Åke Sandberg, Fredrik Augustsson and Anne Lintala

IT and Telecom Companies in Kista Science City, Northern Stockholm

– Activities, Networks, Skills and Local Qualities

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Preface

This report, as indicated by its title *IT companies in Kista,* describes companies and establishments in the Kista area north of Stockholm that are active in IT and telecommunications. Kista and the IT companies have long attracted media attention and been the subject of debate and some research. Kista has stood out as a leading IT and telecom cluster and as the location for many of the biggest and most influential companies. The area has scored high in international rankings and has acquired a number of epithets including 'mobile valley'.

There has however been limited documented knowledge of the companies in Kista, how they cooperate and are organised and what they think of Kista as a place of business. There are also shortcomings in knowledge about the employees, their skills, development opportunities and health. The aim of the study reported here is to contribute up-to-date empirical facts about the companies by documenting responses from the establishment managements of IT-related companies in Kista.

The study was performed as part of the MITIOR programme (media, IT and innovation in organisation and work) at the Swedish National Institute for Working Life and NADA (Royal Institute of Technology department working with numerical analysis, computer science, computer interaction and media technology). The study has been led by Professor Åke Sandberg and conducted in cooperation with Kista Science City AB (KSC). The project group include analyst Anne Lintala, researcher Fredrik Augustsson and in some parts doctoral student Karin Darin.

The report is part of the MITIOR programme's research into the interplay between new forms of technology, organisation and management with the aim of identifying and supporting good jobs with development potential in efficient, long-term sustainable companies. This is the fifth descriptive report of the empirical studies that we have carried out. Earlier studies were based on responses from managements of specialised interactive media companies (Sandberg 1998, Sandberg & Augustsson 2002) as well as major Swedish companies and public agencies that have in-house production of interactive media solutions (Augustsson & Sandberg 2004a). In 2005 we published a fourth report based on questionnaires answered by employees of companies producing interactive media solutions (Sandberg et al., forthcoming).

The Swedish Governmental Agency for Innovation Systems (VINNOVA) has helped fund the study, which was conducted at the Work and Health unit at the Institute under the auspices of the theme of *Arbetsliv i storstad* (Working life in urban areas), and at the Center for user-oriented IT Design (CID) at the School of Computer Science and communication, KTH Royal Institute of Technology, Stockholm

In preparing and reporting the study, we have had useful contact with Electrum and Kista Science City AB, above all through the company's CEO Per-Anders Hedkvist and later Magdalena Bosson, as well as the then marketing manager Mattias Bäckman.

Advice on the wording of questions and the analysis was provided by Tomas Lindh in particular, but also Malin Bolin, Klas Gustavsson, Annika Härenstam and Anders Wikman at the National Institute for Working Life. Casten von Otter provided support and useful comments. Daniel Högberg commented an earlier version in the light of his own ongoing surveys in Kista. In tests of the questionnaire we received valuable feedback from Mia Kaasalainen, Excosoft AB; Bo Löwstedt, Technia; Göran Hellberg, TietoEnator; John Kindborg, Peppar Mobil; Mattias Bäckman, Kista Science City AB (KSC) and Magnus Östberg, from the *Competence* newspaper. Delegates at the conference at the Campus IT University in Kista and at a CID seminar at which a preliminary version of the report was presented provided good pointers for revision. Those who commented on the report at the KTH IT University Campus in Kista included panellists Madgalena Bosson, KSC; Jonas Dallöf, i3 micro technology; Fredrik Hånell, Phoxtal; Kjell Jonsson, Sif (Non manual workers' union); Anna Svärdemo-Alander, Sinf (The Swedish Industry Association) and Tommy Tengvall, Interverbum. Finally, a special word of thanks to the managements of over a hundred establishments that responded to the questionnaire.

This report has previously been published in Swedish as 'IT-företagen i Kista' (2005). Apart from minor corrections and some updates, the Swedish and English versions of the report are identical.

Stockholm, April 2004 and January 2007

Åke Sandberg

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Introduction: IT and Kista

The slump in parts of the IT and telecoms sector during the first half of this decade – which now have evolved into a period of stabilisation and appears to have changed into a renewed upturn – does not change the fact that the sector is an important part of Swedish industry and the Swedish labour market, with extensive business in the domestic and export markets. This applies particularly, although by no means solely, to the Stockholm region, in which many people either work directly in the IT sector or in companies that are dependent on it as subcontractors of company services and producers of knowledge intensive services and products.

The growth in production volume, sales and profit that we are now seeing, not least at Ericsson, whose importance as a driving force in Kista can hardly be overstated, is also generating new jobs in Kista and the rest of Sweden, although job creation is taking place at a slower rate than the growth in turnover. This is partly due to ongoing structural and everyday rationalisation in production and increased productivity, partly a renewed shortage for skilled workers (a situation which was far from the case when the survey this report is based on was conducted), and partly because some stages of production and development have been outsourced to subcontractors. These subcontractors are often in other countries; if they are in Sweden, they are often more geographically mobile than the organisation outsourcing the production. Somewhat paradoxically, the success of the IT sector leads to its limitation in Sweden: companies develop technical solutions that boost opportunities of moving operations to other locations and doing the same things with fewer resources. Globalisation and regionalisation are taking place at the same time; change in the geographical and functional aspects of work management, where new IT solutions constitute *one* factor together with changed forms of organisation and leadership models. There are also more overarching institutional and structural processes, for example related to changes in Swedish society, EU membership and expansion, and altered industry structures.

This report presents the results of a survey of the area that has become a symbol not just of Stockholm's, but all Sweden's IT sector: Kista. Kista has been called 'Sweden's Silicon Valley' and, 'Mobile Valley'. In 2000, *Wired Magazine* ranked Stockholm and Kista Science Park second among the world's foremost high-technology regions after Silicon Valley. In the same year, Stockholm was described on the cover of *Newsweek* as 'Europe's Internet Capital'.

Although Kista is an oft-written about region with substantial IT activity (in relative and absolute terms), it is a region about which it is difficult to find reliable empirical data. Official statistics are of some help, but the dynamism of the industry, with its constant start-ups, relocations, mergers and shutdowns of

companies and activities, along with shortcomings in statistical classifications, point to a need of focussed surveys (see e.g. Augustsson 2005 on industrial data limitations). In short, we are living in changing (although not necessarily revolutionary) times, in which what companies do, as well as how and where they do it, changes. In other contexts, we have pointed to structural change related to outsourcing, buy-outs and other factors affecting Swedish industry. IT is *one* part of this, along with several other factors (Augustsson & Sandberg 2003b).

Pressing issues that require well substantiated answers include: which IT operations actually exist in Kista? Do companies cooperate in production and other areas in local networks in Kista? What is the profile of those working in Kista? What are the most important skills and their sources? What learning opportunities are available? How important is proximity to universities and other research and training? What are Kista's strengths and weaknesses as a location for business? What challenges face companies and the location? This report provides some answers to these questions. The report is based on a questionnaire completed by managements at IT establishments in Kista conducted in 2003/4.

It is also helpful that questions similar to ours about production, markets and networks were asked in a survey from Kista's early days as an IT centre around 1990 (Larsson and Lundmark 1991). This data enables some longitudinal analyses to be made. (Our study has a broader approach, including questions about personnel and skills, as well as questions about assessment of Kista the location). Like us, they have a geographical delimitation corresponding to the Kista post code areas. Their delimitation of the electronics and computer sector largely correspond to what we mean by the IT sector. However, bearing in mind the dynamism of the location and the time that has passed since the earlier study, comparisons between the results is a complicated matter, so analyses of changes and differences will have to wait.[1]

Other important issues about the IT sector and its regional distribution apply to the working conditions, skills, networks, career paths and health of personnel. It would be useful to supplement the company management questionnaire reported here with a questionnaire for employees, to be able to link organisational conditions and company growth to development and wellbeing at work. Questions about the dynamism of the local job market in a region with a changeable industry such as the IT sector can also be illuminated in this way, for example in issues such as employability, competence development, the role of educational institutions and cooperation between companies in terms of recruitment.

This report from the questionnaire to the managements of Kista's IT establishments is more descriptive than analytical. In other words, the report largely

[1] For discussions of the complexity of longitudinal analyses and theoretical explanations of changes in organisation and work, see e.g. Sztompka 1993, Bijleveld et al. 1998 and Ahrne & Papakostas 2002.

consists of diagrams and tables with comments that describe the situation in the IT sector in Kista. The report provides explanations of the presented results to only a limited extent, although in certain cases we present preliminary hypotheses and relate the data to social science theories. Similarly, few comparisons have been made with other industries and locations. We cannot therefore always provide the reader with points of reference and finished interpretations of our results.

As with all questionnaire based data – especially that expressing opinions (in our case, for example, company managements' view of Kista as a business location) – the figures in this report must be interpreted with caution. The discussions sparked by our preliminary report confirmed the importance of emphasising this. In order to make pronouncements about what are normal, high or low values, the results must be related at least to comparable data from other surveys, such as those from other locations and sectors. We will return to this in our continued processing of the results. In the summer of 2004, we held interviews with representatives of local companies and universities with the aim of investigating the reasons for some of the responses and response patterns obtained from this study, particularly concerning cooperation and knowledge-building between organisations. The results of this follow-up study will be published in a separate report (Movitz & Augustsson forthcoming).

There have been requests from the field, and an aim on the part of those of us in the MITIOR programme, to feed the empirical results back to those who took part in the study in order to present participants with a picture of the situation in Kista as well as enable them to contribute insights and possible explanations to assist us in our continued analysis. Visions are a relatively common commodity in the IT sector, and 'cluster' has been the word of the day in research into innovation and regional development (Brenner & Sandström 2000). What are really needed now are good descriptions: useful maps that tell us possible steps for the realisation of the vision of Kista Science City. This was the foundation of KSC AB's involvement in the project. An improved map reflects reality better than the old one did, and may make a change of direction necessary. As Gunnar Myrdal once wrote: 'facts pack a punch'. It is the nature of research that we are sometimes wrong, but we can continue to learn, improve our understanding and thereby reduce our errors (Bhaskar 1975; Sayer 2000). Empirical data cannot provide answers on its own, but they are important building blocks in explanations (Fleetwood & Ackroyd 2004).

Delimitations of 'IT in Kista'

Our preliminary studies, as well as our own previous studies of interactive media production, made clear that how industries and activities – in this case Information Technology (IT) in Kista – are delimited is crucially important. Alternative

definitions generate very different results in terms of the number of employees and companies, turnover, operations, etc. We have therefore tried to be as consistent and clear as possible about what we have actually studied. In brief, we have surveyed establishments that are located in the post code areas of Kista, Akalla and Husby that work in IT related business (according to the codes discussed in the methodology section) and that have 0–199 employees. In addition to these, we have included establishments that focus on technical research and development according to the SNI classification system (Swedish Standard Industrial Classification), because some of these companies may be presumed to have IT-related activities. Furthermore, the survey includes companies that have establishments in Kista but whose head office is located outside the area. By 'establishment' we mean a physically delimited unit with its own address (such as an office, a shop or a factory).

In terms of the geographic delimitation, in the following we will use Kista to refer to Kista, Akalla and Husby, for the sake of simplification. This corresponds to the area of the Kista city district within greater Stockholm. Although it is technically possible to distinguish Kista geographically, this is not preferable, since the neighbouring areas are socially and economically fused with Kista. We have therefore chosen to also include establishments and companies located in Akalla and Husby. This area became known as Kista Science Park in 1998. Since 2000, the area has been known as Kista Science City, and now also includes Södra Järva and adjacent parts of Sollentuna, Järfälla and Sundbyberg municipalities. One reason why the study is not based on the later division is that in our view, it includes areas that only have a limited link to IT in Kista and that in some cases are more related to Stockholm's inner city or the northern part of greater Stockholm in general.

We report here on how we made our selection of establishments after acquiring them from public databases. The responses to the questionnaire then determined whether each establishment met the geographical and sector criteria for inclusion in or exclusion from our survey. It emerged that some establishments and companies do not regard themselves as part of the IT sector, and that other companies' operations were not located in Kista. A more detailed account of the selection process is provided below and in the methodology section at the end of this report. The inclusion based on questionnaire responses was necessary due to the dynamism of the industry and the limitations of existing registers. There are also theoretical arguments and consequences of this strategy that we will not discuss here (see Augustsson 2005 for a discussion).

Despite the fact that a large proportion of the employees in IT-related jobs in Kista are employed in a small number of large companies (including Ericsson), this report only includes the results for establishments that have 0–199 employees. This is because the big companies are so few in number that they are often not in the responses, and if they are, their responses affect the results so

much that they must be reported on separately anyway; this usually means that their anonymity cannot be guaranteed. It is particularly important to bear this delimitation in mind in relation to the presented results about the average size of the establishments and the extent of the sector. In other words, the IT sector in Kista is much bigger than we report here, since there is a small number of major companies with considerably more employees and higher turnover than those included in the results we report.

Concerning Establishments, Companies and Business Groups

From an organisational perspective, it is worth clarifying what we mean by an establishment, a company and a business group. An *establishment* is each separate address at which a company has operations, which means that each company can have a number of separate establishments. If a company has only one establishment – which is the case for most companies – then the company and establishment are synonymous. A 'business group' consists of a collection of legally independent companies that have separate corporate registration numbers and are led by one parent company.

Many employees do not reflect on whether the place where they work is a department, a separate company or a collection of legally separate companies under the leadership of a parent company. In many cases it is not important to them. They see it as an organisational unit, rather than a collection of separate companies (or vice versa). This is clear when we compare some of the responses that we received with the company and group register: in certain cases, people have provided data about companies when the questions were actually about the group (for example when stating the number of employees), or data about the establishment instead of the company as a whole. In our calculations, we have corrected for this as much as possible, and in a few doubtful cases we have excluded responses from calculations if they substantially distort the results.

Outline

The presentation of results starts with a short description of Kista's history, companies year of establishment, and the number and size of IT companies and IT establishments in Kista. This is followed by the IT-related and non-IT-related activities of the establishments. We then describe cooperative ventures and networks between companies and establishments, including outsourcing, subcontracting and contacts with interactive media companies in Stockholm's inner city. The subsequent chapter describes how the managements of establishments view Kista as a business location, i.e. the factors that they consider important for doing business in Kista, and the extent to which Kista actually meets these requirements. This is followed by a description of the people working with IT related activities, including the number of employees, labour turnover and working

hours. The section following presents educational levels, the importance of skills in different fields and their sources, and the extent and forms of competence development. The presentation of results ends with a description of salaries and other remuneration systems, as well as issues of work environment, agreements and unionisation. The concluding discussion thematically summarises and discusses the empirical findings in brief before the report ends with a more detailed description of the method and design of the study.

A Brief Note on Method

The results are based on questionnaires that were sent (in 2003/2004) to all establishments (irrespective of size) in Kista, Akalla and Husby that work in IT-related operations, according to the definition and SNI (Swedish Standard Industrial Classification) 92 and 02 for the sector used by, among others, the Swedish Agency for Economic and Regional Growth, Statistics Sweden, the Swedish Institute for Growth Policy Studies and the Swedish National Labour Market Board. We have also included technical R&D. From USK – the Stockholm Office of Research and Statistics – we ordered a list of current establishments according to the above definition and with the area codes provided in Statistics Sweden's CFAR register of companies and establishments. For simplicity, we will hereafter only write IT-related activities, or IT activities, to include R&D, production (both hardware and software), infrastructure, trade and leasing, consulting and service, as well as other IT activities (including publiccation of software, data processing etc). The company list based on the CFAR business register has been supplemented with information from Affärsdata's database, where companies with Kista addresses were asked about their establishments in Kista. The selection from Affärsdata was based on the companies' focus as stated in their articles of association.

Questionnaires were sent by mail with an SAE to the manager of the establishment in Kista. Four written reminders were sent, including new questionnaires; the final reminder included a shorter version of the questionnaire with 18 questions, in contrast to the 65 questions of the full questionnaire. In addition, reminders were sent by e-mail and telephone to several establishments.

Questionnaires were sent to at total of 397 establishments and we received 173 replies. Of these replies, 104 were completed questionnaires from establishments that were active IT companies in Kista, and 69 replied that they were not in the category because they are not active at all, do not have IT-related activities, are not located in Kista, Husby or Akalla, or a combination of the above. By analysing non-respondents we were able to discount a further 130 establishments that almost certainly do not belong to the population. Of the remaining 198 establishments, 104 responded to the questionnaire, which translates into a response

rate of 52 per cent, a comparably good response rate for surveys at organisational level (Franfort-Nachmias & Nachmias 1992).

Our survey was directed towards all establishments with IT-related activities in Kista, irrespective of their size, but there are many small and very few large establishments in Kista. Only two establishments with 200 or more employees filled in the questionnaire and we therefore chose not to include them in our calculations. The results therefore apply to establishments with 0–199 employees. This means that the calculations are based on a total of 102 replies for a population of 196 companies.

Our analysis of the non-respondents show that there are no statistically significant differences between the establishments that replied and those that did not with respect to SNI code, location or size in terms of number of employees.

IT Companies and Establishments in Kista

Kista – from ABC to KSC

Järvafältet, an area about 10 km north of Stockholm's inner city, was a military training area at the start of the last century. During the 1970s, housing construction started on this piece of land as a result of a government programme to build a million new houses in Sweden. The aim was to remedy the lack of housing in Sweden's big cities and thus in order, Husby, Akalla and Kista were built. Construction in Kista was more varied than the large-scale developments in Husby and Akalla. The idea was that Kista would become an integrated ABC town (in this term, ABC stands for work, housing and commercial town centre), with a residential area separated from the commercial property area by a town centre with extensive public services and a range of commercial businesses that would make Kista similar to Vällingby (a municipality in greater Stockholm). The City of Stockholm presented Kista-Akalla as an alternative to company location in the inner city. The area had available land and premises were to be built to house small companies. Big companies could also build premises themselves (SNK 2000, Mariussen 2003).

However, since the idea was that housing and establishments were to be close to each other, special requirements were placed on companies that wanted to locate their businesses in Kista. These included environmental considerations so that the companies would not generate noise or emit pollution and so forth. Early on, companies were not exactly queuing to relocate to Kista due to the economic recession at the time (partly caused by the oil crisis). There was not any particular initial intention to create a centre for IT – or the electronics industry, as it was known at that time – in Kista, even though that type of activity would meet the municipality's special requirements. It occurred more by chance, as three large companies decided to move to Kista in 1975: the Ericsson companies SRA

and Rifa, and IBM (see e.g. Meurling & Jeans 2000 for a description of Ericsson's history). Additional large and small companies followed in the footsteps of these pioneers. In October 1977, the Swedish morning newspaper Dagens Nyheter wrote: '*Calling all companies, big and small! This is the place where you can rent 3,000 to 10,300 square-metre building plots, with green spaces and attractive parks. Kista is to be Stockholm's largest employment area…'* (quoted from Björklind 2003). The rest, as they say, is history (though as yet unfinished).

In the early 1980s, with the support of the Royal Institute of Technology (KTH) and Ericsson, the City of Stockholm launched a programme for an electronics centre in Kista. People starting talking about 'Sweden's Silicon Valley'. A foundation called the Electrum foundation was formed, with the municipality, researchers and companies among its founders (the well known triple helix model in innovative systems thinking, Etzkowitz & Leydesdorff 2000). The Electrumhuset building was inaugurated in 1988. Electrum today houses several research institutes including SISU, SICS (the Swedish Institute for Computer Science) and Acreo. Several spin-off companies have been formed there. It also houses the KTH's engineering school, parts of the electronics department and courses in computer and systems sciences run by Stockholm University and the KTH.

More companies of different sizes established themselves in Kista during the 1980s and 1990s, including Nokia, Microsoft, Apple, Sun and the Ericsson Components factory. An important reason for these companies choice to locate in Kista is said to have been the close proximity to Arlanda Airport, rather than closeness to other IT firms. Nevertheless, a result of companies choice of location has been that Kista has become ranked at the top of several international comparisons between IT centres.

In 2000, Kista Science Park, the joint name of the Kista and Akalla business areas, became Kista Science City AB, which is seen by local actors as a tool for realising the business community's, the education institutions' and the municipalities' joint vision of the future. Kista Science City encompasses the entire Järva area and parts of surrounding municipalities. The IT University Campus – a joint venture between KTH and Stockholm University – was founded in 2002; Ericsson relocated its head office to Kista the following year. But relocation of staff from the Telefonplan area close to Midsommarkransen – one of the earliest suburbs built south of Stockholm – only partly compensated for redundancies in manufacturing and R&D that the company made in the same period.

Soon after 2000, the 'dotcom bubble' burst and IT companies in and outside Kista experienced several difficult years of cutbacks and redundancies. Ericsson, the dominating company, had at most 17,000 employees in Kista. 9,000 have been made redundant since then and just under 8,000 now work at Ericsson in Kista. In total, Ericsson has reduced its staff in Sweden from 45,000 to 23,000

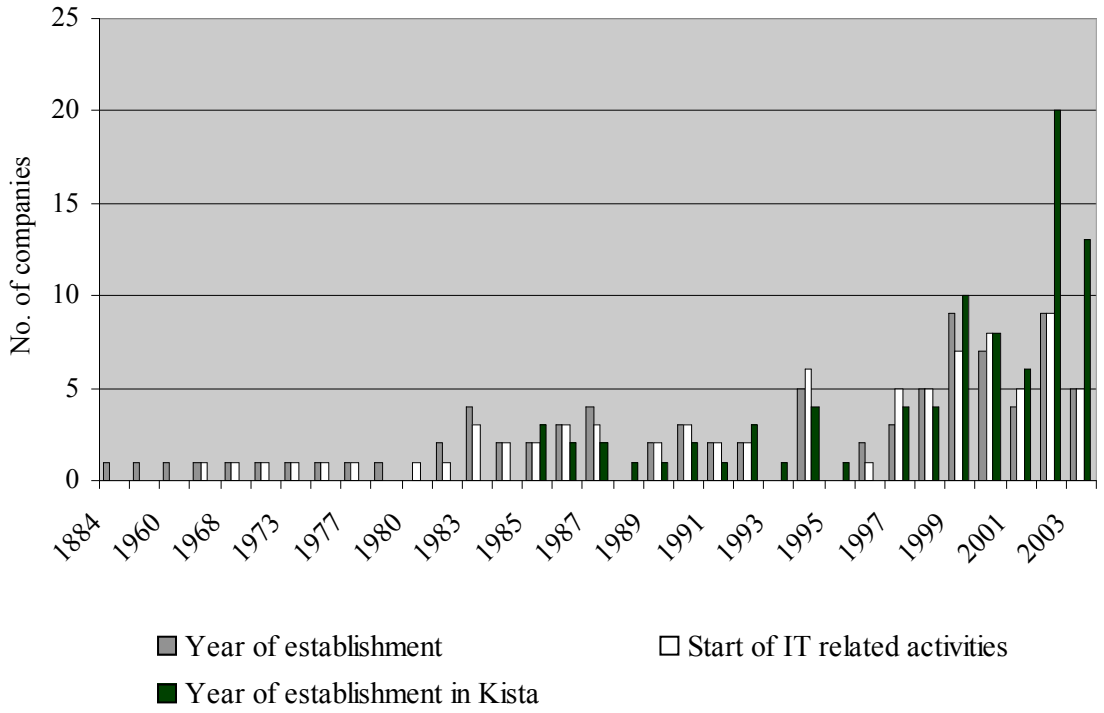
employees (DN 2004-08-03). Some of these people have however been transferred to other companies, like Flextronics, which means that the jobs may still exist – although companies to which the employees have been transferred have also made some staff redundant or moved. The IT downturn has however turned into stability, and there are apparent signs of recovery according to analysis reports and industry media estimates. We are again seeing recruitment of new employees in both IT and telecommunications often as hired consultants or through staffing companies (DN 2004-08-05, reporting data from the National Labour Market Board and the trade organisation IT-Företagen), and there are increasing reports of a shortage of skilled IT workers. In Kista, the premises that began to be built in the late 1990s, including Kista Science Tower, are now filling up with activity.

The rest of this section shows how these historical developments are reflected in our empirical results in terms of the background and establishment of the companies and establishments, and the size of the sector.

New Establishment and Experience in IT

Growth in the number of IT companies now active in Kista has mainly occurred over the five to ten years proceeding the survey. On average, the companies were established in 1992, began IT activities in 1994 and located operations to Kista in 1998 (see figure 1).

Figure 1: Year of firm establishment, start of IT activities and location to Kista. Note: Asymmetric scale before 1983.

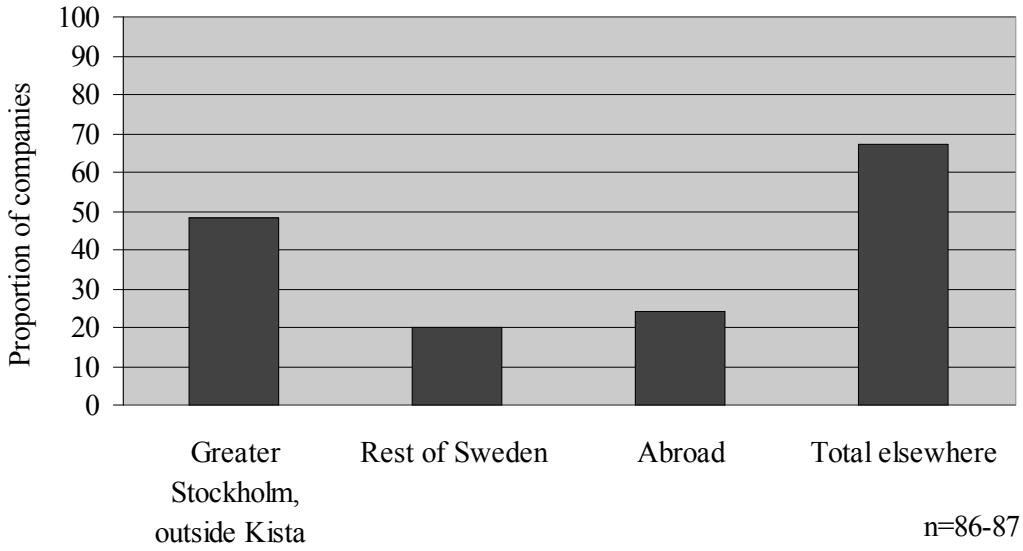


The median is consistently a few years later so the emphasis is on the past few years. If we look at the development of individual companies, we find that they on average started IT activities about five years after the company was founded. Their IT activities began just over a year after the company established itself in Kista. The figures for the year 2000 up until 2004 are illustrative of the young age of the companies and the Kista area: over these years, 30 per cent of the companies were founded, 33 per cent started IT-related activities and 55 per cent located to Kista. This indicates that there is dynamism in Kista, where companies and establishments already there have created space for new establishment. More than half the establishments in Kista were established after the dotcom crash. The figures only give the age of the companies that at the time of study had an establishment in Kista (inflow) and not the companies that have moved away from Kista, or have ceased doing business altogether (outflow).

Before establishing in Kista, a total of 67 per cent of the companies had operations at a different location (which means that they either relocated to Kista or established a further establishment there). 48 per cent had operations in other parts of greater Stockholm, 20 per cent in the rest of Sweden and 24 per cent abroad; some companies previously had operations in a number of locations (see figure 2). That many establishments in Kista have a background in companies from the larger Stockholm area is a first indicator of Kista as an integrated part of

the region. Ten per cent of the currently active companies are spin offs from other companies in Kista.

Figure 2: Number of companies with operations in other locations before establishing in Kista. More than one answer possible.



Bearing in mind the low number of establishments per company (the vast majority of companies have just one establishment, see below), it appears that in several cases, companies have *relocated* their operations to Kista, rather than starting or expanding the company (i.e. establishment in Kista *in addition* to existing establishments in the company).[2] At the same time, Kista is also a place where new businesses are started. Thirty-three per cent of the companies currently working there were started on establishment in Kista, and have thus *not* previously operated elsewhere. This can be compared to the situation in 1990 when the corresponding proportion was just over 20 per cent (Larsson and Lundmark 1991, p 29). The proportion of newly-started companies in Kista has thus grown sharply over time.

More than 70 per cent of the companies state that their head office is located in Kista, a few elsewhere in Sweden and about a quarter abroad. The head office is (naturally) in Kista if it is the company's only establishment. If companies have more than one establishment (does not apply to groups), their *Swedish* head office is located in Kista in 81 per cent of cases. If companies have stated that

[2] In 1990, almost 79 per cent of those who responded to Larsson and Lundmark's (1991, p 74) questionnaire stated that they had moved in from other parts of the Stockholm region. The proportion of companies that were spin-offs from other Kista companies was eight per cent in 1990 – only slightly smaller than in our study.

their head office is abroad, they have in many cases stated the location of the *business group's* head office; this was revealed in a review of the responses.[3] If these companies are excluded, 94 per cent of the head offices are in Kista. The fact that a quarter of the establishments have their group head office abroad shows that these companies, and Kista as a location, have important international contacts: a number of multinational groups have chosen to locate their operations, and often their Swedish or Nordic head office, in Kista rather than in central Stockholm.[4]

Size of the Sector

It is always difficult to estimate the size of a regional or national sector or activity, irrespective of whether the estimate is made in terms of the number of companies, establishments or employees, or turnover. Statistics databases can be of help in describing the change in an operation over time, but such databases always have certain fundamental problems: uncertainty as to whether all objects have really been included, whether they have been correctly classified and how well changes are registered (reliability). In addition there are also issues of validity, i.e. whether the databases really classify and measure what you are seaching for. Our previous studies of interactive media production, i.e. Internet and multimedia companies, show that the companies that are active in this field are represented in a number of categories (Sandberg & Augustsson 2002). To some extent, these errors can be corrected through questionnaire responses, which can be used to analyse whether companies really are active and whether they are involved in the activities stated in databases, as well as to collect up-to-date information on the extent of their operations. This is what we did in this study. Questionnaire responses do however contain inference problems, i.e. limitations in statements on the size of populations based on selections (including reductions in responses due to non-respondents in total surveys), and error margins in estimates (Agresti & Finlay 1997, Edling & Hedström 2003).

Here, we do not make a more detailed review of the size of the sector in Kista and the basis of various estimates. Based on official registers, primarily CFAR, we had a list of about 400 establishments. After having reviewed responses and examined the lists in other ways, we estimate that there were in total roughly 200 establishments with fewer than 200 employees in the IT sector in Kista in 2003. They were part of companies that have about 340 establishments in total. These 200 establishments had a total of about 4,000 employees in Kista, of whom

[3] Swedish subsidiaries of e.g. multinational US companies stated that their head office was placed somewhere in the US, although strictly legal the Swedish placed subsidiary is a company in its own right.

[4] This does not mean that the closeness of Stockholm lacks importance. As shown later, the close proximity of Stockholm, Arlanda Airport and the IT focus of Kista are all factors that influence company's decision to locate to Kista.

roughly 3,200 work in IT related activities. They generated a turnover of SEK seven to twelve billion from IT operations in 2003, which constituted about 90 per cent of their total turnover at both company and establishment level.[5] The majority of the currently active establishments were started relatively recently and have grown in terms of employee numbers and turnover in the past few years but have somewhat reduced their focus on IT (although it remains substantial).

Regional significance in a sector should however not be measured only in terms of size, especially not only as the number of establishments. It is also relevant to look at the regional labour market, what companies actually do, the skills in the region, and knowledge-building cooperation between different establishments and companies, as well as between local universities and decision-makers (see examples of regional cooperation between companies and other organisations in Ekstedt & Wolvén 2003, Wolvén & Ekstedt 2004). This is particularly important when a region has achieved 'critical mass' (Krugman 1991; Porter 1998), which Kista has in IT. In these cases, dynamism –a change in the group of companies and establishments – might be seen as a positive factor that creates an influx of new ideas, skills and cooperation partners (Saxenian 1994).

At the same time, acquisitions by multinational companies, and dominating companies moving out of the area, show that regions can be quite seriously affected – at least for a while – even if a critical mass exists (cf. Christmansson & Nonås 2003). If most activities in a region is centred around one large company and this company disappears, the region might not recover for a long time unless other companies or activities move into the area and are able to replace those that are gone (Engstrand 2003). In Kista, this part is of course primarily played by Ericsson. Even though not all companies and other activities are directly linked to Ericsson's various companies, they form a natural part of the backdrop and the perception of Kista and IT operations.

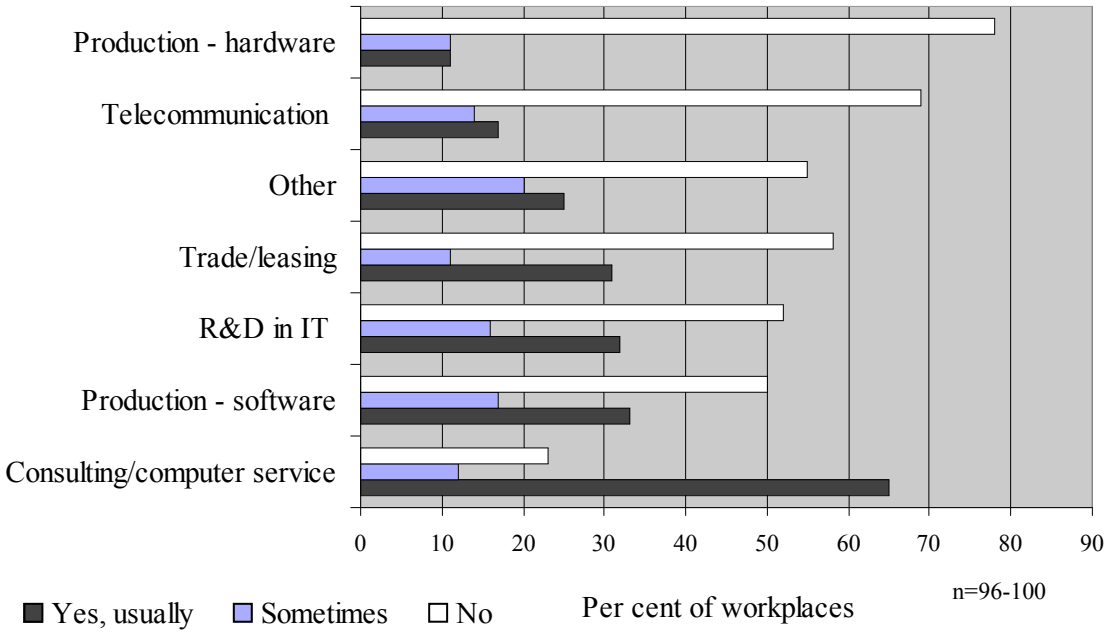
Business Activities

As stated earlier, the terms 'IT sector' and 'IT-related activities' are vague and encompass many different types of operations: in descriptions, 'development of new IT solutions' often includes e.g. erecting radio base stations and retail sales of mobile phones to private consumers (cf. the Swedish Institute for Transport and Communications Analysis (SIKA) 1998, 2001). To obtain a better picture of

[5] Larsson and Lundmark (1991) had the same experience in their study of 'electronics and computer companies' in Kista. Of the original 255 establishments mainly gathered from CFAR, the population was reduced to just over a hundred companies. In a dynamic sector like IT, public records seem to over-estimate the number of companies. One problem is the classification; there may be a tendency for companies to want to be classified in a 'sector of the future' (Augustsson 2005). Additional companies seem to be registered to a greater extent than removal of companies that should be removed due to inactivity, relocation or a change in orientation.

what activities establishments and companies in Kista are involved in, and what their scope is, we have specified distinct IT activities based on SNI classification, and the scope to which they are carried out (figure 3).

Figure 3. Proportion of establishments in Kista that often, sometimes or never perform various IT related activities.



Seventy-nine per cent of the establishments are involved in at least two activities and 62 per cent in three or more, the average number being three. Establishments are therefore generally speaking not entirely specialised in only *one* IT activity, even when the categories are as broad as they are here. IT does however constitute a large part of their total activity. As can be seen from the figure, consulting and computer services is the most common IT activity performed. More than three quarters of the establishments feature this type of activity, and 65 per cent usually perform such services. Half or just under half of the establishments are active in the production of software, R&D, trade and the publication of software/ data processing/other activities, respectively. About a third work in telecom and infrastructure and more than 20 per cent in production of hardware.

Clusters of Activities

The responses are very similar at aggregated level when we ask the same question about the companies in which the establishments are included (shown in table appendix). By correlating the different activities at company and establishment level, we also find that there are significant links in all cases, i.e. if the company as a whole is active in a certain field then this work is also done at the establishment in Kista. This is rather to be expected, due to the fact that the

company and the establishment are often the same organisational unit. It is interesting to note the differences in strength of the links at company and establishment level. In trade and consulting, the correlations are very strong, while they are much weaker for R&D and hardware production.

We also see that R&D is primarily correlated to the production of hardware and software, while consulting correlates negatively with both R&D and the production of hardware and software. When relating these findings to company size, we find that we to some extent can talk about two different types of establishments with IT activities in Kista: big establishments (although with fewer than 200 employees) that are active in hardware and software production and that also conduct some R&D within this field, and small companies that are more focused on activities such as consulting, service and trade in IT-related areas.

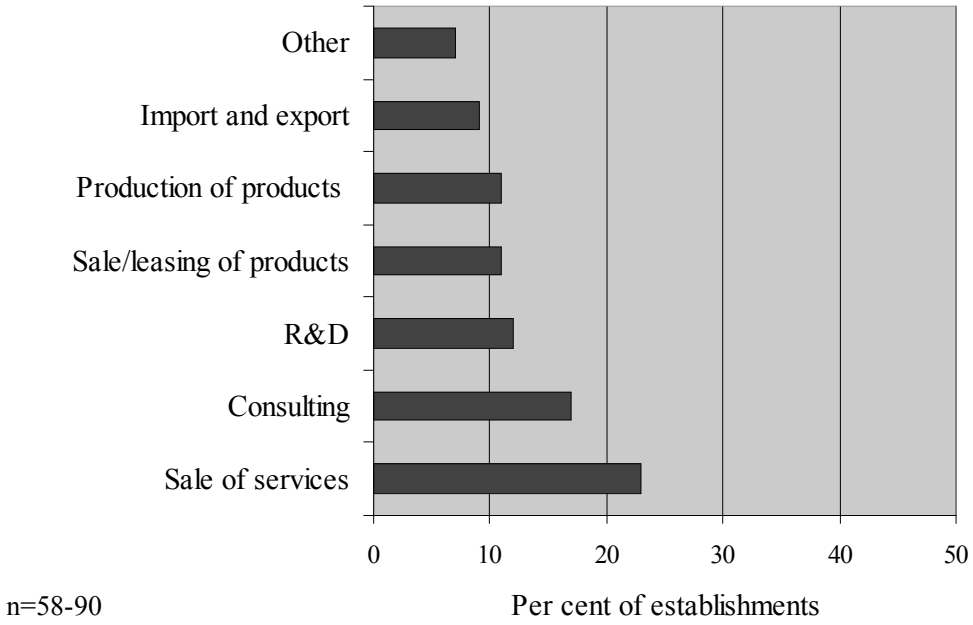
This division is also visible, and can partly be understood from, the proportion of establishments that are active in various fields. It is not particularly surprising that the proportion of establishments active in the production of hardware, telecommunications and infrastructure (including maintenance) is not very large, because these are activities that usually require major investments which small companies are not always able to make (cf. Ackroyd 2002). Some activities, such as hardware production and infrastructure in IT-related fields, are characterised more by economies of scale than others like consulting and service (cf. Chandler 1990). Kista's focus on services and sales-and-service reflects the minor and diminishing size of manufacturing industry throughout the Stockholm region. Although we do not have evidence to prove it in this survey, it is relatively clear that there seems to be a regional difference between e.g. Stockholm and greater Gothenburg (including the three towns Trollhättan, Uddevalla and Vänersborg). While the IT sector in Stockholm – including Kista – appears to focus more on general business solutions, Gothenburg and its environs focus more on the manufacturing industry and production support. This is probably due to a tradition of automotive industry, shipbuilding and other industry in the area. For example, Volvo IT grew out of Volvo (now owned by Ford). Volvo IT has such advanced skills in IT support for vehicle production that the company works in the global market and develops solutions for other automotive manufacturers, both within and outside the Ford group.

Activities besides IT

As has become apparent, the establishments that responded to the survey are highly focused on IT-related activities, which account for more than 90 per cent of turnover. The proportion of activities that are not related to IT is thus on average relatively low. We have thus succeeded in finding the companies that almost solely focus on IT. Still, 32 per cent of the establishments perform business activities besides IT. A third of the establishments cannot therefore be

classed as having purely IT activities, even in the relatively broad definition that we are using here. The most activities besides IT that the establishments are involved in are selling services (23 per cent) and conduct consulting activities (17 per cent, see figure 4).

Figure 4. Proportion of establishments that perform various activities besides IT.



It is not easy to make simple estimates of Kista's sensitivity to sector-dependent fluctuations in the economy, i.e. upturns and downturns in IT-related markets, on the basis of the establishments' heavy concentration on IT activities. This is because this study focuses on the establishments that have IT-related activities. We lack data about what proportion of Kista's total business these establishments represent. Additionally, the IT sector is broad and fluctuations in the economy do not necessarily affect all establishments in the same way. Also, unlike some factory towns that have substantial operations in a few fields (and companies), the population of Kista is part of a wider geographical job market that includes large parts of greater Stockholm (cf. von Otter 2004). A slump in one area will have direct and negative impact on certain types of companies and their employees, but may perhaps only marginally affect other IT-related activities or Kista as a whole. Few residents of Kista work in Kista and its IT companies. Kista has not yet become an ABC (work-housing-centre) town but is on the way to becoming a knowledge town: KSC, Kista Science City. The new Kista Galleria shopping centre has strengthened Kista as a commercial centre, and a new attractive residential area is emerging in Kista Gård. Young people who live in Kista are becoming more highly educated than their parents, a large proportion of whom have an immigrant background. On the whole, we are seeing favourable

trends towards a more integrated ABC town in Kista although the process is slow and uncertain. To succeed, this requires not only the influx of new groups of residents to Kista, but also the integration of existing residents or gentrification leading to relocation of existing residents and new groups of citizens taking over. In contrast to old factory towns, residents in Kista have been relatively independent of what is happening in their biggest industry because so few residents in Kista work in it. There are however indirect dependencies since some residents work in companies that in turn are dependent on companies and employees in Kista's IT sector as customers. ABC towns therefore do not simply bring about inclusion of residents, but also greater homogeneity and thus dependency, unless the local economy is diversified.

Cooperative Ventures and Networks of Companies

Local cooperative ventures, personal face-to-face contacts, and networks of companies are often regarded as beneficial, even as a prerequisite for growth in a global economy, where change is ongoing and companies are forced to focus on their core competencies due to difficulties in maintaining high standards in more than one, or a few, areas of knowledge (Burton-Jones 1999; Porter 1998; Saxenian 1994). Innovations in IT boost opportunities for telecommuting and the creation of virtual organisations, but can only partly replace personal contacts (Jackson 1999). Employees and companies that develop these new technical solutions appear to be aware of the limitations of the technologies, and tend to cluster companies (Sandberg 1999) and to primarily carry out work at the company's office rather than through telecommuting (Sandberg et al. 2005). Here, we are able to present information about the extent to which establishments and companies in Kista actually cooperate with each other and with other organisations, and how common it is that these cooperative ventures are local.

Outsourced Activities

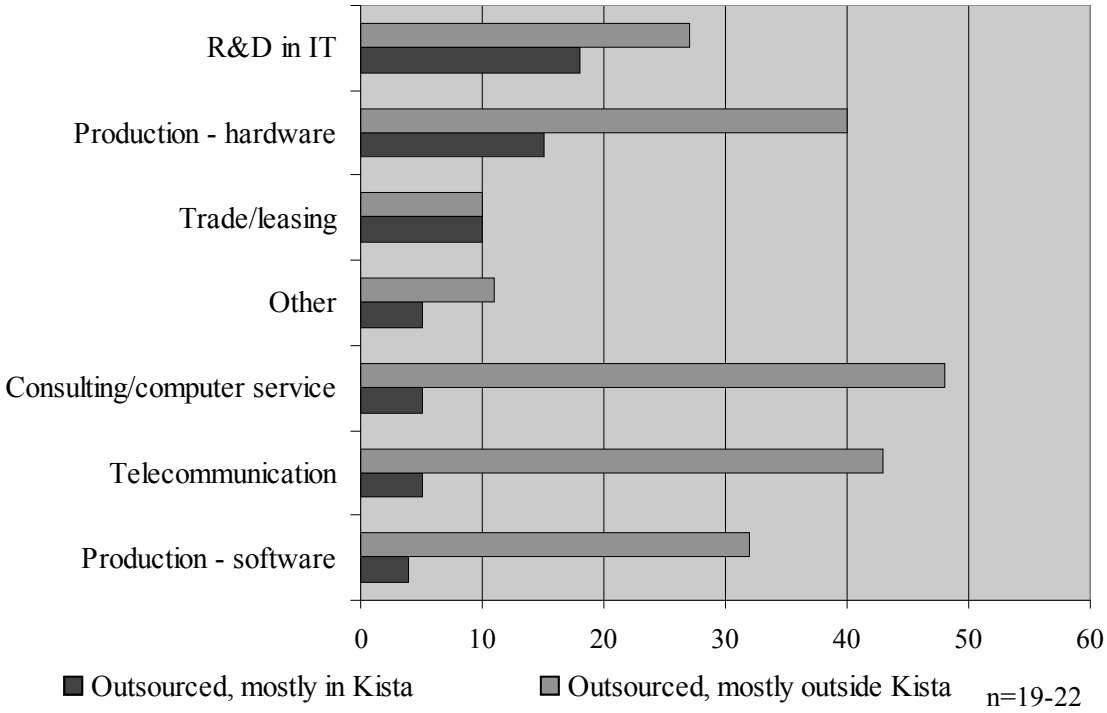
More than a quarter (27 per cent) of the establishments outsource parts or all of their IT-related activities to other companies (including those within their own business group, if they are part of a group). This quarter outsources an average of 37 per cent of their turnover. Of the outsourced activity, 19 per cent (corresponding to five per cent of the total turnover of the establishment) was outsourced to companies in the same group in cases where the establishment was part of a group. However, the proportion outsourced within the same group is low: the median is zero, i.e. a small number of companies outsource some activities but the majority does not outsource any.

Outsourcing among IT companies in Kista can be compared to that of Swedish interactive media producers, where a considerably larger proportion of com-

panies (65 per cent) outsources activities, although outsourced work amounts to a smaller proportion of their turnover; 19 per cent (Sandberg & Augustsson 2002). It should be noted that although interactive media production is highly IT-related, it is not a widely prevalent business activity in Kista, and no companies are included in both of the compared surveys. So, we can say that a smaller proportion of the establishments in Kista outsource activities, but that those that do so outsource nearly twice as much measured in proportion of turnover. Because the total number of establishments in the study is limited, and only a small proportion of them outsource operations, detailed analyses are difficult: the baseline figures are too low. We do see however that the establishments that carry out sub-contracting assignments, and those that outsource to other companies, do not differ noticeably from the average of all IT establishments in Kista; the former are on average somewhat larger, with 21 employees compared to 19, and the proportion of employees in IT-related activities is somewhat higher. There is therefore no strong tendency among bigger companies (with a maximum of 200 employees) to be involved in sourcing to a higher extent.

The most common outsourced activities are hardware production, consulting and computer service operations, the maintenance of infrastructure, and R&D. Of the 27 of establishments that do outsource, 45–55 per cent outsource these types of activity (figure 5).

Figure 5. Proportion of establishments that have wholly or partially outsourced various IT related activities to other companies in Kista and outside Kista. Comment: Only establishments that have outsourced operations.



It is striking that the proportion of establishments that mainly outosurce to other establishments located in Kista in several cases is relatively low: in consulting and maintenance of infrastructure, the proportion is five per cent. For the strategic areas R&D and hardware production, it is considerably higher, at 18 and 15 per cent, respectively. In the case of software production, the proportion is again low: four per cent outsource most within Kista. In many areas, not least infrastructure operation and the 'soft' work of consulting and software production, there may be scope for new businesses in Kista that could benefit from close proximity to customers in the Kista cluster. It is also possible however that these are areas in which buyers and sellers do not regard close proximity to customers as particularly important. The lack of firms with a segment can mean both that there is a business opportunity and not.

If all establishments and companies are included in the analysis, and not just those that actually outsourced operations during the past twelve months, the figures of course fall significantly, by about three quarters. This means that even activities that were outsourced most often were outsourced by a maximum of just over ten per cent of the establishments. Focus on core competencies and outsourcing of the rest to other companies does not therefore seem to have made much impact here, bearing in mind that many companies are active in several fields. This may be due to a diversification strategy, because companies are dependent on income from several different areas, or because core competencies do not fit into the divisions usually made using the SNI industrial classifications that we are asking about here.[6]

Note also the low baseline figures: of 22 establishments, 18 per cent – equivalent to four establishments – have outsourced R&D operations in Kista during the past year. If we assume that the respondents are representative of all IT companies in Kista with fewer than 200 employees, the market for R&D subcontracting assignments consists of about eight customers, and for a number of activities the local customer base comprises two or three companies. This only applies to establishments with fewer than 200 employees however, and it is reasonable to assume that larger establishments in Kista outsource more activities. These larger companies are so few in Kista however that the number of customers probably does not exceed ten to fifteen. It is probable, on the other hand, that the number of *assignments*, and participation in different projects, is much higher. Previously presented results also show that almost half the establishments carry out R&D, and that about twelve per cent do so as subcontractors (see figure 7). Just one per cent of the establishments perform such work for companies situated in Kista however, which suggests that a large proportion of

[6] It might very well be that the activities/solutions that companies offer as a whole are highly specialised and make up distinct parts within much broader value chains, in effect making the companies specialised.

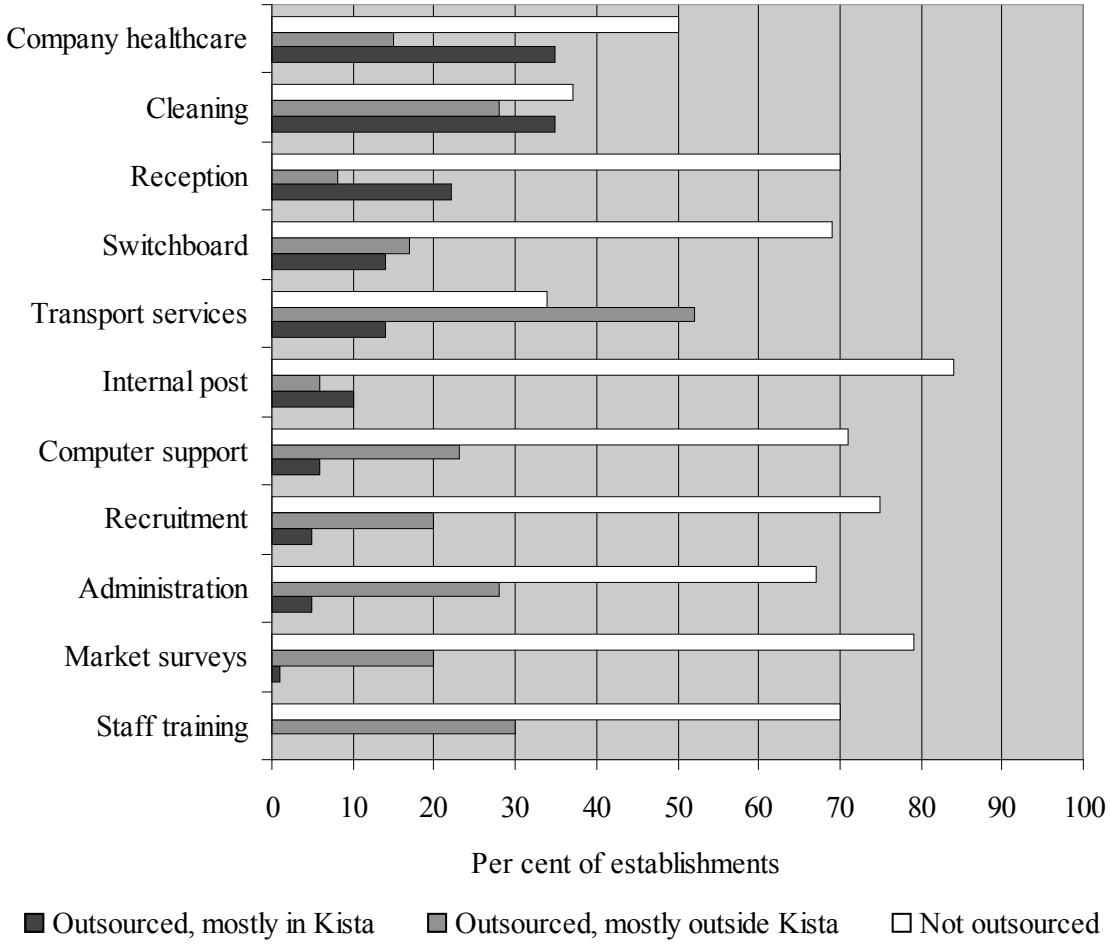
the research conducted is either for own use or for other companies outside Kista. In brief, then, we can say that even though these companies relatively rarely outsource R&D and even more rarely do so locally, Kista does constitute an important location for R&D used in-house and for companies outside Kista.

Peripheral Operations and Support Functions

The establishments and companies that we have studied are, as previously shown, largely focused on IT related activities. But these are not the only activities on which they are dependent on to function. Like all organisations, they are dependent on a variety of peripheral operations and supporting functions, the majority of which can potentially be performed by external actors, i.e. other companies and contract staff**.**

Cleaning of commercial premises and transports and logistics are the most commonly outsourced peripheral or support activities, being outsourced by two thirds of establishments in Kista. More than half the establishments that outsource cleaning, but only one fifth of those that outsource transport services, do so mainly to other companies located in Kista (see figure six).

Figure 6. Proportion of establishments that wholly or partially outsourced peripheral activities not related to IT to other companies in and outside Kista, and proportion that did not outsource at all the past twelve months.



Areas in which a small proportion is outsourced within Kista are marketing, administration, computer support and recruitment. These may be markets for expansion and establishment in Kista, and important areas in the further development of local networks to strengthen the Kista area. Alternatively, they may be operations in which geographical proximity is not very important. Does it matter to companies if those who clean their premises or take care of their transport are based in Kista or not? Perhaps not. At the same time, IT companies in Kista may constitute a small proportion of the customer base of these service companies, which makes it less of interest to them to establish in Kista unless they wish to focus specifically on the IT sector. In general, when establishment managements say that they have not outsourced a particular operation, that is all we know; we do not know whether they have managed the activity themselves in-house, or whether it is perhaps irrelevant to their business. For example, all premises need to be cleaned but internal post management is usually only relevant for large companies. The figures are therefore a limited basis for assessments of the size of potential markets for company services aimed at IT companies in Kista.

Subcontract Work

Having analysed what operations Kista establishments outsource, we will now go on to examine what subcontracted work the Kista establishments do for other companies. Forty-one per cent of the establishments perform IT related subcontract work; these tasks account for an average of 53 per cent of their turnover. Of the establishments that are part of business groups, 21 per cent of the subcontracted work was done for other companies in the group – the equivalent of ten per cent of the total business of the establishment. We can again compare this situation with interactive media producers, where 52 per cent do subcontract work for other companies and earn 25 per cent of their turnover from such assignments (Sandberg & Augustsson 2002). It is thus somewhat more common for interactive media producers to work as subcontractors, but on average this work constitutes just half the proportion of the turnover of interactive media producers. In total, then, cooperation between companies (outsourcing and subcontracting) is much more common among interactive media producers than among IT establishments in Kista, but the sums of money involved are smaller.

Figure 7. Proportion of establishments in Kista that carried out IT related subcontract assignments for other companies in and outside Kista, and proportion that did not the past twelve months. Note: Only companies that have carried out assignments.

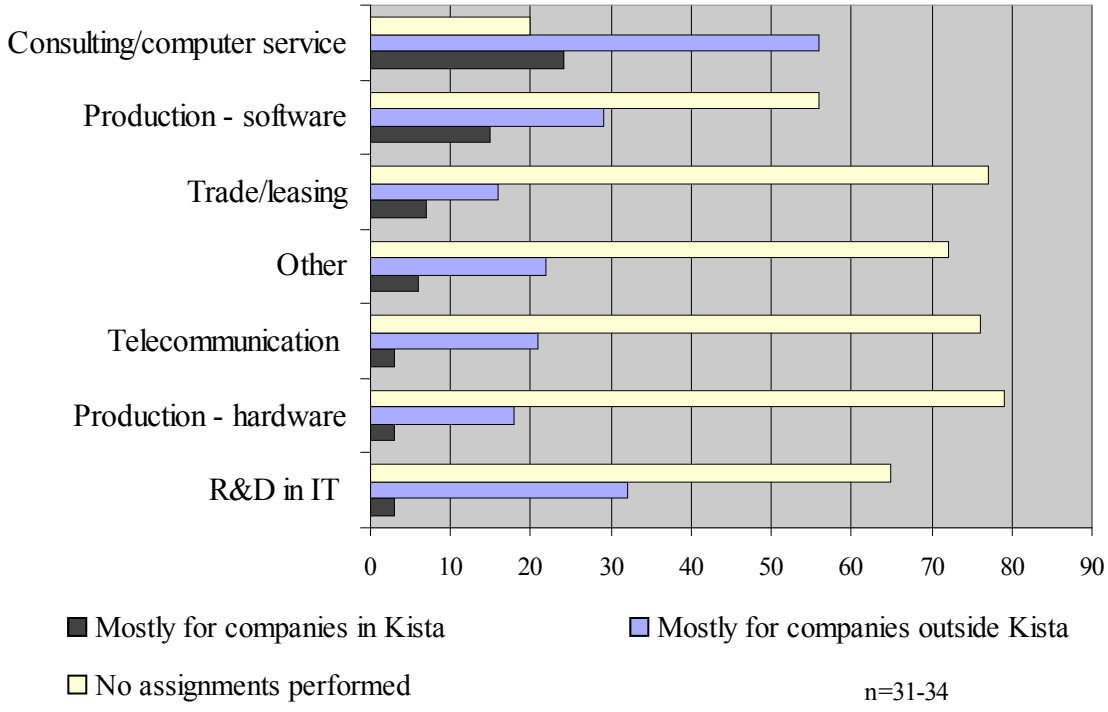


Figure 7 shows what subcontracted activities IT establishments in Kista carry out for other companies and where they are located. Consulting, followed by software production are the most common activities among establishments that do subcontract work for other companies in Kista.[7] These activities, together with the leasing of IT products, are those in which where the largest proportion is carried out for other Kista companies. Taken together, consulting and computer servicing operations are the most common types of subcontracted work, being performed by 80 per cent of the establishments that acted as subcontractors in the past twelve months. This corresponds to about a third of all establishments that responded to our survey. It is about half as common that the establishments carry out software production and R&D assignments; 15 and twelve per cent, respectively, of all establishments do subcontract work of this type. Other types of subcontract work are less common; between seven and nine per cent of all establishments have done such work. Although 41 per cent of the establishments have done subcontracted work, only eleven per cent have done so for companies located in Kista. The number of companies that outsource various operations is so low that it is difficult to make reliable judgements about how they differ from the companies that do not outsource, in terms of for example size.

In total, the results show that a relatively large proportion of companies and establishments in Kista cooperate with other companies, in the sense that they have either outsourced IT activities or performed such activities on behalf of other companies in the past twelve months (approximately corresponding to 2003). As illustrated in table 1, twelve per cent outsourced IT activities *and* acted as subcontractors in the past year. At the same time, nearly half the establishments neither did subcontract work nor outsourced work (irrespective of the location of the cooperating company/companies). The results also show that only a small proportion of the companies' cooperation is within Kista; most of the partners are located elsewhere in Sweden.

Table 1. Number of establishments that have done IT related subcontract work and outsourced work, respectively, the past twelve months.

		Outsourced IT activities		
		Yes	No	
Acted as subcontractor	Yes	12	28	40
	No	14	46	60
		26	74	100

n = 95

[7] Larsson and Lundmark (1991) found that it was predominantly consulting that had much of its sales in Kista. Almost 30 per cent of all consulting sales went to Kista, and roughly 90 per cent to the Stockholm region as a whole.

It should be noted that these figures include cooperation with other establishments and companies of all sizes, not just those with fewer than 200 employees, and to some extent also include companies that are not part of the IT sector. This is therefore a picture of the companies' *total* cooperation in IT related activities. From this, it appears that clustering in Kista consist more of geographical co-localisation rather than direct cooperation with other local companies. We wish to emphasise that this does not mean that Kista is not important, but rather that other factors than direct cooperation in production also play a part, and that for some companies, these other factors may actually be more important. We do not know the extent to which the companies that have actually outsourced activities or done subcontract work are part of more stable production networks with other companies – whether local or not – or whether they usually work with new companies on each separate occasion. A partial indication of this is however given below by the number of companies with which these companies worked during the past year.

The Geography of Cooperation

The establishments that *outsourced* IT activities to other companies cooperated with an average of 3.8 companies the previous twelve months. Of these companies, only a small proportion was located in Kista; the majority was either located in other parts of greater Stockholm (besides Kista) or in other countries. The same applies to the distribution of the proportions of outsourced operations: twelve per cent in Kista, 38 per cent in the rest of greater Stockholm and 32 per cent in other countries. The pattern in clear: *local* production cooperation in Kista, which may include face-to-face contacts and cluster formation, is quite limited. Along with the rest of greater Stockholm, the *region* appears to be an important geographical foundation for production networks; half of all cooperation takes place within the region. In a geographical perspective, however, greater Stockholm is a relatively limited region with good communications, which means that face-to-face contacts are possible within the region as a whole. Entities in other countries account for a third, and Sweden (outside greater Stockholm) accounts for less than 20 per cent. *Global* cooperation on production seems to be relatively important for the companies that outsource work or which act as subcontractors (see below). The picture that emerges of cooperative ventures in Kista's IT sector is that Kista is a location open to regional and global (and to a lesser degree national) networks, rather than closed local clusters.

The pattern is somewhat different for companies that do IT related *subcontract work* for other companies. On average, they worked with four different companies over the past twelve months, i.e. about the same number of partners as the companies that outsource operations. The proportion of companies in Kista is still low; the proportion in the rest of Sweden is higher than when companies

outsource, while companies from greater Stockholm and abroad are less common. In terms of the proportions of outsourced operations, Kista accounts for 29 per cent, the rest of greater Stockholm for 41 per cent, the rest of Sweden for eight per cent and other countries for 22 per cent. Although the establishments act as subcontractors for a small number of other companies located in Kista, these represent a relatively large proportion of turnover from IT-related subcontract assignments. The same applies to the rest of greater Stockholm. There are a relatively large number of the companies in the rest of Sweden for which the establishments do subcontract work. However, these account for a smaller proportion of the turnover from subcontractor assignments.

Compared to companies that outsource assignments, then, subcontractor networks are much more local in Kista (about 30 per cent) and to a lesser extent national and global, while the level is the same for the rest of greater Stockholm. Overall, then, *subcontract work has a stronger local and regional focus*, with the Stockholm region accounting for 70 per cent compared to 50 per cent for outsourcing companies. This may be a sign of the effects generated by major IT companies establishing in Kista: there are not many of them, but for the companies that do subcontract work they make up a significant proportion of income from subcontract assignments. The rest of Sweden is of little importance in this context, but entities abroad still account for 20 per cent. We also see signs of uneven globalisation or current account balance in IT: assignments outsourced by IT establishments in Kista with fewer than 200 employees exceed the subcontractor assignments carried out for foreign companies.

A common factor in these results with respect to geographical aspects of cooperation on production is that the underlying data is very limited. In addition, the proportion finding it difficult to determine the number of companies, and the proportion of turnover, is relatively high. The analyses are therefore not fully reliable and should be regarded as trends among the respondents rather than reliable conclusions for the population as a whole. Bearing in mind the limited size of the establishments and the fact that the questionnaire was filled in by local managements, it is however interesting that there is so little knowledge of the size, number and type of cooperative ventures. This is an issue that we address in a focused study of organisation and knowledge sharing among IT companies in Kista (Movitz & Augustsson forthcoming).

Interactive Media Companies

We asked a couple of specific questions about Kista establishments' contacts with interactive media companies (such as Internet consultants, web agencies and multimedia). The reason is that there has long been a hope that the 'traditional' IT companies in Kista and the often more creative (as in artistically, rather than technically, innovative) Internet and multimedia consultants in Stockholm's inner

city will find forms of cooperation, and thereby develop innovative solutions, by combining their separate yet largely complementary knowledge and logics. In previous discussions of these issues, it was described as 'the corporate meets the creative'. In the case of Ericsson, their engineering skills in building systems and mobile phones could be complemented by the ability of creative companies to design attractive telephones and fill them with exciting content. The foundation for this is the convergence that IT, media and telecommunications are believed to be undergoing following the digitalisation of various types of activity (Manovich 2001). The idea is not new: as far back as 1974, IBM contacted Ericsson with proposals for a possible merger (Meurling & Jeans 2000), but such discussions escalated dramatically during the 1990s due to the rapid spread of the Internet, and among other things led to the merger of Time Warner and AOL. The 'TIME week' event was launched in Stockholm during this period; its purpose was to draw attention to the sector and facilitate contacts between different types of actors in telecom, IT, the media and entertainment. In the late 1990s, Ericsson established a Cyberlab East in New York with the aim of creating links to Internet and new media companies in Manhattan to facilitate such co-operations.

We have previously carried out questionnaire surveys of company managements and employees in interactive media companies (Sandberg 1999, Sandberg & Augustsson 2002, Bäcklund & Sandberg 2002, Sandberg et al. 2005), and intend to make a number of more detailed comparisons in the future. For the time being, we can observe that just under a quarter of the Kista establishments state that they have actively cooperated with interactive media companies in Stockholm's inner city in the past twelve months, and 18 per cent of them have recruited someone from such a company in the past three years. The cooperation that has been sought for is thus already taking place, at least for some companies (and possibly certain types of companies) in Kista, and also in the shape of mobility of labour. In the latter case it is not impossible that this is partly due to the effects of partly distinct economic cycles, or perhaps different times of impact of the dotcom crash; i.e. interactive media companies felt the impact of difficult economic conditions before companies in more traditional IT operations did, which meant a movement of labour from interactive media companies to traditional IT companies.

Given that IT companies in Kista also cooperate with other types of companies based in Stockholm's inner city, it appears that this geographical location may in at least some respects be more important than Kista. The results below (figures 9 and 10) also show that two thirds of the respondents think that Kista has good proximity to Stockholm's inner city, while one third rate this proximity as highly important or crucial for their business. There is therefore much to suggest that Kista should be seen as a partly integrated section of the larger Stockholm region rather than a local cluster with limited outward connections.

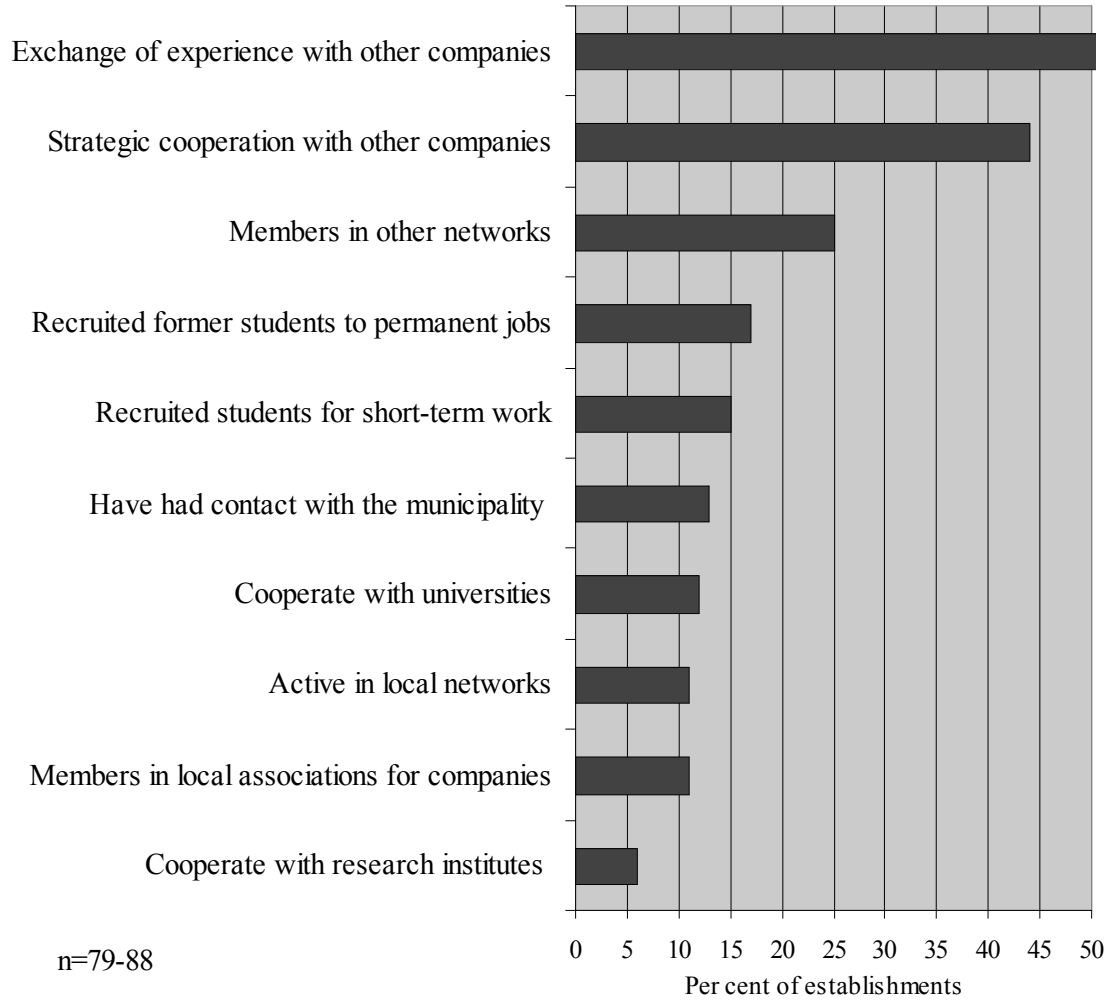
Other Local Co-operations

In strictly geographical terms, a location is a physical area in which people and companies are situated (live, work, shop, spend time etc), and things happen and get done. Each location is so much more than this however: it is somewhere you should be able to get to and from, hopefully like, and one that in various ways facilitates or obstructs what you want to do there. It is a social space with quantitative entities, the quality of which we have opinions about that affect our will to remain, work and live there. These aspects of the significance of the geographical location are brought to the fore in the case of clusters; in principle, they define what they are in terms of geographical and social fields for relationships and practitioners (Augustsson 2004; Gunneriusson 2002). In the light of this, it should not come as a surprise that we have given the location itself and the opinions of people involved a lot of room in the design of our study and report.

We have reported our results on establishments' outsourcing of different types of assignment to, and subcontracting work for, other companies in Kista and in other locations. In addition to these co-operations related to production, the next section highlights other types of local cooperative ventures and networks in Kista. We then conduct a comprehensive review of perceptions of the importance of various factors in being able to do business in Kista, and the extent to which Kista actually meets these requirements, according to those who filled in our questionnaire.

To obtain an idea of cooperative ventures and contacts between establishments and other local players, and to see whether companies utilise the opportunities created by co-localisation with other companies with IT-related activities, we have asked our respondents in establishment managements to say whether they agree with a number of statements about local cooperation and the networks in which they have played a part (see figure 8). The most common factors regarding cooperative ventures are exchange of experience and strategic cooperation with other companies in Kista; 54 per cent and 44 per cent of the companies, respectively, state that they are involved in such cooperative ventures. These figures are on a level with the proportion of establishments that have worked as subcontractors, outsourced IT related activities, or both (54 per cent). But this is much higher than the proportion that did most of this work for companies located in Kista. This means that exchanges of experience and strategic cooperative ventures at local level exceed, and are more extensive than, cooperation in production, at least when measured as the proportion of establishments that have outsourced IT activities and those than have done IT-related subcontract work in Kista during the past twelve months.

Figure 8. Proportion of establishments that agree with various statements on local co-operations.



Besides this, we only find limited forms of local cooperation between different players: eleven per cent are members of a local business owner organisation and 25 per cent are members of other networks in Kista. However, only eleven per cent say that they are *active* participants in one of the networks. The fact that the active proportion is lower than the proportion of members is hardly surprising, but the figure, eleven per cent, means that almost nine out of ten are not active in these types of cooperative venture. As mentioned earlier, and pointed out further on, we cannot state whether this is high or low, because comparisons have not been made with other locations and industries. However, there appears to be scope for additional cooperative ventures if they develop in a way that makes them attractive to the companies.

On the whole, the number of local cooperative ventures not directly related to the running of the businesses – with the exception of strategic cooperative ventures and exchanges of experience – is lower than many would perhaps have expected based on theories about the necessity of local clusters with face-to-face

contacts and triple helix structures. 'Objectively' defining low or high figures is however delicate. We cannot state whether the degree of local cooperation between IT companies in Kista is now higher or lower than before or than in other locations and sectors. That assessment will at his stage be left to the reader. The data that we have available and which we present here allows us to say that the IT companies in Kista appear satisfied with the current situation and that the industry as a whole remains relatively healthy with its current level and types of cooperative ventures.

The picture that emerges of Kista is that it is a location where companies establish an establishment and have IT activities but it is only to a limited extent a location where the establishments cooperate with other nearby companies. This is probably to a certain extent dependent on time and economic climate. The IT companies have had a hard time in the past few years, and have possibly focused on their everyday core operations, which in the short-term generate resources and contribute to the survival of the companies. More long-term, and possibly more uncertain, investment in local cooperative ventures must in such circumstances take a back seat. We do not however have any figures from other times or locations to compare with; figures for local cooperative ventures may well be high in relation to other locations or times. If this is the case, there may be reason to revise some of the hypotheses on the importance of cooperation and networks and find other explanations for the growth of clusters and the willingness of companies to establish themselves there.

A major investment in Kista has been the establishment of the Campus IT University, although both the Royal Institute of Technology (KTH) and the Department of Computer and Systems Sciences at Stockholm University (DSV) have had a presence in the area for a long time. Twelve per cent of the establishments cooperate actively with the university in Kista and six per cent with other research institutes. There is thus some local cooperation between the university and companies with fewer than 200 employees, as well as with local research institutes, but it is limited. Another expression of cooperation with higher education institutions is a local job market that includes students, and recruitment among them: 17 per cent of the establishments surveyed have recruitted former Kista students to permanent jobs, and a slightly lower percentage have worked with them through degree projects or other short-term jobs.

All in all, this indicates that a relatively large proportion of the students in Kista come into contact with local companies and establishments with IT-related activities. Various events are also held, such as lectures by representatives of companies, local job market days, fairs and seminars, in which companies, students, researchers and local decision-makers take part. Our figures do not include more informal contacts and networks at individual level, such as those involving students with relatives and friends who work in Kista, or spontaneous meetings that occur as a result of the companies' and universities' geographical

co-localisation and the function of Kista Galleria as a centre for lunching, shopping and public transport. To clarify such informal networks and the function of the local job market, we need to ask company managements more specially focused questions about staff, but above all survey those who work in IT companies in Kista.

Overall, the picture that emerges is one of cooperation and exchanges of experience between companies, while contacts with universities and the research community are more limited. This agrees with Power and Lundmark's (2004) study of labour mobility in the IT sector in the entire Stockholm region. There is considerably higher intensity between the companies than it is between companies and universities. There is relatively high mobility between manufacturing companies and research, perhaps because these have more service and commerce.

Thirteen per cent of the companies say that they have been in contact with municipal business development officers. In contrast to some other regions, counter-purchasing or local political promises are rarely on the agenda when companies plan to establish themselves in Kista; they find the location attractive for other reasons than economic support. This probably requires other types of political action from local decision-makers working with business development: fundamentally, maintaining Kista's attraction as a business location, ensuring that conditions are in place for development of companies and networks and not getting excessively involved in details. We will come back to this when we have presented what companies think is important for business in Kista and to what extent they think that the location fulfils these conditions.

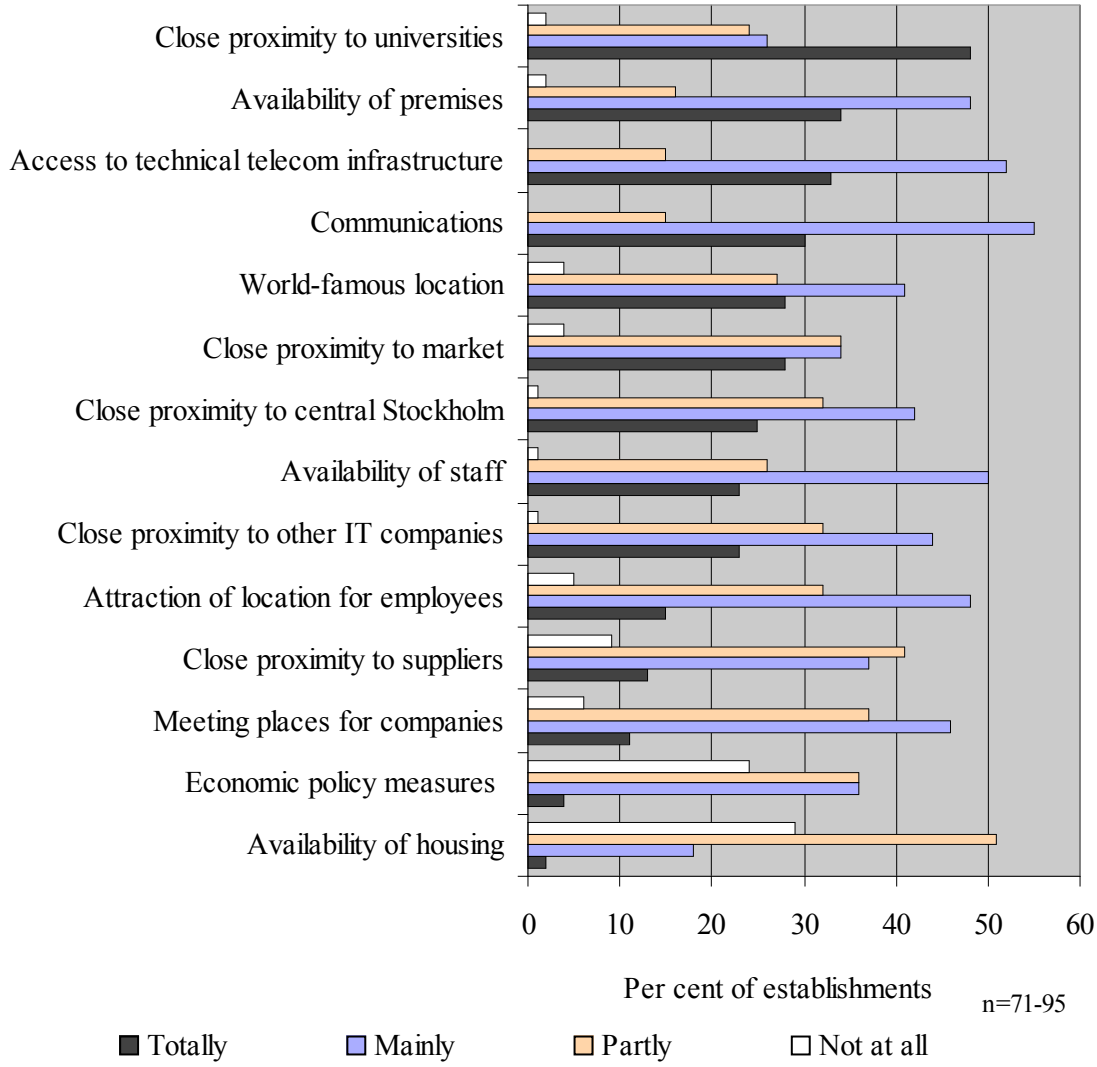
Kista's Qualities as a Business Location

The above results are interesting as a description of how networks and cooperative ventures currently function in Kista. To the extent that these networks and ventures are important to companies, the description provides a foundation for further development of Kista as a location for IT operations. Additional underlying information for business development policy and practice is provided through the following account of how establishment managements view the importance of various factors in the operation of their business, and how they regard Kista's strengths and weaknesses in these respects. We can discern different conditions that make it possible, and favourable, to run and grow companies in a given location. We have asked the managements of IT establishments in Kista to what extent they think that Kista meets a number of conditions – what 'marks' they want to give Kista. The respondents' replies are shown in figure 9.

What does Kista Offer?

Almost half think that Kista fully meets the condition of close proximity to universities and research institutes and three quarters think that Kista mainly or totally meets the condition. This is not totally surprising with a view to the fact that Kista is home to the Campus IT University with its extensive and broad courses at degree and MSc level in computing and IT-related areas, the Department of Computer and Systems Sciences (DSV) from the University of Stockholm, the Royal College of Music, and a number of public and private research institutes such as the Swedish Institute of Computer Science (SICS) and Acreo. Questions may be asked as to why a quarter of respondents reply that Kista meets this proximity requirement only partly or not at all. In some cases, the focus and types of R&D activities may not suit these establishments.

Figure 9. Proportion of establishments that think that Kista *meets* various conditions required for operating a business.



Other factors besides close proximity to universities that are particularly strong in Kista are telecommunications infrastructure, communications and purpose-built commercial premises; more than 80 per cent of respondents think that Kista fully or largely meets these conditions, and about one third stated 'totally'. Kista has to a great extent been built specifically to suit IT operations, among other things in terms of infrastructure and commercial premises, although the needs of small companies have been somewhat overshadowed by the establishment and building of large enterprises. The area of available commercial premises has also been expanding in Kista with the construction of Kista Science Tower and the establishment of business centres, which also benefits small companies. Against this background, it is understandable that such a high proportion of the companies think that these aspects are well catered for in Kista. Almost three quarters also think that Kista can totally or mainly be said to provide access to skilled staff; this is a view that is of course very dependent on the situation in the labour market. This view probably does not primarily apply to people living in Kista, but instead to students and people working in, or related to, other companies in IT. Companies in Kista are also able to attract and recruit staff from large parts of the greater Stockholm area, not just locally in Kista.

In a halfway position, we find conditions that about 60 per cent or more of respondents think Kista totally or mainly meets, such as close proximity to customers and other IT companies, Kista's standing as an internationally famous location, its attractiveness to employees and the availability of places to meet and exchange experiences. For the last two conditions, only 15 and ten per cent respectively think that Kista totally meets the conditions, which may indicate that these aspects are worth considering in future construction projects. Kista Galleria is large and contains many shops, but this is not the only important factor in creating an attractive location and arenas for exchange of experience. In media interviews, there is a recurring theme that Kista as a city district falls silent after office hours, and a lack of restaurants, cafés and other facilities where companies can take their customers and meet others in the industry in the evenings.

The availability of attractive housing was clearly rated lowest; just two per cent think that Kista totally meets this condition and 18 per cent that it mainly meets it. This reflects the general view of Kista as a place where you either work (or study) or live, but rarely both, at least not if you are in the IT sector. Business policy measures are also given a relatively low score: 40 per cent state that Kista meets this condition totally or mainly with four per cent stating 'totally'. One reason may be that there is actually only limited action on business policy in Kista. It may also be the case however that the measures implemented are not visible, or are not perceived as business policy measures.

Examples of the latter may include the expansion of Kista Galleria to become one of Sweden's biggest and most modern shopping centres, as well as the establishment of the Campus IT University. One of the aims of the shopping centre

expansion has been to make Kista an attractive place in which to live, and above all work. The aims of the university expansion include the creation of a local job market with qualified individuals and close proximity and cooperation between the research and business communities. As previously discussed, relevant business policy measures in a location like Kista might not be about directly influencing what companies actually do, but rather in supporting Kista in more general terms as an attractive place in which to locate and operate a business and in which to work.

Kista seems to be quite highly rated for many factors that may be important to company development (even though we do not have comparable figures), despite the degree of uncertainty expressed about business policy measures. A relatively large proportion rate Kista's attractiveness for employees in the form of cinemas, shops and restaurants as quite good, but people think that the housing situation leaves a lot to be desired. Just 20 per cent of the establishments state that Kista has attractive housing (totally or mainly), while the figure is four times higher for purpose-built commercial properties.

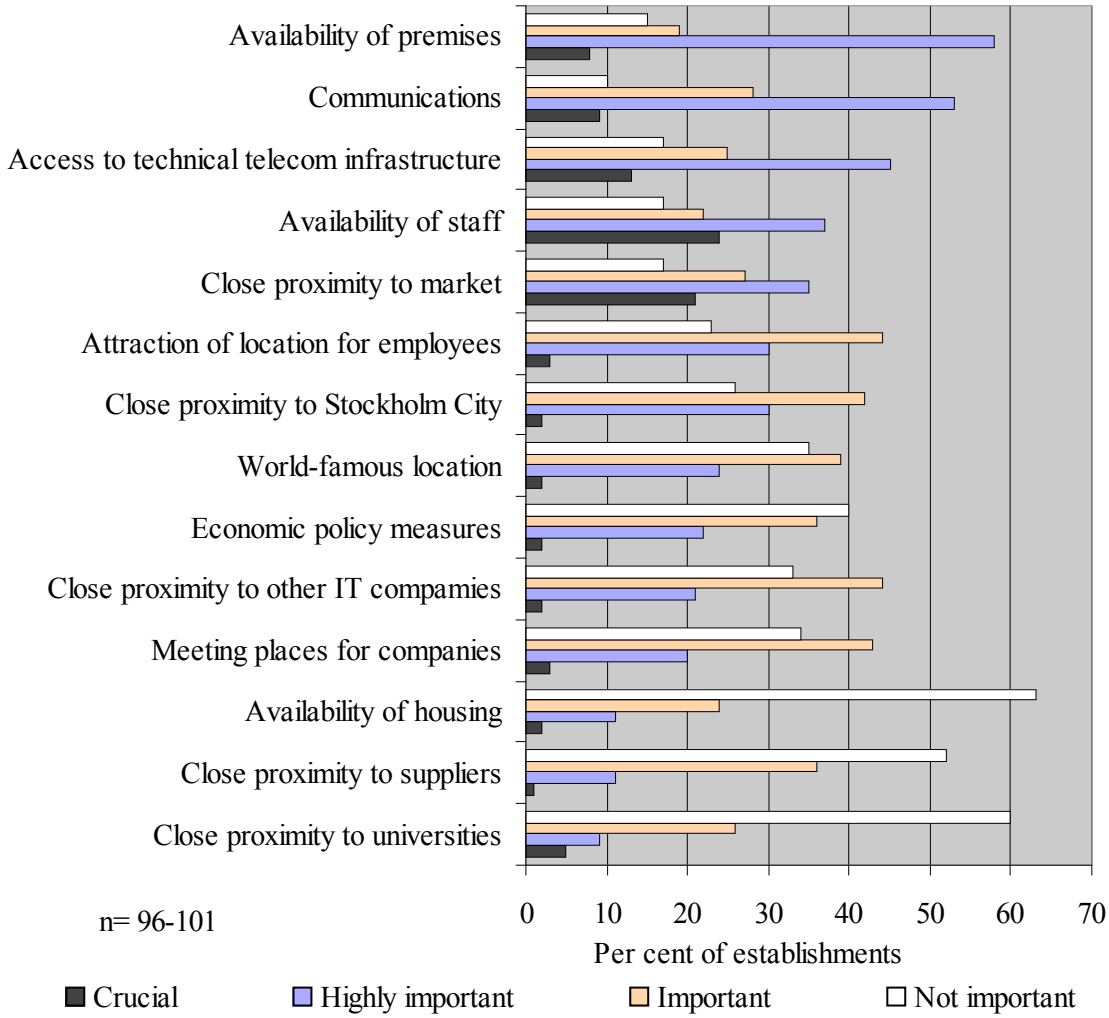
The respondents seem unsure of their view of Kista in some respects. Nearly a third reply 'do not know' to the question of whether Kista meets the conditions of attractive housing, business policy measures and meeting places for exchanges of experience. This may mean that people are not aware of the situation, have not given it much thought, or perhaps find it irrelevant.

We described earlier how Kista appears to be a location where companies set up and run operations but only to a limited extent have relationships with other companies. The results also reveal that only a small proportion of those who are members of local networks are actually active. The companies make demands and hold opinions on the extent to which Kista is a suitable place in which to operate a business, but rather a lot of companies seem to have limited interest in the location itself and its development. Kista has a short history, and few companies and employees in the IT sector have traditional or historical connections with the location. Kista as a location can therefore largely expect companies to remain in the location only if Kista's qualities compare well with other alternatives. This is a challenge to local politicians and decision-makers in Kista.

What is Important to IT Companies?

So far, the replies have illustrated what conditions the respondents think that Kista *meets* to varying degrees. The natural following question is what *importance* these different factors have on IT companies' ability to operate in Kista. The fact that the conditions are met does not mean that they are regarded as important by establishments and companies. Figure 10 shows the respondents' perceptions of the importance of different factors.

Figure 10. Proportion of establishments that think that various factors have no, some or major *importance,* or are completely crucial to operating a business in Kista.



Factors that more than 60 per cent of the establishment managements think are highly important or completely crucial are telecommunications infrastructure, purpose-built premises, communications and skilled staff. Close proximity to customers is at almost the same level, 56 per cent. Relatively speaking, respondents attach least significance to close proximity to universities and research and to attractive housing; only 14 and 13 per cent, respectively, state that these factors are very important or completely crucial to their business. We also see a relatively low rating – about a quarter – for close proximity to other IT companies, business policy measures and meeting places for exchanges of experience. More than half the respondents think that close proximity to universities and suppliers, and availability of attractive housing, are not important at all in their ability to operate a business in Kista.

We can make comparisons here with Larsson and Lundmark's 1991 study. They have an open question on reasons for locating in Kista. Their answers, like

ours, are topped by access to premises and good communications. There is also agreement on access to customers/markets and proximity to staff. In their study, Kista's image was more important than the two latter factors; in our study, 'world famous location' was lower down (cf. Kotler et al 1999). Proximity to other high-tech companies was mentioned by few companies. Both then and now, then, traditional localisation factors such as premises, transport situation, skilled staff and customers appear important to the companies.

On the whole, it is interesting that such a large proportion of our respondents think that many of the factors have no or little importance, and that a relatively low proportion thinks that individual factors are crucial. The only factors that a relatively large proportion of companies think are crucial are close proximity to customers and the market and availability of skilled staff, and to a certain extent infrastructure. Some aspects of Kista that it markets to companies, and takes pride in, are thus of limited importance to a large proportion of companies, although a small proportion of them may regard these aspects as important. At the same time, it is not possible simply to point to one or two factors that decision-makers can either focus on completely, or ignore. If Kista's goal is to attract and keep IT related companies, it is important to see what factors they class as important and to focus on them.

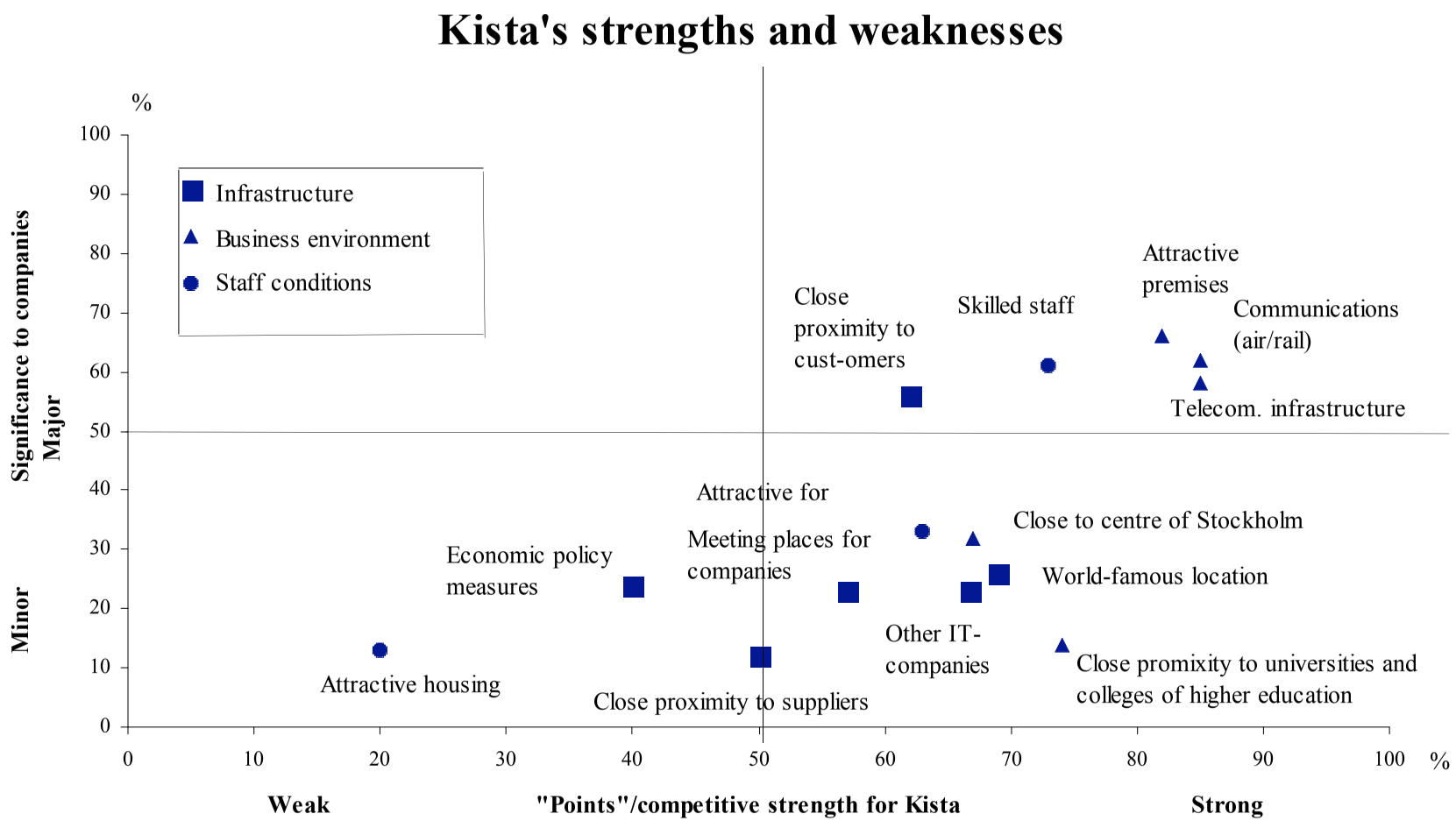
Kista gets Top Marks

We will now compile the results of the two previous figures into one figure to clearly and simply illustrate the degree to which Kista is felt to meet various conditions/factors (its 'marks') and the importance accorded to each factor (figure 11). A key question for us to answer is: what are the important factors that are rated good or bad in Kista – Kista's strengths and weaknesses?

The results are clear: *Kista scores very well for those factors that are judged particularly important for the operations of a large proportion of the establishments (i.e. that are highly important or completely crucial): close proximity to customers and market, skilled workers, premises, infrastructure and communications.* This is a notably good score for Kista as a location.

As stated, Kista received good marks for proximity to universities and research, but it is perhaps somewhat surprising that just 14 per cent of the respondents think that this is highly important or crucial. It is difficult to deduce the reason for this low score from questionnaire data. Perhaps university activity in Kista is taken for granted? Perhaps people think that immediate proximity is not crucial to business, cooperation and recruitment? Many places – at least those with what are described as 'less qualified' operations – have been successful without having a local university, but this is often thought not to apply to high-tech clusters.

Figure 11 Kista's strengths and weaknesses.



Note: Proportion of establishments that think that each factor is crucal or highly significant, and think that Kista totally or mostly has these factors.

In Kista's case, there are universities and other higher education institutions in and near the centre of Stockholm, with relatively good communications. As with other types of cooperation, the *region* is perhaps just as valid a delimiter as the actual location for cooperation with higher education. Additionally, the questionnaire responses were given during a recession for the industry and location. In a situation with more offensive development efforts and greater recruitment needs, it is possible that the local university would have been valued more highly and accorded more importance, particularly because establishments in Kista compete with other companies regionally in greater Stockholm as well as the rest of Sweden, and to some extent globally.

Kista's lower grade for availability of attractive housing is apparently not perceived as a major problem, since a mere 13 per cent of the establishments state that the housing issue is of high or crucial importance. They do not appear to expect or believe that staff will want to live in Kista. Conversely, it is possible that those who live in Kista do not get jobs at these establishments. This presents a gloomier, but to some extent more realistic, picture of the situation: Kista is a divided city with the shopping centre and underground train track acting as a physical and social dividing line between housing and work.

The figures above are all aggregated, i.e. they give the proportion of all the establishments that say that Kista to various extents meets the condition, 'availability of skilled staff', and the proportion of all the establishments that gives various assessments of the importance of this condition. The results reveal that a large proportion of the establishments rate the availability of skilled staff as good; an equally large proportion think that this is an important factor. This does not mean that the same establishments think that availability of staff is an important factor and that Kista meets this condition. Two calculations below highlight this (table 2). First, we study the proportion of those who think a certain factor is important for their operation (highly important or crucial) and who also think that this condition is met in Kista. We then present correlations between individual respondents' answers to the questions on fulfilment of conditions and importance, factor by factor.

The results of these calculations show that as a group, those who regard a factor as important often also think that Kista meets the condition for that factor. The link between good 'marks' for important factors does not therefore just apply to the total aggregated level on average for all establishments, but also for the group of companies that see a factor as particularly important. For example: of the 61 per cent of establishments that think that availability of staff is highly important or crucial, 82 per cent think that Kista mainly or totally meets the condition, compared to 61 per cent of all companies.

The pattern throughout is therefore that a large proportion of the establishments that rate a certain condition as particularly important also think that Kista meets the condition. Between 23 and 29 per cent of the establishments give Kista

high marks (mainly or totally meets, on a four-point scale) for all conditions. In several cases, the establishments that rate a certain condition as important think that it is met to a greater extent than the establishments that do not rate the condition as important. This applies above all to the attraction of the location for employees, the fact that Kista is internationally famous, proximity to other IT companies and meeting places for exchanges of experience and proximity to suppliers. In terms of communications, housing, telecommunications infrastructure, proximity to Stockholm and universities and business policy measures, the differences are however small between establishments who think that the factors are important and those who do not (compare figure 9 above).

There are a couple of exceptions to the positive pattern great importance-high mark. Of the relatively few (13 per cent of establishments) that view availability of attractive housing as highly important or crucial, only 23 per cent think that this condition is mainly or totally met. Of the quarter that think that business policy measures in the area are highly important or crucial, just under 40 per cent think that Kista meets this condition mainly or totally.

Table 2. Proportion of establishments that think various factors are highly important or crucial for operating in Kista, and the percentage of *those* who think that Kista totally or mainly meets these conditions.

Factors	Highly important or crucial	Mainly or totally met	n
Availability of appropriate premises	66	89	99
Communications (proximity to airports/railways)	63	89	98
Availability of skilled staff	61	82	98
Access to technical telecom. infrastructure	59	89	97
Proximity to customers/market	56	73	101
Attraction of the location for employees (cinemas, shops, restaurants)	33	81	97
Proximity to centre of Stockholm	32	69	98
Internationally well known location	27	85	98
Economic policy measures in the area	24	39	96
Proximity to other IT companies	23	87	98
Meeting places for exchange of experience with other company owners in Kista	23	74	97
Proximity to universities/higher education, colleges and research institutes	14	71	98
Availability of attractive housing	13	23	98
Proximity to suppliers	12	83	98

If we study the connection between the importance of a certain condition and how well it is thought to be met at each individual establishment, i.e. if we correlate the replies of individual respondents to the two questions factor by factor, we see a somewhat different pattern.[8] There is no significant covariation between perceived importance and fulfilment of the condition of proximity to universities, other IT companies and the centre of Stockholm, as well as business policy measures. In other words, those who think that these conditions are important think that they are fulfilled to the same extent as those who do not regard them as important. There are only weak correlations for Kista as an internationally well known location, availability of commercial premises, telecommunications, other communications and meeting places for exchanges of experience. Strong correlations exist only for close proximity to customers and skilled staff, and to some extent for the availability of attractive housing, which means that those who regard these conditions as important also think that Kista meets them.

The lack of covariation in many cases between the responses of individuals to the two questions need not be a problem: both those who think that a condition is important and those who think it is not may, for example, think that it is met to a large extent. However, the result may indicate that the managements of IT establishments in Kista sometimes do not think that conditions important to them are met while less important conditions are actually met. From a policy perspective, there might be potential problems of legitimacy and credibility if establishment managements perceive that local authorities do not understand their needs and focus on the wrong issues.

All in all, we can based on the three comparisons of importance and degree of fulfilment say that companies on the whole give Kista good marks for factors they regard as important. The group of companies stating that a certain condition is important to operating a business generally feels that the condition is met more often than the whole group of companies does. For the majority of the conditions, there is however no notable link between degree of importance and fulfilment, i.e. in assessing the degree of fulfilment of conditions in Kista, those who think that a condition is important do not differ from those who do *not* think that the condition is important.

[8] This in effect means that we add two more columns to table two, consisting of employees that do not view a factor as important, and those that regard it as met to a lesser degree, respectively.

Work and Employees

After studying the growth and establishment of companies, activities, cooperative ventures and assessments of Kista as a location, we now turn to staff, staff turnover and composition, education/training levels and skills acquisition.

Total Number of Employees and within IT

The companies and establishments that have responded to the questionnaire are generally quite small, which is rather understandable since the upper limit was set at fewer than 200 employees. On average, the establishments have 19 employees, including an average of three working full or part-owners (table 3). The median is six employees, of whom one is an owner or part-owner. Of the average 19 employees, 16 focus on IT activities. An average of one person per establishment was temporarily employed and there was an average of one hired consultant in addition to employees and owners.

Twenty of the companies that responded to the questionnaire (i.e. roughly one in five) are one-person companies, meaning that they have just one employee who is the owner and/or part-owner. If we exclude establishments with just one employee, the total number of employees averages 24, of whom four are owners or part-owners. Of these, 20 work in IT-related activities. The median remains much lower however: a total of ten employees, of whom one is an owner and seven work in IT-related activities.

Almost 60 per cent of the establishments have fewer than ten employees (including owners and part-owners, hereafter included in the figures for employees). Ten per cent have between 50 and 200 employees. Despite the delimitation to fewer than 200 employees, the size distribution of IT establishments in Kista is skewed with many small and a few large establishments – a situation that applies to working life in general.

Table 3. Average number of employees, totally, per group, and focusing on IT.

Number	Average	Median	n
Employees, incl. owners or part-owners	19	6	98
Of whom…			
…Owners or part-owners	3	1	98
…Employees excl. owners or part-owners	16	4	99
…IT employees incl. owners or part-owners	16	5	93
IT consultants	1	0	98
Temporary employees within IT	1	0	63

The average establishment has one hired consultant in its IT operations. There is a skewed distribution here as well, with three quarters of the establishments having no hired consultants at all, about 20 per cent having one to three hired consultants and about four per cent employing four or more hired consultants.

In the IT activities, temporary staff account for six per cent of the total number of employees. It therefore appears to be relatively unusual to use short-term and temporary employees to attain numerical flexibility, deal with brief peaks in the workload and obtain external expertise in various projects. This may also partly depend on economic cycle; after the 2000 dotcom crash, many companies may have been forced to shed temporarily employed staff by not renewing their contracts. Another factor is that short-term labour and skills needs in parts of the IT sector – as in interactive media – are met by utilising small consulting companies and one-person enterprises (Sandberg et al. 2005; Augustsson 2005). More or less temporary employment contracts between employers and employees are thereby replaced by business contracts between companies. Part of this use of one-person companies and freelancers is however included in the above figures for hired consultants.

All employees worked on IT related tasks at almost three quarters of establishments, and a large proportion did so at other establishments. We can therefore clearly say that the establishments in our survey are highly focused on IT activities. Only four per cent of the establishments have fewer than half of their employees working in IT related activities. The rest of this section will only cover employees with IT related tasks, working at establishments in Kista with IT-oriented operations. That is to say, the eight per cent of the employees who do not perform IT related tasks are not included.

Labour Turnover

During the twelve months prior to the survey, the average size of the establishments fell in terms of number of employees as more left their jobs than were recruited (table 4). The number of new employees at an average establishment during these twelve months was 2.6. The number of permanent employees who left during the same period was 4.6, and most of these (3.6) had been made redundant. Based on these different measurements, IT labour turnover at establishment level is 21, 15 and twelve per cent respectively, over the past year. The median for the number of new employees is one, the number who left is two and the number made redundant is one.

If we calculate the total change, i.e. the number of new employees minus permanent employees who left their jobs, and compare this with the situation twelve months previously at each establishment, we find an average annual reduction of seven per cent at establishment level.

Table 4. Number of permanent employees in IT related activities that were recruited the previous year, number that quit, number of these made redundant. Note: not one-person companies.

	Number of IT employees				Proportion of IT employees			
	Average	Median	Do not Know	n	Average	Median	Do not know	n
Newly hired	2.6	1	5	69	21	8	5	62
Employees that quit	4.6	2	5	67	15	7	5	64
– of whom made redundant	3.6	1	5	62	12	2	5	60

One conclusion of this in comparison with the figures above, and a comparison between mean and median values (corrected for establishment size), is that staff turnover is unevenly distributed among establishments. There has thus not been a general reduction that has affected all or most establishments, but instead a reduction that has heavily affected a small number of establishments. In terms of number of employees, then, the problems that IT companies have experienced do not seem to have had an impact on all companies in Kista, and some have actually increased their number of employees during the period.

If we look at labour turnover in relation to establishment size, we find an emphasis on establishments that have 20–49 employees. The size group constitutes 20 per cent of the establishments with IT related activities in Kista, and 28 per cent of the total number of employees in IT related activities (excluding one-person companies). Among our respondents, this group accounts for 35 per cent of new recruitment, 44 per cent of those who quit and 41 per cent of those made redundant.

At present we have no real explanation for the higher labour turnover in companies and establishments with 20–49 employees. A problem that is the subject of recurring discussion is that small businesses in Sweden (as elsewhere) rarely grow into large enterprises, although many companies are not started with the aim of expanding (Aldrich & Auster 1986; Aldrich 1999). We do not claim that labour turnover is a reason why IT companies do not expand, but it may be an expression of some of the factors that limit the companies' growth potentials. All companies are dependent on their surroundings – above all on markets and other companies – something which leads to fluctuations in demand and a need for flexibility. Big companies can to a larger extent offload flexibility requirements onto dependent cooperating partners (Pfeffer & Salancik 1978; Alter & Hage 1993). It is possible that medium-sized companies have a higher labour turnover because they try to deal with fluctuations in demand through numerical flexibility (Atkinson 1984; cf. Dubois 1998; Ackroyd 2002). Smaller companies are also dependent on other companies, but have a larger proportion of working

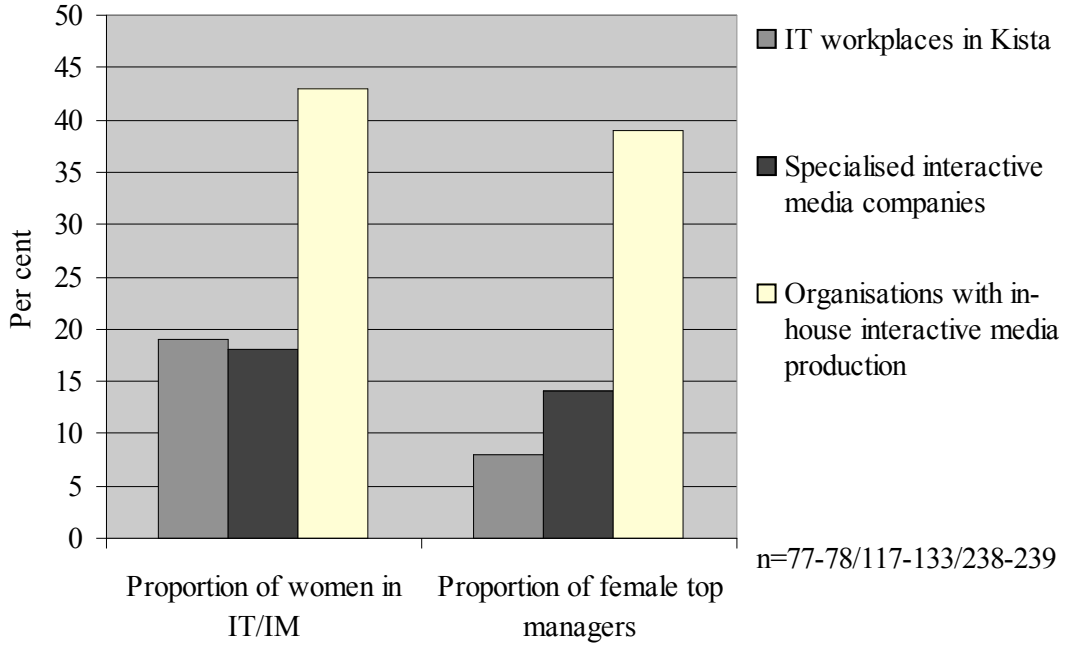
part-owners and more active 'invisible contracts', which means that they may try to deal with temporary changes in demand without making staff redundant. Some of the establishments in Kista are a part of larger companies, but it is possible to hypothetically explain their greater staff turnover using similar arguments: these establishments are part of and depend on their companies, and despite the fact that they are relatively large, they are not always large enough to constitute a powerful internal entity. This means that the establishments are hit extra hard by decisions made in their companies.

Another and perhaps more uplifting hypothesis to explain higher labour turnover among establishments and companies with 20–49 employees is that they contribute a disproportionately large amount to spin-offs and employees who leave to start their own companies.

A Man's Job? Gender and IT

On average, a fifth of employees in IT-related activities at the establishments are women; the median is 17 per cent (figure 12). Twenty-eight per cent of establishments have no female employees in IT activities at all and just eleven per cent of the establishments have 50 per cent or more female employees. The top manager is a man at more than 90 per cent of the establishments, compared with just eight per cent where the top manger is a woman.

Figure 12. Average proportion of women and the proportion of organisations with a female the top manager, respectively in different types of organisational settings.



Although the IT companies in Kista are not totally gender-homogeneous, they are clearly dominated by men. Bearing in mind the domination of the IT industry in Kista, the location constitutes a locally segregated labour market that largely excludes the women who live there – perhaps not primarily because of their gender however since they are often already excluded due to their being of immigrant origin, like many residents of Kista (cf. Darin 2003, Gunnarsson et al 2006). As a group, then, women are excluded from IT companies in Kista irrespective of where they live, but those who live in Kista are probably mainly excluded due to their immigrant origins (Askonas & Stewart 2000).

We can here compare data with another part of the IT sector that we have studied, namely interactive media production. This includes companies that specialise in such production (Internet and multimedia consultants, etc), and the same operations in-house in a cross-section of all major Swedish companies and public agencies with in-house production. In specialised interactive companies, which are part of a younger sector than IT companies in general, the proportion of women was about the same as in the Kista companies: 18 per cent (Sandberg and Augustsson 2002), while the proportion of female managers was twice as high: 14 per cent (Augustsson and Sandberg 2006). In-house interactive media production includes much larger proportions of women both in the operations and as managers.

Although the three groups are similar in terms of organisational size and focus, they usually represent different types of organisational units and management. In Kista, they consist of establishments, although these establishments are usually the same as companies. The study of specialised interactive media producers always concern companies. Similar in-house activity takes place in departments, networks or projects in organisations with different main operations (banks, municipalities, etc). It should be pointed out that there is a gendered vertical division of work in the labour market and in within companies, which partly explains why the proportion of women managers is higher in organisations with in-house production than in specialised companies (as the former includes the public sector which is female dominated). It is, however, more difficult to explain why there is a lower proportion of female managers among IT companies in Kista. One possible explanation is that the IT establishments in Kista are perceived to have a more technical focus (stereotypically male), while interactive media include aspects more related to aesthetics, content and media (something which may or may not be true).

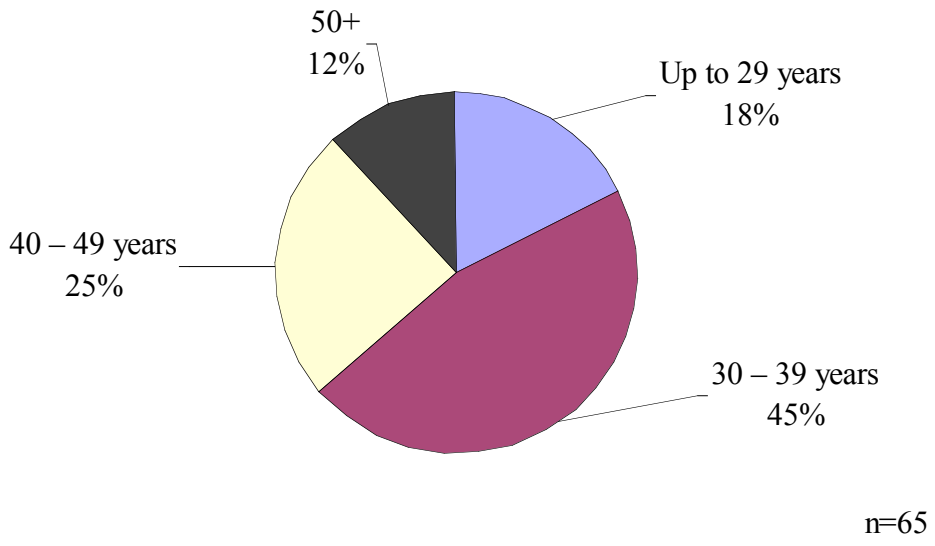
We have developed the discussion of this relative difference in gender-based exclusion in a chapter of an anthology, edited by Ewa Gunnarsson and others, within the framework of the *Tema Storstad* (City Theme) project at the NIWL (Augustson & Sandberg 2006). Here, we simply note that the IT sector in Kista is largely homosocial in terms of gender, probably also in terms of ethnic background and country of birth. Although people who are grouped into other cate-

gories (women, people of immigrant origin, people with low education levels and so on) than the dominant ones ('ethnically Swedish' highly educated men) are sometimes included in the establishments and jobs, they are subject to vertical and horizontal exclusion. As a result, it is only in exceptional cases that they become managers of the companies and establishments where they work in.

Age

The IT companies are thus male-dominated. It is usually also often assumed that the employees are relatively young. On average, the establishments are constituted by 18 per cent employees that are younger than 30, two thirds of employees are under 40, 25 per cent 40–50 and just twelve per cent 50 or older (figure 13). The employees are thereby clearly older than in interactive media companies, in which on average 45 per cent of employees are under 30 and only 19 per cent are 40 or older (Augustsson & Sandberg 2004a, Sandberg et al. 2005). Interactive media is a young sector, with many recently started companies, a 'young image' and fewer people with a long university education. As shown in the results presented above, older sectors also include young companies and new sectors may contain individual companies that are older than the sector as a whole. Of course, older people are also recruited to newly started companies and young people to older companies. However, the general pattern appears to be that young sectors overall contain a larger proportion of young companies and more young employees – even in technically advanced operations that require both previous knowledge and experience.

Figure 13. Average proportion of employees in IT related activities in different age groups.

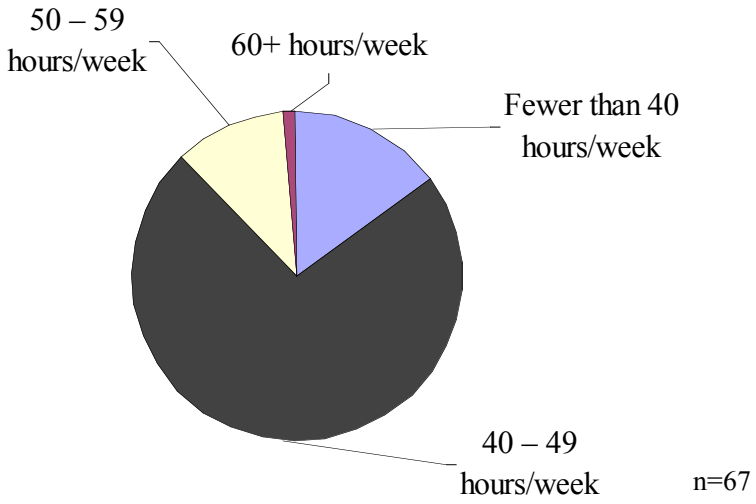


The average age of employees in IT related activities is about 38. At individual level, i.e. weighted for the number of employees in IT related activities at the establishments, the average age is the same. It may indicate that not only young entrepreneurs start companies, or that the career path can lead from employment to starting a company (rather than the traditional route upwards in the same company via the in-house job market; cf. le Grand 1989; Batt et al. 2001). The average age is lower among specialised interactive media companies than among employees in IT related activities at establishments in Kista. There is however little difference in age between employees in IT related activities in Kista and employees who work in interactive media production in-house in large Swedish organisations (Augustsson & Sandberg 2004a).

Working Hours, Overtime and Remuneration

There is often a perception that working days are long in the IT sector. This particularly applies to the parts of the sector that are related to e.g. R&D and consulting, rather than areas such as the IT retail trade. Long and irregular working hours, together with what are known as boundaryless jobs, forms of work and as a heavy workload, are important underlying causes of stress and burnout in working life (Marklund 2000; Gustafsson & Lundberg 2004). Long working days in themselves need not constitute a work life-related problem, but it is an important factor and an indicator of total workload for employees. We asked establishment managements to estimate the proportion of the employees in IT activities who work a specific number of hours per week.

Figure 14. Average proportion of full-time equivalents in IT related activities who work a specific number of hours per week.



At the average IT establishment in Kista, the vast majority of full-time employees (72 per cent) work between 40 and 49 hours a week (figure 14). Fifteen per cent work fewer than 40 hours, twelve per cent 50 hours or more and one per cent 60 hours or more. This distribution does not differ substantially from the figures in interactive media production, where slightly more (21 per cent) work fewer than 40 hours, and slightly more (four per cent) work 60 hours or more. Among the IT establishments in Kista, then, we see a larger concentration of employees who work 'normal' weekly hours than we do among employees in specialised interactive media companies. There is however a shift towards longer working hours than for the Swedish job market as a whole, in which 'normal' working hours are 38.5 hours a week.

More than a third of the establishments (36 per cent) systematically report overtime and overtime compensation is paid at approximately the same proportion of establishments (34 per cent). At two thirds of establishments, overtime is paid in the form of time off in lieu, i.e. at significantly more establishments than those that have systematic time reporting. At 27 per cent of establishments (40 per cent of those where overtime is paid in time off) time off in lieu is based on formalised time reporting, and in another 40 per cent of cases the employees manage this informally. The normal situation appears to be that working hours are managed by offsetting shorter and longer days against each other and that employees determine this schedule themselves. As is often the case, and as illustrated by the above figure, this schedule seems to grow outside its framework, i.e. employees work more hours than they are paid for. In parts of this sector, as in several other lines of work, overtime compensation is quite often more or less explicitly included in the regular salary. In other words, employees are expected or even demanded to perform some overtime work within reasonable hours without receiving extra compensation.

On the whole, overtime is managed more systematically at bigger establishments, at which 57 per cent of all permanent employees in IT related activities systematically record overtime and 58 per cent of them receive financial compensation for their overtime. A somewhat higher proportion, 67 per cent, receive compensation in the form of time off, but this is rarely administered using formal time reporting; 35 per cent of the establishments have such a system (corresponding to 52 per cent of those that offer time off in lieu of overtime). Generally speaking, these figures are higher than those for specialised interactive media companies: a smaller proportion of the latter systematically report overtime and fewer employees receive financial compensation. A large proportion of the interactive media producing companies let their employees keep track of overtime themselves by taking time off in lieu. The differences between IT establishments and specialised interactive media companies, like those between small and large companies, show that the length of working hours and the organisation of and compensation for overtime appear to constitute part of the formalisation of the

organisational structure where older sectors (and some older companies) and major companies have developed institutions and structures with which to administer their employees' working hours (Blau & Scott 1962; Aldrich 1999). But we should not expect all companies to formalise working hours and other organisational processes over time. Some types of operation may be facilitated by, and partially require, looser work forms (Mintzberg 1983; Alvesson 1995; 2004). Due to generational effects, companies and sectors that were started in recent years will differ somewhat from older ones (Stinchcombe 1965; Carroll & Hannan 2000), although older companies still have capacity to change (Ahrne & Papakostas 2002; Augustsson & Sandberg 2003a). The overall trend in Swedish working life, as elsewhere, seems to be towards less formalisation of e.g. working hours and compensation (Allvin et al. 2006).

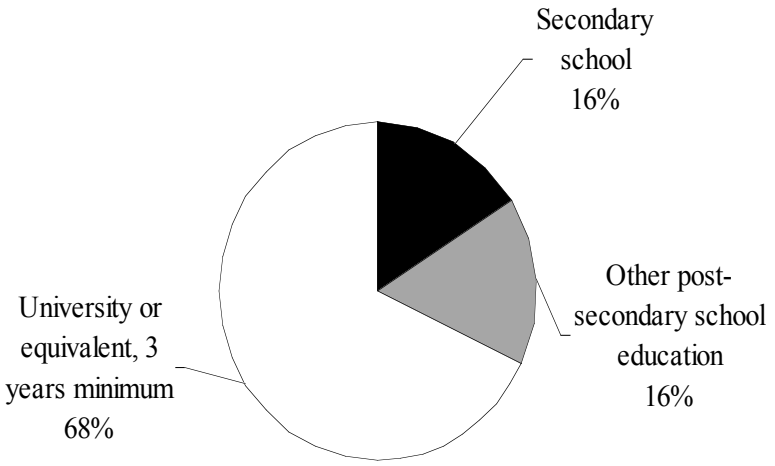
Education and Competence Development

Although technological development in IT appears to have decelerated somewhat in recent years, it is still rapid. Producing and further developing technical solutions is also the actual business idea of some of the companies in Kista. High levels of formal technical training and ongoing acquisition of know-how in relation to practical development work are therefore important aspects of the job for employees, companies and the entire region (cf. Nonaka & Takeuchi 1995; Porter 1998; Burton-Jones 1999; Holmqvist 2000; Johansson 2000; Svensson et al. 2001). In this section we present the educational levels of employees in IT-related activities, establishment managements' view of the importance of various skills among employees, the most important sources of skills and the extent and forms of skills acquisition.

Levels of Formal Education

Although learning in the establishment is clearly ranked highest among knowledge sources (see below), formal education is obviously very important. On average, almost 70 per cent of the employees have at least three years of university-level education. Sixteen per cent have other post secondary education and an equal percentage have upper secondary education; no one had only compulsory education (figure 15). The average level of education among IT staff in Kista is higher than that in interactive media, in which more than 40 per cent have a university education and 37 per cent have other post-upper secondary school education. Differences at individual level, i.e. weighted for the number of employees, are negligible, which shows that there are no differences in the general level of education related to establishment size.

Figure 15. Distribution of the highest formal level of education among employees in IT related activities.



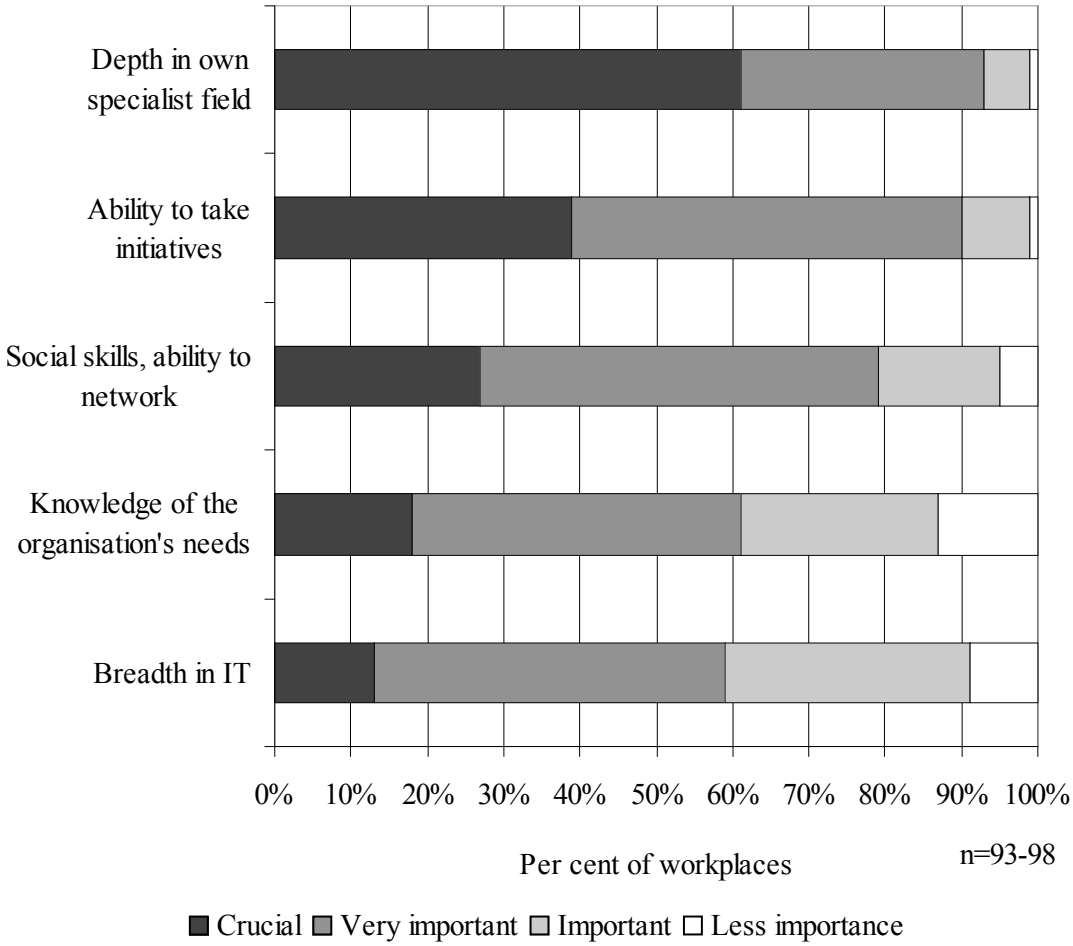
University education thus appears to be more or less a requirement for a large proportion of the jobs in Kista's IT companies, although a third of employees do not have such education. Since we do not have data at individual level, we do not know whether the latter third consists of, for example, special types of jobs or older people with shorter formal education but longer experience.

Important Skills in IT

The above results indicate the general level of the employees' formal education. We have no data regarding the orientation of this education (since it is difficult to obtain such information through questionnaires at establishment level) and therefore cannot comment on how important particular types of education are for jobs or specific types of jobs among the IT companies in our study. We have however asked the managements of the establishments which competencies they consider important for employees in IT related activities (figure 16).

The figure shows that people's in-depth knowledge of their own specialist field as well as ability to take initiative are seen as the most important skills for those who work in IT related activities. Both skills are regarded as crucial or very important by 90 per cent or more of the managements that responded to the questionnaire. Depth of knowledge in the specialist field is ranked highest and is regarded as crucial by more than 60 per cent of the establishment managements. Social skills and ability to network are also classed as very important or crucial by 80 per cent of the respondents. The ranking of skills is the same as for employees in interactive media who work in IT and programming, which is to be expected since the two are close to each other (Sandberg & Augustsson 2002).

Figure 16. Respondents' estimates of the importance of various competencies for employees in IT related activities.



The skills that are considered important differ depending on the number of employees who work with IT related activities at the establishment. At establishments with a large number of employees in IT related activities, breadth is not regarded as very important, while people's depth in their specialist field and knowledge of the organisation's needs are more important. This is not surprising; in a small company everyone must be able do a little of everything, because there are fewer opportunities for specialisation.

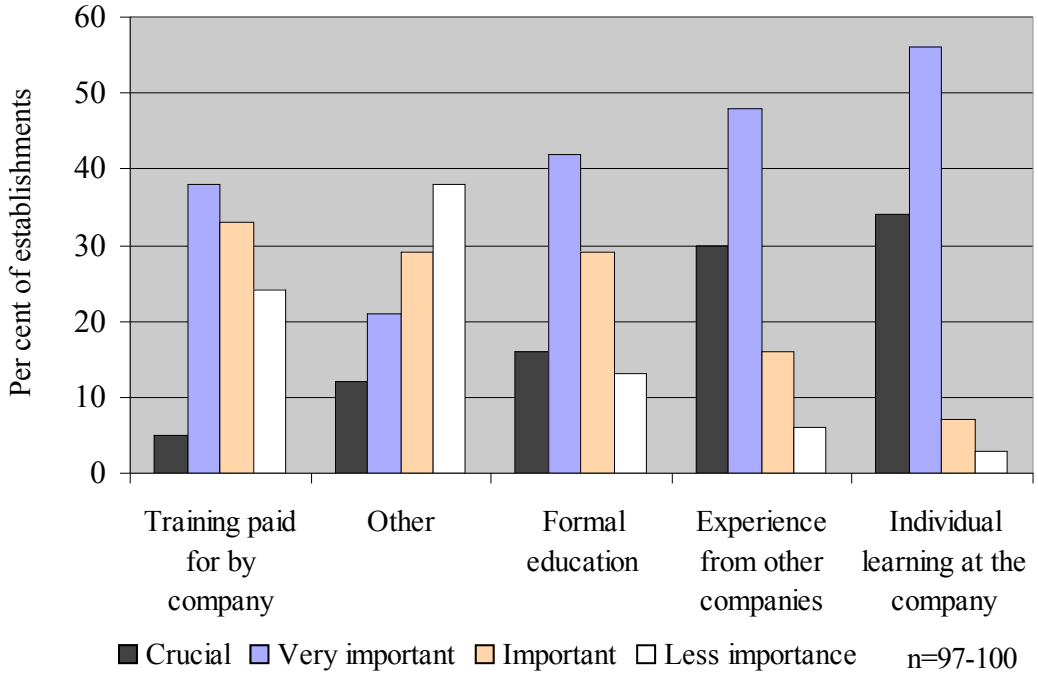
To summarise, employees in IT are required to be knowledgeable in their specialist field, take initiatives to apply this knowledge and, in conjunction with this, establish contacts and cooperate with other participants, e.g. in projects. Breadth and knowledge of the organisation's needs are not considered equally important; these are possibly skills that are classed as more important for a limited group of employees such as managers and project managers.

Sources of Skills

Where do employees' current skills come from? The above showed that a large proportion of the employees have undergone formal post-secondary education, but this is naturally not the only, or necessarily the most important, source of the employees' current skills. In the questionnaire, the managements were asked to estimate the relative significance of various possible sources of the employees' current skills (figure 17).

Learning and experiences from the current company are generally considered the most important source of employees' skills. Nine out of ten managements think that this source is very important or crucial. Eight out of ten value experience from other companies (i.e. previous employers) just as highly. About 60 per cent rate formal education and just over 40 per cent rate courses paid for by the company as very important or crucial factors. The pattern seems to be clear: learning in the current establishment is classed as most important by far. The high value placed on experience from other companies further points to the felt importance of on the job learning. It further hints that labour mobility between companies can be an important mechanism for not only workers competence development, but also firm knowledge dissemination.

Figure 17. Respondents' estimates of the importance of various sources of the current skills among employees.



In a study of the Stockholm region's IT firms, Power and Lundmark (2004) argues that labour mobility boosts knowledge dissemination and creates links between firms, a dynamic that is more common within a cluster than in the local labour market as a whole.[9] The establishment appears to be where knowledge transfer takes place, rather than through chance face-to-face contacts.[10]

The emphasis on learning in the establishment does not necessarily mean that formal education is less important, although its importance is perhaps less obvious. It may be the case that it is taken for granted, and that in everyday work, informal learning in the establishment is more readily emphasised. Formal education can act as a ticket to a job in the IT sector, and some of the factors classed as personal characteristics, such as social skills, ability to take initiatives and networking, may partly be the result of higher studies with a more general and abstract content: university studies aim to impart not just factual knowledge, but also tools for thinking in abstract terms, structuring tasks, developing students' own knowledge, and skills in cooperating with others. The very high levels of average education are a sign of the perceived, as well as actual, importance of formal education.

Individual learning is also considered important in interactive media companies. Among these, however, training and courses that the employer pays for are considered more important than formal education, although both are regarded as of lesser importance relatively speaking. The significance of ongoing learning is further emphasised by the fact that more than 80 per cent of the knowledge that employees gain is obtained in conjunction with their daily work, in contrast to just under 20 per cent through formal training, courses, etc.

For the establishments in Kista, we have seen that formal education is regarded as clearly more important than such courses. It is reasonable to assume that the difference in valuation of courses and formal education between the two groups of companies is probably due to the fact that interactive media production is a new field (and was even more so when that survey was conducted in 2001), for which formal education has so far only been developed to a limited extent. Compared to interactive media production, courses aimed at IT activities in general are far more developed, and as a result more workers working in IT firms in general have a relevant academic education.

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[9] In 1999, 80 per cent of what 'management personnel' in IT companies had previously worked for another IT company in the Stockholm region according to a study conducted by Birkinshaw (2000).

[10] It may be the case during the period of study, right after the big companies' staff cutbacks in Kista, that job creation took place through newly started small companies, a situation in which face-to-face contacts in an area with localised skills may be of particular importance (cf. Mariussen 2003).

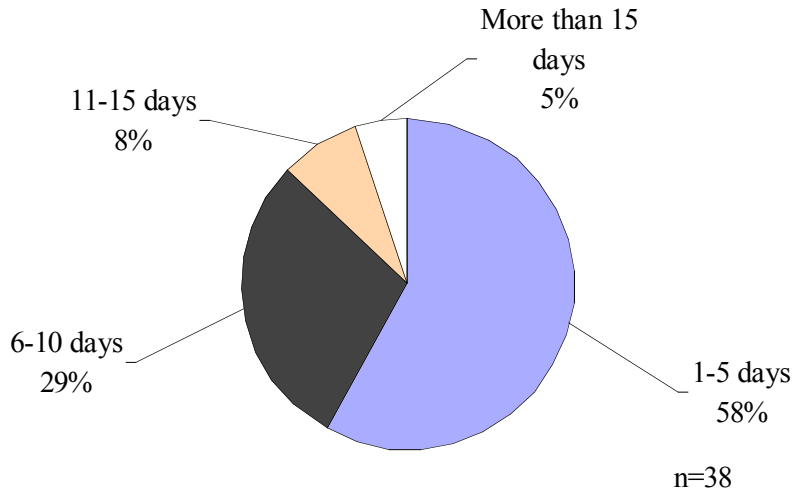
Competence Development: Resources, Utilisation and Organisation

Since learning in conjunction with daily work is regarded as the most important source of the employees competence development, it is important to analyse the skills acquisition resources offered to employees, the proportion of these resources that are actually used and how companies try to ensure that skills acquisition actually takes place, i.e. how they organise it. Our previous studies of competence development among employees in interactive media production – in specialised companies as well as in-house production in companies and government agencies in general – have shown that competence development often is under developed, despite a lot of talk of its importance. As a result of shortcomings in organisation and high work load, many people working in interactive media production (above all in specialised companies) are forced to use part of their free time for skills acquisition (Augustsson & Sandberg 2004b).

Resources

Our results here for IT employees in Kista show that a third of the establishments do not offer the employees special time for competence development, that half offer employees such time through individual competencies plans and that 17 per cent devote equal amounts of time per year to each employee. It is of course not necessarily the case that the third of establishments that do not offer any special time for competence development do not offer their employees any competence development at all. It does however mean that competence development has not been systematised in terms of scope (but perhaps in terms of organisation). With respect to systematisation of competence development, a large proportion of the establishments surveyed do not have special methods, despite allocating time.

Figure 18. Proportion of establishments where employees in IT related activities have been offered a certain number of days for competence development the past twelve months. Comment: Only companies that offered time for competence development.

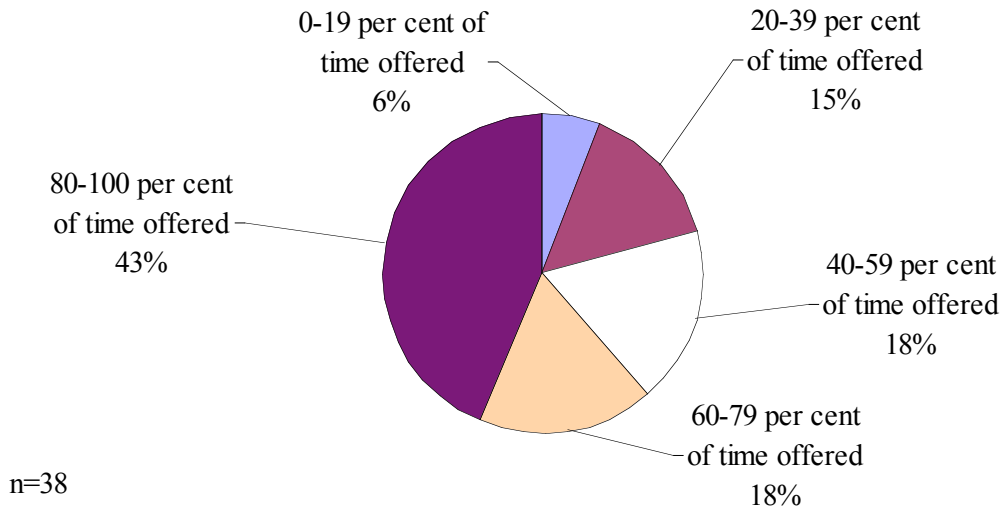


The time offered for competence development varies between establishments. Just under 60 per cent of the establishments offer one to five days and 29 per cent six to ten days (figure 18). 87 per cent of the IT establishments that offer time for competence development offer one to ten days annually, as compared to 66 per cent of interactive media companies.

Utilisation

The time offered to employees for competence development is interesting and important, but gives us a limited picture of the competence development that the employees actually undergo, because in some cases they do not have the opportunity or motivation to utilise the resources. At a quarter of the IT establishments in the study, all time offered for skills acquisition was used; in over 60 per cent of cases, it was stated that 60 per cent or more of the time was used (figure 19). Employees in IT related activities on average used 66 per cent of the time offered for skills acquisition last year. This means that a third of the time was not utilised. Thus, at just under 90 per cent of the companies, employees are offered about five days for skills acquisition and use three of them. However, the Kista companies are not exceptional in this respect: the 66 per cent of the time that is used can be compared to the specialised interactive media companies, in which an average of 55 per cent of the time was used. In 17 per cent of cases, management does not know what proportion of the resources is used. The same question has been put to specialised interactive media companies, in which 13 per cent of managers did not know how much time was used; in organisations that produce interactive media in-house, 35 per cent did not know.

Figure 19. Percentage of employees that actually used different proportions of the time offered for competence development. Comment: Only companies that have offered time for competence development.



Establishment managements say, then, that they have offered more time for skills acquisition than the employees have utilised. When knowledge rapidly becomes outdated, this should prompt reflection and discussion about how to secure knowledge. It might be argued that the resources are so generous that not all of them are required. But since 87 per cent of the establishments have ten or fewer days for competence development a year, this does however not seem likely.

Organisation

Since a large proportion of the time offered for competence development is not used, and work is regarded as central to learning, it is interesting to study the methods used to ensure that the employees receive sufficient time for competence development. It turns out that ten per cent of the companies do not use any method at all (table 5). Individual learning as a key source of skills acquisition can be interpreted literally in many cases: the point is to take responsibility for your own learning, with limited support from your own organisation.

The dominating way of trying to ensure time for competence development is planning as and when it becomes relevant; three quarters of the establishments use this strategy. In other contexts related to interactive media companies, we have discussed this as ad hoc planning, which admittedly creates flexibility, but also might lead to shortcomings in long-term development of knowledge, as well as creating uncertainty for employees (Augustsson & Sandberg 2004b).

About a fifth of the establishments set performance targets so that competence development is supposed to fit into regular working hours. Given that a relatively large proportion of the employees regularly work overtime and that a third of the time offered for competence development is not used, there may be reason to question whether this is a suitable strategy. In the choice between short-term work requirements, in which shortcomings in performance are directly visible, and more long-term requirements for competence development, for which there are fewer direct incentives, short-term requirements easily take precedence.

Table 5. Proportion of companies that use various methods to ensure that employees in IT related activities receive sufficient time for competence development. Note: Only companies that offer time for competence development. More than one answer possible.

Method	Yes, is used
Pre-decided time put off	0
Time planned in gradually	74
Performance requirements set lower than full time	18
Partially handled outside regular working hours	3
Other methods	8
No particular strategy used	10

n=38

Bearing in mind that a considerable amount of the time offered is not used, there may be scope for innovative thinking in terms of conditions and strategies for competence development. The same applies to courses: despite a wide range of training companies and courses focused on IT related areas, they are not thought to contribute a great deal to employees' skills.

At the same time, we should point out that employees also of course have individual responsibility for utilising resources available for competence development, and for using the resources they are offered. No type of organisation (except perhaps making competence development compulsory) can guarantee that resources are actually used if employees are not willing to use them, in the same way that courses do not produce results if participants are not motivated to learn. At the same time, managers and others in authoritative positions have a discursive advantage concerning how they signal and reward the value of competence development and learning. They also have a formal and practical advantage: they lead and distribute work, and they can affect employees' actual opportunities to take part in competence development through the way in which work is organised and the resources that are provided (e.g. time and staffing of projects).

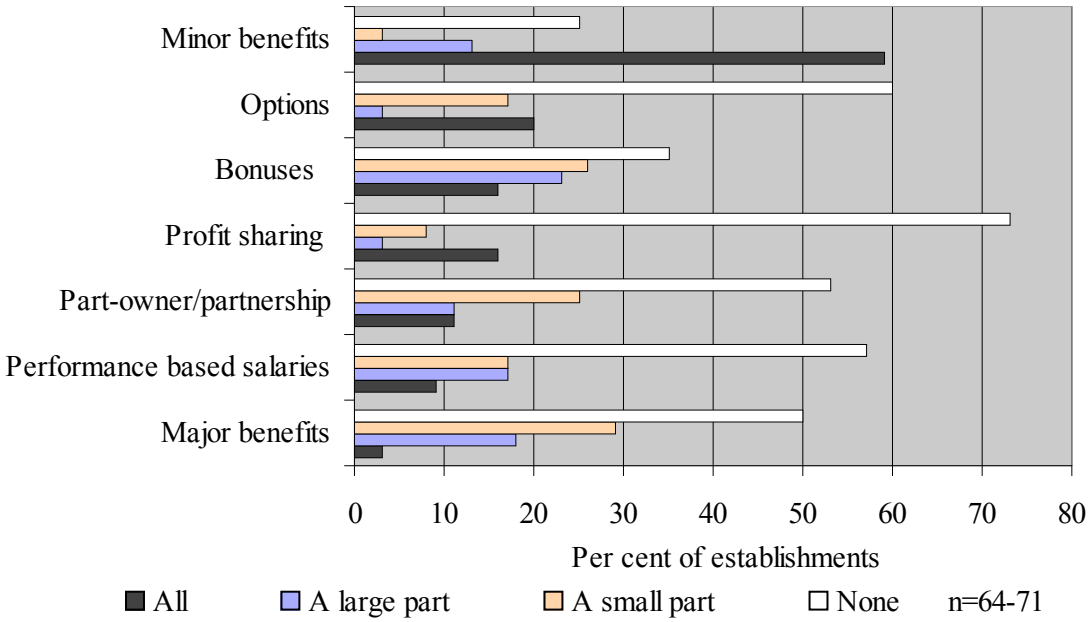
Among interactive media companies, the most common strategy is also to plan time for competence development when there is a perceived need. The significant difference is that nearly a third of the respondents from these companies answer 'do not know' to the question of which strategy is used. No respondents at IT establishments in Kista answer 'do not know', which suggests that knowledge of and involvement in competence development is greater, even though this knowledge sometimes consists of knowing that no strategy is used.

Salary and Other Remunerations

Since the IT sector in Kista includes so many different types of operations, we did not ask respondents to state average salary levels for all employees or different groups of employees in the questionnaire. The result of such a question would be difficult to analyse, and easy to misinterpret; an average salary for an 'IT worker' would for example include shop assistants in computer shops, chief R&D engineers and hardware installers.

To obtain some kind of picture of economic compensation, we asked how common different *types* of salary system and other remuneration are (see figure 20). This gives us a snapshot of the extent of 'new' types of remuneration that are more closely linked to the results of the individual, work group and establishment, as well as the company's results. Some forms of compensation are based on and foster increasing measurement of individual performance using various parameters that are believed to benefit productivity and owner value – an actual basis for them to act as incentives.

Figure 20. Proportion of establishments where none, a small or large proportion, or all employees in IT related activities have various types of remuneration.



The individual performance based systems of compensation break down the worker collective (Lyysgaard 1967) and increase processes of individualisation and differentiation of employees and departments, which must to a greater extent exhibit their usefulness and continued employability to the company, to ensure that they are not phased out or taken over (Garsten & Jacobsson 2004). These types of compensation are believed to increase in among companies, although the empirical evidence is somewhat contradictory (cf. Sandberg 2003).

At more than a quarter of the establishments, all or most employees receive a performance-based salary. The most common form of economic compensation is bonuses, which are received by all or a large proportion of employees at almost 40 per cent of the establishments. On the other hand, bonus programmes at a quarter of establishments are reserved for a small proportion of the employees. One might assume that this in general refers to managers, but in some cases perhaps also e.g. sales staff.

Options are more unusual than bonus systems, but still over 20 per cent of the establishments offer them to all or a large proportion of their employees. Eighty per cent of interactive media companies did not offer the opportunity to subscribe for options in 2001 to any employees (Sandberg & Augustsson 2002), compared to 60 per cent in this case.

Since option programmes have been the subject of considerable criticism in recent years, it is somewhat surprising that such a large proportion of the establishments surveyed offer this type of remuneration. Option programmes have also long been proven to be a weak form of financial incentive. Experience from the interactive media sector indicates that options make employees more focused

on share value than their actual tasks or their company's long-term growth. While 'quarter-by-quarter capitalism' may create pressure from the top (i.e. from owners) or perhaps even more so from the outside (i.e. the market) on managers to focus on share prices, options may instead create pressure from below and inside the company; employees follow the company's valuation based on external estimates rather than concentrating on the tasks that at least in traditional valuation (i.e. not the norms put forward in discussions on the new economy) are regarded as those which create a company's value and contribute to its long-term sustainable development.

The IT sector has come under strong criticism, not least after the dotcom crash when employees felt cheated after exchanging part of their salary for options that in a number of cases proved worthless. In companies that did well for a long time – not least Skandia and other insurance companies – option programmes were criticised as signs of excessively generous gratuities to already well-paid company directors. The few companies in the interactive media sector in which employees did earn substantial sums of money from their options were also subjected to criticism. This criticism was often linked to the later plummeting share prices of the companies, and the losses suffered by private individuals who had invested in these shares (although this criticism was not always justified, bearing in mind that firm founders and venture capitalists often made substantial losses as well). Many of the option programmes mentioned here were probably drawn up several years before the time of study, before the dotcom crash and the debate on option programmes. One can assume that Ericsson, which launched an option programme that was regarded as a safe way for employees to become rich, acted as a source of inspiration due to its position as the local dominating company and as Sweden's largest company at the time. Smaller companies may have tried to match their programmes in order to attract staff (DN 00-02-17).

At a relatively large proportion of the establishments studied (about 20 per cent), all or a sizeable proportion of the employees are part-owners or partners; owners are represented at nearly half the establishments. This is partly because many companies are small. It is therefore not entirely correct always to refer to part-ownership and partnership as forms of remuneration, because part-owners may in several cases be the people who started the company and were involved in various ways in its early stages. Many companies make a relatively limited profit, and it is possible that a large part of this is re-invested for growth, rather than distributed to the owners. At the same time, part-ownership is an asset, something that can be sold or transferred to other part-owners for potential profit.

Another important aspect is probably the IT sector itself, not least consulting, in which there is a long tradition of attracting skilled and creative people and creating loyalty by offering part-ownership in the company. This is partly a result of the fact that a large proportion of these companies at least initially lack capital, but need an input of skills and work. Similar structures are also found in

professional and knowledge-intensive companies such as law firms and auditing firms, in which part-ownership becomes a way of attracting skilled people who contribute to the company's value and status.

At almost 60 per cent of the IT establishments in Kista, employees receive minor benefits such as lunch coupons, free fruit at work, etc. Larger benefits such as use of a car and domestic help are much less common and are often limited to certain groups – probably co-owners, sales staff and managers.

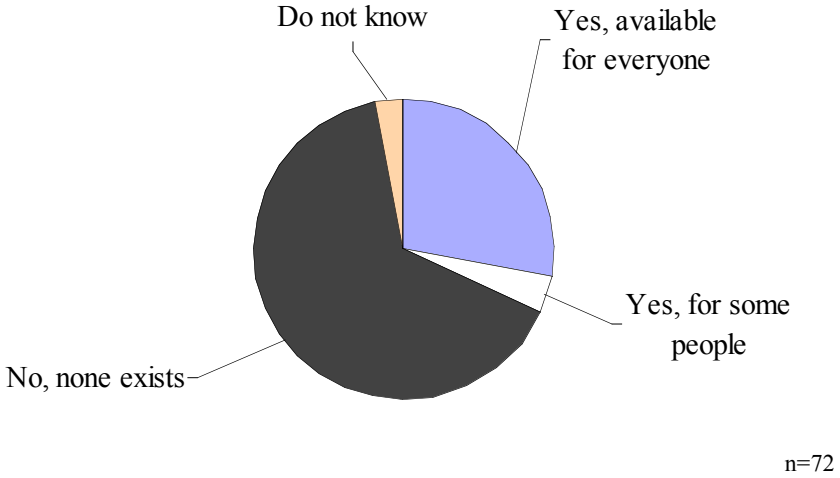
Work Environment, Agreements and Unionisation

Average sickness absence at the establishments participating in the study is three per cent. A quarter of the managers who responded did not know average sickness absence at the establishment. In our earlier survey of interactive media companies, sickness absence was reported to be two per cent. In that case, too, a quarter of the respondents lacked any knowledge of the level of sickness absence in the company. Some sickness absence, similar to overtime, is probably dealt with informally using compensatory leave. The actual sickness frequency, i.e. the proportion of working hours during which the employees are so ill that they should not work, is therefore probably higher than three per cent, but is concealed by compensatory leave and possibly work from home and by sickness presenteeism (cf. Wikman & Marklund 2003).

More than half the establishments (54 per cent) are affiliated to Swedish company healthcare system. Since affiliation is more common among large establishments, occupational healthcare services cover 87 per cent of the employees in IT related activities in Kista. At establishments that offer this healthcare, 94 per cent of agreements are said to cover health checks and treatment, and 69 per cent include advice on the work environment and working conditions. This corresponds to 98 and 84 per cent, respectively, of all employees in IT related activities. If the 'do not know' answers are included, the figures are 89 and 55 per cent respectively. Quite a lot of respondents, 21 per cent, do not know whether advice on work environment and conditions is included; the issue has perhaps not become relevant, or they might not be aware of the possibility. We have not asked how often company healthcare systems are actually contacted and used.

Twenty-eight per cent of the establishments surveyed have collective agreements that cover all employees in IT-related activities, and four per cent have agreements for some of their employees (figure 21). Three per cent of the establishment managements do not know. The level is not particularly high in relation to working life in general, but is about ten percentage points higher than it was for interactive media companies a couple of years earlier (in 2001); the latter figure has probably climbed following the increased level of unionisation during the crisis in that sector in recent years.

Figure 21. Proportion of companies that have collective agreements that cover employees in IT related activities.



n=72

The lack of collective agreements does not necessarily mean that there no agreements at all between employers and employees. Among establishments without collective agreements, about 78 per cent have a standardised agreement for all employees and the rest have varying agreements with different employees. In the interactive media sector, only about 50 per cent of the companies have standardised agreements.

Concluding Discussion

This report has aimed to give a first general description of the IT related activities in companies and establishments with fewer than 200 employees in Kista, a description that is of great intrinsic value. We have presented some preliminary discussions here and there throughout the report, but refrain from attempting to draw summarising conclusions here. To the extent that it is possible to present empirical results objectively, we have primarily wanted to 'put the cards on the table' for the immediate benefit of those active in the business community, the public sector and the research community. This is one of the reasons why we have added an extensive appendix of tables, which also includes some results – such as the size of Kista's IT sector – that we do not discuss in the report. Possible ways forward are analyses that enable us to reject or confirm some of the hypotheses that we have presented, as well as more interactive work to boost growth in employment and companies in the region and sector. In this concluding discussion, we summarise the most important results and questions presented.

Growth and Activities

Thirty-five years ago, Kista was nothing more than a windswept, empty part of Järvafältet. It is therefore not surprising that many of the companies and establishments that are active there today are relatively new. The majority of the companies currently active in Kista have been established in the past five to ten years, either as start-ups, relocations to Kista or expansions of existing companies, in which the old has been both supplemented with and replaced by the new. This suggests both growth and dynamism among companies. For individual companies, recent years have however been characterised by a downturn rather than growth in terms of turnover and number of employees. Despite this, more than half of the establishments were established *after* the dotcom and telecommunications crises at the turn of the Millennium. The subsequent decline has had a considerable impact on a small group of establishments, while others have emerged virtually unscathed and in some cases have expanded their operations.

Extent of Kista's IT Related Activities

Drawing conclusions about the size of phenomena from questionnaire studies is always fraught with uncertainty. We commented on this in the introduction and the method chapter, and in this report we have chosen not to go into more detail in analysing the extent of IT related activities in Kista. Based on the methods and definitions we have used, we can say in summary that at the turn of the year 2003/2004 there were about 200 establishments in Kista with fewer than 200 employees apiece that had IT related activities. The establishments have an average of 19 employees, including owners and part-owners, 16 of whom are

focused on IT related activities. At the time of the study, these 200 establishments had about 4,000 employees, about 3,200 of whom worked in IT-related activities. We can establish, with a relatively large degree of certainty, that these establishments generated a turnover of SEK seven to twelve billion from IT-related activities in 2003. This constitutes 90 per cent of their total turnover at that time. As we have repeatedly pointed out, these figures do not include the small group of significantly larger IT-related companies that are located in Kista; if they are included, the size of the local sector becomes several times bigger.

Activities

In our broad classifications we have discerned seven different IT related activeties: production of hardware and software, telecom and infrastructure, trade and leasing, R&D in IT, consulting and computer servicing, and other activities. All these activities are relatively heavily represented in Kista, including the production of hardware, which is the least common activity; about 20 per cent of the companies produce hardware at least sometimes. About four fifths of the companies are also active in more than one area, and the average number of areas of activity is three. Consulting and computer servicing are the most common operations by far – often performed by 65 per cent of the companies and sometimes by three quarters. In terms of areas of activity, there is a division between on the one hand the vast majority of small companies that often focus on consulting, and on the other the minority of slightly larger companies (but with fewer than 200 employees) that focus on hardware production and also conduct some R&D.

A third of the establishments also have activities not related to IT. The most common are retail trade and consulting, and there appears to be a relatively clear pattern in this case: the companies that provide e.g. IT related consulting often also act as consultants in other areas if they have operations besides IT related activities, and those who trade in IT related products also tend to trade in other products (rather than e.g. carrying out production).

Cooperative Ventures and Networks

Our results show that, in relation to its area and population, Kista is home to a very large number of companies and establishments that are active in various IT related activities. Many of the companies are probably to some extent each other's competitors. In hardware production alone, which is the area of activity with the smallest number of companies, we estimate that about 40 companies with fewer than 200 employees are active in Kista. However, due to the work distribution and specialisation that exist both within and between companies, there are complementary areas of activity and knowledge do exist that cooperating companies can utilise and build on in R&D and production.

Our results show that about a quarter of the companies surveyed outsource all or parts of their IT related activities and about 40 per cent perform IT related activities as subcontractors for other companies. This corresponds to 37 and 53 per cent, respectively, of the companies' turnover from IT related activities. Twelve per cent act as both subcontractors and outsourcers of operations, which means that a total of 54 per cent of the companies have had production-related cooperation with other companies during the past twelve months (2003) and that 46 per cent have not. Only a small proportion of outsourced work and subcontracted tasks is however done for other companies located in Kista. The majority is performed for and by, respectively, companies in the Stockholm region outside Kista, and to some extent elsewhere in Sweden and in other countries. The companies with which Kista firms cooperate most often are also located outside Kista. It is in fact more likely that a Kista-based IT company has had production cooperation with an interactive media company from central Stockholm than another IT company in Kista.

As far as Kista can be described as a cluster, it is for many of the companies not because of local production networks. But production is not the only opportunity for local cooperative ventures provided by close geographical proximity: there are also more strategic cooperative ventures and exchanges of experience, business associations, contacts with local universities and decision-makers, and recruitment. Our results suggest that some of these forms of cooperation – especially strategic cooperation and exchanges of experience – are more established: more than 40 per cent of the companies surveyed have taken part in such cooperative ventures. The proportion of companies that has had contact with, or worked with, local universities and decision-makers is again low, about ten per cent. Although we do not have the opportunity to compare with other locations and times, the proportion of companies participating in cooperative ventures not directly related to the business is too low for Kista to be said to be characterised by triple helix cooperation (cf. Gibbons et al. 1994). To sum up, the factors of importance to companies that are clearly apparent now, as when Larsson and Lundmark (1991 p 75) did their Kista study, are traditional localising factors such as premises, transport situation, skilled personnel and customers. Local production cooperation between firms is still limited in scope, as are other types of cooperation, although about 50 per cent of establishments have taken part in strategic cooperation and exchanges of experience.

As we show below, however, the relatively limited local networks need not constitute a problem, or at least are not regarded as such by the companies involved. This may be because Kista appears to be well integrated into the Stockholm region business community.

Good Marks for Kista – Without Clusters

In local networks or clusters, in which sectors interact and people meet, 'social capital' is generated that leads to growth in the 'knowledge economy'. This is the mantra of the day. The Swedish town of Gnosjö, known for its entrepreneurship, is pointed out as an example, as is Silicon Valley, with the church and the university, respectively, as spiritual centres. In high-tech fields in particular, the interplay between industry, research and public administration in a 'triple helix' structure is often regarded as an engine of growth (Etzkowitz & Leydesdorff 2000). Gnosjö, with its close, local and personal contacts and cooperative ventures born out of the traditional industrial society, cannot function as a role model for a new area like Kista, where a number of large and small high-tech IT companies have gradually become established. Silicon Valley, which has a long tradition of advanced technology in the aviation industry and a long-established university in the region with a strong tradition of spin-offs and new enterprise, is very different from Kista in terms of problems as well as opportunities. So even if there are lessons to be learned and inspiration to be drawn, Kista's development must spring from its own specific conditions. With the study results we have presented, we are now aware of some of these conditions.

We are able to illustrate the situation and indirectly highlight some current perceptions of e.g. clusters and business conditions. Our survey shows that Kista in general is awarded high marks for *everything* that company managements consider crucial to business: good premises, train and air communications, telecom infrastructure and good access to skilled staff.

The Kista companies involved in production cooperation are often not only involved in such activity locally, but also, and not least, in networks with a regional and global reach. Although we did not find a clear local cluster in our measurements, the IT companies surveyed give Kista high marks.[11] It is probably the case that the close proximity between companies does play a role in self-image, enthusiasm, creative meetings and other factors that are difficult to measure in a questionnaire, so our later work has included a smaller, more qualitative survey (Movitz & Augustsson forthcoming).

Kista is also close to universities; this however is one of the factors that the company managements rated as of minor importance. There are several possible reasons for this, as we discussed in the report: is the university taken for granted? Does research in Kista have the wrong focus? Or will universities in Stockholm or San Francisco do just as well…? Or would it have been classed as being of

[11] Against the background of globalisation and other factors, Amin (2004) questions the idea of the importance of the local, closed location, and stresses its relationships of various kinds, both domestic and global. Places can be significant as nodes in systems of relationships with global geographical reach. Based on experiences of a development programme in the Swedish Bergslagen region, Casten von Otter (2000) argues for the importance of 'open regions' where players interact with complementary activities in other regions.

greater importance in an economic boom when competition for staff is tougher and investments in activities such as research are greater? The high level of education among those working for IT companies shows, in any event, that the higher education system as a whole provides a significant basis for the companies' activities.

Kista is regarded as a poor provider of attractive housing, but this does not bother the managements, as they do not class it as important. This may be because they have 'given up' on that point. When the issue was discussed at our seminar at the Campus IT University, the district council stressed that attractive housing is now being built, e.g. in Kista Gård, while the companies emphasised that a good urban environment is not just about housing, but that Kista should be a place that employees and visitors find it enjoyable and exciting to 'go out on the town' in. A vibrant residential environment therefore appears as an indicator of a good environment for companies and their employees and customers. This creates a location that encourages cross-fertilisation, creative meetings – in short, provides the conditions for cluster development. Although the companies think that Kista is good for them, even without close local networks, it could be even better with them. Kista and the Stockholm region would perhaps be further strengthened if, for instance, the underground train station were more attractive and the centre of the capital city perceived as even more accessible.

Kista has been a success story for a long time. Success sometimes leads to 'slack' and shortcomings in rationality in organisations, whereas setbacks induce improved focus and efficiency. After the international 3G-dependent recession, we can now discern a change for the better. Due to rationalisation and outsourcing there will be few immediate new jobs, but there are trends for an increased labour demand. There are several factors that still need to be surveyed: work, health and skills development in Kista's IT industry, the local and regional job market, and opportunities for job creation and new enterprise.

Those Who Work in Kista

The survey on which this report is based has been aimed at the managements of establishments in Kista with IT related activities, and is largely an organisation study. Our goal has been to answer more detailed questions about employees in a questionnaire aimed at individuals (cf. Sandberg et al., 2005), and combine the results from the different studies. We have however chosen to present an introductory picture of the composition of staff in IT operations in Kista – who are they, where do they come from and what characterises them? The answers that we can provide from our results largely support the image of IT employees in Kista that we often see in the media: well-educated men who appear to be 'ethnically Swedish' and live outside Kista.

The vast majority of the workers is permanently employed and works full time. For a relatively large proportion of them, this means in practice that they work more than 40 hours a week. Temporarily employed staff do not account for more than six per cent, but external consultants work at a quarter of the establishments in our study. About 20 per cent of the companies are one-person enterprises.

Women are no more than a fifth of the employees in IT-related activities. Only eight per cent of the establishments have a female manager, and nearly 30 per cent of them have no female employees at all. It thus appears that it is difficult for women to gain access to and become established in the Kista IT job market. One reason may be that a smaller proportion of women are interested in jobs in the sector; differences in admissions to IT oriented university courses suggest this (Swedish National Agency for Higher Education 2004). In addition, a large proportion of female students dropping out of university and fewer opportunities for women to become managers (about one in 17 men are the top manager of their establishment, compared to one in 50 women) indicates that they find it difficult to become established and create a career for themselves in the IT sector.

The distribution is not as distorted for age as it is for gender, although there is a greater emphasis on younger staff in the sector than in working life in general. Just under a fifth are younger than 30, nearly half are 30–39 and a quarter are 40–50; just twelve per cent are 50 or older. There is no difference in average age between small and large companies. This indicates that a certain proportion of older people start companies and that career paths sometimes start with employment and lead to jobs as freelancing consultants or small-business owners.

Education and Learning

The levels of education among employees in IT related activities are higher than for working life in general: almost seven out of ten have completed at least three years of university education, a further 16 per cent have other kinds of post-secondary education and the remaining 16 per cent have completed secondary school. None of the employees have just elementary education – at least according to the managements. A high level of formal education therefore appears to be a requirement for, and an obstacle to, employees in IT activities in Kista. At the same time, on-the-job learning (in current and previous companies) is considered the most important source of employees' skills. This illustrates the need for ongoing competence development. The majority of companies offer special resources for competence development, but only two thirds of this time is actually utilised. Part of the reason behind this probably that so many companies lack a real strategy to ensure that the time is actually used. The vast majority rely on ad hoc planning – allocating time to competence development as and when the need arises – and the majority of the remaining companies say that they have

performance requirements that allow time for competence development within regular working hours. None of these methods appear to be fully effective.

Design of the Study and Methodology

This section provides a detailed description of the design of the empirical study reported here. It is basically an expanded version of the initial description under the heading 'A Brief Note on Method'.

Delimitations of 'IT in Kista'

As was initially mentioned, our preliminary studies show that the way in which the IT industry in Kista is delimited is of crucial significance. Alternative definitions generate very different results in terms of the number of employees and companies, turnover, activities, etc. This is particularly relevant in relation to IT related activities, which may include everything from people and companies that develop and produce IT solutions to those who use such solutions. It may also include all those who work at companies that are classed as IT related, despite the fact that many employees have jobs that are not IT related.

We have therefore tried to be as consistent and clear as possible about what we have actually studied. In brief, we have surveyed establishments in Kista, Akalla and Husby that work in IT related business according to the Swedish Standard Industrial Classification codes (SNI codes) used in official statistics and which various government agencies such as NUTEK (the Swedish Agency for Economic and Regional Growth), define as the IT sector. The survey furthermore includes companies that have establishments in Kista but whose head office is located outside the area. The establishments have 0–199 employees and identify themselves as belonging to the sector. In addition to these establishments, we have included establishments that focus on technical research and development according to the SNI code. See the section on the structure of the study at the end of the report.

By Kista we mean the Kista city district within the city of Stockholm. This area includes Akalla and Hjulsta. It is not advisable to single out Kista, because the neighbouring areas are socially and economically fused with Kista. We have therefore chosen to include establishments and companies located in Akalla and Husby as well, an area that became known as Kista Science Park in 1998. Since 2000, the area has been renamed Kista Science City and includes Södra Järva and neighbouring parts of Sollentuna, Järfälla and Sundbyberg municipalities. One reason why this study is not based on the later definition is that we think it includes areas that only have limited connections to Kista, and that in some cases are more related to Stockholm's inner city or the northern part of greater Stockholm in general.

As stated, this report only includes the results for establishments that have 0–199 employees, despite the fact that a large proportion of the employees in IT related jobs in Kista are gathered in a few large companies. This is because the big companies are so few in number that they often do not end up among the responses, and if they do, their responses affect the results so much that they must be reported on separately anyway, which usually means that their anonymity cannot be guaranteed. This also applies to the Swedish IT sector in general: a large proportion of the employees can be attributed to a small number of companies. It is particularly important to bear this delimitation in mind in relation to the presented results about the average size of the establishments and the extent of the sector.

Organisational Units

From an organisational perspective, it is worth clarifying what we mean by an establishment, a company and a business group. An establishment is each separate address at which a company runs operations; this means that each company can have several separate establishments. If a company only has one establishment – which is the case for most companies – company and establishment are synonymous. We use the term establishment rather than, plant, office or place of business for matters of consistency, and because it covers factories, offices, stores, warehouses and so on. An establishment may in turn be divided into different departments, teams or other organisational units. In some cases, these intersect and include employees at several different establishments. Strictly speaking, an establishment can only belong to one company, but in practice several related companies may work at the same address and be perceived as a joint establishment. A business group consists of a collection of legally independent companies that have separate corporate identity numbers and are led by a parent company.

Many employees are not sure whether the place where they work is a department, a separate company or a collection of legally separate companies under the leadership of a parent company. In many cases, they do not regard this as particularly important. They see it as an organisational unit, rather than a collection of separate companies (or vice versa). This is clear when we compare some of the responses that we have received with company and business group registers. In some cases, people have provided data about companies when the questions were actually about the business group (for example when stating the number of employees), or data about the establishment instead of the company as a whole. Where possible, we have tried to correct this by transferring responses to the right organisation level, among other things by comparing the responses given with public databases. When a company has several establishments in Kista (according to our mailing list) we have sent a questionnaire to each establishment. We did however not receive separate responses from several establish-

ments belonging to the same company, although some companies sent in joint responses for several establishments (see more below).

Design of Questionnaire

The questions in the questionnaire are based on the earlier company-level studies of interactive media production that we have conducted as part of the MITIOR programme (Augustsson & Sandberg 2004a; Sandberg 1998; Sandberg and Augustsson 2002; Sandberg et al. 2005), which in turn are based on studies of interactive media production in other countries (see Batt et al. 2001; Fuchs 2002; Leisink et al. 2000), as well as a number of studies of Swedish working life in general, including the Establishment Survey (APU) at Stockholm University. Many questions have therefore already been tested, which facilitates high reliability and validity. This also enables us to make comparisons between the IT companies in Kista and interactive media production, as well as Swedish working life in general. One of the fundamental aims of the survey was namely to study the similarities and differences between various parts of the IT sector and between the IT sector, as well as working life in general.

Several questions have however been modified, and others have been added to adapt the questionnaire to the study object. Since this study, unlike previous surveys, is aimed at establishment level and not company level, some questions have been edited or deleted. To a certain extent we have also asked more general questions than in previous studies, particularly about areas of activity. We decided to do this because the IT sector as defined here is substantially more heterogeneous than interactive media production, for which it is possible to analyse the presence of specific production tasks. The delimitation to a specific region, its strengths, opportunities and problems, also entails some modification of the questions, in contrast to previous nationwide studies. An important aspect of this is to establish which IT related companies are located in Kista.

Since companies with establishments performing IT related activities in Kista vary in terms of size, three different versions of the questionnaire were distributed, including an appendix. The establishments obtained through Statistic Sweden's CFAR register, which corresponds to the majority of the population, received an establishment questionnaire. The 65 companies obtained from Affärsdata received a slightly modified version of the questionnaire, in which we asked how many establishments they had in Kista and how many of them worked with IT related activities (since we did not have access to this information from available databases). An appendix aimed at all establishments and companies that consisted of just one person including the owner – one-person companies – was sent to all. For one-person companies, the appendix replaced the final 25 questions in the normal questionnaire since they were not relevant for this type of respondent (e.g. the proportion of female employees among one employee). A

fourth and shorter version of the questionnaire with key questions was used in the final stage of the data collection period to increase the proportion of respondents. This was important due to the limited baseline numbers obtained from the small population. The use of different versions of the questionnaire, and especially the appendix for one-person companies and the shortened questionnaire, is the main reason why the number of respondents to individual questions is often lower than the total number of respondents. For one-person companies however, we have in some cases included the responses in analyses.

Sampling

The theoretical population for the study has been companies with establishments in Kista that conduct IT related activity. In practice, this means that the selection included all establishments (irrespective of size) that the Stockholm Office of Research and Statistics, USK, classes as being located in Kista and those in Affärsdata's register that are in Kista, Akalla and Husby (postal codes 164 00–164 99) that have IT-related activities, according to the definition and SNI 92 and 02 codes for the sector, as used by, among others, the Swedish Agency for Economic and Regional Growth, Statistics Sweden, the Swedish Institute for Growth Policy Studies and the Swedish National Labour Market Board. This comprises R&D, production (both hardware and software), infrastructure, trade and leasing, consulting and service, as well as other IT activities. We added SNI code 73102, technical research and development, as Kista was thought to be home to several IT-related research institutes. A mailing list of relevant establishments according to the definition was obtained from the Stockholm Office of Research and Statistics (USK) which had processed Statistics Sweden's CFAR register of companies and establishments for the second quarter of 2003.

The list based on CFAR has been supplemented with data from the Affärsdata database. The selection from Affärsdata was based on the companies' business orientation as stated in their articles of association. A total of 65 companies in Affärsdata that were judged to have IT activities were not represented among establishments in CFAR. Seventeen of these companies had an SNI code for IT operations, 44 did not, and no data was available about four companies. Of the companies that did not have IT related operations, the most common SNI codes were 74140 (consulting in the field of company organisation) and 74202 (other technical consulting operations).

Self-Classification

On the basis of our earlier studies of companies that produce interactive media, we know that SNI codes are an imprecise classification in which there is a great risk that companies and establishments that should actually be included in the selection are classified differently. There may also be companies in the selection

that do not carry out the activities that we are aiming to study, in this case IT related activities. We have partly solved the first problem – that companies are incorrectly excluded – by including companies (via Affärsdata) that appear to have IT related activities according to their articles of association, despite having a different SNI code.

To deal with the second problem – that some companies have been incorrectly classified in the CFAR register as having IT related activities in Kista – the questionnaire began with two questions on the location of the establishment and its activities. This aimed at giving us less discrepancy between the theoretical population and the actual selection. The first question asked companies whether they carried out IT related activities, which were also defined. The second question asked companies whether such activities took place at an establishment in Kista. We have thereby been able to discard respondents that are not active at all, do not have IT related activities, are not located in Kista, or a combination of these factors. These respondents did not fill in the rest of the questionnaire.

Data Collection

Initially, we intended to use a web-based questionnaire for data collection as the target population was assumed to consist of advanced computer users who would perhaps prefer to fill in the questionnaire this way. The web-based tool we had access to was however not compatible with long questionnaires (it for example lacked a 'save' function, which meant that the entire questionnaire had to be filled in on one occasion). It could not handle 'filter questions' where respondents are not supposed to answer various follow-up questions depending on how they answered a previous question. This meant that a web-based survey would have entailed several limitations. The creation of a mailing list of personal e-mail addresses also proved problematic, making it difficult to determine who had filled in the questionnaire, or if it had even reached the establishment (the e-mail could have been blocked by the company's firewall or classed as spam and rejected without being read).

In the study, questionnaires were instead sent by mail, enclosing a SAE, to 'the manager of the establishment in Kista'. Four written reminders were sent, including new questionnaires, between mid-November 2003 and mid-January 2004. The final reminder included a shorter version of the questionnaire with 18 questions instead of the 65 questions of the full questionnaire. In addition, reminders were sent by e-mail and via telephone to several establishments that had not replied by mail.

Results and Response Rates

In total, questionnaires were sent to 397 establishments and we received 173 replies. Of these replies, 104 were completed questionnaires for 109 active estab-

lishments with IT activities in Kista (the respondents were given the opportunity to reply on behalf of more than one establishment if they found it difficult to separate their answers). 69 respondents replied that they were not part of the population, because they were not active at all, did not have IT-related activities, were not located in Kista, or a combination of these factors. Through an analysis of non-respondents (via telephone calls, e-mail, checking websites, etc) we were able to write off a further 178 establishments that did not belong to the population. Of the remaining 219 establishments, 104 filled in the questionnaire, which translates into a response rate of 47 per cent. The analysis of non-respondents was conducted by calling and e-mailing companies, as well as searching for information about them on their websites, where applicable, and in various databases (Affärsdata, Kredit.se, Eniro, and so on). In the first stage, we only discarded the companies that we definitely or almost certainly knew did not belong to the population. In the second stage, we also discarded companies that we were not definitely, but relatively, sure did not belong to the population. We are relatively sure that 21 establishments and companies can be discarded from our population, because they have been impossible to locate via telephone, e-mail, the Internet, etc. – their only mention was inclusion in the lists we received from CFAR and Affärsdata. It is reasonable to assume that an active company should be interested in potential customers, and therefore be contactable *somewhere* and *somehow*. If these establishments are excluded, the population falls to 198 and the response rate rises to 53 per cent. Table 6 shows a summary of the changes in population size and responses according to various methods of calculating over-coverage.

Our survey was directed to all establishments irrespective of size. Like in many other regions and sectors however, establishment sizes are unevenly represented in Kista, with many small and few large establishments. Only two establishments with 200 or more employees filled in the questionnaire. We therefore chose not to include them in our calculations. We therefore claim that our results are only applicable for establishments with 0–199 employees, which gives a population of 197 establishments, responses from 102 establishments and a response rate of 52.

Table 6. Summary of population size, number of respondents and response rate, based on various calculation methods.

	According to database	Questionnaire only	Certain over-coverage	Estimated over-coverage
Population size	397	328	219	198
No. of responses	-	104	104	104
Response rate	-	32	47	53

The limited population means that despite a relatively high response rate for contemporary quantitative studies at establishment/company level, we rarely obtain statistically significant results. Even if *all* the establishments in the population had responded, the responses would seldom have been statistically significant (although in that case significance tests would not have been necessary). It is vital to bear this in mind in comparison with, for example, extensive epidemiological individual level studies: there are quite simply not enough establishments and companies with IT related activities in Kista to make the results significant (given the relationship between mean values, standard deviation and the number of responses to individual questions). At the same time, this does not mean that the results lack theoretical or practical relevance or that statistical studies cannot be carried out. On the contrary: it may be a strong point in that differences in individual percentage units for variables do not 'automatically' become significant, and more interesting differences are brought to light.

Analysis of Non-Respondents

Our analysis of non-respondents shows that there are no statistically significant differences between the establishments that answered the questionnaire and those that did not with regards to SNI code (i.e. business orientation), location (Kista, Akalla or Husby), form of company, or size in terms of number of employees.

The lack of significant differences in e.g. the t-test regarding SNI codes, form of company or location among those who responded and those who did not, actually has no direct significance because these are nominal scales. This means that value two is not more than value one, definitely not double the size of one, and not half the size of four. To test whether there are significant differences, the distribution of the respondents and total population has instead been compared for various categories, e.g. proportion of the two groups that are located in Akalla. We have not found any significant difference in any of the cases given, but in terms of SNI codes, we have some over-representation of consulting among the respondents, while wholesalers are under-represented.

The number of employees has been analysed, both according to size class in line with Statistics Sweden's distribution up to and including class eleven (100–199 employees), and via comparisons of actual number of employees stated in the Affärsdata database. One problem here is that our comparisons of number of employees based on companies' responses in the questionnaire and what is stated in the database differ somewhat, and it is probable that the stated responses are more correct than the databases. Due to the differences in measurement method however, we prefer to compare the respondents' stated number of employees in databases with the population as a whole, rather than questionnaire responses with database information. We have no reason to believe that there are systematic deviations in the stated number of employees in databases between those who

have replied to the questionnaire and those who have not, which is why the strategy should work in assessing any differences. The lack of significant difference in size only applies when the upper limit is set at 199.

Number of Establishments

One conclusion of this study is that the number of active IT establishments in Kista actually is much smaller than sometimes thought. This is however not because of widespread closures or removal of IT activities and companies from Kista. On the contrary, our figures show that many companies are relatively new or have moved to the Kista area. The lower proportion of active companies and establishments compared to public statistics is rather a matter of shortcomings in the databases and their classification systems, as well as the at times illogical and unclear definition sometimes given of the IT sector, IT-related activities and the geographical area, i.e. Kista. Reality sometimes changes faster than we can manage to describe it, and descriptions vary in a way that makes comparisons problematical. This calls into question the reliability of the calculations sometimes presented in the media and in reports of factors about the IT sector such as the number of companies, bankruptcies, new establishment and new jobs.

Summary

Sandberg Å, Lintala A & Augustsson F (2007) *IT and Telecom Companies in Kista Science City, Northern Stockholm. Activities, Networks and Local Qualities.* Work Life in Transition 2007:1. Stockholm: National Institute for Working Life.

The Kista area north of Stockholm is a symbol of Sweden's IT and telecom sector, which has great importance for the economy and working life. The report gives a current, empirically founded description of the IT sector in Kista (including the districts Akalla and Husby), which to a high extent previously has not been available. What do the establishments in Kista look like and what are the relations between them? The management of one hundred IT and telecom establishments in Kista with up to 200 employees have answered a substantial number of survey questions about their activities, their staff and about Kista.

The report is descriptive and includes a short description of Kista's history from the ideas of a city with an integration of work, housing and services until today's Kista Science City, the year of establishment, number and size of the IT establishments in Kista and their activities. Some results in brief are:

- Most of the companies have developed during the last five to ten years.
- They are to a very high degree focused on IT and telecom. The most common activity is consulting followed by production of software, R&D and commerce.
- More than half of the establishments have an exchange of experiences with other companies in Kista, and almost half of them are involved in strategic cooperation within e.g. development, production and marketing.
- Quite a few outsource IT activities to other companies and work as subcontractors to them, but only a limited part of the contracts are with companies in Kista. The networks are regional and international rather than local.
- About a quarter cooperate with interactive media companies in Stockholm.
- The managements are throughout satisfied with Kista. On all the five factors they see as most important for their operations, Kista comes out well: communications, telecom, premises, competent staff and customers. Kista also comes out well on the criterion proximity to university; although few regard this as important, which is discussed in the report.
- One fifth of the employees are women and the top manager is a woman in less then ten per cent of the establishments.
- The average age of employees is 38 years.
- The staff is well educated, almost 70 percent have three years university education or more. Still, managements view learning on the establishment as the most important source of skills. Perhaps university education is taken for granted.

Sammanfattning

Sandberg Å, Lintala A & Augustsson F (2007) *IT and Telecom Companies in Kista Science City, Northern Stockholm. Activities, Networks and Local Qualities.* Arbetsliv i omvandling 2007:1. Stockholm: Arbetslivsinstitutet.

Kistaområdet norr om Stockholm framstår som en symbol för Sveriges IT- och telekomindustri, som har stor betydelse för såväl ekonomi som arbetsliv. Sammantaget ger rapporten en aktuell empiriskt grundad beskrivning av IT-företagen i Kista (inkl. Akalla och Husby), vilket hittills i stor utsträckning saknas. Hur ser arbetsställena i Kista ut och hur är relationerna mellan dem? Ledningen för drygt ett hundra IT- och telekomarbetsställen i Kista med upp till 200 anställda har besvarat en rad enkätfrågor om sin verksamhet, sin personal och om Kista.

Rapporten är deskriptiv. Den ger en kort beskrivning av Kistas historia från de ursprungliga tankarna på en ABC-stad med integrering av arbete, boende och centrum, till dagens KSC, Kista Science City. Vidare redovisas etableringsår, antal och storlek för IT-arbetsställena i Kista samt deras verksamheter. Några av resultaten kan summeras som följer:

- De flesta företagen har växt fram de senaste fem, tio åren.
- De är i mycket hög grad fokuserade på IT och telekom. Vanligast är konsultverksamhet och därnäst produktion av mjukvara, FoU samt handel.
- Över hälften av arbetsställena har erfarenhetsutbyte med andra företag i Kista och nära hälften har strategiska samarbeten inom t ex utveckling, produktion och marknadsföring.
- Ganska många lägger ut IT-verksamhet på andra företag och utför uppdrag åt andra. Som regel är det dock bara en mindre del av uppdragen som görs åt eller läggs ut till företag i Kista. Nätverken sträcker sig utanför den lokala platsen till regional och internationell nivå.
- Cirka en fjärdedel har samarbeten med interaktiva-medieföretag i Stockholm.
- Ledningen på arbetsställena är genomgående nöjda med Kista på de fem faktorer de anser viktigast för sin verksamhet: Kommunikationer, telekom, lokaler, kompetent personal och närhet till kunder. Kista uppfyller också närhet till universitet; att ganska få anser detta ha stor betydelse diskuteras.
- Bara en femtedel av de anställda är kvinnor och högsta chefen är kvinna på mindre än tio procent av arbetsplatserna.
- Medelåldern bland de anställda är 38 år. 18 procent är under 30 år, jämfört med 45 procent i de interaktiva-medieföretag vi tidigare undersökt.
- Personalen har hög utbildningsnivå, nära 70 procent har minst tre års högskoleutbildning. Samtidigt ser ledningarna lärande på arbetsplatsen som den viktigaste källan till kompetens. Kanske tas högskoleutbildning för givet.

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Table Appendix

This appendix contains the empirical background material for the material presented in this report, unless data is shown in the main text. To enable readers to assess the number of uncertain respondents and internal dropout rates, the proportion of do not know responses is shown. These have not been included in the results section, except a few cases where they contribute valuable information. Response rates and number of respondents might therefore differ between the appendix and the results section. Empirical background material from comparisons with interactive media is not presented here (see e.g. Sandberg & Augustsson 2002; Augustsson & Sandberg 2004a; Sandberg et al. 2005).

Table 1. Mean and median number of establishments that companies have in Kista, the rest of greater Stockholm, the rest of Sweden and abroad.

Area	Mean value	Median
Kista	1	1
Rest of greater Stockholm	0.1	0
Rest of Sweden	0.5	0
Abroad	0.1	0
Total (all locations)	1.7	
n =71		

Table 2. Proportion of companies that have a certain number of establishments in Kista, (incl. Akalla and Husby), the rest of greater Stockholm, the rest of Sweden and abroad.

	Number of establishments:					
Area	0	1	2	3-	Total	n
Kista	0	100	0	0	100	70
Rest of greater Stockholm	93	6	1	0	100	71
Rest of Sweden	76	13	3	8	100	71
Abroad	92	4	3	1	100	71

Table 3. Mean and median for companies' year of establishment, the year companies started IT related activities and for the year companies established operations in Kista.

	Mean	Median	Do not know	n
Establishment year	1992	1996.5	0	84
Started IT related activities	1994	1997	3	84
Established operations in Kista	1998	2000	1	97

Table 4. Average number of years from establishment of the company to start of IT activities and establishment in Kista.

	Mean	Median	n
From establishment of company to start of IT activities	5	1	77
From start of IT activities to establishment in Kista	1.3	0	78
From establishment of company to establishment in Kista	6.7	2	80

Table 5. Proportion of companies that had operations in different areas before establishment in Kista. Percentage of companies.

Area	Yes	No	Don't know	Total	n
Greater Stockholm, outside Kista	48	51	1	100	88
Rest of Sweden	19	79	2	100	88
Abroad	24	74	2	100	88
Total elsewhere	66	33	1	100	88

Table 6. Proportion of companies that are spin-offs from another company in Kista. Percentage of companies.

Spin-off	Per cent	n
Yes	10	9
No	90	82
Total	100	91

Table 7. Geographical location of the company's head office according to questionnaire responses, database (Affärsdata) and Internet.

	Questionnaire		Database	
Head office location	Per cent	n	Per cent	n
Kista	71	65	69	63
Rest of greater Stockholm	1	1	2	2
Rest of Sweden	4	3	3	3
Abroad	24	22	26	23
Total	100	91	100	91

Table 8. Company's average turnover in MSEK based on the three most recent year-end accounts. Source: Affärsdata, 6 February 2004.

	Mean value MSEK	Median MSEK	n
Latest year-end accounts	98	13	77
Year-end accounts 2	105	14	72
Year-end accounts 3	98	13	64

Table 9. *Companies'* average turnover in 2001, 2002 and expected for 2003. MSEK.

Year	Mean	Median	Do not know (n)	n
2001	63	8	9	52
2002	64	11.5	9	57
2003	71	6.5	11	65

Table 10. *Company's* proportion of turnover from IT related activities in 2001, 2002 and expected proportion for 2003.

Year	Mean	Median	Do not know	n
2001	97	100	9	45
2002	95	100	9	50
2003	92	100	9	56

Table 11. *Establishments'* average turnover 2001, 2002 and expected in 2003, MSEK.

Year	Mean	Median	Do not know (n)	n
2001	51	8	6	36
2002	51	8.6	6	43
2003	62	7.2	8	58

Table 12. *Establishments'* proportion of turnover from IT related activities in 2001, 2002 and expected proportion for 2003.

Year	Mean	Median	Do not know	n
2001	96	100	5	30
2002	91	100	6	37
2003	91	100	9	50

Table 13. Change (in percent) of companies' and establishments' average turnover in 2001 to 2003.

Year	Company	n	Establishment	n
2001-2002	13	39	21	32
2002-2003	26	38	5	36
2001-2003	36	36	28	29

Table 14. Average number of employees at the *company* as a whole and the proportion of those who work in IT related activities.

Year	Mean	Median	n
Total number of employees	61	14	39
Proportion in IT related activities	57	12	39

Table 15. Average number of employees at the companies according to the latest year-end reports. Source: Affärsdata, 6 February 2004.

	Mean value Number	Median Number	n
Latest year-end accounts	72	12	75
Year-end accounts 2	76	13	71
Year-end accounts 3	50	10	64

Table 16. Percentage of *companies* working in various ITrelated areas.

Operations	Yes	No	Do not know	Total	n
R&D in IT	51	47	2	100	49
Production of IT - hardware	24	74	2	100	49
Production of IT - software	54	42	4	100	50
Telecom & IT infrastructure (operation and maintenance)	31	69	0	100	48
Trade/leasing of IT products	40	60	0	100	48
Consulting and computer servicing operations	70	30	0	100	50
Software, data processing, database operations etc.	39	59	2	100	49

Table 17. Percentage of *establishments* that often, sometimes or never perform different IT-related activities.

Operations	Yes, usually	Some-times	No	Do not know	Total	n
R&D in IT	32	16	51	1	100	100
Production of IT - hardware	11	11	77	1	100	100
Production of IT - software	33	17	49	1	100	100
Telecom & IT infrastructure (running and maintenance)	17	14	67	2	100	98
Trade/leasing of IT products	31	11	58	0	100	97
Consulting and computer servicing operations	65	12	23	0	100	100
Software, data processing, database operations etc.	25	20	55	0	100	99

Table 18. Proportion of establishments involved in a certain number of IT related activities (of maximum seven operations).

Number of activities	Proportion of establishments	n
0	1	1
1	20	19
2	16	15
3	26	24
4	20	19
5	6	5
6	3	3
7	8	7
Total	100	93

Table 19. Average proportion of turnover from IT related activities that were out-sourced and performed as subcontractors for other companies in the same business group, as well as proportion of total turnover from IT related activities the past twleve months, respectively. Note: only establishments that are part of a business group and that have outsourced operations, or worked as subcontractors in the past twelve months.

	Mean	Median	Do not know (no.)	n
Proportion of outsourced operations	19	0	4	19
Proportion of total turnover	5	0	4	18
Proportion of subcontractor operations	21	0	7	31
Proportion of total turnover	10	0	7	30

Table 20. Percentage of establishments that think that various factors are not, somewhat, highly or crucially *important* for being able to operate in Kista.

Factor	Not important	Important	Very important	Crucial	Do not know	Total	n
Proximity to university and other research institutes	58	25	9	5	3	100	100
Proximity to customers/market	17	27	35	21	0	100	101
Proximity to suppliers	51	36	11	1	1	100	100
Proximity to other IT companies	32	44	21	2	1	100	99
Proximity to central Stockholm	26	42	30	2	0	100	100
World-famous location	35	38	24	2	1	100	100
Local business policy measures	39	35	21	2	3	100	99
Availability of skilled workers	17	22	37	24	0	100	99
Purpose-built premises	15	19	57	8	1	100	100
Attractive location for employees	23	44	29	3	1	100	99
Availability of attractive housing	62	24	11	2	1	100	100
Telecom infrastructure	17	25	45	13	0	100	100
Communications	10	28	53	9	0	100	100
Meeting places for exchanges of Experience with other companies	33	42	20	3	2	100	100
Other	-	76	6	18	-	100	17

Table 21. Percentage of establishments that think that Kista *meets* various conditions that enable them to operate in Kista, partly, mainly, totally or not at all.

Condition	Not at all	Partly	Mainly	Totally	Do not know	Total	n
Proximity to universities and and other research institutes	2	21	24	43	10	100	98
Proximity to customers/market	4	32	32	25	7	100	101
Proximity to suppliers	8	37	33	11	11	100	98
Proximity to other IT companies	1	29	41	21	8	100	99
Proximity to central Stockholm	1	31	41	24	3	100	98
World-famous location	4	24	38	26	8	100	98
Local business policy measures	16	25	25	3	31	100	97
Availability of skilled workers	1	22	44	20	13	100	99
Purpose-built premises	2	15	46	32	5	100	99
Attractive location for employees	5	30	45	14	6	100	98
Availability of attractive housing	21	38	13	2	26	100	98
Telecom infrastructure	0	14	49	31	6	100	97
Communications	0	15	54	30	1	100	98
Meeting places for exchanges of experience with other companies	4	27	34	8	27	100	97
Other	-	67	27	6	-	100	15

Table 22. Proportion of establishments that think different factors are highly important or crucial to perform business in Kista and proportion of *these* who think that Kista mainly or totally meets the conditions.

Factor	Highly important or crucial	Mainly or totally met	n
Availability of purpose-built premises	66	89	99
Communications	63	89	98
Availability of skilled workers	61	82	98
Availability of telecom infrastructure	59	89	97
Proximity to customers/market	56	73	101
Attractive location for employees	33	81	97
Proximity to central Stockholm	32	69	98
World-famous location	27	85	98
Local business policy measures	24	39	96
Proximity to other IT companies	23	87	98
Meeting places for exchanges of experience with other companies	23	74	97
Proximity to universities and other research institutes	14	71	98
Availability of attractive housing	13	23	98
Proximity to suppliers	12	83	98

Table 23. Average distribution of turnover from IT related operations on customer type.

Market	Per cent
Private consumers	3
Corporate customers	
in Kista	18
outside Kista	68
Public sector	11
Total	100

n = 90

Table 24. Proportion of establishments that actively cooperated with one or more interactive media companies from central Stockholm the past twelve months.

	Per cent	n
Cooperated	23	20
Did not cooperate	75	67
Do not know	2	2
Total	100	89

Table 25. Percentage of establishments that are active in various areas not realted to IT.

Activities	Yes	No	Do not know	Total	n
R&D	12	87	1	100	90
Production of products	11	89	0	100	90
Sale or leasing of products	11	88	1	100	90
Sale of services	23	76	1	100	88
Import and export	9	91	0	100	90
Consulting operations	17	83	0	100	90
Other	7	93	-	100	58

Table 26. Percentage of establishments that agree and do not agree with various statements about local cooperative ventures and networks.

Statements	Agree: Yes	No	Do not know	Total	n
At this establishment…					
…we have recruited former students from universities/ colleges in Kista to permanent jobs	15	78	7	100	90
…we have recruited students from Kista for short-term work	15	82	3	100	90
…we exchange experiences with other companies in Kista	51	45	4	100	90
…we have strategic cooperation with other companies in Kista	43	55	2	100	90
…we are members of a local business owner network	10	84	6	100	89
…we are members if (an)other network(s) in Kista	23	69	8	100	90
…we are active in one of the different local networks	10	85	5	100	87
…we cooperate actively with universities/colleges in Kista	11	86	3	100	89
…we cooperate actively with research institutes in Kista	6	89	5	100	90
…we have had contact with municipal business development officers	11	77	12	100	90

Table 27. Percentage and number of establishments that have outsourced whole or parts of their IT related activities to other companies, including those within the same business group, if such a group exists.

	Per cent	n
Have outsourced	27	27
Have not outsourced	71	72
Do not know	2	2
Total	100	101

Table 28. Percentage of establishments in Kista that wholly or partially outsourced peripheral operations to other companies in Kista, outside Kista and those that did not outsource operations at all the past twleve months.

Peripheral operations	Outsourced, and mostly… ...in Kista	...outside Kista	No outsourcing-	Do not know	Total	n
PR and marketing	1	32	65	2	100	90
Market surveys	1	20	77	2	100	87
Administration	5	27	67	1	100	88
Cleaning and maintenance	34	27	36	3	100	89
Company healthcare	35	14	49	2	100	90
Computer support (external and internal)	6	22	71	1	100	89
Transport services	14	51	33	2	100	90
Switchboard	14	17	67	2	100	89
Reception	22	8	70	0	100	90
Internal mail	10	6	82	2	100	90
Recruitment	4	20	75	1	100	90
Staff training	0	29	69	2	100	89
Other	0	8	78	14	100	51

Table 29. Average proportion of turnover from IT related activities outsourced among establishments in the past twelve months. Note: Only establishments that have outsourced activities in the past twelve months.

	Mean	Median	Do not know (no)	n
Proportion outsourced	37	30	6	27

Table 30. Proportion of establishments that wholly or partially outsourced various IT related activities to other companies in Kista, outside Kista and those that did not outsource at all the past twelve months.

Operations	Outsourced, and mostly… ...in Kista	...outside Kista	Do not outsource	Do not know	Total	n
R&D in IT	18	27	55	0	100	22
Production of IT - hardware	14	38	43	5	100	21
Production of IT - software	4	32	64	0	100	22
Telecom & IT infrastructure	5	43	54	0	100	21
Trade or leasing of IT products	9	9	82	0	100	21
Consulting and computer servicing operations	5	48	47	0	100	21
Software, data processing, database operations etc	5	10	76	9	100	21

Table 31. Percentage and number of establishments that have performed IT related subcontract work for other companies or organisations, including within their own business group, if they are part of such a group, the past twelve months.

	Per cent	n
Have performed	39	40
Have not performed	56	57
Do not know	5	5
Total	100	102

Table 32. Percentage of establishments in Kista that have performed subcontract assignments in various IT related activities for other companies in Kista, outside Kista or not at all during the past twelve months.

	Yes, and mostly for companies…		No sub-contracting	Do not know	Total	n
	...in Kista	...outside Kista				
R&D in IT	3	31	61	5	100	36
Production of IT - hardware	3	17	75	5	100	36
Production of IT - software	14	28	53	5	100	36
Telecom & IT infrastructure (running and maintenance)	3	19	72	6	100	36
Trade or leasing of IT products	6	15	73	6	100	33
Consulting and computer servicing operations	22	53	19	6	100	36
Software, data processing, database operations etc.	6	21	67	6	100	34

Table 33. Geographical distribution of average number of companies that establishments have outsourced operations to the past twelve months and proportion of turnover for outsourced operations, respectively. Note: Total calculated based on correlations at establishment level.

	Number of companies				Proportion of turnover			
	Mean	Median	Do not know	n	Mean	Median	Do not know	n
Kista	0.6	0	1	16	12	0	1	15
Stockholm	1.9	1	1	16	30	1	2	16
Rest of Sweden	0.9	0	1	14	23	0	1	15
Abroad	1.6	1	1	18	35	11.5	4	18
Total	3.8	3	-	12	100	-	-	14

Table 34. Average proportion of turnover from IT related activities accounted for by subcontract assignments during the past twelve months. Note: only establishments that have acted as subcontractors during the past twelve months.

	Mean value	Median	Do not know (n)	n
Have worked as subcontractors	55	45	8	40

Table 35. Geographical distribution of average number of companies that establishments have worked as subcontractors for and proportion of turnover for subcontracting operations, respectively the past twelve months. Note: Total calculated based on correlations at establishment level.

	Number of companies				Proportion of turnover			
	Mean	Median	Do not know	n	Mean	Median	Do not know	n
Kista	1.2	1	4	33	29	0	9	31
Stockholm	2.3	1	5	31	41	27.5	8	30
Rest of Sweden	3.4	0	5	31	8	0	8	30
Abroad	1.7	0	5	31	22	0	8	30
Total	4	2	-	24	100	-	-	24

Table 36. Total number of employees and distributed among various staff categories, *including* one-person companies.

	Mean	Median	Do not Know (n)	n
Total number of employees	19.2	6	4	102
Of whom owners	3.3	1	3	101
Of whom employees	15.9	4	1	99
Employees in IT operations	15.7	5	4	97
No. of people temporarily employed in IT	1	0	5	68
Hired consultants	0.8	0	1	98

Table 37. Mean and median number of managerial levels at establishments.

	Number of managerial levels
Mean	2
Median	2

n = 72

Table 38. Total number of employees and divided among various staff categories, *excluding* one-person companies.

	Mean value	Median	Do not Know (n)	n
Total number of employees	23.9	10	0	78
Of whom owners	4	1	0	78
Of whom employees	20	7	0	78
Employees in IT operations	19.7	7	0	77
No. of people temporarily employed in IT	1	0	5	68
Hired consultants	1	0	1	78

Table 39. Proportion of employees including owners and part-owners in IT related activities, newly hired, that quit and made redundant, respectively, distributed by establishment size. Note: one-person companies not included.

Number of employees	Proportion of establishments	Proportion of IT employees	Proportion of newly hired	Proportion of employees that quit	Proportion made redundant
1-4	41	4	8	2	2
5-9	18	7	12	5	4
10-19	14	12	14	21	21
20-49	16	28	35	44	41
50-99	7	24	12	10	9
100-200	4	25	19	18	23
Total	100	100	100	100	100
Do not know (n)	0	5	5	5	5
n	78	72	71	69	64

Table 40 Percentage and number of establishments at which the top manager is a man and woman, repsectively.

	Per cent	n
Men	92	91
Women	7	7
Do not know	1	1
Total	100	99

Table 41. Proportion of women among employees in IT related activities.

	Mean	Median	n
Proportion of women	19	17	77

n = 72

Table 42. Average proportion of employees in IT operations in different age groups.

Age	Mean
Up to 29 years	18
30–39 years	46
40–49 years	25
50+	12
Total	100

n = 65

Table 43. Calculated average age among employees in IT related activities at establishment and individual level (i.e. weighted according to establishment size).

	Establishment level			Individual level		
	Mean	Median	n	Mean	Median	n
Average age	37.8	37.2	65	38.1	37.5	1187

Table 44. Average proportion of full-time employees in IT activities who work a certain number of hours per week.

Hours per week	Mean
Fewer than 40 hours	15
40–49 hours	72
50–59 hours	11
60+ hours	1
Total	100

n = 67

Table 45. Percentage of establishments where no employees, a small proportion, a large proportion or all employees in IT related activities have various types of remuneration.

Type of remuneration	None proportion	A small proportion	A large know	All	Do not	Total	n
Performance-based	56	17	17	9	2	100	66
Profit-sharing	72	8	3	15	2	100	65
Bonuses	35	25	23	16	2	100	71
Options	59	16	3	19	3	100	68
Part-owner/partnership	52	24	11	11	3	100	66
Major benefits (car, domestic help etc.)	49	29	17	3	1	100	69
Minor benefits (lunch coupons, free fruit at work, etc.)	25	3	13	58	1	100	72

Table 46. Percentage and number of establishments that systematically report overtime worked by employees in IT related activities.

Systematic reporting	Percentage	n
Yes	35	25
No	61	44
Do not know	4	3
Total	100	72

Table 47. Percentage and number of establishments where employees in IT related activities receive financial compensation for overtime.

Overtime pay	Per cent	n
Yes	31	22
No	65	46
Do not know	4	3
Total	100	71

Table 48. Percentage and number of establishments where employees in IT-related activities receive time off in lieu of overtime.

Time off in lieu	Per cent	n
Yes, based on formal time reporting	26	18
Yes, employees manage it informally	39	27
No	32	22
Do not know	3	2
Total	100	69

Table 49. Respondents' estimates of the importance of different skills areas for employees in IT-related activities.

Skills area	Less important	Important	Very important	Crucial	Do not know	Total	n
Breadth in IT/generalist	9	32	46	13	0	100	96
Depth in own specialist field	1	6	32	61	0	100	97
Knowledge of the organisation's needs	12	25	41	17	5	100	98
Social skills, networking	5	16	52	27	0	100	98
Initiative	1	9	51	39	0	100	98
Other	35	19	35	11	0	100	26

Table 50. Respondents' estimate of the importance of various sources of employees' current competencies.

Skills area	Less important	Important	Very important	Crucial	Do not know	Total	n
Formal secondary school education or equivalent	13	29	42	16	0	100	99
Experience from other companies (incl. training)	6	16	48	30	0	100	99
Training paid for by the company (e.g. courses)	23	32	38	5	2	100	99
Indivual learning at the company (practical experience, tuition)	3	7	56	34	0	100	100
Other	38	29	21	12		100	24

Table 51. Average distribution of highest level of formal education among employees in IT related activities.

Education level	Mean value
University or equivalent, three years minimum	68
Other post secondary school education	16
Secondary education	16
Elementary School	0
Total	100

n = 66

Table 52. Percentage and number of establishments where employees in IT related activities are offered competence development for a certain period of time per year.

	Per cent	n
Yes, equal offers for everyone	16	11
Yes, extent is determined in individual competence plans	46	33
No	31	22
Do not know	7	5
Total	100	71

Table 53. Percentage and number of establishments where employees in IT related activities were offered a certain number of days for competence development the past twelve months. Comment: only companies that offer time for skills acquisition.

Number of days offered	Per cent of establishments	n
1–5 days	48	22
6–10 days	24	11
11–15 days	7	3
More than 15 days	4	2
Do not know	17	8
Total	100	46

Table 54. Mean and median proportion of working time that employees in IT related activities have been absent due to sickness the past twelve months.

	Mean	Median	Do not know (n)	n
Percentage of total working hours	3	1	18	72

Table 55. Proportion of the time offered for competence development that employees actually use. Comment: only companies that have offered time for skills acquisition.

Time used of time offered	Percentage of establishments	n
0– 9 %	5	2
20–39 %	12	5
40–59 %	15	6
60–79 %	15	6
80–100 %	38	15
Do not know	15	6
Total	100	40

Table 56. Proportion of companies that use various methods of ensuring that employees in IT related activities receive sufficient time for skills acquisition. Note: Only the companies that offer time for competence development. Multiple responses permitted.

Method	Yes, is used	No, not used	Total	n
Pre-decided time put off	0	100	100	38
Time planned in gradually when	74	26	100	39
Performance requirements set lower than full-time	18	82	100	38
Partially handled outside regular working hours	3	97	100	38
Other methods	8	92	100	38
No particular strategy used	10	90	100	38

Table 57. Respondents estimates of proportion of employees' knowledge acquisition that takes place on the job and through formal training and courses, respectively.

	Mean	Median
On the job	81	85
Through formal training, courses, etc.	19	10
Total	100	
n = 83		

Table 58. Percentage establishments in Kista affiliated to company healthcare system.

	Per cent	n
Affiliated	54	38
Not affiliated	45	32
Do not know	1	1
Total	100	71

Table 59. Aspects covered in agreements with company healthcare system. Percentage of establishments. Note: only establishments that are affiliated with copmany healthcare system.

Covered in agreement	Included	Not included	Do not know	Total	n
Health checks and healthcare	89	6	5	100	37
Advice on work environment and working conditions	55	24	21	100	33
Other	40	60	-	100	11

Table 60. Existence of collective agreements for employees in IT related activities. Percentage of establishments.

Collective agreements	Per cent	n
Yes, available to everyone	28	20
Yes, available to some	4	3
No, not available	65	47
Do not know	3	2
Total	100	72

Table 61. Methods for regulating working and employment conditions in lack of collective agreements. Percentage and number of establishments. Comment: Only establishments without collective agreements for employees in IT related activities.

Type of agreement	Per cent of establishemnts	n
Standardised Agreement for all employees	76	39
Varying individual agreements	20	10
Another solution	2	1
Do not know	2	1
Total	100	51

MITIOR

Media, IT and innovation
in organisation and work

MITIOR is a research programme about organisation and work in the IT and media sectors and other operations where IT use is central. The programme looks at the development and design of new IT solutions as well as their use in other industries. One fundamental issue is the possibilities of combining good jobs with effective businesses. The MITIOR programme is currently located at the Department for Work and Health at Arbetslivsinstitutet, Swedish National Institute for Working Life and at KTH, the Royal Institute of Technology and its School for Computer Science and Communication.

Those active in the research group at present (January 2007) include Åke Sandberg (research team leader, professor), Fredrik Augustson (researcher) and Helena Norman (research assistant). Atty Burke, Karin Darin, Tommy Lindkvist, Sanja Magdalenic, Gabriela Maguid and Emma Movitz have been involved previously as research assistants and Anne Lintala as analyst.

Contact

Åke Sandberg, research team leader. Due to the government's decision to close the Arbetslivsinstitutet as of June 30, 2007, the Arbetslivsinstitutet email will be closed down. Alternative addresses are akesan@kth.se or ake.sandberg@gmail.com There may also for some time be links or contact information on www.arbetslivsinstitutet.se

Studies within the Mitior Progamme

The focus of studies has so far been on the interactive media industry in Sweden and on ICT companies in Kista in northern Stockholm, i.e. companies that *develop* different kinds of IT solutions. Currently, since one year, we are moving into sectors that are intense *users* of ICT and interactive media, focussing on digital journalism and on call centre work. We are also working on a reader in English with Scandinavian perspectives on management in the new working life, and we are planning a summary book on development of ICT related work and industry in Sweden.

Interactive Media: Internet and Multimedia

Most of the sub-projects have concerned the development of companies and work in interactive media, i.e. production of Internet and multimedia solutions. Three comprehensive company management questionnaire-based surveys have been conducted and reported on (Sandberg 1998, Sandberg and Augustsson 2002, Augustsson and Sandberg 2004) as has a smaller interview-based survey about social integration (Darin 2003). A survey about work, health and competence to employees in 60 interactive media producing companies has been carried out and reported in 'Net workers' (Sandberg et al 2005a) A new company management survey has been carried out in the same 60 companies, which would allow for a two-level analysis not yet made.

IT and Telecom Companies in Kista

A study of ICT companies in Kista was carried out in 2003–2005 with a questionnaire to establishment managements as the empirical tool. A report was first published in Swedish (Sandberg et al 2005b) and a slightly revised and updated version in English is published in January 2007. It covers the companies' operations, networks, skills and Kista's strengths and weaknesses as a location in which to establish an ICT business. An interview based study of knowledge sharing and inter-organizational collaboration between firms, local university and authorities has been conducted, a preliminary report was produced and a revised version is to be published in spring 2007. A series of feed-back workshops with the same three groups of actors was carried out (Högberg 2006)

Digital journalism

Case studies of work within digital news journalism and web publishing have been conducted and published (Ekström and Buskqvist 2001, Norman 2005). We are currently planning deeper studies into the development of the work of journalists in media companies on a very competitive media market and with digital tools and channels for publishing. Quality of work and of products/publications is a theme.

Call centre work

We participate in *The Global Call Center Industry Project* and a descriptive report of call centres in Sweden has been published in Swedish (Strandberg et al 2006); it is currently being revised and an English translation will be published spring 2007.

Integration and Analyses

In addition to the reports from the various empirical sub-studies, the researchers draw up various types of summary and analysis. In the autumn of 2003, SNS förlag published a fourth, revised version of the textbook *Ledning för alla* (Leadership for All). An English language and substantially reworked version of the book is under completion and will have the theme Scandinavian perspectives on management in 'the new working life'. Also articles and chapters on specific topics such as employability, organisations purchase of services, and the productive potential of 'good work' were published in books and journals.

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