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Outsourcing of ICT: An Empirical Study in Swiss SMEs

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Abstract

Results from a longitudinal study on the importance and use of information and communication technology in Swiss small and medium-sized companies provide the basis of this paper. In an empirical survey, 901 questionnaires were collected and analysed. The results were weighted according to company size and industry sector and are representative for Switzerland. The data was used to run an extensive cluster analysis. Based on the identified clusters, several bivariat analyses were performed in order to identify the typical outsourcing behaviour of the clusters. The clusters were tested against four different statements regarding (1) experiences with outsourcing, (2) degree of outsourcing (buy or rent), (3) IT know-how, and (4) influencers for outsourcing. The results have a high statistical validity and allowed us to draw conclusions about the typical behaviour of cluster members.

Keywords: Empirical Study, SME, ICT Outsourcing, Outsourcing Strategy, Switzerland

1 Introduction

The 20th Bled Conference is dedicated to the topic of eMergence. Multiple phenomena in IT management have “emerged” over the last years – one of them is the question of make-or-buy for ICT-related services. Due to an increased standardisation of IT services assisted by emerging concepts such as service level

agreements (SLA), service oriented architectures (SOA), or application service providing (ASP) it has become more feasible for companies to assess the value of outsourcing.

This has stimulated us into initiating a dedicated survey to the topic of “procurement of information technology” (hardware, software, networks, and related services). For some years now, the research group behind this paper has been conducting a long-term study project on the use of ICT in Swiss small and medium-sized companies (SMEs) as well as small and medium-sized organisations (e.g. hospitals, public administration, schools). Each year, primary data is raised in an empirical survey. The research initiative is carried out in cooperation with industry partners who contribute their valuable observations about the current ICT market. In 2006, the specific focus of the yearly survey was put on IT procurement (outsourcing).

The sample resulted from various considerations of the study partners. Firstly, the chosen size range (10 to 250 employees) in the business sectors two and three (industry and services) represents 94 % of Swiss companies which have ten or more employees and constitute therefore a large proportion of Swiss business.

Secondly, other empirical studies [e.g. KPMG 2005; silicon.de 2003; Impulse 2005; IBM 2005] are often concerned with large companies which have different conditions and structures from small and medium-sized companies. Different conditions and structures are also found in “very small companies” with 0-10 employees. Both of these “marginal groups”; large companies and very small companies were therefore excluded from this study.

The final objective of our long-term study on ICT use in SMEs is the identification of typical ICT company patterns.

The paper is structured as follows: The following chapter provides a brief literature review and explains our intentions for this study. The research design is introduced including the method of investigation and the characterisation of the control sample. Selected results from the descriptive analysis are then presented. The main section contains the analytical findings of the cluster analysis. The paper concludes with an outlook to future research.

2 Background and Objectives of the Study

The outsourcing of ICT functions to external service providers has been discussed in the literature for many years [e.g. Aubert et al. 1996; Bakos/Brynjolfsson 1998; Choudhury/Sabherwal 2003; Kishore et al. 2003; Lee et al. 2003; Schlueter Langdon/Sikora 2006; Shao/Smith David 2007]. In practice, it is often the large outsourcing contracts between big companies (e.g. banks, insurance companies, industrial concerns) and large ICT providers (e.g. Atos Origin, EDS, IBM) that are to the fore in this subject area [Shao/Smith David (2007)]. Within the framework of these large-scale orders, it is not unusual for the entire ICT services to be outsourced to the ICT provider, even if the ICT is of critical significance for the business.

The most widespread form of outsourcing, apart from complete outsourcing, is selective outsourcing. In this case, only selected ICT tasks are outsourced to an external provider, such as the operation or the maintenance of hardware.

Various objectives can be pursued by ICT outsourcing [Goo et al. 2000, 605 f.]. Mostly, a reduction in the TCO (Total Cost of Ownership) and a stronger concentration on the core business is to the fore [Kishore et al. 2003, 91; Lee et al. 2003;

Schlueter Langdon/Sikora 2006]. Further possible positive effects of outsourcing cited are the opportunity to take advantage of the benefits of the provider's specialisation, the access to his expertise and IT resources, a better ability to control ICT costs as well as a reduction of risk.

This paper looks into ICT outsourcing in small and medium companies (SMEs). It is especially for smaller companies which cannot set up specialised departments for all business areas that the outsourcing of ICT tasks can be a sensible measure. However, observations of real life indicate that SMEs, at least in Switzerland, are rather conservative in their attitude towards outsourcing and some of them have quite large ICT departments of their own [Leimstoll/Schubert 2002; Schubert et al. 2006]. Because of this, even SME-oriented concepts such as *Application Service Providing* (ASP), have not really been able to gain acceptance yet.

This prompts the question of how SMEs outsource their ICT nowadays. Three aspects regarding content are to be looked at:

1. Which ICT tasks are suitable for outsourcing?

2. Which effects have been achieved with ICT outsourcing in SMEs so far?

3. Which strategies will SMEs follow in ICT outsourcing in the future?

ICT tasks can be divided into strategic tasks and operative tasks. *Strategic* ICT tasks are less suitable for outsourcing. They are laid down in the company management [Leimstoll 2001, 380] and because of their significance should be undertaken with considerable participation of the staff [Knolmayer 1991, 330 f.; Kuehl/Lambing 1990, 244]. The integration of external expertise can be a useful addition to already existing knowledge [Cragg/Zinatelli 1995, 6].

Operative ICT tasks are better suited for outsourcing [Picot/Reichwald 1991, 306; Aubert et al. 1996, 53 f] than strategic tasks. They can be roughly divided into installation and operation of resources 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 decision on the outsourcing of ICT tasks goes hand in hand with a decision on the personnel and organisational supporting measures that have to be established [Schotters 1992, 217-228]. It is to be expected that outsourcing of tasks leads to a change mainly in the internal company expertise. The operative execution of ICT tasks is transformed into contract and relationship management [Bakos/Brynjolfsson 1998; Kishore et al. 2003].

The information asymmetries which are caused by outsourcing, in particular, offer an opportunity for opportunistic behaviour. From the perspective of transaction cost theory, the outsourcing of IM tasks to external services leads to an increased need for coordination [Mertens/Knolmayer 1998, 11; Schlueter Langdon/Sikora 2006], which must be compensated by supporting measures. An ever more widespread approach, which is said to solve these problems, is long-term collaboration with what are known as IT partners [Aubert et al. 1996, 62; Ang 1997, 3 f.]. Long-lasting relationships create an increased social proximity and therefore reduce the risk of opportunism.

Finally, the question of future outsourcing strategies in SMEs is particularly relevant for the outsourcing service providers. Future strategies also 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. In this way, in this study it will be demonstrated as to whether a stronger trend to-

wards outsourcing should be expected from SMEs or whether alternatively, a trend towards insourcing can be observed.

3 Research Design

3.1 Method of Investigation

The present study presents an analysis of companies with 10 to 250 employees in business sectors two (industry) and three (services). It covers therein a universal set of 38'099 companies. The Federal Office of Statistics drew a stratified random sample of 4'393 companies from this universal set, based on sector and company size (Figure 1).

We used computer-aided telephone interviews (CATI) for the collection of data. The basis of the survey was a standardised questionnaire in German and French with predominantly closed questions. The questionnaire was developed in cooperation with business partners and trialled several times in pre-test interviews. It was aimed at members of senior management in small and medium-sized Swiss companies and other organisations.

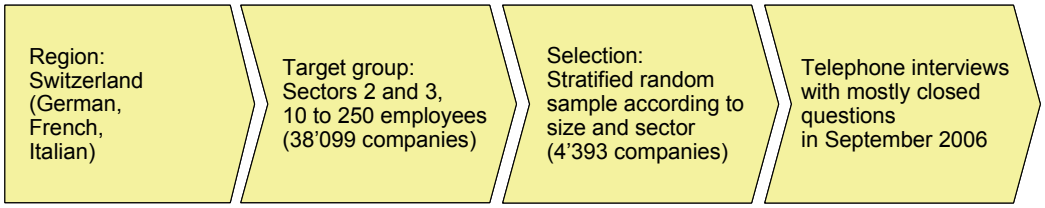

Figure 1: Research Steps

3.2 Return Rate and Weighting

Altogether, 901 companies were interviewed. This corresponds to a return rate of 20.5 %. Declaration of company size and business sector were mandatory. We used this information 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 those companies which answered with the universal set shows that the companies with 50 to 100 employees are underproportionally 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. Figure 2 shows the weighting factors which were used to calculate the weighted results.

Business sector	Company size [number of employees (full-time equivalent)]		
	>=10 & <50	>=50 & <100	>=100 & <=250
Manufacturing, industry	2.862	0.444	0.262
Power, water utility	0.159	0.058	0.047
Construction company	3.986	0.733	0.171
Trade, repair of durable goods	2.795	0.337	0.139
Hotels and restaurants	3.922	0.377	0.121
Transport and telecommunications	2.154	0.302	0.088
Banking and insurance	1.151	0.159	0.060
Company-related services	8.720	2.649	0.464
Public administration	0.505	0.186	0.106
Education	5.085	1.098	0.288
Health and social services	2.080	0.860	0.183
Other services for third parties	0.838	0.117	0.043
Source: Swiss Federal Statistical Office (SFSO); own calculations			

Figure 2: Weighting factors according to company size and business sector

The weighting causes the smaller companies (10 to 49 employees) to increase 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 Characterisation of the Control Sample

In order to convey an impression of the control sample, this section describes some fundamental characteristics of the respondents and the companies. In order to portray the control sample unchanged, the results in this chapter are not weighted.

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. Only 4 % of the respondents have other functions in the company. In smaller companies with 10 to 49 employees, many more respondents were CEOs (35 %). In larger companies with 50 to 99 and 100 to 249 employees CIOs prevail clearly (62 and 73 %). The differences are highly significant and they show – compared with the results of a similar study from the previous year [reference deleted for double blind review, 2006] – an increasing proportion of responding CIOs even in the small companies. This is an indicator that even SMEs tend to acknowledge that IT management requires particular skills and thus a special role in management. One year earlier, the rate of responding CIOs was only 35 % (as compared to 57 %).

The distribution of companies according to their size shows a balanced picture. The company size was 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 (service) 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

The final objective of our long-term study on ICT use in SMEs is the identification of typical ICT company patterns. The resulting clusters are expected to be characterised by a combination of *observable characteristics* and the *typical attitude* towards strategic and operational use of ICT. We are thus trying to develop an

“ICT classification” for *SMEs*. Looking at their typical peer group they could run a “fitness test” on their ICT deployment and find out if ICT could benefit their business more effectively.

The building of clusters and typical ICT company profiles is aimed at two additional target groups: (1) It should offer orientation for *ICT consultants*: knowing the external characteristics of a lead customer they should get an idea how best to accommodate him. What are 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.

For the identification of typical company clusters we used the cluster analysis in SPSS. The results are presented in chapter 5.

4 Descriptive Analysis

As mentioned above, the distribution according to company size and business sector in the control sample does not correspond to the universal set, in which the small companies would comprise a larger proportion. The results of the descriptive analysis in this section are based, therefore, on data which is weighted according to size and sector (cf. 0). In this way, representative results about SMEs in Switzerland are presented.

4.1 Current Degree of Outsourcing

The attitude of the SMEs towards outsourcing could be described as „All or nothing“ – at least concerning the issue of *Buy or Rent*. More than 80 % of the companies buy their ICT resources as a complete package. If they are rented, then in their entirety. Hybrid solutions of *Buy and Rent* are very rare. “Only” 70 % of the companies still completely take care of *Installation and Services* themselves. Hybrid solutions tend to be the exception here as well (Figure 3).

The only area recording a clear outsourcing share is *Maintenance and Support.* Only 40 % of the companies carry out these tasks completely internally. 20 % source them out completely, 40 % use hybrid solutions. In the case of hybrid solutions, meaning selective outsourcing, the dominant outsourcing share is less than a third of the resources. The differences between the resource types are minor. Networks tend to be “outsourced” more often than other resources. From this, we draw the following conclusions:

- Conclusion 1: The term “Selective Outsourcing“, when used for SMEs can refer to *Installation and Services* but primarily to *Maintenance and Support.* In this case, “selective” means that tasks are partly outsourced and partly carried out internally.
- Conclusion 2: The purchase of ICT resources will remain for the time being the dominant sourcing strategy, complemented by external service provision in the areas of *Installation and Servicing*.

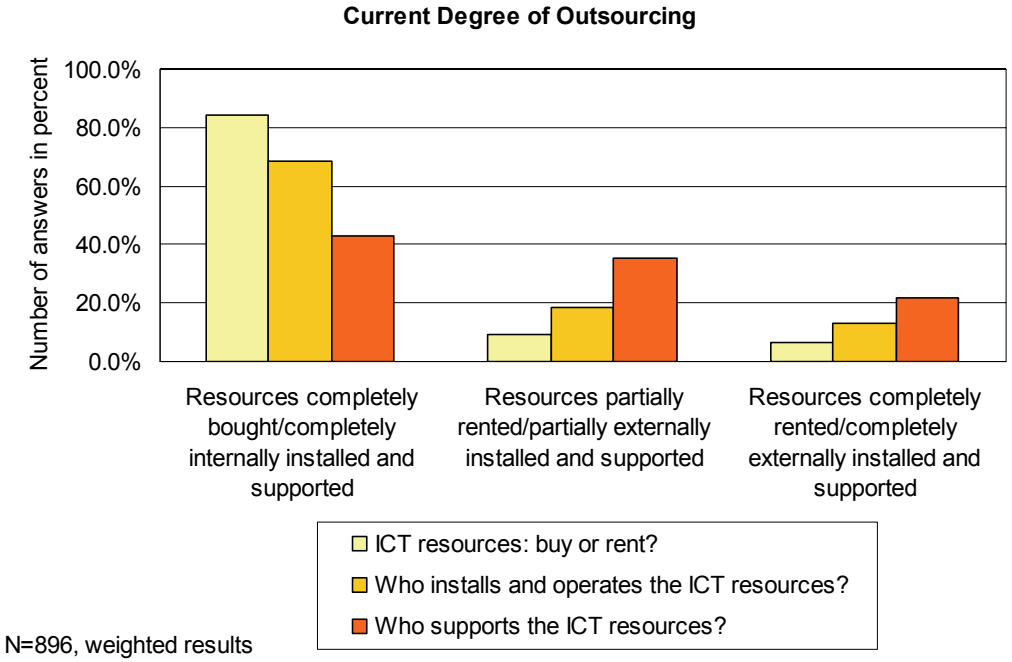

Figure 3: Current degree of outsourcing

4.2 Effects of Outsourcing

On this issue, only companies with outsourcing experience were questioned. This was still (a good) 400 of the 900 companies (around 45 %). The responses differed greatly. The most observed effect is the change in the *specialist demands* (IT 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).

Far behind, but nevertheless actually achieved by a third of the companies were *cost reductions*. It is not possible to make definite statements as to the consequences of the change or requirements regarding to *internal expertise*. From this, we draw the following conclusion:

- Conclusion 3: 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.

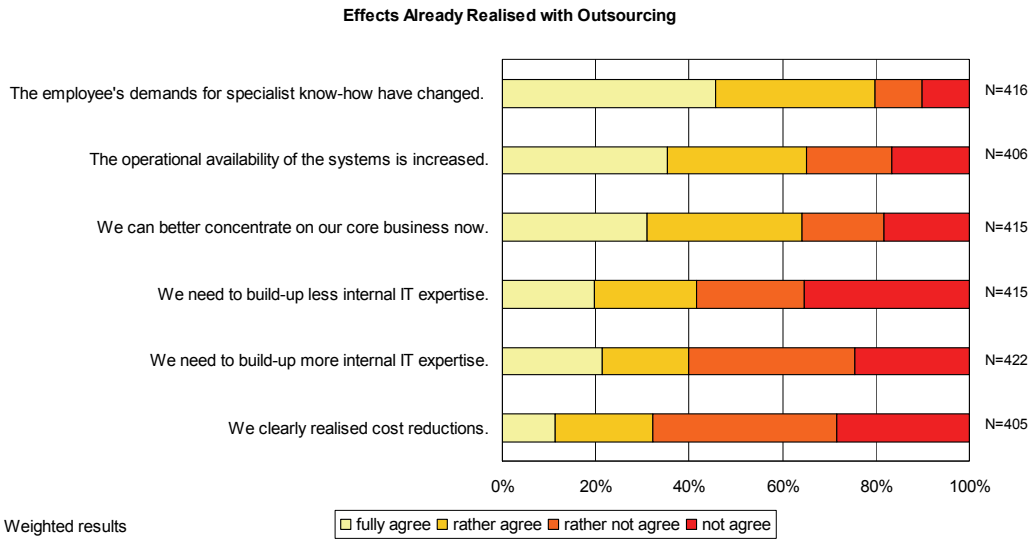

Figure 4: Effects realised with outsourcing

4.3 Future Strategies for the Procurement of ICT Resources

The responses in this field 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 most rarely. It arises most in the following sectors: 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. Accordingly, it is rather the larger companies for which *outsourcing is out of the question.* From this, we draw the following conclusions:

- Conclusion 4: Smaller SMEs tend to be more open-minded towards outsourcing than larger companies.
- Conclusion 5: Suppliers of external ICT services specialised on selective, definable services are at an advantage. External service provision is most often made use of in the area of *Maintenance and Support* (Figure 3).

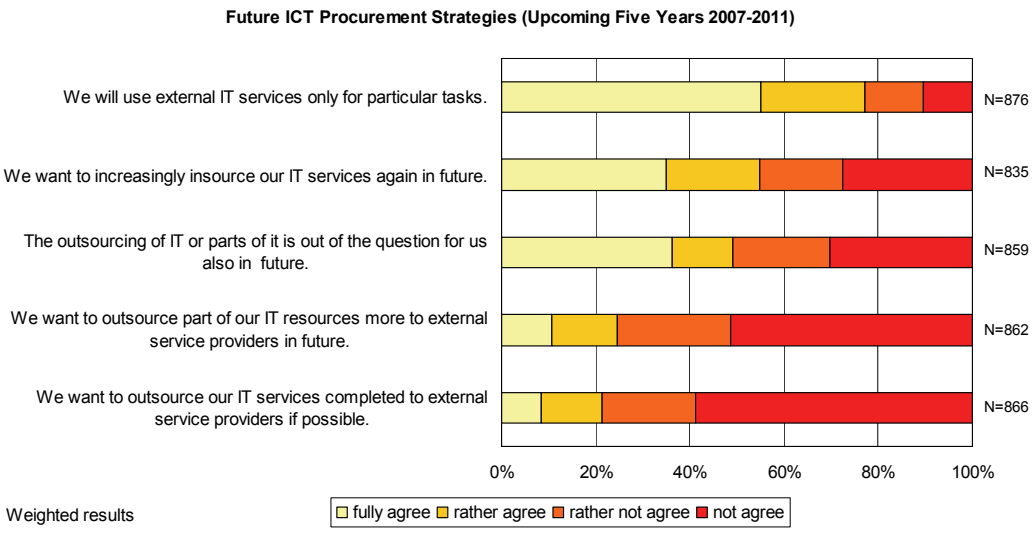

Figure 5: Future ICT procurement strategies

5 Cluster Analysis

As mentioned earlier, this survey is the third consecutive instalment of a long-term study project [Dettling et al. 2004; Schubert et al. 2006; Leimstoll/Schubert 2007]. This time, the size of the company had an even lesser influence on ICT use in companies than in previous years. 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 by which we can differentiate the companies. One of these features is certainly 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 is concerned with this question [e.g. Backhaus et al. 2006]; its results are presented in the following section. The objective of the cluster analysis was to find characteristics which help in forming 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, into a specific cluster because of the group classification. 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 on the market, of the degree of product standardisation or the level of innovation in the company.

Through several combinations of different characteristics, six SME clusters were identified from the data from 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 IT 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 IT requirements of the company.

5.1 Research Approach

As mentioned before, the cluster analysis in SPSS was used as an instrument for calculation. In this approach one selects various questions from the survey and calculates similarities in the responses between the companies. There is no mathematical formula for the selection of observable factors (variables). They need to be identified through reflection. The start characteristics for the analysis were defined by information systems experts (in a workshop). This was followed by a subsequent optimisation of the results in several flow cycles. The gradual improvement of the results is effected by plausibility tests and calculation in SPSS.

Subsequent to the identification of the clusters (observable factors) a bivariat analysis with non-observable factors was carried out (degree of outsourcing, buy or rent, etc.). The research approach is illustrated in Figure 6.

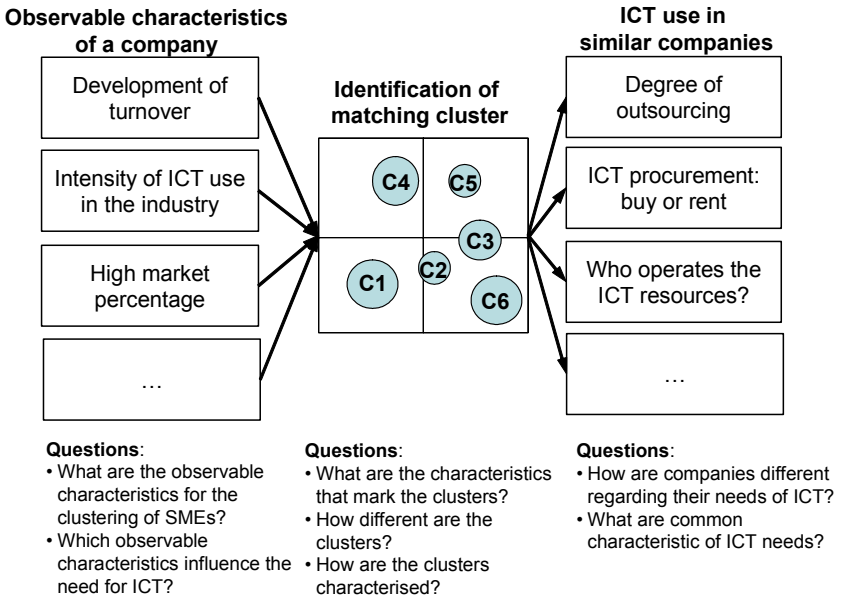

Figure 6: Research model

5.2 Emerging Clusters

Figure 7 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 Figure 8 (annex).

The clusters show the following characteristics and are further described in the following paragraphs.

1. Cluster 1: The heavily ICT reliant, innovative, supply-chain-oriented, standard product suppliers
2. Cluster 2: The future-oriented, product-focussed suppliers

3. Cluster 3: The miscellaneous suppliers with a strong turnover
4. Cluster 4: The rather outsourcing-reluctant, non-innovative, standard product suppliers with low market percentage.
5. Cluster 5: The high turnover, heavily ICT-reliant, non-innovative standard product suppliers
6. Cluster 6: The high turnover, specialised product suppliers

	Number of the Cluster					
Factor	**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 7: Emerging clusters

After identifying the six clusters we ran several multiple bivariat analyses with the following non-observable factors:

1. Experiences with outsourcing
2. Plans for outsourcing/degree of outsourcing (buy or rent)
3. IT expertise
4. Triggers and influencers for outsourcing

The following paragraphs provide the discussion of these results.

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

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 characterised 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 use (non observable characteristics)

These companies have experiences with outsourcing but have not managed to gain measurable cost reductions. One third of this group does not rule out outsourcing for further ICT procurement. The companies state that they need remarkably less IT expertise within the company when they choose to outsource IT services. Compared to the other clusters, customers' wishes are an important trigger for IT outsourcing (in 20% of the cases).

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

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

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 characterised by the application of ICT.

ICT use (non observable characteristics)

Similar to cluster 1, these companies have experiences 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 the current state of ICT procurement. In this cluster, customers' wishes are the most important trigger for IT outsourcing (in 25 % of the cases).

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.

5.2.3 Cluster 3: The diverse suppliers with a strong turnover

Profile (observable characteristics)

Cluster number three has very few outstanding characteristics. It's a collection group of "miscellaneous" others. Production processes in the business sector are less characterised by the application of ICT. The businesses in this group 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 use (non observable characteristics)

The non-observable characteristics are as "miscellaneous" as their profile. The bivariat 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 little 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.

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

Profile (observable characteristics)

The fourth cluster includes companies who 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 process are quite characterised by the application of ICT. They *do not* believe that their clients recognise them as an innovative company.

ICT use (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 IT 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. Their corporate (or IT) strategy is *not* a driving force for the procurement of ICT. “Process orientation” or the “increase of profitability” are *not* seen as triggers for new IT systems. In 80 % of these companies, customers play little or no role in the decision process regarding ICT procurement.

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

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

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 characterised by the application of ICT. This makes them an interesting group for study.

ICT use (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 IT expertise still has to be guaranteed inside the company. Guidelines in their corporate (or specialised IT) strategy influence their decisions for ICT procurement. Customers, on the other hand, have almost no influence on these decisions.

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

5.2.6 Cluster 6: The high turnover specialised product suppliers

Profile (observable characteristics)

The last cluster includes companies who have a high turnover and offer specialised products. The businesses in this group experienced a slight increase in sales in the last three years. Their production process are quite characterised by

the application of ICT. They claim that they stand out from the competition because of their unique product features.

ICT use (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. As already seen for cluster 2, companies in cluster 6 are happy with the current state of ICT procurement. Triggers for ICT procurement are rooted in corporate (or IT) strategy. This is the only group who states that an improved "process orientation" is a trigger for the purchase of new IT systems. Increased profitability is a top priority for these companies. Again, customers have little influence on the IT 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 and Future Research

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 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.

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

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Annex

	Cluster		Fehler			
	Mittel der Quadrate	df	Mittel der Quadrate	df	F	Sig.
Q08: Umsatzentwicklung im Branchendurchschnitt (2003-2005)	52.599	5	.532	614	98.934	.000
Q1203: Die Produktions- und Leistungsprozesse in der Branche sind vom Einsatz der Informatik gekennzeichnet.	50.072	5	.608	614	82.363	.000
Q1208: Wir haben auf unseren Zielmärkten einen hohen Marktanteil erreicht.	44.501	5	.496	614	89.770	.000
Q1302: Wir heben uns von der Konkurrenz ab, weil unsere Produkte einzigartige Eigenschaften aufweisen.	70.039	5	.595	614	117.654	.000
Q1306: Die Gestaltung der unternehmensübergreifenden Koordinations- und Auftragsabwicklungsprozesse ist wettbewerbsentscheidend.	75.163	5	.614	614	122.379	.000
Q1307: Unsere Kunden erkennen in uns ein innovatives Unternehmen. Mit unseren Neuerungen sind wir meist die ersten auf dem Markt.	37.267	5	.639	614	58.276	.000

Die F-Tests sollten nur für beschreibende Zwecke verwendet werden, da die Cluster so gewählt wurden, daß die Differenzen zwischen Fällen in unterschiedlichen Clustern maximiert werden. Dabei werden die beobachteten Signifikanzniveaus nicht korrigiert und können daher nicht als Tests für die Hypothese der Gleichheit der Clustermittelwerte interpretiert werden.

Figure 8: ANOVA table for the cluster analysis