ICT OUTSOURCING IN THE SWISS SME SECTOR: CONCLUSIONS AND TYPCIAL COMPANY CLUSTERS

Leimstoll, Uwe, Institute for Information Systems, School of Business, University of Applied Sciences Northwestern Switzerland, Peter Merian-Str. 86, PO Box, 4002 Basel, Switzerland, uwe.leimstoll@fhnw.ch

Schubert, Petra, Institute for IS Research, Department of Computer Science, University of Koblenz-Landau, Universitaetsstr. 1, 56070 Koblenz, Germany, petra.schubert@uni-koblenz.de

Fisher, Julie, Monash University, Australia, PO Box 197, Caulfield East, julie.fisher@infotech.monash.edu.au

Abstract

The outsourcing of ICT services has been common place in large organizations for many years. To date, most of the published research has focused on large organizations with very limited discussion exploring outsourcing in small to medium-sized enterprises (SMEs). This paper reports on a major study (based on 900 completed questionnaires) of Swiss SMEs and their approach to outsourcing. The results presented in this paper are weighted according to company size and industry sector and are in this respect representative for Switzerland. The findings are presented in four main conclusions and six identified clusters (typical company profiles). ICT outsourcing for SMEs is primarily focused on Maintenance and Support. The majority of SMEs using outsourcing have achieved positive outcomes as a result. Smaller SMEs are more likely to consider outsourcing than their larger counterparts. Suppliers of external ICT services specialised on selective, definable services seem to be at an advantage. Over all, the amount of outsourced ICT services is rather small. A cluster analysis identified six distinct clusters. Based on the identified clusters, several bivariate analyses were performed in order to show the typical outsourcing behaviour of the clusters.

Keywords: SME, ICT Outsourcing, Outsourcing Strategy, Switzerland.

1   INTRODUCTION

On the topic of ICT outsourcing (King 2004) argues that "The sourcing issue is among the top five agenda items for ICT executives, as the amount of such outsourcing grows, its impact on the economies of companies and nations increases and political controversy over the consequent jobs lost to offshore outsourcing heightens". Tan and Sia (2006) suggest that by 2009, ICT outsourcing expenditure will exceed $260 billion. It is therefore not surprising that in recent years there has been a significant focus on ICT outsourcing reported in our literature with publications on the topic traceable to the early 1990s (Gonzalez et al. 2006).

For the purposes of this paper we have adopted the definition of outsourcing and selective sourcing used by (Hirschheim and Lacity 2006): "*IS outsourcing* refers to the third-party management of IS assets, people and/or activities required to meet pre-specified performance levels of defined services either on-site or remotely." *Selective sourcing* is where an organization uses third-party vendors for some of the ICT functions whilst still retaining a substantial ICT department. Typically 20-60 % of the ICT budget is retained.

2   ICT OUTSOURCING IN ORGANIZATIONS

The literature reports numerous reasons why companies outsource. The most significant motivations for outsourcing were "cost reduction, effective use of human resources, higher capacity on demand, and better access to advanced technologies" (Lee et al. 2003). Other reported reasons include outsourcing for strategic reasons, for control and to fill a capability gap (Dibbern et al. 2004; Willcocks and Feeny 2006).

Benefits from outsourcing are also widely reported. Dibbern et al. (2004) conducted an analysis of some of the major studies in the area of outsourcing. Their research included an analysis of the benefits or outcomes of outsourcing which included: helping organizations focus on their core business, improved IS competence, management of costs and cost reduction and access to leading technology and personnel. A recent analysis of research methods used to investigate outsourcing reported by Gonzalez et al. (2006) found that the vast majority of studies conducted in this area were either case studies or field studies suggesting limited research into outsourcing using surveys.

Despite the fact that there has been a significant amount of research in the area, most of the research has so far focused on large organizations. Dibbern and Heinzl (2006, p. 58) note that "There is hardly any empirical evidence about the outsourcing decision of small and medium-sized enterprises (SMEs)." The authors argue that this is an important area because, particularly in countries such as Germany, SMEs play a significant role in the economy. SMEs also play a significant role in the economy of many other Western developed nations for example the UK, USA, Australia and much of Europe (Beaver and Prince 2004; Meckel et al. 2004). We use the EU definition of SMEs. A small business is defined as employing between 10 and 49 people and a medium-sized enterprise is defined as employing between 50 and 250 people (European Commission 2003).

Dibbern and Heinzl (2006) found that among SMEs the main reason for outsourcing was that the organization did not have the required internal resources compared with external service providers. They also found that SMEs were reluctant to outsource if there was a high risk of market failure. The risk was considered higher if the people in the organization performing the IS function were considered to have skills specific to the organization. Further they found that there is limited emphasis on strategy when decisions are being made on outsourcing. Another major finding from their research was that "SMEs outsource application services, system operations or the helpdesk function despite a small number of suitable IS service providers because for them, the elimination of resource deficits

with the help of external suppliers outweighs the danger of resource dependency on an IS service provider" (Dibbern and Heinzl 2006, p. 72).

This paper examines ICT outsourcing in Swiss SMEs. It would seem plausible that outsourcing is an important area for smaller companies which generally cannot afford to set up specialised ICT departments. There has, however, been evidence indicating that SMEs, at least in Switzerland, are rather conservative in their attitude towards ICT outsourcing resulting in many large ICT departments even in small companies (Leimstoll and Schubert 2002; Schubert et al. 2006). Due to this ambiguity, we decided to take a closer look at the issue in the following chapters.

3 RESEARCH DESIGN

Since the year 2003, a Swiss research group has been conducting specialised research on the use of ICT in Swiss SMEs as well as organizations, e.g. hospitals, public administration, schools (Dettling et al. 2004; Schubert et al. 2006). Each year, data is collected through empirical surveys. The research is carried out in collaboration with industry partners who contribute their observations about the current ICT market. In 2006, the third survey was conducted (Schubert and Leimstoll 2007). The specific focus of the 2006 survey was on the outsourcing of ICT services.

This paper explores the following questions relating to how SMEs outsource their ICT today:

1. Which ICT tasks do SMEs see as suitable for outsourcing?

2. What has already been achieved with ICT outsourcing?

3. Which kind of sourcing strategies are SMEs likely to follow in the future?

4. Is it possible to find typical ICT outsourcing patterns?

The long-term objective of the study on ICT use in SMEs is the identification of typical ICT company patterns. A yearly cluster analysis was chosen to identify these patterns. In this paper, we present the results of the first cluster analysis for the 2006 survey.

3.1 Method of Investigation

The study looks at companies with 10 to 250 employees in business sectors 2 (industry) and 3 (services). It covers therein a universal set of 38'099 companies, representing 94 % of Swiss companies with between 10 and 250 employees. This sample constitutes a large proportion of Swiss business. Large companies and "very small companies" with up to 10 employees have different conditions and structures from small and medium-sized companies. Both of these "marginal groups" were therefore excluded from this study.

Upon request, we received a stratified random sample of 4'393 companies from the universal set, based on sector and company size (Figure 1) from the Swiss Federal Office of Statistics. Computer-aided telephone interviews were used for the data collection. The basis of the survey was a standardized questionnaire in German and French with predominantly closed questions. The questionnaire was developed in cooperation with the industry partners and trialled in pre-test interviews. It was aimed at members of senior management.
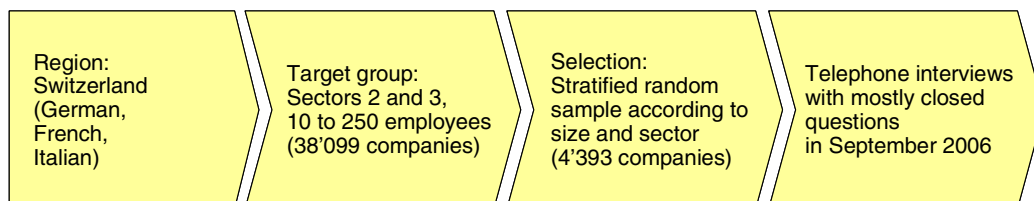

Region:
Switzerland
(German,
French,
Italian)

Target group:
Sectors 2 and 3,
10 to 250 employees
(38'099 companies)

Selection:
Stratified random
sample according to
size and sector
(4'393 companies)

Telephone interviews
with mostly closed
questions
in September 2006

Figure 1.   Research Steps

3.2 Return Rate and Weighting

Altogether, 901 companies were interviewed, which equals a response rate of 20.5 %. Declaration of company size and business sector were mandatory. This information was used to classify the questionnaires and to weight them according to company size and business sector. All 901 questionnaires were suitable for further analysis. Not every company answered every question. As a result the given number of valid cases (N) in the graphics and tables is sometimes smaller than 901.

A comparison of the distribution of responding companies with the universal set shows that companies with 10 to 49 employees are under-proportionally represented as compared to the Swiss universe. The distribution of sectors, however, shows a good correspondence with the universal set.

In order to ensure that the results were representative in terms of size and sector distribution, the data was weighted according to company size and business sector (Kromrey 2002, p. 281). Weighting factors were based on a comparison between the control sample and the universe. The weighting brings the size and sector distribution of the control sample in line with the size and sector distribution of the universe.

The weighting results in the smaller companies (10 to 49 employees) increasing in importance. Consequently, the weighted results differ from the gross results wherever the answers of this particular group diverge from the other two groups.

3.3 Characterization of the Control Sample

Nearly all respondents are members of senior management. 57 % of the questionnaires were answered by CIOs, 20 % by CEOs, and 19 % by other executives in commercial and technical areas. In smaller companies with 10 to 49 employees, more respondents are CEOs (35 %). In larger companies with 50 to 99 and 100 to 249 employees CIOs clearly prevail (62 and 73 %).

The distribution of companies according to size shows a balanced picture. The company size is measured in "number of employees" (full-time equivalent). 35 % of the companies have between 10 and 49 employees, 25 % between 50 and 99. The majority of the companies in the control sample (39 %) have between 100 and 250 employees.

Companies from business sectors 2 (industry) and 3 (services) are represented in the control sample; almost all business fields. The largest proportion is taken up by *Manufacturing and industry* (19 %), followed by *Trade and repair of used goods* (14 %) as well as *Public Administration* (10 %).

3.4 Identification of Typical Company Profiles

To identify typical company clusters we undertook a cluster analysis (Backhaus et al. 2006) using SPSS. A cluster analysis involves selecting various variables from the survey and calculating similarities in the responses between the companies. The relevant variables for the analysis were identified and defined by information systems experts (in a workshop). This was followed by a subsequent optimization of the results in several flow cycles. The gradual improvement of the results is effected by plausibility tests and calculation in SPSS.

The clusters are characterized by a combination of *observable characteristics* and the *typical attitude towards ICT outsourcing*. We are thus trying to develop an "ICT classification" for SMEs. Subsequent to the identification of the clusters through observable (i.e. independent) factors, a bivariate analysis with non-observable (i.e. dependent) factors was carried out. Figure 2 describes the research approach.
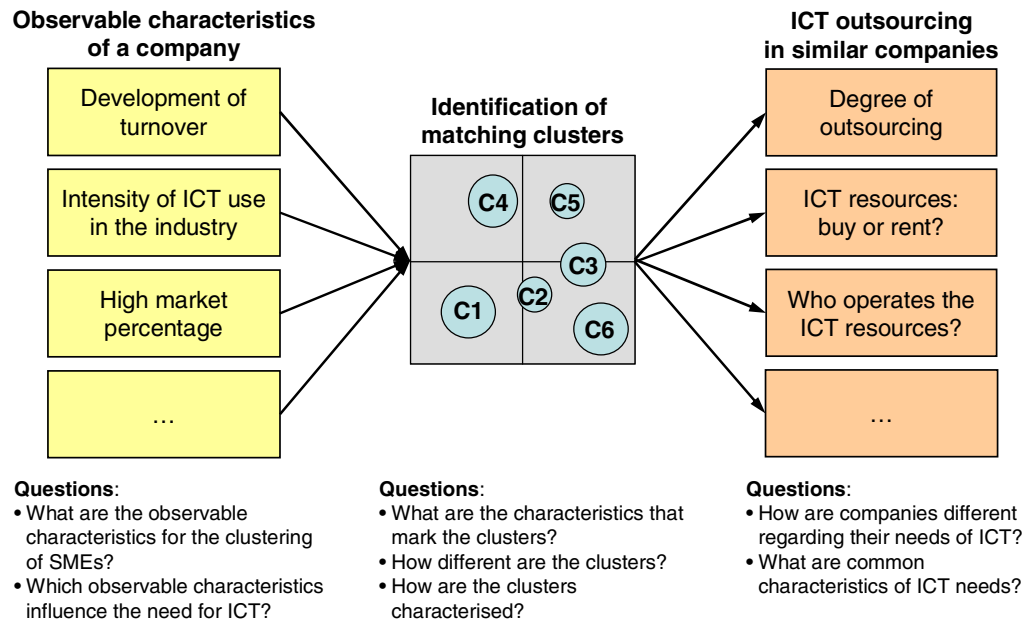
Figure 2.   Research model

One of the outcomes of the cluster analysis will be a fitness index. Looking at their typical peer group SMEs could run a "fitness test" on their ICT outsourcing behaviour and find out if ICT outsourcing could benefit their business. The building of clusters and typical ICT outsourcing company profiles is aimed at two additional target groups: (1) It should offer orientation for *ICT consultants*: in looking at the external characteristics of a potential customer they should get an idea how best to accommodate the customer. The consultant should be able to identify the typical needs and opportunities for such a company. (2) The second target group are *ICT suppliers*. They should be able to improve their products and services with an improved knowledge of what their customers actually need.

4   RESULTS

The following section presents the results of the different areas in the survey questionnaire. For each area we draw conclusions from the findings.

4.1   Current Degree of Outsourcing

Operative ICT tasks can be roughly divided into *Installation and Services* and into *Maintenance and Support*. Rental of resources can also represent a form of outsourcing. Through the combination of different sourcing variants, such as *Buy or Rent*, internal or external operations, internal or external support, different outsourcing variants emerge – such as ASP and Housing. The authors do acknowledge that buying or renting equipment is not strictly outsourcing but is included because of the relevance to the SME sector.

SMEs' attitude towards outsourcing could almost be described as "All or nothing" when it comes to *Buying or Renting* (Figure 3). More than 80 % of SMEs buy their ICT resources as a complete package. Only 6 % rent ICT resources completely and 10 % rent them partially. *Maintenance and Support* is the area where outsourcing is strongest. Only 40 % of the companies manage this internally. By comparison, 70 % of the companies still manage *Installation and Services* internally. From this, we draw the following conclusion:

Conclusion 1:   The small percentage of ICT outsourcing applied by SMEs is primarily focused on Maintenance and Support.
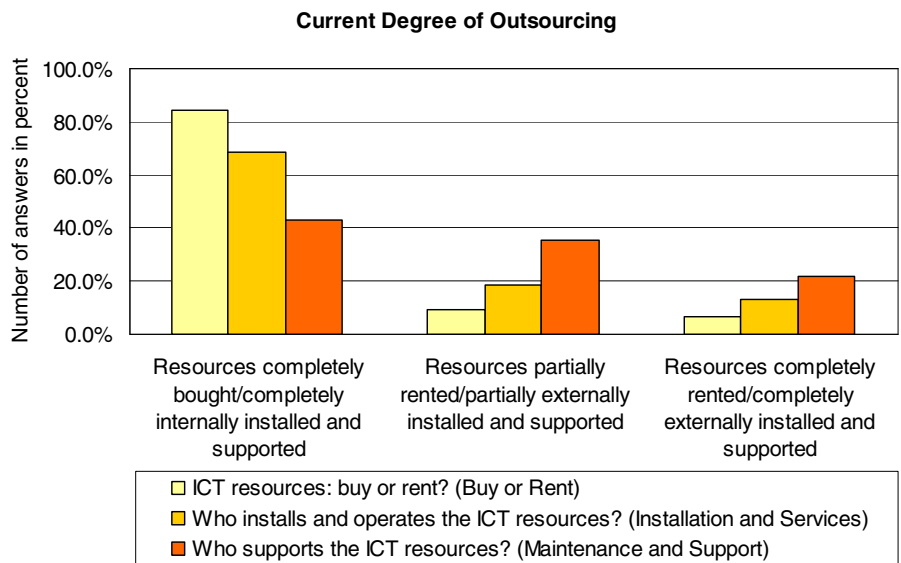
Current Degree of Outsourcing

N=896, weighted results

Figure 3.   Current degree of outsourcing

4.2   Effects of Outsourcing

Only companies with outsourcing experience were questioned on the effects of outsourcing. This resulted in responses from 400 of the 900 companies (45 %). The responses differ greatly. The most observed effect is the change in *specialist demand* (ICT know-how) on the staff. A further effect is, that the *operational availability* of the systems is increased which allows improved *concentration on the core business* (Figure 4). Only one third of the companies indicated that outsourcing had resulted in *cost reductions*. It is not possible to make definite statements as to the consequences of the change or requirements regarding *internal expertise*. From this, we draw the following conclusion:
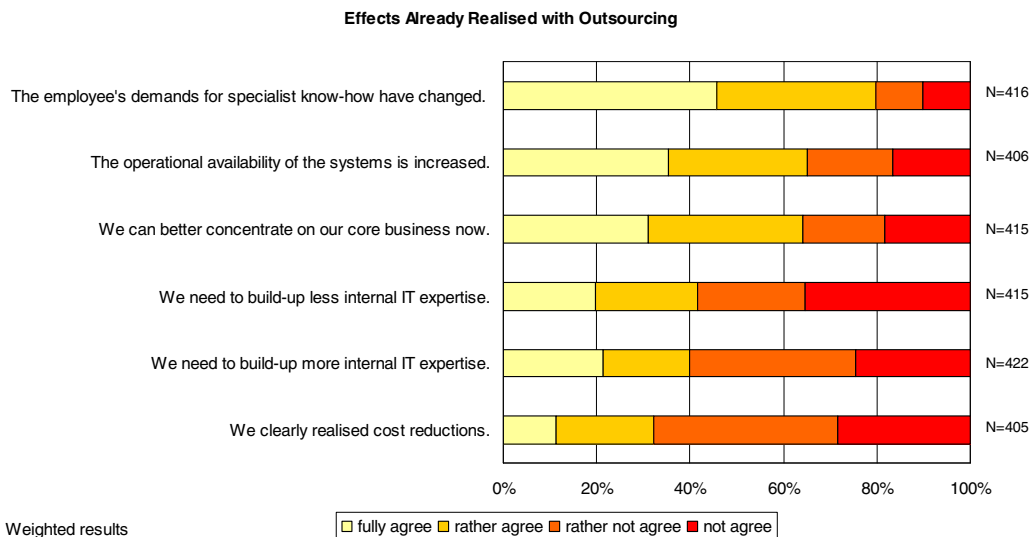
Effects Already Realised with Outsourcing

Weighted results

Figure 4.   Effects realised with outsourcing

Conclusion 2:   The majority of SMEs achieved positive effects with outsourcing. Employees must be trained, educated and, where necessary, supported, so that they can master the changing demands.

4.3   Future Strategies for ICT Outsourcing

The responses regarding future strategies differ greatly. The result confirms that outsourcing is predominantly used for *particular tasks*. 23 % of the SMEs want to *outsource more in future* (Figure 5). The question remains whether this is a high or a low percentage. In order to answer this, reference statistics would have to be collected from other countries.

The desire for *complete outsourcing* is mentioned rarely. It arises mostly in the processing industry, the credit and insurance industry as well as the hotel and catering industry. Smaller companies are somewhat more open-minded about *complete outsourcing* than larger companies (Schubert and Leimstoll 2007). Accordingly, in larger companies *outsourcing is out of the question.* From this, we draw the following conclusions:

Conclusion 3:   Smaller SMEs tend to be more open-minded towards outsourcing than larger companies.

Conclusion 4:   Suppliers of external ICT services specialised on selective, definable services are at an advantage. External service provision is most often used in the area of Maintenance and Support.
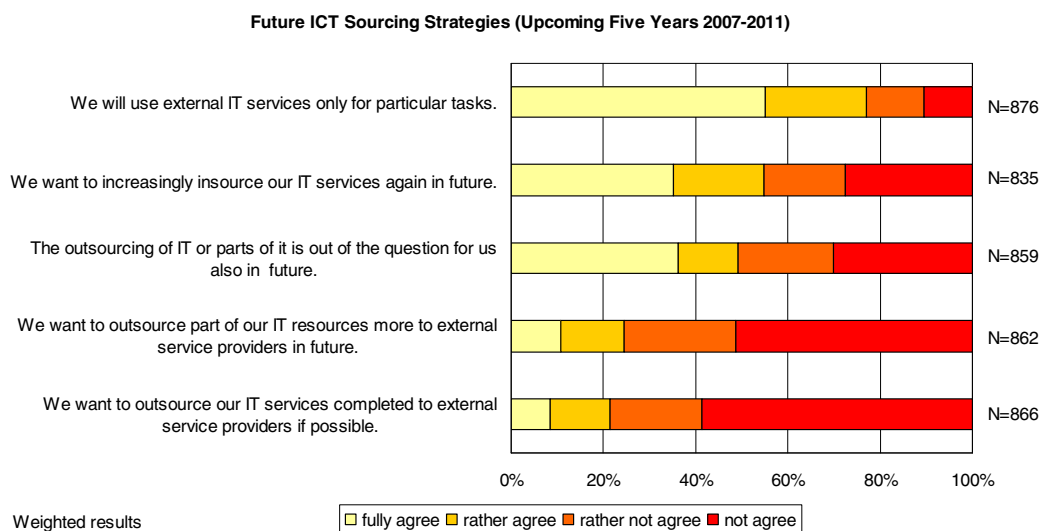

Figure 5.   Future ICT sourcing strategies

5   CLUSTER ANALYSIS

The results indicate that the difference of ICT outsourcing in very small, small and larger companies is not statistically significant. If, as shown, the company size loses significance as a differentiating factor for classification, other characteristics are needed in order to differentiate the companies. One of these features is the business sector. Some considerable differences, dependent on the business sector, are shown in the results. Because of the obviousness of "industry sector" as an influencing factor, it was excluded from our further analysis. The remaining question was therefore, whether there are further characteristics which allow classification of SMEs.

The following cluster analysis deals with this question. Its objective was to find characteristics helping to form the SMEs into groups (clusters). The companies within one group should be as similar as possible, the companies in different groups as different as possible. It should also be possible for a sales professional to allocate a single company, from which one knows certain observable criteria, to a specific cluster because of the group classification. Using an example, a consultant could be approached by "Office Supplies", a vendor of office products (a non-innovative standard product with a high turnover). According to the classification (cf. Figure 6) this company belongs to cluster number five allowing the consultant to assess the probability of outsourcing (members of this group are most likely to outsource their ICT to other parties in the future and they believe that ICT expertise still has to be guaranteed inside the company). For this, the grouping needs to be based on characteristics distinctive enough to allow assessment of an individual company without needing to know the company particularly well. Such factors can be examples of the situation of the market, of the degree of product standardization or the level of innovation in the company.

Through several combinations of different characteristics, six SME clusters were identified from the data of this study. They are based on a combination of six characteristics, which significantly separate the groups and lead to a high level of similarity within the groups. A further analysis of these groups shows that they also differ from each other in regard to their ICT requirements. The newly created classification by means of a cluster allows an outsourcing supplier to assign an actual SME to one of the clusters and deduce from this the ICT requirements of the company.

Figure 6 shows the clusters that emerged from the SPSS cluster analysis. The results have a high statistical validity as can be seen from the ANOVA table in the annex (Table 1). The clusters show the following characteristics and are further described in the following paragraphs.

Cluster 1: Heavily ICT reliant, innovative, supply-chain-oriented, standard product suppliers

Cluster 2: Future-oriented, product-focussed suppliers

Cluster 3: Miscellaneous suppliers with a strong turnover

Cluster 4: Outsourcing-reluctant, non-innovative, standard product suppliers with low market percentage

Cluster 5: High turnover, heavily ICT-reliant, non-innovative standard product suppliers

Cluster 6: High turnover, specialised product suppliers

Factor	Number of the Cluster					
	1	2	3	4	5	6
Development of sales in the business sector in the last 3 years	steady	steady	slightly increased	steady	slightly increased	slightly increased
Production processes in the business sector are characterised by the application of ICT.	fully agree	rather agree	rather not agree	rather agree	fully agree	rather agree
We reached a high market share in our target markets.	rather agree	rather agree	rather agree	not agree	rather agree	rather agree
We stand out from the competition because our products have unique features.	rather not agree	fully agree	rather not agree	rather not agree	rather not agree	fully agree
The configuration of the company-to-company coordination and order-processing between ourselves and our clients is crucial for our competitiveness.	fully agree	rather agree	rather not agree	rather not agree	rather not agree	rather agree
Our clients recognise that we are an innovative company. We are usually first to market with our innovations.	rather agree	rather agree	rather agree	rather not agree	rather not agree	rather agree
Number of Companies in the Cluster	99	134	98	64	78	147

N = 620

Figure 6.   Emerging clusters

After identifying the six clusters we ran multiple bivariate analyses with the following non-observable factors describing ICT outsourcing behaviour (see section 4):

- Degree of outsourcing

- Effects realised with outsourcing

- Future sourcing strategies

The following paragraphs provide the discussion of these results. Each paragraph describes the typical company profile for the cluster and the corresponding ICT outsourcing behaviour (the result from the bivariate analysis).

5.1 Cluster 1: The heavily ICT-reliant, innovative, supply-chain-oriented standard product suppliers

Company Profile (observable characteristics)

The first cluster includes companies who are heavily reliant on ICT, seen as rather innovative by their clients, supply-chain-oriented and producers of standard products. They fully agree that production processes in their business sector are characterized by the application of ICT and that the configuration of the company-to-company coordination and order-processing between themselves and their clients is crucial for competitiveness. They believe that their clients recognise them as an innovative company and that they are usually first to market with their innovations.

ICT outsourcing behaviour (non observable characteristics)

These companies have experience with outsourcing but have not managed to gain measurable cost reductions. One third of this group does not rule out outsourcing in the future. The companies state that they need remarkably less ICT expertise within the company when they choose to outsource ICT services (see section 4.2).

Typical examples for this cluster are wholesalers and retailers selling standard products (e.g. office supplies).

5.2 Cluster 2: The future-oriented, product-focussed suppliers

Company Profile (observable characteristics)

The second cluster comprises the future-oriented, product-focussed suppliers. Companies in this group claim that they stand out from the competition because of their unique product features. Their production processes are characterized by the application of ICT.

ICT outsourcing behaviour (non observable characteristics)

Similar to cluster 1, these companies have experience with outsourcing but have not managed to gain measurable cost reductions. They do not intend to increase their ICT outsourcing. At the same time they do not want to increase the level of internal ICT activities. The conclusion from these two statements is that companies in this cluster are satisfied with their current state of ICT procurement.

Possible company examples for this cluster are service-oriented companies e.g. a provider of store fittings in large department stores or in general companies specialised in customized products.

5.3 Cluster 3: The diverse suppliers with a strong turnover

Company Profile (observable characteristics)

Cluster number three has very few outstanding characteristics. It represents a collection of "miscellaneous" others. Production processes in the business sector are less characterized by the

application of ICT. The businesses in this group have experienced a slight increase in sales in the last three years. Their products do not have unique features. Nevertheless, they are seen as rather innovative by their clients.

ICT outsourcing behaviour (non observable characteristics)

The non-observable characteristics are as "miscellaneous" as their company profile. The bivariate analysis for ICT use in this cluster shows that the respondents are quite clear that they do not want to outsource ICT. Since their production processes do not require much ICT, and B2B processes are not crucial for their business it is likely that this is a group which uses ICT only very scarcely and thus does not consider outsourcing the small amount of ICT that they are using.

Possible examples in this cluster are innovative companies in the healthcare sector, companies in promising business sectors, repair of consumables, or the building industry.

5.4   Cluster 4: The rather outsourcing reluctant, non-innovative, standard product suppliers with low market percentage

Company Profile (observable characteristics)

The fourth cluster includes companies which are rather outsourcing-reluctant, non-innovative, only manage to reach a low market percentage, and offer standard products. They state that they have a low market share in the target market. They are *not* seen as innovative companies by their clients. Their production processes are rather characterized by the application of ICT. They *do not* believe that their clients recognise them as an innovative company.

ICT outsourcing behaviour (non observable characteristics)

These companies have had experience with outsourcing, but have not, like those in cluster 1 and 2, managed to gain cost reductions. Interestingly, they are very clear about not wanting to outsource more ICT services in the future. On the contrary, they are the only ones who want to build up an increasing amount of internal ICT services. They believe that ICT expertise has to be built up by the company itself which is in line with the statement that they do not want to outsource ICT to others.

Examples are companies selling consumer goods or offering company-related services (e.g. lawyers, tax consultants).

5.5   Cluster 5: The high turnover, heavily ICT reliant, non-innovative standard product suppliers

Company Profile (observable characteristics)

The second cluster comprises high turnover companies who are heavily ICT reliant and offer non-innovative standard products. Companies in this group experienced a slight increase in sales in the last three years. They *do not* believe that their clients recognise them as innovative companies. Their production processes are heavily characterized by the application of ICT. This makes them an interesting group for study.

ICT outsourcing behaviour (non observable characteristics)

This group has had experience with outsourcing and a remarkable number of companies have – and this differentiates this group from the others – actually managed to gain cost reductions. Not surprisingly, members of this group are most likely to outsource their ICT to other parties in the future. They believe that ICT expertise still has to be guaranteed inside the company.

Examples for this group are manufacturing companies or hotels and restaurants (for which the industry turnover has slightly increased over the last years).

5.6   Cluster 6: The high turnover specialised product suppliers

Company Profile (observable characteristics)

The last cluster includes companies who have a high turnover and offer specialised products. The businesses in this group have experienced a slight increase in sales in the last three years. Their production processes are rather characterized by the application of ICT. They claim that they stand out from the competition because of their unique product features.

ICT outsourcing behaviour (non observable characteristics)

This group *does not* intend to further outsource ICT in the future. At the same time, they *do not* want to increase the level of internal ICT activities.

Increased profitability is a top priority for these companies. Again, customers have little influence on the ICT decision process.

Examples for companies in this cluster are manufacturers of specialised machines and the manufacturing industry in general (in which turnover has slightly increased over the last years).

6   CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH

Few studies have investigated ICT outsourcing in small and medium sized enterprises (Dibbern and Heinzl 2006). The results of this study are therefore important both because of the focus on SMEs and because of the large size of the survey. Our results suggest that SMEs are able to achieve significant benefits from outsourcing. Some of these benefits include meeting the changing needs for specialist knowledge, making better use of existing systems and ability to concentrate on core business functions. Future intentions of SMEs with regard to outsourcing were also explored and indicate that the majority of businesses will use outsourcing for some functions again in the future. However, very few businesses are planning to outsource all of their ICT services in the future.

The future outsourcing strategies for SMEs are particularly relevant for outsourcing service providers. Future strategies provide information about whether the SMEs are satisfied with their outsourcing experience or whether they would rather revert to carrying out their ICT services internally. This study provides a picture of future trends towards outsourcing by SMEs and points to areas where, alternatively, a trend towards insourcing can be observed.

This study represents another milestone in a longitudinal research process on the topic of "ICT use in SMEs". Each year, we have been able to explore in more depth, together with our industry partners, the data gained from this extensive and long-term-oriented series of studies. The findings have a high explanatory value due to the high response rate; 901 questionnaires were returned in the third round. The results are representative for Switzerland with regard to company size and industry sector.

The examination of clusters is an approach which can classify companies and group them according to characteristics which exceed the usual classification of "industry sector" and "company size". The clusters are a valuable instrument for ICT vendors to segment their market, to derive needs, and to improve their products and services for identified market segments.

A weakness of the clustering model is the number of variables. For both the observable characteristics and the typical attitude towards ICT outsourcing several single characteristics are used. This allows the identification of clusters but the relationships between the clusters and the ICT outsourcing behaviour are merely found by chance and not systematically.

The future surveys will validate and refine the cluster analysis and thus the profiling of companies over all three studies. The longitudinal orientation of the research helps to gradually improve the theoretical model which is currently being developed.

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Appendix

ANOVA

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
Development of sales in the business sector in the last three years	52.599	5	.532	614	98.934	.000
Production processes in the business sector are chraractarised by the application of ICT.	50.072	5	.608	614	82.363	.000
We reached a high market share in our target markets.	44.501	5	.496	614	89.770	.000
We stand out from the competition because our products have unique features.	70.039	5	.595	614	117.654	.000
The configuration of the company-to-company coordination and order-processing between ourselves and our clients is crucial for our competitiveness.	75.163	5	.614	614	122.379	.000
Our clients recognise that we are an innovative company. We are usually first to market with our innovations.	37.267	5	.639	614	58.276	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Table 1.   ANOVA table for the cluster analysis