

## **Current Trends and Challenges in Electronic Procurement: An Empirical Study**

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### **Abstract**

The following paper presents results from a longitudinal study on the use of ICT for B2B-related business processes in large Swiss companies. In an empirical survey, 68 questionnaires were personally collected from procurement heads and subsequently analysed. The findings show that reduction of purchase prices is the top priority when goal-setting in procurement. Electronic orders and invoices are the business documents that are most often exchanged electronically between partners. Electronic exchange of invoices (e-invoicing) is a current key topic for over 70 % of the companies. Procurement heads sense a lack of supplier involvement which makes the realisation of balanced B2B solution scenarios difficult. The study shows that IT, without doubt, plays a significant role in everyday procurement, but that the expectations of IT are rarely completely fulfilled.

**Keywords:** Empirical study, survey, SME, ICT outsourcing, Switzerland

# 1 Introduction

The 20th Bled Conference is dedicated to the topic of eMergence. E-procurement, the electronic support of the professional buying process, which addresses the relationships of a business with its suppliers, has been an emerging topic for several years [Carter/Monczka 2005]. Around the year 2000 and following years, online marketplaces, reverse auctions, and desktop procurements systems were among the various e-procurement-related topics of interest [Eyholzer 2002]. Now that the euphoria surrounding e-business in general has abated, there is also less talk about e-procurement. But what is the role of information technology in the procurement function of large companies today? The study at hand addresses this question for the top 200 companies in Switzerland.

For years, the research group behind this paper has been conducting a long-term study project on the use of ICT for B2B-related business processes. In 2003, an initial e-procurement study was carried out on a small scale [Tanner 2003]. It was embedded in the so-called “E-Supplier Initiative” and showed the need for action in the area of electronic invoice exchange. The research group subsequently launched the initiative swissDIGIN.

This paper presents the most recent and more broadly-based study which aims to capture the current status of market development, identify progress, and identify current topics requiring action for future research projects. In this study, we put a focus on the current state of the art in major companies who have shown in the past that they set the tone for the whole market, authoritatively defining for small and medium enterprises both the rules of the game and the instruments to be used.

The paper is structured as follows: The following chapter provides a short literature review and describes our research objectives. The research design and the characterisation of the control sample are then presented. The main section contains a discussion of the trends and challenges in e-procurement drawn from the empirical survey. The paper concludes with a discussion of the results and its limitations.

## 2 Literature Review and Objectives of the Study

### 2.1 Literature Review

Procurement plays a major role in manufacturing and trade, which can significantly influence a company’s success. As a core function it is, however, subjected to the mega trends of the market. Its day to day existence is very much defined by growing procurement volumes due to greater concentration of business on core competences, globalisation of procurement markets, growing market dynamics as well as the ever shorter product lifecycle [Belz/Mühlemeyer 2001].

For a procurement organisation to operate both efficiently and effectively in such a complex environment useful structures need to be created and suitable instruments put to use [Eichler 2003, Möhrstädt et al. 2001]. Information technology

can have an important function in this regard [Kearney 2004]. Used appropriately it can offer:

- smoother and faster process flow,
- efficient distribution of information,
- decentralisation of tasks and decisions,
- increased transparency and better control,

In addition, information technology helps not only to support internal processes, but also those involving business partners [Minhahan 2005]. In this way information technology grows in importance in the daily business of procurement managers [Aberdeen Group 2003 and 2005].

Electronic Data Interchange (EDI), and with it the streamlining of the purchasing process, has been a research topic for almost 20 years. There have been many studies on the effects of the electronic support in business processes which were published in leading journals [e.g. Iacovou et al. 1995; Lim/Palvia 2001; Dai/Kauffman 2002; Lee et al. 2004; Beck et al. 2005]. The study presented in this article was not motivated by the academic discussion but was initiated by industry partners which had specific questions regarding the Swiss market. The article does thus not immerse itself in the treatment of the vast amount of academic literature regarding the issue of e-procurement but limits itself to a particular analysis which was of interest to Swiss companies at a given point in time. The authors hope to provide a source for other authors who are interested in comparison of the state of the art of e-procurement over time or between countries.

## **2.2 Research Objectives**

Based on the situation described above, the study has the following objectives:

- Describing the significance and the current status of the use of information technology in procurement.
- Identification of the challenges involved in using IT in procurement.
- Identifying priorities in the further development of IT for procurement.

Four topics are covered in depth: (1) trends and challenges in procurement, (2) challenges in the utilisation of IT for procurement, (3) further development of the use of IT in procurement, and (4) the hot topics of SRM and e-invoicing.

## **3 Research Design and Characteristic of Control Sample**

### **3.1 Method of Investigation**

The population for this study consists of the *200 privately owned companies* who are the *major employers in Switzerland* according to the listing entitled “Top 2004 – the largest companies in Switzerland“ published by the Swiss business maga-

zine Handelszeitung [Handelszeitung 2004]. The company names were taken from the corresponding database. In a first step, we telephoned the companies and identified the people in charge of procurement in the company or group. Once we had the name of the responsible person, we sent a personal letter explaining the study objectives and the link to the online questionnaire. The questionnaire was available in German and English. The collection of data was carried out in November 2005. Following this, the results were evaluated and processed by the research group.

### **3.2 Response and characterisation of the participants**

68 companies in total took part in the study, resulting in a return rate of 34 %. Four of the questionnaires had to be discarded. They had been completed by small group companies whose procurement function did not demonstrate the characteristics of a large company and did not play a major role within the group.

The participants in the study were broken down by the size of their company, the sector they are in as well as their procurement volume and job function. This study describes the situation and evaluation of the responding companies, but in spite of the comprehensiveness of the inquiry, it cannot be described as representative for Switzerland as a whole.

### **3.3 Company size**

Of the participating companies, 76.6 % employed over 1000 staff (calculated as full-time equivalents). Companies with less than 500 employees were subsidiaries of groups of companies who were either responsible for most of the company's purchasing or else had the highest procurement volume in the group. In total, 28 % of the respondents indicated that they were answering from the perspective of a subsidiary. The remainder answered the question from the perspective of the procurement organisation of an independent company, or from the perspective of the corporate group.

### **3.4 Sector affiliation**

The distribution of participating companies with more than 500 employees according to sector was compared with a separate table taken from the Federal Industry Census of the Department of Statistics of 2001. It can be observed that commerce is underrepresented in our study while the machine industry is overrepresented.

### **3.5 Job function of the respondents**

85.9 % of the responses were provided by people with a leading function in the procurement organisation. In five cases the questionnaire was filled in by respondents who were in charge of IT and in a further four cases, by respondents who had a supporting role in procurement.

## 4 E-Procurement: Trends and Challenges

Before the use and role of IT in procurement can be examined, the main goals in procurement should be highlighted. The main emphasis in the utilisation of IT in procurement is very much dependent on the procurement objectives, the particular field and the core business. The latter two criteria influence to a large extent the volume of procurement and the requirements of a company.

### 4.1 Main goals in procurement

Reduction of purchase prices is the top priority when goal-setting in procurement (cf. Figure 1). This classical goal is given very high priority, with 56.3 % of responses. The broad objective of optimising the total costs of procurement is, with the exception of four companies, ranked as rather high or very high priority.

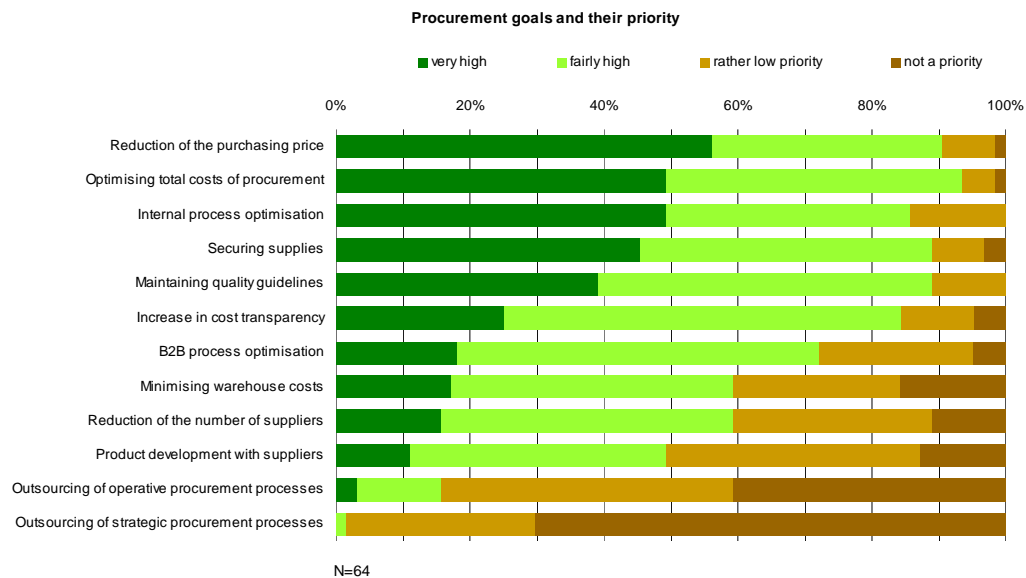


Figure 1: Reduction of purchasing price has highest priority

The internal optimisation of processes plays an important role in this. 48.4 % of participants grant it very high priority and here they seem to identify untapped potential. In contrast, B2B process optimisation was only given high priority by 17.2 %.

Outsourcing of strategic or operative processes did not seem to be an important issue from the procurement perspective. This is in accordance with another Swiss survey specialised on outsourcing [Tanner et al. 2006].

### 4.2 Electronic Data Interchange with suppliers

The potential of information technology also lies in the design of processes beyond the company's borders [CAPS Research 2003; Carter/Monczka 2005]. It was therefore investigated to what degree the interchange of structured, electronic

business documents with suppliers is developed in the TOP 200 companies in Switzerland, such as orders, despatch advice or invoices.

#### **4.2.1 Greatest volume with electronic orders and invoices**

53.2 % of the companies who exchange business documents completely electronically with their suppliers (i.e. transmission or receipt of documents takes place in structured form without renewed manual data entry) reported doing this with the following documents:

- Purchase order 84.8 %
- Invoice 57.6 %
- Order confirmation 57.6 %
- Request for quote/bid 57.6 %
- Despatch advice 48.5 %

If the documents which are exchanged electronically are compared with the total number of documents, including those in paper form, orders and invoices achieve the highest values. Other types of documents lag somewhat behind. In addition it can be ascertained that few companies consistently use the electronic route. The majority of respondents exchange less than 20 % of all types of documents electronically with suppliers.

#### **4.2.2 Lack of supplier involvement and balanced B2B solution scenarios**

The potential of electronic process optimisation outside the company is used by few study participants to any great extent. Almost half (46.8 %) of the companies do not exchange documents electronically with their suppliers. Only 14.6 % of the responding companies exchange documents electronically with 100 or more suppliers.

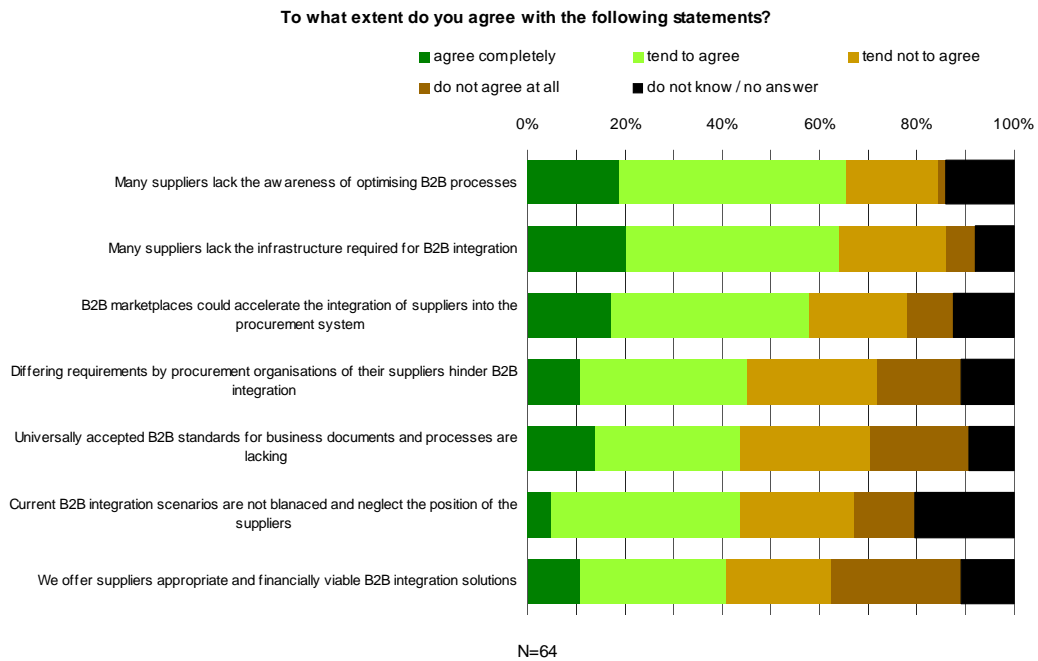
In order to get to the root of why integrated B2B solutions have only penetrated to a small extent with suppliers, study participants were confronted with a variety of statements and asked to what extent they agreed (cf. Figure 2). Their answers do not provide a clear picture of the cross-section of the TOP 200. This would require a more in-depth investigation.

Over 60 % of procurement organisations judge the suppliers' lack of awareness and infrastructure to optimise B2B processes as a hindrance on the way to integrated B2B solution scenarios.

However, 48.4 % of the respondents admit that suppliers cannot always be offered appropriate or affordable integration solutions. In addition, the majority of the companies agree with the statement that the current B2B scenarios are not balanced and the position of the suppliers is insufficiently considered, although only 4.7 % of respondents agree completely with the latter.

Over 40 % of the companies see the varying requirements of the procurement organisation to their suppliers as a hindrance. Almost as many lack accepted and widespread B2B standards for business documents and processes.

B2B marketplaces could accelerate the integration of suppliers with the procurement system of companies. 57.8 % of the study participants tend to agree or agree completely with this statement.



**Figure 2: Lack of involvement of suppliers, as well as inadequate solution scenarios as a hindrance to increased B2B integration**

Noteworthy in Figure 2 is also the high proportion of companies who did not comment on the statements. The proportion of companies who did not respond to the statement about the balance of current B2B integration scenarios was even over 20 %.

### 4.3 Challenges in the utilisation of IT for procurement

The study shows that IT without doubt plays a significant role in everyday procurement, but that the expectations of IT are rarely completely fulfilled. We investigated what procurement managers see as the current challenges.

#### *High costs, few suppliers and deficient master data*

One of the biggest difficulties seems to be the high introduction costs for new solutions (cf. Figure 3). This was named by 61.3 % of the study participants. Closely connected with this is the statement of 48.4 % of the companies that the benefit and the potential of new IT solutions are difficult to appraise. This should lead the solution providers to deduce that the challenge is to give high priority to

cost/benefit considerations and, in relation to this, to transparent, open communication.

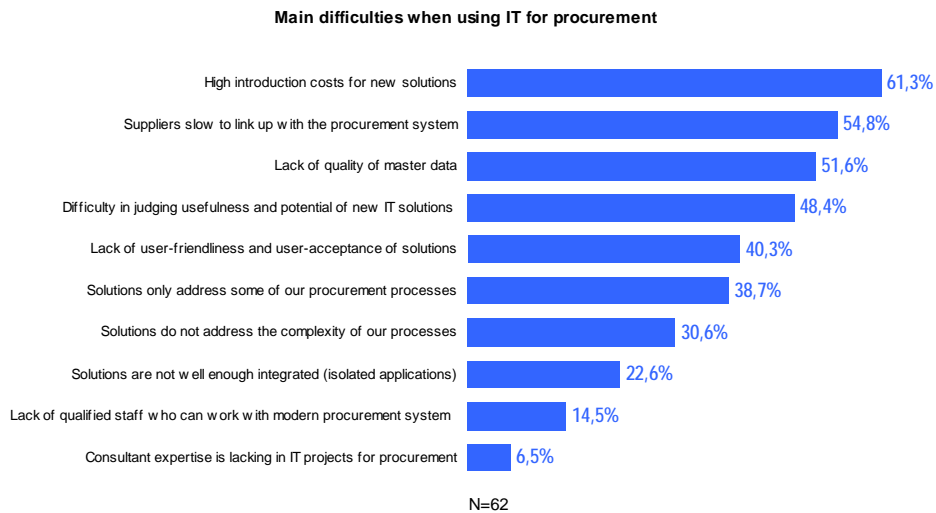
As shown earlier, it was ascertained that Electronic Document Interchange with suppliers in the companies is only at an advanced stage in a few companies. 54.8 % of respondents describe the slow integration of suppliers to the procurement system as one of the main difficulties in effectively using appropriate IT solutions. Poor quality of master data remains an ongoing issue [Leukel 2004]. 51.6 % of companies still see a problem here. Four out of ten study participants see a further difficulty in the use of IT in the lack of user-friendliness and user acceptance.

38.6 % of companies assess problems in process support, because only some of the procurement processes can be covered by IT solutions and 30.6 % attribute it to the IT solutions not addressing the complexity of the processes. In total, however, only 22.6 % of the respondents are of the opinion that a major difficulty lies in the lack of fully integrated software solutions.

The lack of qualified staff is (fortunately) a problem for only few of the TOP 200 companies in Switzerland. Only 14.5 % of the respondents see a problem here. This contrasts with the results of an international study by the Economist [Economist, 2005, p. 23] commissioned by SAP, which was conducted with 350 management board members. 58 % of participants reported that the lack of qualified staff and training was the greatest challenge to achieving maximum efficiency in procurement. It is quite possible that, in comparison, companies in Switzerland can count on better educated staff.

Consultant expertise does not seem to cause a bottleneck for further development of IT for procurement, as only 6.5 % see any difficulty in this area. The study participants were also asked to what extent they would agree that the quality of data on expenditure in the company was insufficient. 39.1 % agreed completely or tended to agree. 28.1 % of companies reported in addition that many orders were placed outside the negotiated contracts, described as maverick buying [Hartmann 1999, 47].





**Figure 3: Main difficulties in the use of IT for procurement**

## 4.4 Further development of the use of IT in procurement

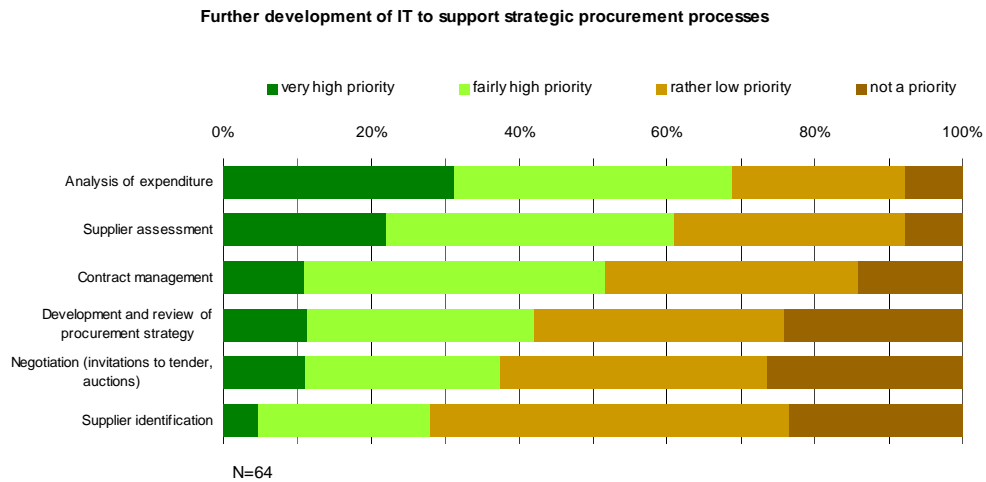
Lastly, the procurement heads were asked how they estimated the further development of their IT utilisation, who the driving force in the company was in this regard and what the main focus would be. They were also asked to make statements regarding their planned expenditure for the next two years.

### 4.4.1 Strategic level: Optimisation of transparency and reporting in focus

The companies were asked where their priorities lie in the enhancement of IT in their own company to support strategic and also operative procurement processes (cf. Figure 4).

In the case of *strategic processes* it is striking that the main focus is on reporting functions. Nearly 70 % of the companies give high or very high priority to optimising the analysis of expenditure. IT support of supplier assessment is also given above average priority with over 60 % mentioning it.

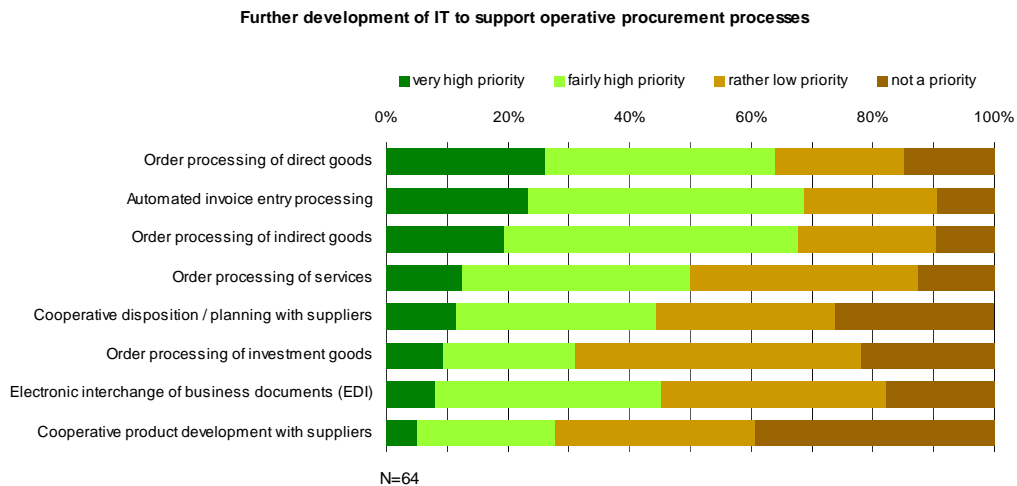
It may come as a surprise to find that the further development of IT in the areas of sourcing processes (supplier identification, negotiation) does not receive higher priority. In view of the efforts made to reduce prices and the low usage of online auctions and invitations to tender, higher values would have been expected here.



**Figure 4: Further development of IT to support strategic procurement processes**

#### 4.4.2 Operative level: Optimisation of order and invoice processing in focus

In the further development of IT support of *operative processes*, order and invoice processing are at the top of the list of priorities (cf. Figure 5). The optimisation of order processing of direct goods takes priority over indirect goods, services and investment goods. If the answers with high priority and fairly high priority are added together, the introduction or enhancement of automated invoice entry processing attains the highest value with 68.8 %.



**Figure 5: Further development of IT to support operative procurement processes**

With regard to the exchange of electronically structured business documents such as orders, invoices and dispatch advices, the companies tend to be less enthusiastic. In only 8.1 % of the responding companies is the dealing of this issue given high priority.

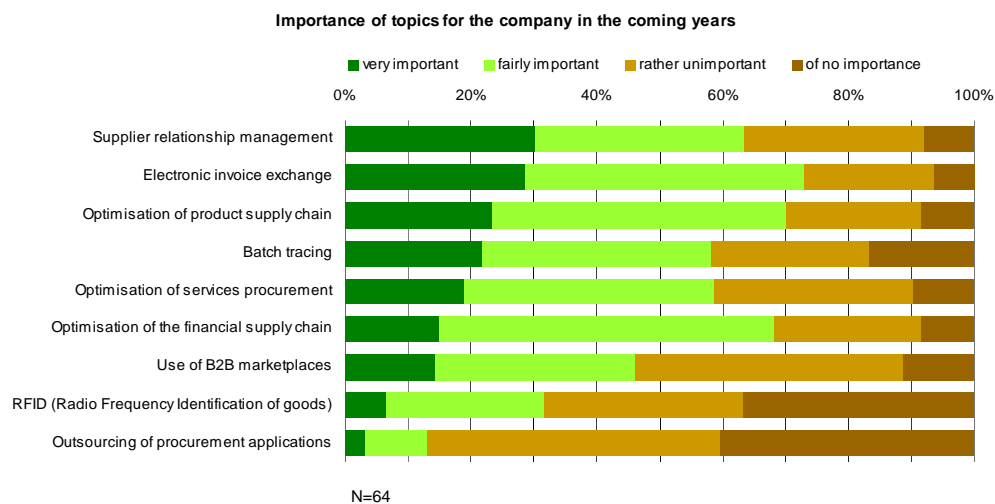
Considering that cooperative disposition and planning with suppliers is not important to all companies and sectors, 42.2 % of companies still attach very high or fairly high priority to developing this area. This corresponds with the data on unfulfilled expectations in the use of these IT tools.

#### 4.5 Hot topics: SRM and e-invoicing

Finally, the survey participants were asked to estimate the importance in the coming years of nine pre-selected topics (cf. Figure 6).

The broadly diversified potentials of the comprehensive “Supplier Relationship Management” concept (SRM) will make it the main topic of the coming years. 30.1 % of companies rate SRM as very important, a further 32.4 % as fairly important. The question as to whether the strategic or operative functions are more in the foreground is not answered.

Electronic exchange of invoices (e-invoicing) is a topic for the future in over 70 % of the companies. Almost 30 % rate it as very important. This may be, on the one hand, due to the potential for optimisation of these administrative processes, but on the other hand it could be due to the legal conditions which have been created, increasing acceptance of electronic invoicing as well as advanced offers of provision of services.



**Figure 6: Importance of topics for the coming years**

The optimisation of the Product Supply Chain is judged as slightly more important than that of the Financial Supply Chain. Along with the highly rated importance of SRM, this underlines the intention of the companies to tackle process improvements comprehensively and beyond company borders.

Although batch tracing is primarily a central requirement in the process industry, this topic was also rated as important or very important by companies in other

sectors. It is to be assumed that some study participants equated this with the tracing of orders.

45.3 % of the procurement organisations rate the use of B2B marketplaces as a very important or fairly important topic for the coming years. The topic of *outsourcing* of procurement applications receives little attention from the study participants. Again, this is in line with another Swiss study [Tanner et al. 2006]. Only 12.5 % of them classify it as fairly important or very important.

RFID as a new technology for identification of goods is a focal point for providers, science and media. However the survey shows that in procurement organisations the topic is only judged very important by 6.7 % and quite important by a further 23 % for the coming years.

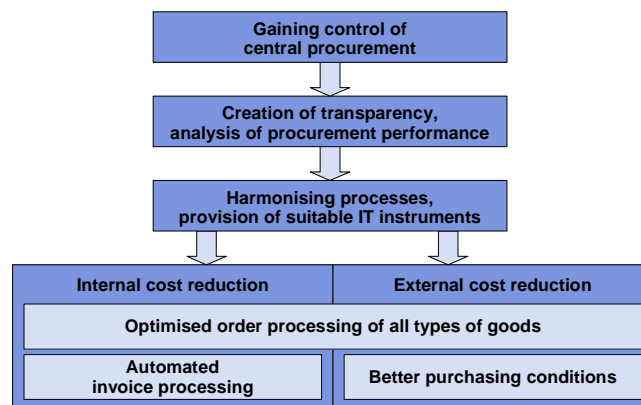
## 5 Discussion of Results

The last few years have been rather quiet in the area of e-procurement. Online marketplaces, auctions and internet based tendering have not revolutionised procurement. As in other fields of application of e-business, however, one should not assume that nothing is happening in the procurement departments in the IT field.

Over the last five years, every second responding company has invested more than a quarter of a million Swiss francs in the further development of IT for procurement. It will increase even more: although large projects are not planned, half of the companies will invest an annual sum of more than 100,000 Swiss Francs (62,500 Euros) over the next two years.

### 5.1 Procurement goals remain stable

Goals in procurement have largely remained stable in the last few years as compared to a previous study on procurement [c.f. Tanner 2003]. From the the current study, the following big picture can be deduced (Figure 7):



**Figure 7: Functional chain of optimisation in procurement**

The guiding theme in procurement departments is cost reduction, most importantly of purchasing prices but also of total costs, therefore including internal

process, logistic and quality assurance costs. The second issue is transparency and control. It is no longer sufficient that, in the vast majority of cases, purchasing goes well and that procurement is well organised in most fields. It must achieve the optimum level across the board. Three quarters of the participants in the study ranked information technology as important. The first task of IT is the central coordination and demand aggregation, which was named as very high priority by the majority questioned.

Whoever expects a push in auctions as a result of cost pressure, will learn better from this study. The companies optimise their procurement from inside to outside. On the strategic level, spend analysis, supplier evaluation, and contract management are the focus of the majority of the companies. On the operative level, automatic invoice entry processing as well as order processing of direct and indirect goods have high ranking, followed by the order processing of services.

## **5.2 Information technology should enable top performance**

The heterogeneity of processes and systems due to decentralised procurement structures which evolved historically makes not only transparency more difficult but also the detection of weak points and the aggregation of demand. The gain of control of central procurement should counteract this, which is not to say that procurement as a whole should be centralised. Complete transparency tracks down the remaining weak points both internally and externally. Investment in IT should lead to their elimination. IT investment pays for itself more quickly when used in a broader way, where possible with company-wide application. It further increases transparency because performance indicators are uniformly raised and benchmarks can be set. New processes are designed and, as far as possible, standardised. These processes include the suppliers, at least in as far as the suppliers must agree to defined processes and IT interfaces. Of course, renegotiation happens too, in which conventional negotiation procedures will, in the next five years, continue to put online auctions in the shade. Where it is worthwhile, internal optimisation will also be invested in – the automatic processing of incoming invoices is the most prominent example at present.

If procurement was focused on direct goods in the past, it today has indirect goods undiminished in sight. Order processing of services is also becoming a priority for half of the responding companies.

It seems as if procurement has completed a stringent fitness programme. In this, it might now be on the right path. The project goals have largely been achieved and 80 % of the companies are, at least, largely satisfied with their current systems. The fact that more investment is being made despite this, shows that procurement is striving for peak performance.

This does not pass the suppliers by. They are affected by practically all current operative issues. It does not look different in regard to future issues. The number of companies which already exchange business documents electronically is approximately as large as the number of companies that complain about the sluggish

integration of suppliers into the procurement system. Only 20 % of the procurement heads attest sufficient awareness to their supplier for the optimisation of B2B processes. The capability necessary for a B2B integration infrastructure for suppliers is not rated higher. Just half of the procurement organisations also confess that B2B integration scenarios do not consider the supplier's situation enough and that their company cannot always offer a suitable and financially acceptable B2B integration solution: Two thirds of those companies which offer their supplier Web-EDI make use of a B2B marketplace or a transaction platform.

### **5.3 All involved parties are called upon to act**

As well as the difficulties within the supplier integration, there are further problem areas in the roll-out of IT. High installation costs and problems with the quality of master data are also complained about by the majority of respondents. In order that procurement's fitness programme is effective and that all the involved companies can stand their ground amidst global competition, the following areas of application can be derived from the study:

- The *procurement organisations* must improve the quality of their master data themselves and test whether their procurement process really needs to be so multifaceted and complex. They must also build bridges for their suppliers. In many cases, their own particular idea cannot be carried through on purchasing power alone – balanced B2B integration scenarios can help keep a lot of spanners out of the works.
- The *suppliers* must also work on their B2B fitness. Is their awareness and is their competence in this area really as bad as their image suggests? The slogan is: Build up competence and be proactive in showing customers how a balanced integration scenario for their own product segment could look.
- *Providers of procurement solutions* should have a vital interest in having well founded arguments with which to defend the difficult-to-appreciate benefits of their solutions. The insufficient user-friendliness and user acceptance should also be addressed. The main objection of procurement organisations, i.e., the high installation costs of new solutions should also be taken seriously. The cause of high costs lies to a decisive extent in the organisation of the buyer and supplier – above all in the heterogeneity of these organisations – but they may well be able to do something about this. With best practice, a certain degree of openness, cooperation in standardisation and support of interoperability, some of the complexity can be reduced and the pace of market development can be accelerated in their own interests.

## **6 Conclusions and Limitations**

Regarding future topics, supplier relationship management takes first place. All the other topics necessitate solutions which go beyond the borders of the own specific organisation. If all the market participants want to develop these relation-

ships individually, one would have to wait a lot longer for any substantial progress. However, a three quarter majority of the companies are prepared to tackle the greatest challenges such as supplier integration together with other procurement organisations and partners.

This study is a major milestone in a longitudinal research process on the topic of e-procurement. According to the best knowledge of the authors, there has never been a comparably extensive and long-term-oriented series of studies about this topic in Switzerland. The findings have a high explanatory value due to the specifically targeted group of procurement heads and the satisfactory return rate (68 out of 200 questionnaires were returned). Although the current study is quite comprehensive it cannot be described as representative as it only reflects the view of large companies and of Swiss economy which has turned out to be quite particular in some aspects (e.g. very high IT penetration, high IT skills in companies, high potential of IT investments) [Dettling et al. 2004, Schubert/Leimstoll 2007].

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