presented in Appendix 2 when the results of the study are evaluated.

Estimation techniques and assumptions

Estimating the number of companies in the industry

The total number of firms which offer software products in Finland was estimated using the following procedure. First, secondary data was used to stratify the non respondents based on the size of the firms into five strata. Then a random sample was drawn from each stratum to achieve +/-10% accuracy with 95 % confidence level for the number of firms. All firms in the largest stratum were included. Each firm in the samples was systematically classified as software product firm based on public data available on the firm. Main data sources used were company www-pages and the Finnish trade register.

Table 30 shows the results of this analysis. In all, there were 587 non-responding software product firms in the sample. Hence, we estimated that the sampling frame contained altogether 900 +/-5% software product firms. After discussing the estimate with members of the steering group of the project, we decided to use 1000 as the estimated number of firms in the industry. The rationale for this decision was that our sampling frame, although carefully constructed, probably did not cover all firms. Although the number of firms is smaller than the estimated number of 1100 firms in the last years study, we do not believe that the number of firms has decreased, but that this is a more accurate estimate. Unfortunately the report from previous year does not report the estimation methods so direct comparison is not possible.

Table 30 Sampling to Estimate the Number of Firms in the Industry

	<i>Total</i>	<i>Sample</i>	<i>Software product firms</i>		<i>Software firms</i>	
			<i>Count</i>	<i>Total</i>	<i>Count</i>	<i>Total</i>
Tiny (<0.4 m€)	1204	88	23	314.6818	33	451.5
Small (0.4-3 m€)	628	86	26	189.8605	27	197.1628
Medium (3-10 m€)	119	83	16	25.63855	38	54.48193
Large (10 m€<)	113	111	11	11.1982	43	43.77477
Unkown	269	70	12	46.11429	31	119.1286
Total	2333			587.4933		866.0481

Estimation of largest non-respondent firms

In order to get as accurate as possible approximation of industry total size and total employee number in the industry, we estimated the key figures for the most the largest companies of industry in case that they did not provide primary data through the survey. The estimation of key figures used the following procedure: First we composed a list of all these companies using a threshold of 3 million euros of revenue from their own software product in 2006 as the inclusion criterion. The list was composed on the basis of several secondary data sources including the Oskari-survey's response database from previous years, the Tietoviikko's 250 greatest Tivi-company list and Asiakastieto's financial statements database. We found 51 such companies. We already had responses from 24 of those companies thus we estimated key figures for 27 remaining non-respondent companies. We focused in our estimation only on key figures which involved total revenue, own software business revenue (divided into domestic and international sales) and total number of employees. The actual estimation for individual company was done using public information such as company's annual report, company's web site and also company's responses from previous years when that was available.

Extrapolation of total size of the industry

The industry total value was estimated by extrapolation. Prior to this study, the industry size was estimated by counting the sum of revenues from all firms with software product revenue exceeding 3M €. The rest of the industry was estimated by counting the average size of the remaining firms in the sample, multiplying this with the estimated number of firms in the industry excluding the larger firms and dividing this figure with 1.2 to remedy for the skewness of the sample toward larger firms.

Due to the better coverage of this years study and the old method's sensitivity for statistical error we opted for another approach to estimate the industry development figures. First we stratified the sample according to revenue class into three classes: 0 - 0.4 million euros, 0.4 - 3 million euros and over 3 million euros. Then all firms in the largest stratum that had not reported revenue figures were estimated individually with the method described above. The rest of the strata were estimated by calculating the average figures from the respondents falling in each stratum. Then the stratum total value was calculated by multiplying the average figure it by number of companies in the stratum. Finally the industry overall value was formed by summing the total value of each stratum.

To maintain comparability of the figures, we applied the same estimation procedure to last year's data. The reported growth figures are ratios between the new estimate for using the last year's data and this year's estimate to eliminate the effect of different extrapolation methods.

After the industry figures were calculated we compared the development of each stratum to see if any of these showed extraordinary values. If this was the case, the particular stratum was examined for any influential observations that might cause statistical error and inflate or deflate the size estimate through extrapolation. The biases discovered using this analysis are described in Appendix 2.

Division of industry total value between domestic and international revenue was done mainly in the same way as the total value calculation, but due to this year's different sampling and statistical error in the last year's study, the international value required a little fine adjustment. This year small companies were much better represented in our data and especially the international ratio in the stratum of smallest companies was seriously skewed. To correct this bias we extrapolated the international revenue over strata with the average value of strata average values from both year 2005 and 2006. Thereafter the domestic revenue was calculated simply by subtracting international revenue from the industry total revenue.

APPENDIX 2 EVALUATION OF THE RESULTS

The results of the research are evaluating in terms of reliability and validity. First, the tests for reliability and validity are applied to establish the general level of quality of the research. Second, we will present specific issues that threaten the validity of the study. Finally, we present suggestions for future research.

General quality of the study

Reliability

Reliability refers to the quality of the responses in terms of the ability of the informants to provide accurate information to the items in the questionnaire. The most robust test for reliability is called test-retest which means that the informants are asked the same questions after for example half a year of the actual study and the variance between the different answers is calculated. If the variance is low, then items are reliable (DeVellis, 2003). However, in most of the cases using this method is not feasible due to resource constraints.

We did not measure any single item reliability statistics in the study. However, considerable amount of work was spent to ensure the reliability before the survey. Moreover, we present our methods in detail as to facilitate replicability of the study.

The survey instrument was constructed very carefully and in a structured manner using both pretest and pilot study (Dillman, 2007). Several procedural issues where we exercised caution are also important for the consistency of our measurement; they are as follows. Key informants were employed; the role of guessing can be controlled thereby (cf., John & Reve, 1982). Multi-item scales (Spector, 1992) were used for several of the constructs where secondary data was not available. Inter-item reliability was measured using Cronbach's alpha (see Appendix 3 for construct reliability statistics). Most of the reliability statistics for the individual constructs used in the study is well in excess of the commonly recommended threshold of .70 (e.g., Nunnally & Bernstein, 1994). Generally, the reliability multi-item scales in our research can be considered to be good.

Regardless of the meticulous construction of the survey instrument, not all issues could be solved. Based on the feedback of the respondents we identified that several items in the Likert item banks were considered ambiguous. These include for example the questions about the use of open source and SaaS model (Question 20 in the paper form). In addition, there was some ambiguity as to how the different types of revenue or personnel should be reported (Questions 5 and 6). Moreover, the question about target markets has questionable reliability due to overlap of response categories and considerably large categories to respondents' ratio (Question 7). The problems with reliability and validity of this scale are evident when comparing the results between different years. Due to the larger role of statistical error in this question, the results should be indicative at best. The question about the type of software (Question 15) was translated from English to Finnish between 2006 and 2007. Although the translation was technically correct, the respondents seem to understand the English and Finnish terms differently. The issue was noticed when comparing this year's data with the data from the previous year. Finally, a moderate amount of item non-response was detected in the final items indicating possible effect of fatigue due to long survey.

Due to possible problems with reliability of the key study variables, we performed several systematic checks that answers were logical and in line with other answers of the company. Because of the relatively large amount of responding companies, it was difficult to verify all of the answers companies have given. In order to overcome these problems and the possible bias in the data, we gathered the TOP-50 (ranked in the order of their revenue) companies' financial figures from e.g. their annual reports. In addition, secondary data from Asiakastieto Oy was used in triangulation.

Validity

Validity relates to how well the research measures the actual phenomenon and not something else. Validity can be divided into four categories: construct validity, internal validity, external validity and statistical conclusion validity (cf. Van de Ven, 2007). These concepts are presented here in the context of survey research. In general, the validity of the study can be considered to be at a decent level. Specific problems with validity are discussed in the next section after the general validity is discussed.

Construct validity

Construct validity refers to the accuracy that a set of items measure one trait – a construct- and nothing else. Most of the multi-item scales were obtained from prior high-quality research and can hence be considered to be valid. Moreover, scales were tested both before and after use (e.g., DeVellis, 2003). In this study, the reliability figures are good, which indicates that the item-level problems do not notably affect the scale (see Appendix 3). For the product development performance scale, we found only one dominant factor using principal factor analysis instead of three that were expected based on received theory. However, in the further analyses the main purpose is to measure overall capability rather than the dimensions, this does not constitute a problem. Moreover, the use of single item scales to measure several constructs can be considered a problem, which should be remedied in the future studies.

Internal validity

Internal validity refers to the extent that the identified relationships between measured constructs represent reality. Internal validity of the study can be considered to be at an adequate level. The statistical significance of all mean comparisons was tested using the appropriate techniques: t-test was used for two group comparisons and more general analysis of variance for multi-group mean comparisons. OLS and logistic regression analyses were used to validate the possible causal inferences based on the descriptive statistics.

External validity

External validity refers to the extent to which the results are generalizable. Since this study does not aim to describe the software business in general, but only focuses on one national market we discuss only the issue of generalizing from the current sample to the chosen population. Two issues can cause problems when generalizing from sample to population. The impact of non-coverage can be considered to be small, since census design was used and considerable effort, including over sampling and collecting address data from several reliable sources. Hence we can conclude that the approximately 900 software product firms is sufficiently close to the total population as to generalize the results.

Overall, we received 342 (233 in 2005¹⁶) responses, of which 287 (186) did software product business in 2006. When compared this years number of responses to the previous year's number of responses counting only the companies that actually answered the survey, we see a 76% increase in the response rate for software product firms. It was estimated that our sampling frame contained 900 software product firms, resulting in response rate of 32% which compares favorably to most other industry specific non-mandatory surveys.

The effect of non-response was tested using two different methods. First, we compared the means of the key study variables between early and late respondents, as suggested by Oppenheim (1966). We found that late respondents were larger ($p = .001$) and older ($p = .02$) than the early respondents. Second, we compared the sampling frame with the respondents. We found that industry codes 722001 (Publishing of Software) and 722002 (Other Software Consultancy and Supply) were overrepresented, which is an

¹⁶ Figures for year 2005 include firms which did not respond to the survey but for which secondary data was available. For this year, only real responses are reported in this figure.

obvious result considering that the survey targeted the software product industry and oversampling was used. We did not find any significant differences between geographical distribution and age of the sampling frame and the respondents. This indicates that the in general the data represent the software industry well. Only possible source of bias is the systematic inclusion of larger firms through the use of secondary data. However, since these figures were used only for the total industry size estimates, and stratification was applied, we can conclude that the effect of systematically including larger firms does not threaten the validity of the study.

Statistical conclusion validity

Statistical validity refers to the appropriateness of the statistical methods and the correctness of the use of these methods. In this study all statistical procedures followed the recommendations presented by Hair et al. (2006). Appropriateness of mean comparison - the most widely used statistical technique on the study – was tested post hoc by analysis of variance and its special case *t*-test. All causal inferences were verified by using regression analyses. OLS regression was used when the dependent variable was metric and logistic regression for dichotomous variables.

Sample size and distributions were checked prior to any multivariate analyses. KMO Measure for Sampling Adequacy was used to estimate the appropriateness of factor analyses. Post-estimation was performed for all regression analyses using variance inflation factors.

Only threat to statistical validity is the use of analysis of variance with the target market scale. Due to the violation of the at least 20 observations per categories, the significance values are artificially inflated and should not be treated to indicate practical significance.

Specific threats to reliability and validity

Three specific threats to overall validity and reliability of the study have been identified. First, several improvements have been made to the research design causing the data to be more representative of the industry than data for the previous years. This obviously creates problems when results between different years are compared. We have attempted to explicitly state when this causes problems, but it is possible that at time this has been omitted. In several cases we recalculated the last year's figures to control for the different analysis techniques. In this way we established when the change in results was more due to different methods. When this was the case, we explicitly mentioned it in the report.

Second issue with validity is that the extrapolation methods that are used, even though revised from the previous years, are too sensitive to firms that are located at the larger end of each stratum. This is especially a concern for firms that are almost at the threshold from moving from the last size class where extrapolation is used to the largest size class where each firm is evaluated individually. The largest impact of this effect was identified in the overall internationalization level which is calculated as the ratio of international revenue to the overall revenue. The problem is that impact of each firm in the second largest stratum is amplified five fold due to extrapolating. We reanalyzed the data for previous year and found out that the large amount of international revenue was largely due to four firms that were close to the 3m€ limit of the second largest strata. This year two of these firms had grown and internationalized further entering the largest stratum, one had become acquired and was hence not a Finnish software company as per study definitions. and one firm chose not to reply. Due to the extrapolation effect, this caused a total of 18 very international firms worth of decrease in the international revenues! Although we increased the amount of strata to decrease the biasing effect of extrapolation, this should clearly be considered one of the more important improvement areas for future studies.

Last, several scales, particularly the target industry scale, are inherently vulnerable to statistical error. The term statistical error refers to the amount an observation differs from reality and is inevitable in all survey research. The problem is that when the sample of roughly 300 firms is divided into 32 categories,

as is the case with the target market scale, the data becomes over fitted: it describes accurately to the firms that responded to the survey but cannot be generalized to the larger population. This effect is inflated when the firms are weighted by their revenue.

Suggestions for Further Research

The suggestions for future research are centred on how this particular survey could – and should – be improved. Moreover, we discuss some interesting findings that did not make it to this report.

The history of the National Software Industry Survey dates back now ten years. During those years the survey has evolved, but not much. The reason for this is that the survey should collect longitudinal data from the industry, and hence there strong reasons need to exist for questions being dropped from the research. However, outside the industry size statistics this approach feels only little if at all justified. Consider for example the questions about releasing new versions of software. It is unlikely that there would be any reasons for changes in the underlying phenomenon over time, and hence the reported differences are most likely caused by statistical error. Inclusion of items with little information value when compared to the data from previous years from the same company have negative value for the survey: First, repeating same set of questions from year to year causes people to think that it is less important to reply to the survey since they have already replied during the previous year. Second, the questions take valuable space that could be used to investigate issues that are novel and timely to software product industry.

Another issue with the burden of history is the evolution of the research report: The report has steadily grown to include more analysis each year. Now the sheer amount of analyses, figures and statistics to be updated takes up most of the resources available for analyzing the data. This, in combination of the desire to report something new and interesting leads too often to haphazard analyses and results that are if not wrong at least unreliable. During this year we decided to drop some of the analyses presented in the previous years report to be able to do higher quality analyses for the rest of the report.

We suggest that in the future the software industry survey is split into two parts. First part would provide only the kernel growth data and second part would be a study that focuses on the most topical issues of the contemporary Finnish software product industry. Instead of conducting a survey and seeing what interesting issues the data can tell us, we should first focus on what are the most topical issues that we want to know and then design a study that gives the best possible answers to these questions.

During analyzes of the data from survey we discovered several anomalies. Unfortunately, most of your analysis effort was expended on upgrading and improving the old analyses and we could not find explanations to the findings described next. First, we identified that there was a statistically significant negative relation between product development capability and profitability. This seems counterintuitive and we could neither find an empirical or theoretical explanation. Yet the effect persisted in several analyses. Another interesting finding is the form of the firm growth curve, which is presented in the company Figure 1 of respondent report. Since we cannot fully explain these findings it was decided not to include them in the report. If you do not provide an interpretation for your research, it will be either ignored or an interpretation will be developed by the reader. Neither of these cases is likely to increase the overall understanding of the Finnish software product industry. Hopefully, we can publish these and several other findings with explanations at later point of time.

Finally, two suggestions for more radical improvements emerged during the project on behalf of the steering committee. These include expanding the survey internationally and including also software development with the embedded systems context. Studying embedded software development might be particularly fruitful, since a large amount of the machinery and electronics that Finland exports are dependent on software, and software has become a key differentiating factor. Actually, we did a small study of the embedded development during this project, but unfortunately we did not have sufficient resources – mainly time – to collect an amount of data that would justify publishing analysis from it.

APPENDIX 3 LIST OF COMPOSITE VARIABLES AND RELIABILITY STATISTICS

Table 31 Composite Variables and Reliability Statistics

<i>Name</i>	<i>Description</i>	<i>α</i>	<i>Original source</i>
Size index	Summated scale of standardized values of natural logarithms of total revenue and number of personnel.	.96	
Product development performance	Summated scale of standardized values of product development efficiency, product development effectiveness and innovativeness	.78	(Kusunoki, Nonaka, & Nagata, 1998)
Product development efficiency	Summated scale of standardized values of items 1-3 in question 27	.75	
Product development effectiveness	Summated scale of standardized values of items 4-7 in question 27	.85	
Innovativeness	Summated scale of standardized values of items 8-10 in question 27	.85	
Market orientation	Summated scale of standardized values of customer orientation competitor orientation and inter-functional integration.	.65	(Narver & Slater, 1990)
Customer orientation	Summated scale of standardized values of items 1-4 in question 25	.82	
Competitor orientation	Summated scale of standardized values of items 6-8 in question 25	.80	
Inter-functional integration	Summated scale of standardized values of items 10, 12, and 13 in question 25	.75	
Productization index	Summated scale of standardized values of items 1 and 4 of question 20 and items 1 and 2 of question 17	.75	
2 year growth index	Summated scale of standardized values of 2 year CAGR between 2002-2004, 2003-2005, 2004-2006 of revenues and asset value (from Asiakastieto database)	.78	
5 year growth index	Summated scale of standardized values of 5 year CAGR between 1999-2004, 2000-2005, 2001-2006 of revenues and asset value (from Asiakastieto database)	.87	

APPENDIX 4 FINNISH SOFTWARE PRODUCT INDUSTRY STATISTICS

Table 32 Finnish Software Product Industry Statistics

	2006	2005	2004	2003	2002	2001
Revenue, overall (M €) ¹	1 435	1 302	1 192	985	1 011	892
Revenue, domestic (M €) ¹	913	797	786	606	611	484
Revenue, international (M €) ¹	522	504	406	379	400	408
Avg. share of SW product revenue	71%	68%	58%	54%		
Number of personnel ¹⁷	12 971	12 340	12 500	12 000	9 950	10 000
Avg. revenue per employee	110 000	109 000	111 000	113 000	107 000	105 000
Avg. profitability	5.6%	2.8%	2.2%	0%	-2%	
Profitability over 15%	22%	24%	27%	24%	15%	
Unprofitable	17%	15%	14%	20%	25%	
Ratio of R&D investment per revenue	24%	31%	27%	31%		
Companies with intl. operations	48%	59%	46%	50%	46%	37%
% of revenue from abroad (0;25]	58%	54%	57%	63%		
% of revenue from abroad (75;100]	17%	19%	15%	18%		
Companies age, years (avg/med)	11 / 10	13 / 11	11 / 10	11 / 10	12 / 10	
Number of years in SW business (avg/med)		10 / 7	9.2 / 8.5	9.5 / 7.5		
Number of respondents	287 ¹⁸	184	220	196	223	278

¹⁷ These figures represent the whole industry i.e. they have been extrapolated to the industry level

¹⁸ Firms for which secondary data are used are not reported as respondents for year 2006

APPENDIX 5 DESCRIPTIVE STATISTICS OF THE SAMPLE

Table 33 Composition of the Sampling Frame and Sample by Municipality

<i>Municipality</i>	<i>Firms in sampling frame</i>		<i>Respondents</i>	
Helsinki	787	30.1 %	92	28.0 %
Espoo	392	45.1 %	54	44.5 %
Tampere	193	52.5 %	29	53.4 %
Oulu	123	57.2 %	17	58.5 %
Turku	117	61.6 %	15	63.1 %
Vantaa	98	65.4 %	15	67.7 %
Jyväskylä	87	68.7 %	21	74.1 %
Lahti	41	70.3 %	4	75.3 %
Kuopio	38	71.7 %	7	77.4 %
Lappeenranta	28	72.8 %	3	78.4 %
Joensuu	26	73.8 %	8	80.8 %
Pori	26	74.8 %	2	81.4 %
Vaasa	23	75.7 %	0	81.4 %
Kajaani	21	76.5 %	2	82.0 %
Hyvinkää	17	77.1 %	0	82.0 %
Kouvola	14	77.7 %	0	82.0 %
Mikkeli	14	78.2 %	1	82.3 %
Seinäjoki	14	78.7 %	1	82.6 %
Hämeenlinna	13	79.2 %	2	83.2 %
Kokkola	13	79.7 %	1	83.5 %
Porvoo	13	80.2 %	3	84.5 %
Kerava	11	80.7 %	1	84.8 %
Kotka	11	81.1 %	0	84.8 %
Lempäälä	11	81.5 %	3	85.7 %
Rovaniemi	11	81.9 %	0	85.7 %
Varkaus	11	82.3 %	2	86.3 %
Pietarsaari	9	82.7 %	1	86.6 %
Salo	9	83.0 %	0	86.6 %
Järvenpää	8	83.3 %	1	86.9 %
Kauniainen	8	83.6 %	1	87.2 %
Oulunsalo	8	83.9 %	0	87.2 %
Nurmijärvi	7	84.2 %	0	87.2 %
Raisio	7	84.5 %	0	87.2 %
Riihimäki	7	84.7 %	0	87.2 %
Uusikaupunki	7	85.0 %	0	87.2 %
Forssa	6	85.2 %	0	87.2 %
Kaarina	6	85.5 %	0	87.2 %
Rauma	6	85.7 %	0	87.2 %
Klaukkala	5	85.9 %	1	87.5 %
Kuusamo	5	86.1 %	0	87.5 %
Lohja	5	86.3 %	1	87.8 %
Mariehamn	5	86.5 %	0	87.8 %
Nummela	5	86.7 %	1	88.1 %
Savonlinna	5	86.8 %	0	88.1 %
Tuusula	5	87.0 %	0	88.1 %
Other	339		39	

Table 34 Composition of Sampling Frame and Sample by TOL 2002 Industry Codes

<i>Industry code</i>	<i>Firms in sampling frame</i>		<i>Respondents</i>	
72220	1437	55.2 %	236	72.2 %
72210	229	64.0 %	33	82.3 %
74140	97	67.7 %	6	84.1 %
72300	88	71.1 %	4	85.3 %
72402	79	74.1 %	4	86.5 %
51840	77	77.0 %	4	87.8 %
72100	61	79.4 %	6	89.6 %
72401	52	81.4 %	3	90.5 %
52492	39	82.9 %	3	91.4 %
74401	38	84.3 %	1	91.7 %
64202	35	85.7 %	1	92.0 %
64201	27	86.7 %	0	92.0 %
74208	25	87.7 %	1	92.4 %
74879	17	88.3 %	1	92.7 %
72200	15	88.9 %	1	93.0 %
74121	15	89.5 %	0	93.0 %
80429	15	90.1 %	1	93.3 %
51862	13	90.6 %	3	94.2 %
74150	13	91.1 %	1	94.5 %
74209	10	91.4 %	1	94.8 %
32200	8	91.7 %	1	95.1 %
72500	8	92.1 %	1	95.4 %
92110	8	92.4 %	1	95.7 %
52493	7	92.6 %	0	95.7 %
67130	7	92.9 %	0	95.7 %
33200	6	93.1 %	2	96.3 %
72600	6	93.4 %	0	96.3 %
73103	6	93.6 %	1	96.6 %
74206	6	93.8 %	1	96.9 %
74853	6	94.0 %	0	96.9 %
74871	6	94.3 %	0	96.9 %
31620	5	94.5 %	0	96.9 %
64203	5	94.7 %	0	96.9 %
74409	5	94.9 %	2	97.6 %
Other	134		8	

APPENDIX 6 ABOUT RESEARCH GROUPS

The **Software Business Laboratory (SBL)** is a part of the Department of Computer Science and Engineering at Helsinki University of Technology (TKK). SBL's research is facilitated by the BIT Research Center of the University, a research institution crossing the departments of Industrial Engineering and Management and Computer Science and Engineering.

The Laboratory's research focuses on the management of software product-based business and related service business and focuses on providing novel and practical research insights to help Finnish software companies strengthen and sustain their competitive advantage. The research team at SBL strives for research that fulfils the highest standards of both practical relevance and academic significance. It is highly multidisciplinary in nature, and specific research areas, such as software entrepreneurship, strategic management of software business, software industry analysis, and internationalization of software companies have been explored substantially by the SBL researchers. Research is carried out in close collaboration with leading Finnish software businesses, industry associations, and government organizations, including the National Technology Agency Tekes.

SBL's strategy emphasize on research, teaching and community impact through industry cooperation. In its research, the Laboratory has active collaboration with other universities in Finland and many of the leading research universities across the globe. The Laboratory provides undergraduate education leading to a Master's degree and postgraduate education leading to a Doctoral degree. SBL also runs a Corporate Training Program, organizing e.g. various clinic and workshop projects for improving the management of international software business. Moreover, active participation in the international conferences, journals, meetings and henceforth enabling the community-building in software business research belong to the strategic activities of the SBL.

Find out more at <http://www.sbl.tkk.fi>

The **Software Product Development Research Group** of the University of Turku, Department of Information Technology, is a part of the newly-concepted Center for Software Business and Engineering, which is one of the joint research units of the Turku University Consortium (University of Turku and Turku School of Economics). The research group is lead by Professor Markus Mäkelä.

The group's research activities are in the intersection of industrial management and software engineering, as exemplified by the term software business (including strategy, new product development, organization, internationalization, and marketing aspects). The research domain requires a holistic approach and requires cross-fertilization of technology management and strategy, marketing management, software engineering, and organization studies at the rendezvous of product innovation in the software industry. The emerging domain of service studies is important for our group. Given our focus on innovation-related activities on the firm level of the economy, also software entrepreneurship in its international context is centrally important in our selected focus.

The group works in tight collaboration with software companies and strives to conduct research that is both relevant for the industry and significant academically. The group also has contacts with some of the most active scholars as publishers of novel research-based knowledge in top universities, mostly in Northern America. The group provides education in three major or minor subjects and operates a Doctoral program. The group further benefits from the resources of Turku Center for Computer Science, which allows it to tap the competencies of the entire pool of related academic research groups of all three Turku-based universities.

Find out more at <http://www.sci.utu.fi/it/spz/>

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APPENDIX 8 SURVEY INSTRUMENT



TEKNILLINEN KORKEAKOULU



UNIVERSITY OF TURKU
SOFTWARE PRODUCT DEVELOPMENT
RESEARCH GROUP

OHJELMISTOYRITYSKARTOITUS 2007

Ohjelmistotuoteliiketoiminnan kilpailukyvyn edellytykset Suomessa

Tämä kysymyslomake on osa vuosittaista Suomen ohjelmistoliiketoiminnan kartoitusta. Tulokset julkaistaan tilastoyhteenvetona ja taulukoina, joista ei voi tunnistaa yksittäisiä vastaajia. Vastaamalla tähän kyselyyn autatte meitä keräämään tärkeitä tietoa maamme ohjelmistoalasta ja sen nykytilasta.

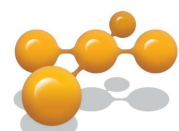
Kyselyn tulokset sekä yrityskohtainen analyysi vastauksista lähetetään vastaajille syyskuussa.

Projektin ohjausryhmässä asiantuntijatukensa vuoden 2007 kartoitukselle ovat antaneet:

**Teknologia
teollisuus**



 **Tilastokeskus**



OHJELMISTOYRITTÄJÄT RY

VASTAUSOHJE: Merkitkää kussakin kohdassa vastausvaihtoehto, joka parhaiten kuvaa tilannettanne. Mikäli johonkin kysymykseen vastaaminen edellyttäisi vaikeasti saatavissa olevia tietoja, myös arvio käy vastaukseksi. Arvio on aina parempi kuin vastaamatta jättäminen.

Vastattuanne kyselyyn palauttaa tämä lomake postitse teille lähettämälläme palautuskuorella. Mikäli ette halua vastata kyselyyn, toivoisimme että palauttaisitte meille tyhjän lomakkeen merkiksi tästä. Vaihtoehtoisesti voitte käyttää vastaamisessa www-lomaketta osoitteessa <http://www.sbl.tkk.fi/oskari/>. Käyttäkää vastatessanne vastaajakoodia [Koodi]

VASTAUSTIEDOT OVAT LUOTTAMUKSELLISIA

Kyselyn toteutuksesta vastaa Teknillisen korkeakoulun ohjelmistoliiketoiminnan laboratorio, Mikko Rönkkö, puhelinnumero (09) 451 5040, sähköpostiosoite mikko.ronkko@tkk.fi. Lisätietoja kartoituksesta saatte osoitteesta <http://www.sbl.tkk.fi/oskari/>

ALOITA VASTAAMINEN:

Ohjelmistoliiketoiminnalla tarkoitetaan tässä kyselyssä liiketoimintaa, joka perustuu ohjelmistojen myymiseen joko tuotteina tai palveluina, tai ohjelmistojen tai ohjelmistopohjaisten järjestelmien toteuttamiseen asiakastilauksesta.

1 Onko yrityksellänne yllä olevan kuvauksen mukaista ohjelmistoliiketoimintaa?

Kyllä.

Ei. → Siirtykää kysymykseen 33.

2 Onko yrityksellänne omaa ohjelmistokehitystä?

Kyllä.

Ei, mutta teetämme ohjelmistokehitystä alihankintana.

Meillä ei ole omaa ohjelmistokehitystä, emmekä teetä sitä alihankintana. → Siirtykää kysymykseen 33.

3 Kumpi seuraavista kuvaa parhaiten yritystänne?

Olemme itsenäinen yhtiö.

Olemme jonkin toisen suomalaisen tai ulkomaalaisen yhtiön tytäryhtiö tai sivuliike.

4 Onko yrityksellänne emoyhtiön tuotteiden tai palveluiden lisäksi omia tuotteita tai palveluita?

Ei, yrityksemme rooli on toimia pääasiassa emoyhtiömme myyntitoimistona. → Siirtykää kysymykseen 33.

Yrityksellämme on emoyhtiön tuotteiden lisäksi omia ohjelmistotuotteita tai palveluita.

Vastatkaa kyselyyn ainoastaan yrityksenne omien tuotteiden ja palvelujen osalta

Omalla ohjelmistotuoteliiiketoiminnalla tarkoitetaan tässä kyselyssä liiketoimintaa, joka perustuu omien ohjelmistotuotteiden myyntiin lisensoina tai palveluina, sekä kiinteästi näihin ohjelmistoihin liittyviin muihin palveluihin.

5 Arvioikaa seuraavat asiat yrityksenne viimeksi päättyneen tilikauden ja kuluvan tilikauden osalta.

	Viimeksi päättynyt tilikausi	Kuluva tilikausi (budjetoitu)
Kokonaisliikevaihto	_____ €	_____ €
Ohjelmistoliiketoiminnan liikevaihto Suomesta	_____ €	_____ €
Oman ohjelmistotuoteliiiketoiminnan osuus Suomen liikevaihdosta	_____ %	_____ %
Ohjelmistoliiketoiminnan liikevaihto ulkomailta	_____ €	_____ €
Oman ohjelmistotuoteliiiketoiminnan osuus ulkomaisesta liikevaihdosta	_____ %	_____ %
Tutkimus- ja tuotekehitykset	_____ €	_____ €
Tulos (verojen jälkeen)	_____ €	_____ €

6 Merkitkää seuraavaan taulukkoon arvionne yrityksenne kokonaishenkilöstömäärästä ja ohjelmistoliiketoiminnassa työskentelevän henkilöstön määrästä. (Tilikauden keskiarvo)

	Viimeksi päättynyt tilikausi	Kuluva tilikausi (budjetoitu)
Kokonaishenkilöstö	_____ henkilöä	_____ henkilöä
Henkilöstö ohjelmistoliiketoiminnassa Suomessa		
Tuotekehitystehtävissä	_____ henkilöä	_____ henkilöä
Asiakasprojektitehtävissä	_____ henkilöä	_____ henkilöä
Myynti- ja markkinointitehtävissä	_____ henkilöä	_____ henkilöä
Muissa tehtävissä	_____ henkilöä	_____ henkilöä
Henkilöstö ohjelmistoliiketoiminnassa ulkomailla		
Tuotekehitystehtävissä	_____ henkilöä	_____ henkilöä
Asiakasprojektitehtävissä	_____ henkilöä	_____ henkilöä
Myynti- ja markkinointitehtävissä	_____ henkilöä	_____ henkilöä
Muissa tehtävissä	_____ henkilöä	_____ henkilöä

7 Mikä on yrityksenne pääasiallinen asiakastoimiala? (Valitkaa yksi vaihtoehdoista.)

- | | | |
|---|--|---|
| <input type="checkbox"/> Päätuotetta ei juurikaan myydä yritysasiakkaille | <input type="checkbox"/> Pankit, vakuutus ja rahoitus | <input type="checkbox"/> Sairaan- ja terveydenhoito |
| <input type="checkbox"/> Ei erityistä toimialaa | <input type="checkbox"/> Lakipalvelut | <input type="checkbox"/> Matkustaminen ja turismi |
| <input type="checkbox"/> Elektroniikka ja korkea teknologia | <input type="checkbox"/> Liiketoiminnan asiantuntijapalvelut | <input type="checkbox"/> Julkinen hallinto |
| <input type="checkbox"/> ICT- informaatio ja kommunikaatioteknologia | <input type="checkbox"/> Energia | <input type="checkbox"/> Yhteisöt |
| <input type="checkbox"/> Teleala | <input type="checkbox"/> Rakennus | <input type="checkbox"/> Opetus |
| <input type="checkbox"/> Mobiiliala | <input type="checkbox"/> Teollinen tuotanto | <input type="checkbox"/> Koulutus |
| <input type="checkbox"/> Ilmailu- ja puolustusala | <input type="checkbox"/> Kaivostoiminta | <input type="checkbox"/> Media ja viihde |
| <input type="checkbox"/> Tiede ja tutkimus | <input type="checkbox"/> Vähittäis- ja tukkukauppa | <input type="checkbox"/> Pelit ja animaatiot |
| <input type="checkbox"/> Nanoteknologia | <input type="checkbox"/> Kiinteistöt ja kiinteistöhoito | <input type="checkbox"/> Hyvinvointipalvelut |
| <input type="checkbox"/> Bioteknologia | <input type="checkbox"/> Kuljetus ja logistiikka | <input type="checkbox"/> Joku muu, mikä? |
| <input type="checkbox"/> Kemia | <input type="checkbox"/> Maa- ja metsätalous | _____ |

8 Minkälainen on päätuotteenne tyypillinen loppuasiakas? (Merkitkää tarvittaessa useampi vaihtoehto.)

- | | |
|--|---|
| <input type="checkbox"/> Mikroyritykset (alle 5 henkeä) | <input type="checkbox"/> Suuryritykset (yli 250 henkeä) |
| <input type="checkbox"/> Pienet yritykset (5-50 henkeä) | <input type="checkbox"/> Julkishallinto |
| <input type="checkbox"/> Keskisuuret yritykset (51-250 henkeä) | <input type="checkbox"/> Kuluttajat (yksityishenkilöt) |

KANSAINVÄLINEN LIKETOIMINTA

9 Oliko yrityksellänne myyntituloja Suomen ulkopuolelta viimeksi päättyneen tilikauden aikana?

- Ei  Siirtykää kysymykseen 13
- Kyllä

10 Täyttäkää seuraava taulukko liittyen yrityksenne kansainväliseen liiketoimintaan.

	Kolme vuotta sitten päättyneellä tilikaudella (2003)	Viimeksi päättyneellä tilikaudella
Kuinka monesta maasta, Suomi poisluettuna, yrityksellänne oli myyntituloja?	_____ maasta	_____ maasta
Kuinka suuri osuus liikevaihdostanne syntyi Suomen ulkopuolella?	_____ %	_____ %
Kuinka monessa ulkomaassa yrityksellänne oli henkilöstöä, joko suoraan palkattuna tai tytä- tai yhteisyrityksen kautta?	_____ maassa	_____ maassa

11 Täyttäkää alla olevaan taulukkoon tiedot kolmesta tärkeimmästä vientimaastanne

	1. tärkein maa	2. tärkein maa	3. tärkein maa
Maan nimi	Maa _____	Maa _____	Maa _____
Osuus kokonaisviennistä	_____ % viennistä	_____ % viennistä	_____ % viennistä

12 Mitä alla olevista toiminnoista teillä oli näissä maissa?

Tuotekehitys.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ohjelmistoalihankinta.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lokalisointi tai sovitustyö.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tuotanto tai tuotteen paketointi.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Koulutus.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helpdesk, ylläpito tai muu asiakastuki.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Muu, mikä? _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

OHJELMISTOTUOTELIIKETOIMINTA JA PÄÄTUOTE

13 Montako eri ohjelmistotuotetta tai –tuoteperhettä yrityksenne tuottaa?

- Meillä ei ole yhtään ohjelmistotuotetta tai tuoteperhettä. **➔** Siirrykää kysymykseen 33
- ↙** 1 tuote tai tuoteperhe
- 2 tuotetta tai tuoteperhettä
- 3 tai useampaa tuotetta tai tuoteperhettä

14 Milloin yrityksenne on julkaissut ensimmäisen ohjelmistotuotteen?vuonna _____

Ohjelmistotuoteliiketoiminnan **päätuotteella** tarkoitetaan tässä kyselyssä sitä ohjelmistotuotetta, johon perustuen yritys sai viimeksi päättäneellä tilikaudella **suurimman liikevaihdon**, sekä tähän tuotteeseen liittyviä palveluita kuten sovitustyötä sekä asennus- ja koulutuspalveluita. Jos ette pysty identifioimaan yrityksenne päätuotetta, siirrykää kysymykseen 33

15 Minkä tyyppinen ohjelmisto päätuotteenne on? (Valitkaa yksi vaihtoehdoista.)

- | | |
|--|--|
| <input type="checkbox"/> Käyttöjärjestelmä | <input type="checkbox"/> Yrityskäyttöön suunnattu sovellusohjelmisto |
| <input type="checkbox"/> Tietoliikenne- tai palvelinohjelmisto | <input type="checkbox"/> Yksityiskäyttöön suunnattu sovellusohjelmisto |
| <input type="checkbox"/> Tietokantaohjelmisto | <input type="checkbox"/> Yleinen liiketoimintaa tukeva tietojärjestelmä |
| <input type="checkbox"/> Ohjelmistokehitysohjelma tai ohjelmointikieli | <input type="checkbox"/> Tietylle toimialalle suunnattu tietojärjestelmä |
| <input type="checkbox"/> Muu järjestelmäohjelmisto | <input type="checkbox"/> Apuohjelma |
| | <input type="checkbox"/> Muu sovellusohjelmisto |

16 Kuinka usein julkaisette päätuotteesta uuden version? (Valitkaa yksi vaihtoehdoista.)

- | | |
|---|--|
| <input type="checkbox"/> Kuukausittain tai useammin | <input type="checkbox"/> 2 versiota vuodessa |
| <input type="checkbox"/> Joka toinen kuukausi | <input type="checkbox"/> Vuosittain |
| <input type="checkbox"/> 3-4 kertaa vuodessa | <input type="checkbox"/> Harvemmin |

17 Mistä osista päätuotteenne tyyppillisen asiakastoimituksen laskutus koostuu?

Ohjelmistojen käyttölisenssien myynti tai vuokraus %

Asiakaskohtaiset ohjelmistoprojektit ja sovitustyö %

Asennus asiakkaalle %

Koulutus ohjelman käyttöön %

Ylläpito- ja huoltotoimet sekä käyttötuki %

Muu, mikä _____ %

Yhteensä 100%

18 Arvioikaa mikä oli päätuotteenne toimitusten tai myytyjen yksiköiden määrä ja keskihinta sekä markkinaosuus vuosina 2003-2006. Mikäli tuotettanne myydään vuosittaisella lisenssimaksulla arvioikaa yhden asiakkaan tuottama keskimääräinen vuosittainen liikevaihto.

	2003	2004	2005	2006
Toimitusten tai myytyjen yksiköiden määrä	_____	_____	_____	_____
Keskihinta	_____ €	_____ €	_____ €	_____ €
Markkinaosuus	_____ %	_____ %	_____ %	_____ %

19 Miten paljon käytätte alla listattuja myyntikanavia päätuotteenne myynnissä Suomessa ja ulkomailla?

	Suomessa						Ulkomailla					
	Emme lainkaan	Hyvin vähän	Vähän	Jossain määrin	Paljon	Hyvin paljon	Emme lainkaan	Hyvin vähän	Vähän	Jossain määrin	Paljon	Hyvin paljon
Omaa suoraa myyntiä	1	2	3	4	5	6	1	2	3	4	5	6
Jälleenmyyjää tai agenttia	1	2	3	4	5	6	1	2	3	4	5	6
Tukkumyöntiketjua	1	2	3	4	5	6	1	2	3	4	5	6
Jälleenmyyjän omalla tuotemerkillä tai nimellä tai oman tuotteen osana (OEM) tapahtuvaa myyntiä	1	2	3	4	5	6	1	2	3	4	5	6
Kylkiäiskauppaa toisen tuotteen kanssa	1	2	3	4	5	6	1	2	3	4	5	6
Omaa jakelua internetin välityksellä.....	1	2	3	4	5	6	1	2	3	4	5	6

20 Miten hyvin seuraavat väittämät kuvaavat päätuotettanne?

	Täysin eri mieltä	Eri mieltä	Hieman eri mieltä	Ei eri eikä samaa mieltä	Hieman samaa mieltä	Samaa mieltä	Täysin samaa mieltä
Päätuotteen toimituksiin sisältyy paljon asiakkaalle tuntiveloituksella tehtävää työtä	1	2	3	4	5	6	7
Päätuotteen toimitus voidaan toteuttaa kokonaisuudessaan ASP- tai SaaS-mallin mukaisesti...	1	2	3	4	5	6	7
Päätuotteen koostuu kokonaisuudessaan avoimesta lähdekoodista (open source)	1	2	3	4	5	6	7
Päätuotteen asennetaan ja otetaan käyttöön ilman erillistä asennusprojektia	1	2	3	4	5	6	7
Päätuotteen myydään sulautettuna ohjelmistona kiinteänä osana jotain fyysistä tuotetta	1	2	3	4	5	6	7
Päätuotteestamme on markkinoilla samanaikaisesti useampia rinnakkaisia versioita	1	2	3	4	5	6	7
Päätuotteestamme on markkinoilla samanaikaisesti useampia tuotesukupolvia	1	2	3	4	5	6	7

21 Miten hyvin seuraavat väittämät kuvaavat yrityksenne päämarkkinaa?

Asiakaskunnassamme tapahtuu usein muutoksia	1	2	3	4	5	6	7
Yleisesti ottaen, meidän ja kilpailijoidemme markkinaosuudet pysyvät vakaina	1	2	3	4	5	6	7
Päätuotteen kysyntää ja asiakastarpeiden kehitystä on kohtalaisen helppo ennustaa	1	2	3	4	5	6	7
Teknologia muuttuu nopeasti päämarkkinallamme	1	2	3	4	5	6	7
Teknologian kehittyminen on mahdollistanut suuren joukon uusia tuoteideoita päämarkkinallamme	1	2	3	4	5	6	7
Liiketoimintamallit vaihtuvat usein päämarkkinallamme	1	2	3	4	5	6	7
Päämarkkinallamme ei juurikaan tehdä tuotekehitystä	1	2	3	4	5	6	7
Meidän ja kilpailijoidemme toimintamallit kehittyvät nopeilla harppauksilla sen sijaan että kehittyisivät hitaasti	1	2	3	4	5	6	7

YRITYKSEN RAHOITUS

22 Mitä seuraavista omistajatyypeistä yrityksellänne on. (Merkitkää tarvittaessa useampi vaihtoehto.).

- Yrityksen perustaja tai hänen perheenjäsenensä
- Työntekijä joka ei ole perustaja
- Riskisijoittaja tai sijoitusyhtiö
- Toinen yritys (ei sijoitusyhtiö)
- Enkelisijoittaja
- Henkilö tai yhtiösijoittaja pörssin kautta

23 Onko yrityksenne etsimässä ulkopuolista rahoitusta vuosien 2007 tai 2008 aikana?

- Kyllä **Arvioi miten paljon eri rahoitustyyppisiä olette yhteensä hakemassa?**
- Ei
- Riskirahoitusta
 - Yksityisiä sijoituksia (esim. omistajien sijoitukset tai enkelirahoitus)
 - Lainaa
 - Julkista rahoitusta tai avustusta
- M€

24 Miten hyvin seuraavat väitteet kuvaavat ohjelmistoalan ja yrityksenne rahoitustilannetta?

	Täysin eri mieltä	Eri mieltä	Hieman eri mieltä	Ei eri eikä samaa mieltä	Hieman samaa mieltä	Samaa mieltä	Täysin samaa mieltä
Ulkoinen rahoitus edesauttaisi huomattavasti tuotteistuspyrkimyksiämme	1	2	3	4	5	6	7
Ulkoinen rahoitus edesauttaisi huomattavasti kansainvälistymispyrkimyksiämme	1	2	3	4	5	6	7
Meillä ei ole tarvetta hankkia lisää ulkoista rahoitusta	1	2	3	4	5	6	7
Käyttäisimme ulkoista rahoitusta enemmän, jos sen saatavuus olisi parempaa	1	2	3	4	5	6	7
Ongelmat riskirahoituksen saamisessa ovat yleisesti esteenä uusien ohjelmistoyrityksien syntymiselle Suomessa	1	2	3	4	5	6	7

25 Miten hyvin seuraavat väittämät kuvaavat yleisesti yrityksen toimintaa?

	Täysin eri mieltä	Eri mieltä	Hieman eri mieltä	Ei eri mieltä	Hieman samaa mieltä	Samaa mieltä	Täysin samaa mieltä
Liiketoimintamme tavoitteita ohjaa pyrkimys luoda lisäarvoa asiakkaille	1	2	3	4	5	6	7
Seuraamme jatkuvasti sitoutumistamme ja suhtautumistamme asiakkaiden tarpeiden täyttämiseen	1	2	3	4	5	6	7
Strategiamme pohjautuu asiakkaiden tarpeen ymmärtämiseen	1	2	3	4	5	6	7
Strategiamme ohjaa visio siitä, että voisimme luoda enemmän arvoa asiakkaillemme	1	2	3	4	5	6	7
Mittaamme asiakastytyvää systemaattisesti ja säännöllisesti	1	2	3	4	5	6	7
Myyntihenkilöstömme jakaa yrityksen sisällä säännöllisesti informaatiota koskien kilpailijoidemme strategioita	1	2	3	4	5	6	7
Reagoimme nopeasti kilpailijoidemme toimiin, jotka uhkaavat meitä	1	2	3	4	5	6	7
Ylin johto keskustelee usein kilpailijoiden vahvuuksista ja strategioista	1	2	3	4	5	6	7
Kohdistamme toimintamme asiakkaisiin siellä missä meillä on parhaiten saavutettavissa kilpailuetua	1	2	3	4	5	6	7
Onnistuneista ja epäonnistuneista asiakascaseista keskustellaan vapaasti organisaatiossamme ja tiimien välillä	1	2	3	4	5	6	7
Kaikki yrityksemme toiminnot on integroitu palvelemaan kohdeasiakaskuntamme tarpeita	1	2	3	4	5	6	7
Kaikki johtotehtävissä olevat ymmärtävät, kuinka jokainen yrityksessämme voi edesauttaa lisäarvon luomisessa asiakkaalle	1	2	3	4	5	6	7
Eri organisaatioyksikömmme työskentelevät yhdessä ja perinpohjaisesti ongelmien ratkaisemiseksi	1	2	3	4	5	6	7

26 Miten hyvin seuraavat väittämät kuvaavat yrityksen tuotekehitystä ja ohjelmistokehitystä?

Tuotekehitysprojekteissamme on runsaasti määriteltyjä välietappeja	1	2	3	4	5	6	7
Yrityksemme toimii aina alihankkijana osana suurempia tuotekehitysprojekteja	1	2	3	4	5	6	7
Käytämme tuote- tai ohjelmistokehityksessä kotimaisia alihankkijoita	1	2	3	4	5	6	7
Käytämme tuote- tai ohjelmistokehityksessä ulkomaisia alihankkijoita	1	2	3	4	5	6	7

27 Miten tärkeinä pidätte alla olevia kehitysalueita yrityksen kannalta seuraavan kolmen vuoden aikana?

Kokonaan uuden tuotteen kehittäminen	1	2	3	4	5	6	7
Nykyisten tuotteiden jatkokehitys	1	2	3	4	5	6	7
Tuotteiden lokalisointi tai sovitukset kansainvälisille markkinoille	1	2	3	4	5	6	7
Tuotteistusasteen nostamiseen	1	2	3	4	5	6	7
Lisäarvopalveluiden kehittämiseen nykyisen päätuotteen ympärille	1	2	3	4	5	6	7
Henkilöstön ja osaamisen kehittäminen	1	2	3	4	5	6	7
Muu sisäisen toiminnan kehittäminen	1	2	3	4	5	6	7
Rahoituksen hankkiminen	1	2	3	4	5	6	7
Verkostojen ja yhteistyön kehittäminen ulkomailla	1	2	3	4	5	6	7
Verkostojen ja yhteistyön kehittäminen Suomessa	1	2	3	4	5	6	7
Kansainvälinen myynti ja markkinointi	1	2	3	4	5	6	7
Kansainvälinen jakelu	1	2	3	4	5	6	7

28 Vertaailkaa tuotekehitystänne lähimpiin kilpailijoihinne seuraavien tuotekehitykseen liittyvien asioiden osalta.

	Olemme huomattavasti heikompia	Olemme heikompia	Olemme hieman heikompia	Olemme samalla tasolla	Olemme hieman parempia	Olemme parempia	Olemme huomattavasti parempia	En osaa sanoa
Tuotekehityksen kustannustaso	1	2	3	4	5	6	7	0
Tuotekehitysinvestointien tehokkuus	1	2	3	4	5	6	7	0
Uuden tuotteen tai tuoteominaisuuden kehittämiseen kuluva aika	1	2	3	4	5	6	7	0
Kaupallistettavuuden huomioiminen tuotekehityksessä	1	2	3	4	5	6	7	0
Tuotteen elinkaarikustannus asiakkaalle	1	2	3	4	5	6	7	0
Tuotteen ominaisuuksien ja laadun kehittäminen	1	2	3	4	5	6	7	0
Tuotteen tekninen kehitysnopeus	1	2	3	4	5	6	7	0
Merkittävien teknisten innovaatioiden määrä tuotteessa	1	2	3	4	5	6	7	0
Merkittävien tuoteinnovaatioiden määrä	1	2	3	4	5	6	7	0
Uusien tuotekonseptien kehittäminen	1	2	3	4	5	6	7	0

29 Kumpi seuraavista vaikuttaa enemmän kun teette päätöksiä tärkeimmistä tuoteominaisuuksista päätuotteen kohdalla?

Avainasiakkaiden toivomukset lähes yksinomaan			Molemmat vaikuttavat yhtä paljon			Laajempi markkinatutkimus lähes yksinomaan
1	2	3	4	5	6	7

30 Kumpi seuraavista vaikuttaa enemmän uusia tuotekehityshankkeita käynnistettäessä?

Oma teknologinen osaamisemme lähes yksinomaan			Molemmat vaikuttavat yhtä paljon			Tunnistettu markkinatarve lähes yksinomaan
1	2	3	4	5	6	7

31 Kumpaa yrityksessänne painotetaan tilanteessa, jossa kaikkea suunniteltua toiminnallisuutta ei kyetä toteuttamaan ohjelmistoon suunnitellussa aikataulussa?

Aina aikataulussa pysymistä			Painotamme molempia yhtä paljon			Aina kaiken toiminnallisuuden toteuttamista
1	2	3	4	5	6	7

PERUSTIEDOT VASTAAJASTA JA LISÄTUTKIMUS

Ohjelmistoyrityskartoituksen yhteydessä tullaan toteuttamaan lyhyt lisätutkimus päätuotteen tuotekehitykseen ja markkinointiin liittyen. Lisätutkimuksessa esitetään lyhyt kysymyssarja päätuotteen tuotekehityksestä ja sen markkinoinnista vastaaville henkilöille. Lisätutkimukseen vastaamiseen kuluu alle 10 minuuttia. Osallistuaksenne lisätutkimukseen vastatkaa seuraavaan kysymykseen.

32 Vastatkaa seuraaviin kysymyksiin päätuotteenne osalta. (Mikäli vastaatte itse tuotekehityksestä tai markkinoinnista, nimitkää lähin alaisenne kyseiseltä alueelta.)

Mitä nimeä päätuotteestanne käytetään yrityksen sisällä? _____

Kuka vastaa päätuotteenne tuotekehityksestä? _____

Nimi: _____

Sähköposti: _____

Kuka vastaa päätuotteenne markkinoinnista? _____

Nimi: _____

Sähköposti: _____

33 Täyttäkää seuraavat perustiedot itsestänne ja yrityksestänne:

Nimi _____

Yrityksen nimi _____

Asemanne yrityksessä _____

Mistä alkaen olette toiminut nykyisessä asemassanne? _____ vuosi


Mistä alkaen olette toiminut tässä yrityksessä? _____ vuosi

Kuinka monen vuoden työkokemus teillä on yrityksen toimialalta? _____ vuotta

34 Saako yrityksenne nimen julkaista kyselyn vastaajalistassa? Vastauksianne ei julkaista.

Kyllä, nimemme saa julkaista. Vastauksiamme ei julkaista.

Ei.

 **Palauttakaa lomake lähettämässämme palautuskuoressa osoitteeseen**

OSKARI 2007
Teknillinen korkeakoulu
Tunnus 5016488
02003 VASTAUSLÄHETYS

Kommentteja kyselystä, parannusehdotuksia, ideoita yritysten yhteisiksi kehitysprojekteiksi, toimenpide-ehdotuksia alan kehittämiseksi tai muita ajatuksia.

Kiitokset vastauksestanne!

Palautusosoite:

OSKARI 2007
Teknillinen korkeakoulu
Tunnus 5016488
02003 VASTAUSLÄHETYS

Kyselyn toteutuksesta vastaa Teknillisen korkeakoulun ohjelmistoliiketoiminnan laboratorio, Mikko Rönkkö, puhelinnumero (09) 451 5040, sähköpostiosoite mikko.ronkko@tkk.fi. Lisätietoja kartoituksesta saatte osoitteesta <http://www.sbl.tkk.fi/oskari/>

APPENDIX 9 EXAMPLE OF RESPONDENT REPORT

Yritys Oy

Yrityskohtainen vastausanalyysi Ohjelmistoyrityskartoitus 2007

Ohjelmistoyrityskartoitus on vuosittain toteutettava ohjelmistoalaa mittaava kansallinen tutkimus. Vuonna 2007 tutkimukseen vastasi yhteensä 370 Suomen noin tuhannesta ohjelmistoyrityksestä. Tässä raportissa vertaillaan yrityksenne antamia vastauksia koko toimialaan.

Lisää tietoa ohjelmistoyrityskartoituksesta ja tarkemman kuvauksen tämän raportin tietosisällöstä löydätte osoitteesta <http://www.sbl.tkk.fi/oskari/>.

Ohjelmistoyrityskartoituksen toteuttivat Teknillinen korkeakoulu ja Turun yliopisto.

1. Yrityksen sijoittuminen koko toimialalle Suomessa

Tässä raportissa vertaillaan yrityksenne vastauksia sekä koko toimialan että tuotteistusasteen ja tuoteliiketoiminnan osuuden perusteella lasketun yritysluokan yritysten vastauksiin. Vastausten perusteella luokittelimme teidät luokkaan 'Tuotteiden integroijat'.

Luokan 'Tuotteiden integroijat' kuvaus:

Tuotteiden integroijat tuottavat korkeasti tuotteistettuja ohjelmistoja, jotka myydään usein yhdessä palveluiden kanssa tai palveluna. Nämä yritykset korostavat asemaansa palveluntarjoajina, ja niiden hinnoittelu perustuu usein palvelun käyttöön tai asiakkaan havaitseman lisäarvon tuottamiseen. Vaikka näiden yritysten palvelutarjoamat yleensä sisältävät ohjelmistojen lisäksi esimerkiksi erityistä sisältöä tai konsultointipalveluja, ovat ohjelmistot silti niiden tarjoaman tärkein osa.

Oheisesta taulukosta 1.1 näette, miten yrityksenne sijoittuu kyselyyn vastanneiden yritysten joukossa. Taulukossa olevat tyhjät arvot tarkoittavat, ettemme ole pystyneet laskemaan tätä kohtaa teille puuteellisen aineiston vuoksi. Taulukossa käytetty kasvuindeksi on suhteellista kasvunopeutta ilmaiseva luku, jonka arvoilla ei ole tämän käytön ulkopuolella järkevää tulkintaa. Tästä syystä niiden osalta raportoidaan ainoastaan sijoituksenne koko toimialan ja yrityksenne luokkaan kuuluvien yritysten joukossa.

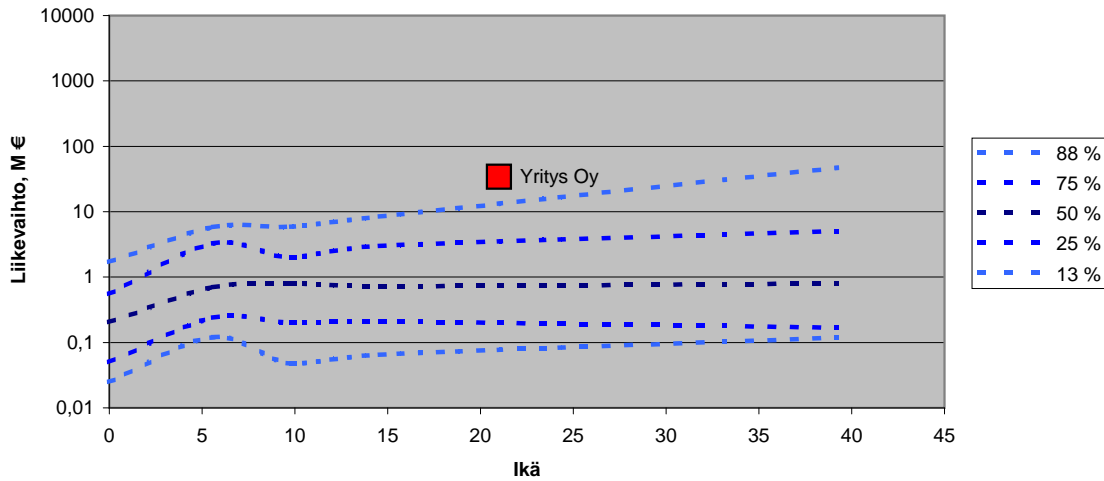
Taulukko 1.1 - Sijoittuminen valituissa tunnusluvuissa

Mittari	Vastaus	Koko toimiala (370 yritystä)			Tuotteiden integroijat (86 yritystä)		
		Sijoitus	Keskiarvo	Mediaani	Sijoitus	Keskiarvo	Mediaani
Liikevaihto 2006, €	34 M	17.	11006959	561930	3.	2912602	400000
Kokonaishenkilöstö	440	11.	96	7	2.	26	6
Liikevaihto/Henkilö, €	77273	153.	89365	75000	34.	79744	68125
Tulos, €	-800000	275.	293611	40000	80.	379577	30000
Tulos/Henkilö, €	-1818	319.	11815	4167	81.	11034	5000
Kannattavuus	-2,35 %	253.	4,64 %	5,02 %	69.	-2,55 %	2,00 %
Ikä, vuotta	21	22.	9,9	9,0	6.	10,8	9,0
2 vuoden kasvu*	-	84.	-	-	21.	-	-
5 vuoden kasvu*	-	84.	-	-	21.	-	-

*=kasvuindeksi, laskettu kaupallisesta tietokannasta saadun tiedon perusteella

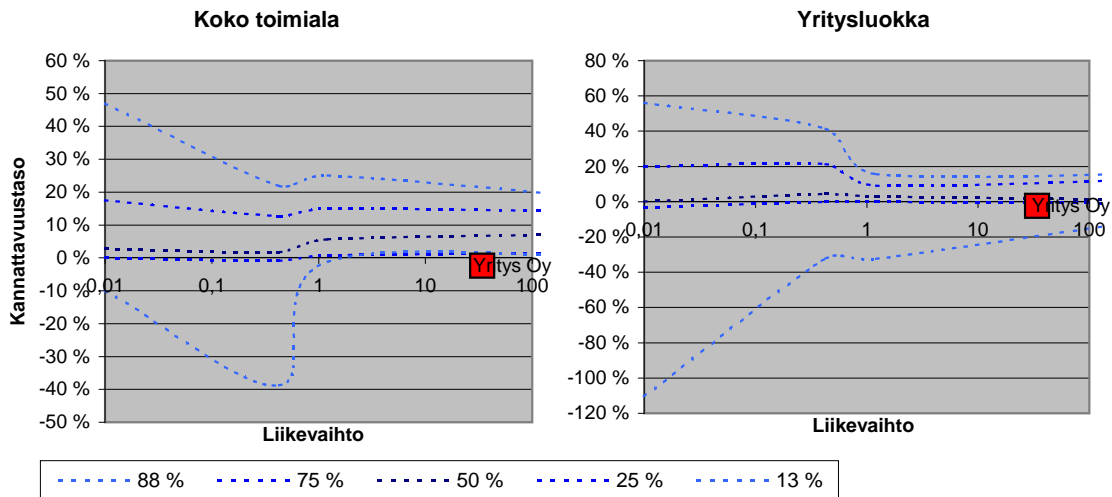
2. Kasvu ja kannattavuus

Ohjelmistoalaa pidetään tyypillisesti kasvuyrityksiä tuottavana alana. Kuitenkin vain harvat yritykset onnistuvat kasvattamaan toimintaansa merkittävästi. Kuvaajassa 2.1 esitetään ohjelmistoyritysten kasvukäyrästä kyselyn vastauksien perusteella. Kuvaajan käyrät osoittavat, kuinka moni vastanneista yrityksistä jää liikevaihdossa käyrän tason alle kussakin ikäluokassa. Käytetyt ikäluokat ovat tässä käyrästä 0-3, 4-7, 8-11, 12-17 ja yli 18 vuotta. Kuvaajasta näkyy selkeästi kasvun yleisesti taittuvan ennen yrityksen kymmenettä toimintavuotta. Tätä trendiä analysoidaan tarkemmin tutkimuksen pääraportissa.



Kuvaaja 2.1: Ohjelmistoyrityksien liikevaihto yrityksen iän suhteen

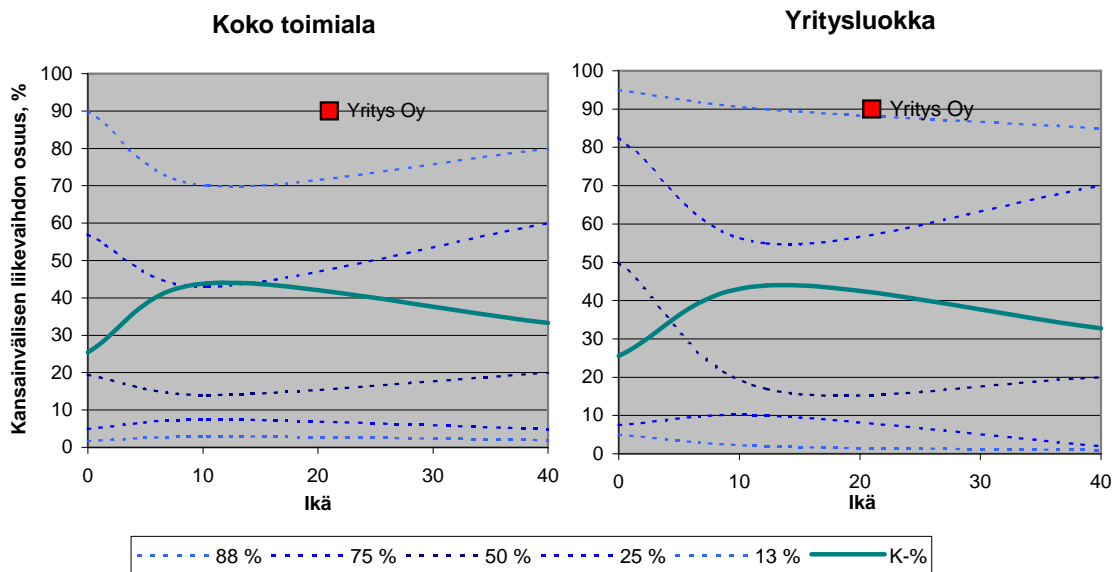
Allaolevassa kuvaajassa 2.2 näkyy vastanneen yritysjoukon kannattavuus liikevaihdon suhteen. Koko toimialan käyrän muodossa on kaksi huomionarvoista seikkaa. Toiminimellä toimivat pienet yritykset laskevat usein toiminimen omistajalle jäävän rahasumman kokonaan voitoksi. Tämä vääristää käyrää pienimmän kokoluokan osalta. Alle miljoonan luokassa selvästi näkyvä tappiollisten yritysten osa koostuu pääosin tuoteyrityksistä, jotka eivät ole vielä saaneet päätuotteensa myyntiä kunnolla käyntiin.



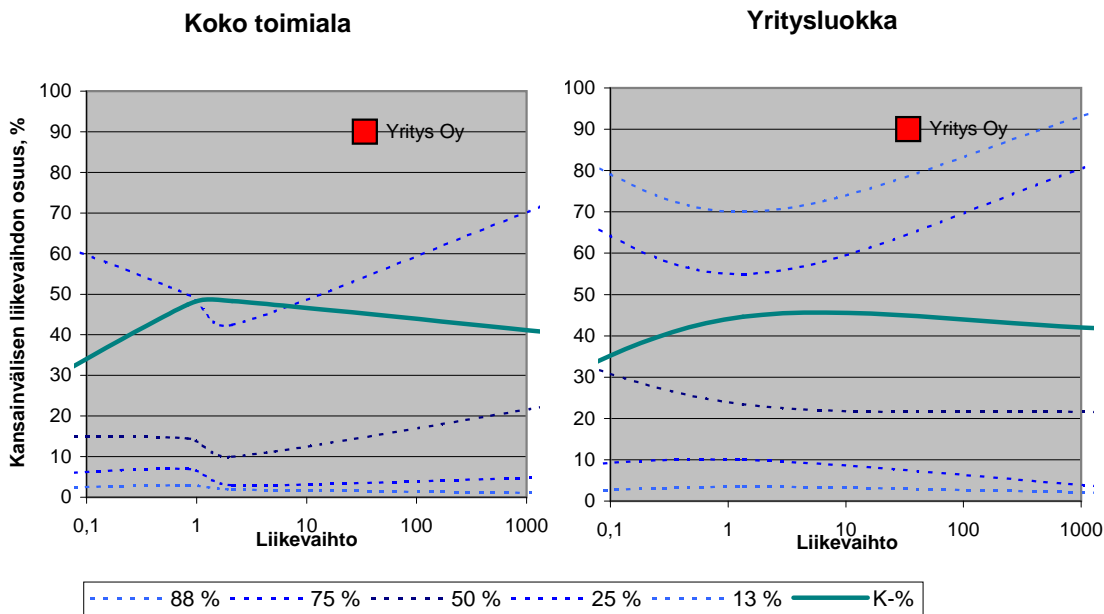
Kuvaaja 2.2: Ohjelmistoyrityksien kannattavuus liikevaihdon suhteen.

3. Kansainvälistyminen

Allaolevat kuvaajat 3.1 ja 3.2 kuvaavat yritysten kansainvälistymisprosenttia ja kansainvälistyneiden yritysten kansainvälisen liikevaihdon osuutta koko liikevaihdosta. Vaikka vain osa suomalaisista ohjelmistoyrityksistä kansainvälistyy, olemme valinneet tämän tarkastelun kohteeksi, koska erityisesti korkean tuotteistusasteen ohjelmistoliiketoiminnassa kansainvälistymistä pidetään pitkän aikavälin menestyksen edellytyksenä. Iän mukaan tarkasteltuna (kuvaaja 3.1) on nähtävissä selkeästi, että 1990- ja 2000-lukujen vaihteessa perustettujen, erityisesti tuoteyritysten, kansainvälistymisprosentti on suuri. Lisäksi kuvaajissa ilmoitetaan kansainvälistyneiden yritysten osuus kaikista yrityksissä kussakin ikäluokassa (K-%).



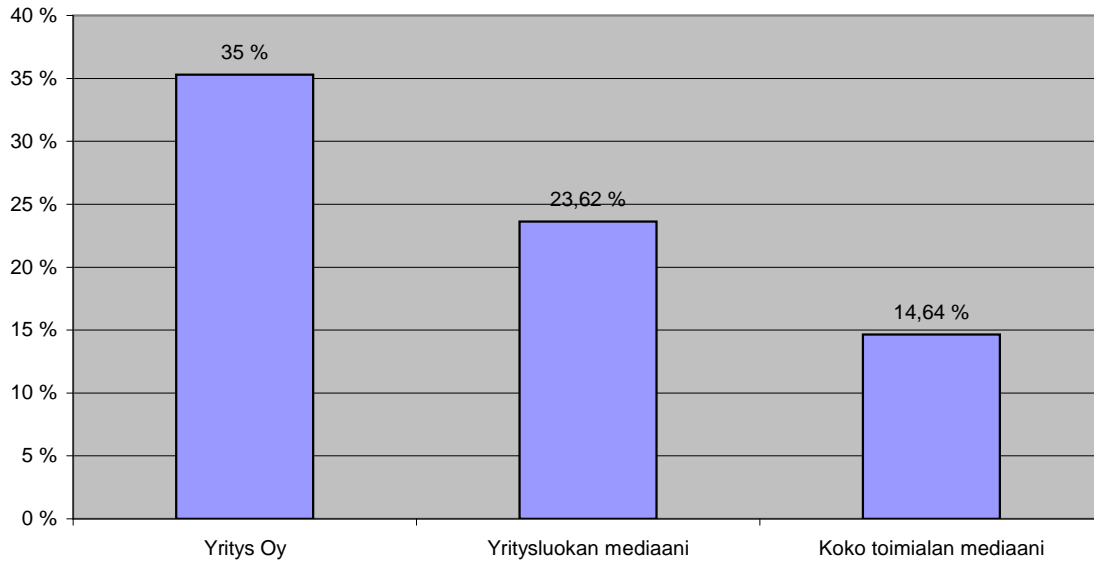
Kuvaaja 3.1: Yritysten kansainvälistyminen iän suhteen



Kuvaaja 3.2: Yritysten kansainvälistyminen liikevaihdon suhteen

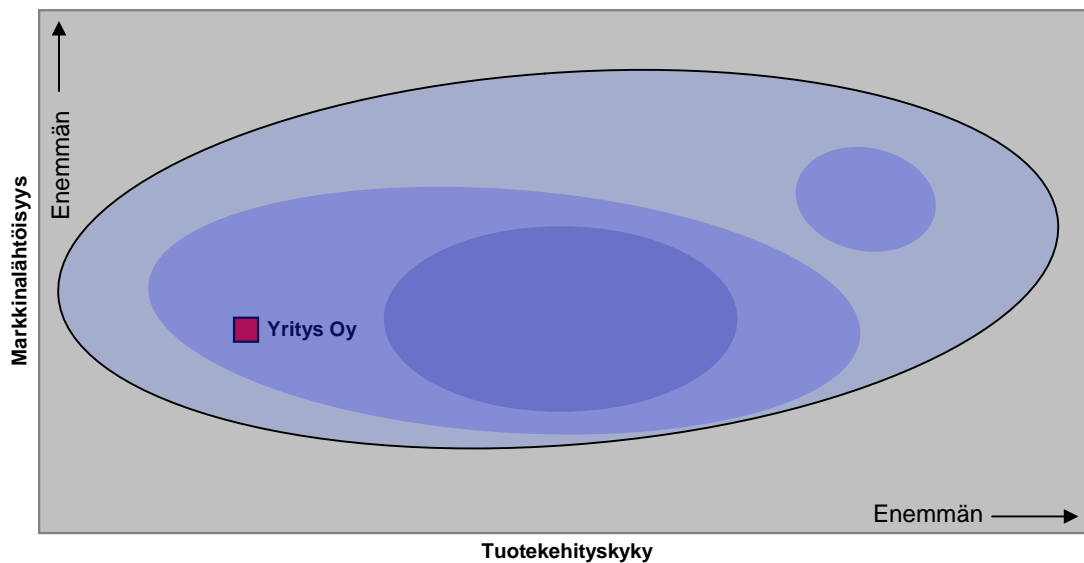
4. Tuotekehitys

Kuvaajassa 4.1 esitetään tuotekehityspanoksen osuus kokonaisliikevaihdosta sekä yrityksen osalta että koko toimialan ja yrityksen luokan muiden yrityksen mediaaneina.



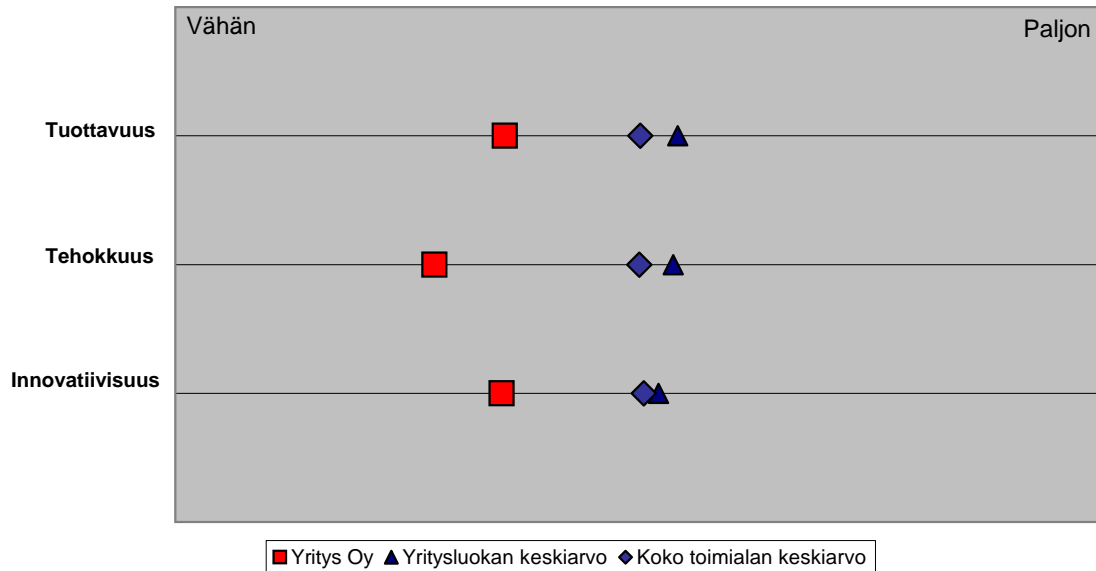
Kuvaaja 4.1: Tuotekehityspanoksen suhteellinen suuruus

Kuvaajassa 4.2 esitetään yrityksen sijoittuminen koko toimialan yritysten joukossa markkinalähtöisyydellä ja tuotekehityskyvyllä mitattuna vastaajien omiin arvoihin perustuen. Pääosa toimialan yrityksistä sijoittuu kuvaajassa rajatulle alueelle. Mitä tummemmalla värillä alue on kuvaajassa piirretty, sitä useampia yrityksiä sille sijoittuu. Kuvaajassa käytetään muiden yritysten kuvaamiseen tarkkojen pisteiden sijasta alueita, jotta yksittäisen vastaajan vastauksia ei voida päätellä. Kuvauksen arvioiden laskentatavasta löydätte Ohjelmistoyrityskartoituksen kotisivulta.



Kuvaaja 4.2: Tuotekehityskyky - Markkinalähtöisyys

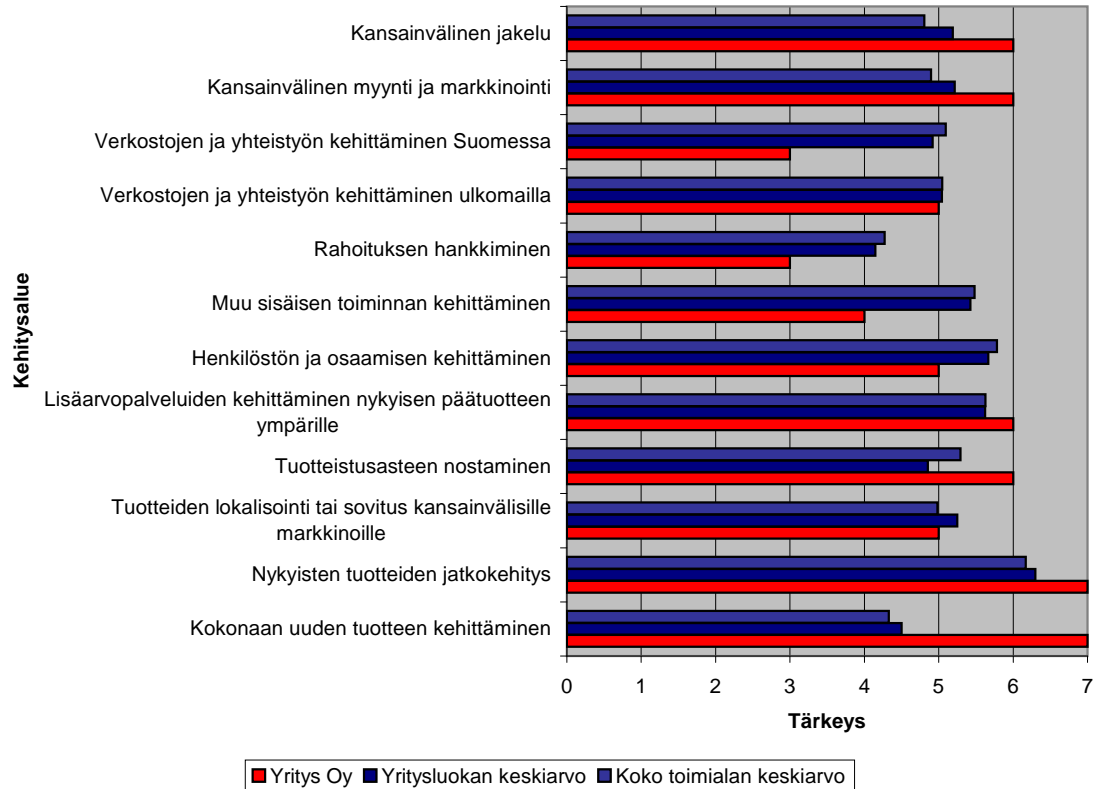
Kuvaajassa 4.3 tarkastellaan tuotekehityskykyyn eri osa-alueita. Tuottavuudella (engl. effectiveness) tarkoitetaan yrityksen kykyä tuottaa hyvin markkinoiden tarpeisiin vastaavia tuotteita. Tehokkuudella (engl. efficiency) tarkoitetaan lähinnä tuotekehityksen kustannustehokkuutta. Innovatiivisuus kuvaa yrityksen kykyä tuottaa uusia ideoita ja jalostaa näistä kannattavia tuotteita ja liiketoimintaa.



Kuvaaja 4.3: Tuotekehityskyky

5. Kehitysalueet

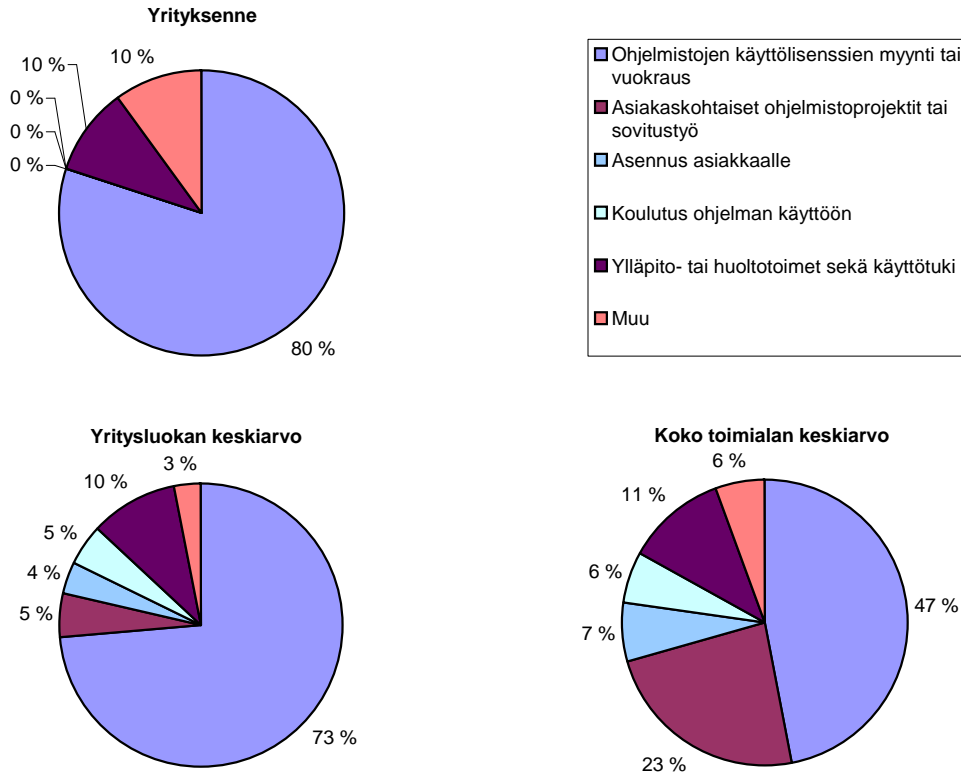
Kuvaajassa 5.1 esitetään eri kehitysalueiden arvioitu tärkeys sekä yrityksenne osalta että yrityksenne yritysluokan ja koko toimialan keskiarvoina. Tutkimuksen pääraportissa analysoidaan näitä kehitysalueita tarkemmin.



Kuvaaja 5.1: Kehitysalueiden arvioitu tärkeys

6. Asiakaslaskutuksen jakautuminen

Kuvaajassa 6.1 tarkastellaan asiakaslaskutuksen jakautumista sekä yrityksellänne että yrityksenne yritysluokassa ja koko toimialalla keskimäärin.



Kuvaaja 6.1: Asiakaslaskutuksen jakautuminen

7. Lopuksi

Ohjelmistoyrityskartoitus 2007 kiittää yritystänne osallistumisestanne tutkimukseen. Toivottavasti tämä raportti on teille sekä mielenkiintoinen että hyödyllinen.

Tämänvuotisen ohjelmistoyrityskartoituksen yhteydessä toteutetaan lisätutkimus, jossa tutkitaan yrityksen ohjelmistokehitystä ja markkinointia. Lisätutkimukseen osallistuville yrityksille toimitetaan syksyn aikana tämän raportin kaltainen, yrityksen ohjelmistokehitystä ja markkinointia käsittelevä raportti. Mikäli yrityksenne on kiinnostunut osallistumaan tähän tutkimukseen, pyydämme teitä ottamaan yhteyttä projektin päätutkija Mikko Rönkköön (mikko.ronkko@utu.fi).

Ohjelmistoyrityskartoitus toteutetaan myös vuonna 2008. Mikäli haluatte vaikuttaa ensi vuoden tutkimuksen tai vastausanalyysin sisältöön, olkaa hyvä ja lähettäkää meille palautetta. Yhteystietomme löydätte Ohjelmistoyrityskartoituksen www-sivuilta osoitteessa <http://www.sbl.tkk.fi/oskari/>. Sivuiltamme löydätte myös raportin koko alan kehityksestä.

Ohjelmistoyrityskartoitus 2007:n toteuttivat Teknillinen korkeakoulu ja Turun yliopisto.

Mikko Rönkkö	Vastaava tutkija
Olli-Pekka Mutanen	Projektipäällikkö
Eero Eloranta	Tutkimusassistentti
Hanna Mustaniemi	Tutkimusapulainen
Mikko Ojala	Tutkimusapulainen
Tuomas Piippo	Tutkimusapulainen
Jyrki Kontio	Professori
Markus Mäkelä	Professori

Vuoden 2007 ohjelmistoyrityskartoituksen mahdollistivat:





Finnish Software Industry Survey 2007

This report contains the findings of the 10th annual software industry survey. The survey's objective is to provide information about the current situation of the Finnish software product companies. This survey focuses on the software product companies and their product development and product management, profitability, internationalization, sales, and financing related issues. The main topics of this report are:

-
- Current state and future prospects
 - Characteristics of the business
 - International operations
 - Financing and ownership
 - Clusters in software industry
 - Conclusions of the findings

New additions in this year's report are large number of appendixes describing the study and the firms.