

MARKET ANALYSIS OF ELECTRONIC BUSINESS IN SWITZERLAND AND COMPARISONS WITH EUROPE

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ABSTRACT

A representative market study was carried out to determine the penetration of electronic business in Swiss companies. A random sample was used in which companies were classified by industry and size, thus allowing a systematic extrapolation. We illustrate the importance of information technology for the electronic business by the numbers of computers in use and the corresponding expenditure on information technologies and compare these with figures for a number of other European countries and the USA. Subsequently, we discuss the use of Internet services and of websites, including objectives and success factors for electronic business as well as potential problems with projects in this field. Finally, we classify companies according to the maturity of their achievements in electronic business.

1. OBJECTIVES AND MAIN FINDINGS OF THE MARKET ANALYSIS

Electronic business is the integration of IT and particularly the Internet into business processes to change organizations, customer relationships and business. According to some authors, see e.g. [Cunningham/Fröschl 1999], Europe and its companies have problems dealing with both threats and opportunities of electronic business. Is this true for Switzerland? What is the state of the art of electronic business for Swiss companies? Are there projects to reshape the business? What are the success factors and which business objectives have already been met? These and other questions have motivated us to analyse the Swiss market, to evaluate the proliferation of electronic business in Swiss companies, and to grasp some of the experience gained during the implementation of electronic business.

The analyses in this article are based on a nationwide survey. An information technology market watch on companies has been carried out by the University of Fribourg, Switzerland for a number of years, which has made it possible to do comparisons over time. In addition, the consulting company KPMG brought in its pioneering role in surveying electronic business strategies in Europe.

'Companies' here refers to all companies included in the overall total: businesses, administrative institutions, all kinds of associations, and non-profit organisations. The sample for the market study was taken from the Swiss Statistical Office in order to allow a systematic extrapolation by industry and size. Other analyses were made based on absolute numbers without giving answers a specific weight. Methodology and amplitude of the market analysis are given in the Appendix.

The main findings of our analysis are:

- ❑ If we compare some ratios, such as the number of computers used or the amount of relevant investment made in Switzerland with figures for neighbouring countries and the USA, Switzerland is found to be in a leading position. We can therefore conclude that the results of this electronic business study in Switzerland will also reflect what is, or will be taking place in other industrialised countries.
- ❑ As a proportion of annual turnover of companies, the extrapolated turnover in electronic business in Switzerland amounts to 2%, with an upward trend. However, companies are also investigating internet technology in order to improve business processes, customer relationships, and service quality.
- ❑ Banks, which were in a leading position up to now with respect to IT, will be outstripped by wholesale trade and insurance business: about 80% of the wholesale companies and over 70% of the insurance companies use the Internet. The lowest use of the Internet is in the retail sector and by manufacturing companies.
- ❑ Companies state that the principal objectives in electronic business are to improve customer relations, to increase order processing speed and to reduce order processing cost. As for process management improvements, electronic business projects have largely lived up to expectations.
- ❑ The most important success factors for electronic business are respect for data confidentiality and security, the setting up of reliable solutions in information technology, and the efforts made with business partners to assure a high level of acceptance.
- ❑ The major obstacles for the implementation of electronic business are a lack of human resources and of technical know-how. In addition, integration difficulties with existing systems and immature software are also major problems. Software solutions for electronic business are very often company owned in-house developments or further developments of standard solutions.

In chapter 2 we illustrate some specific ratios concerning information technologies as a precondition for electronic business. Chapter 3 analyses the results referring to Internet use, the existence of websites, the objectives and success factors of electronic business and problems that have occurred during electronic business projects. Finally, in chapter 4 the companies are classified according to their maturity based on the level of integration of electronic business into business processes.

2. INFORMATION TECHNOLOGIES AS A PRECONDITION FOR ELECTRONIC BUSINESS

There would be no electronic business without the appropriate infrastructure. Electronic business is highly dependent on information technology. The state of the infrastructure can show how soon companies will be able to set up an electronic business solution.

At the beginning of the year 2000 more than 2 million computers were in use within Swiss companies, which at the same time employed 3.5 million persons. According to the results of our inquiry the number of computers used (without palmtops) has increased by 300,000 units or 17% compared with the year 1998. In figure 1 the computers in use have been classified into the categories of PC, notebook, server and mainframe.

The most substantial increase, one of 70% compared to 1998 [Häuschen/Kueng/Wismer 1998], can be found within the category of notebooks. More and more, these machines are replacing desktop PCs. A substantial increase of nearly 50% can also be seen within the category of server.

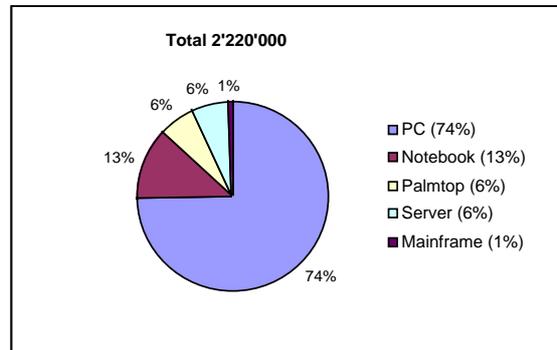


Figure 1: Computer inventory in five categories

The explanation for this growth is the propagation of networks and of Internet technologies (network server and web server). This is important because the existence of an intranet (company network) is an enabler for electronic business. Companies that have already set up an intranet can easily allow their employees to order electronically, or link their network to those of suppliers and customers to exchange information or to carry out business transactions.

Professionally used palmtop computers have been considered within this study for the first time. This new category already amounts to 6% of the total inventory of computers with a frequency comparable to the server category.

It is too early to predict how this new trend will affect business processes and consequently electronic business. However, these small devices will provide their owners with mobile internet access which could foster mobile commerce.

It is useful to compare the number of computers used in Switzerland to the number used in other countries. Statistically available is the computer frequency per 100 employees, so-called white collar workers (blue collar workers were not included). Figure 2 gives the number of computers used professionally per one hundred employees for a number of countries. This material is based on the “European Information Technology Observatory 2000“ [EITO 2000] from the year 1998.

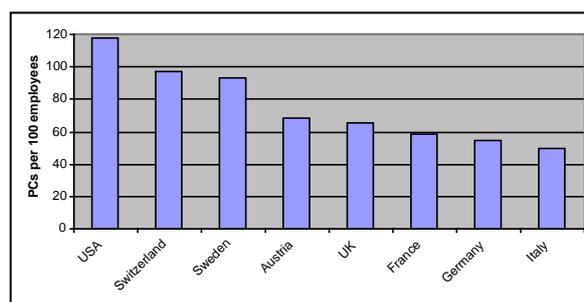


Figure 2: Number of business PCs per 100 white collar workers [EITO 2000]

Switzerland thus has one of the highest computer frequencies per 100 employees in comparison with other industrialised countries.

The reason for this is certainly the high percentage of service companies in Switzerland. These companies are almost all computerised, which does not mean, however, that they all carry out electronic business.

A further analysis of information technologies in companies was done: taking desktop computers and terminals together we obtain the number of computerised workplaces. Since 1996 we have also included

notebooks as a separate sub-category. Figure 3 shows the development of the figures for computerised workplaces. The number has grown steadily over the last few years, with ratios of 10% per annum during the years 1994 to 1998, though the increase has recently declined slightly. In the year 2000 more than 2 million working places were equipped with computers. This means that nearly 60 percent of all existing workplaces were computerised.

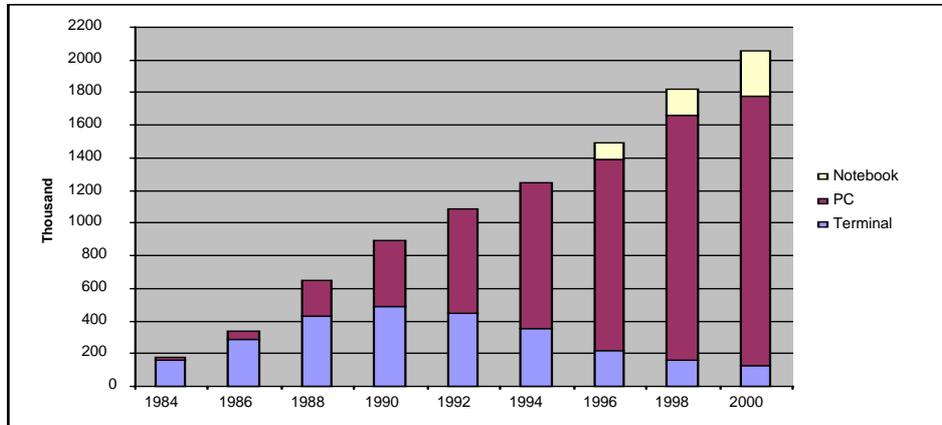


Figure 3: Development of computerised workplaces 1984–2000

Another interesting development is the on-going substitution PCs for terminals. The total number of terminals has fallen to 25% compared to the year 1990. During the last few years we have also seen a tendency for notebooks to replace a substantial percentage of desktop PCs. The quality of notebooks has improved so that they can now be used as fully operational desktop PCs.

In 1999 Swiss companies spent 19 billion CHF on information technologies. Compared to the previous study [Häuschen/Kueng/Wismer 1998] a substantial increase in investments can be observed. The boost of 2 billion CHF is mainly caused by higher investments in hardware and software.

Figure 4 presents the expenditure on information technologies per inhabitant for selected countries. The results are based on [EITO 2000] and refer to the year 1998. Expenditure figures are more difficult to compare than numbers of units sold because of exchange rate variations.

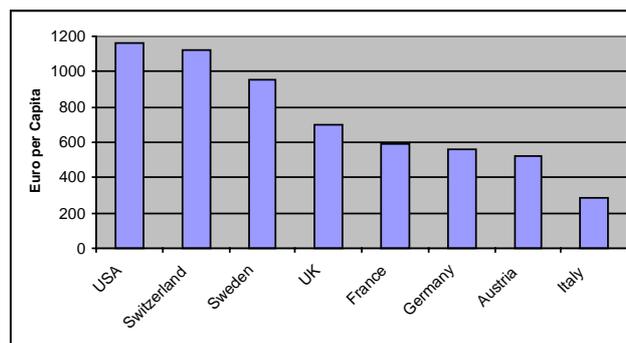


Figure 4: IT expenditure per capita (Euro) in selected countries [EITO 2000]

Switzerland comes in second behind the United States in respect to per capita expenditure on information technologies.

In all of the countries mentioned in figure 4 we find considerable electronic business activity. The USA is the one which is in the leading position. Further research has to be done to validate the hypothesis that higher expenditure on information technologies leads to more successful electronic business projects. We will show in the next chapter that psychological factors are important too.

3. INTERNET AND ELECTRONIC BUSINESS IN SWITZERLAND

3.1. Market Analysis of Electronic Business

We demonstrate the importance of electronic business for Swiss companies by the turnover that is achieved by electronic business:

As a proportion of annual turnover of companies, the extrapolated turnover in electronic business in Switzerland amounts to 2%, with an expected increase to 4% in 2000.

In the year 1999 ninety-eight companies (11%) of the 891 returning questionnaires made some part of their turnover with electronic business. These companies produced an average of 15% of their total turnover with electronic business. In fact, all those companies with some turnover in electronic business in 1999 expect an increase in electronic business turnover for the year 2000, though most of them feel that the increase will be moderate. Furthermore, for the year 2000, the number of companies with turnover in electronic business is expected to increase from 11% to 15%.

The University of Bern regularly publishes studies in the field of business-to-consumer electronic commerce. A recent study by [Zahner/Hunziker 2000] looks at the retail trade. It shows that more than 50% of the companies achieve less than 5% of their turnover through Internet sales.

Electronic business will not necessarily have an impact on turnover. A company can also engage in electronic business by exchanging information with its partners. In chapter 3.3 we consider companies that use electronic business to improve their business processes.

It is also interesting to see that products ordered through electronic business in Switzerland are very rarely paid for electronically (e-Cash, credit card) up to the present time.

The main way to pay is by invoice and collection on delivery, sometimes by credit card, but very rarely with electronic money.

The confidence of both companies and individual customers in the existing security systems seems to be rather low, resulting in most payments being made the traditional (offline) way.

3.2. Use of Internet and Existence of Company Websites

The development of the Internet is considered to have paved the way for electronic business. For this reason we will first examine the use of the Internet in companies. Subsequently, we will see what kind of companies have set up their own website.

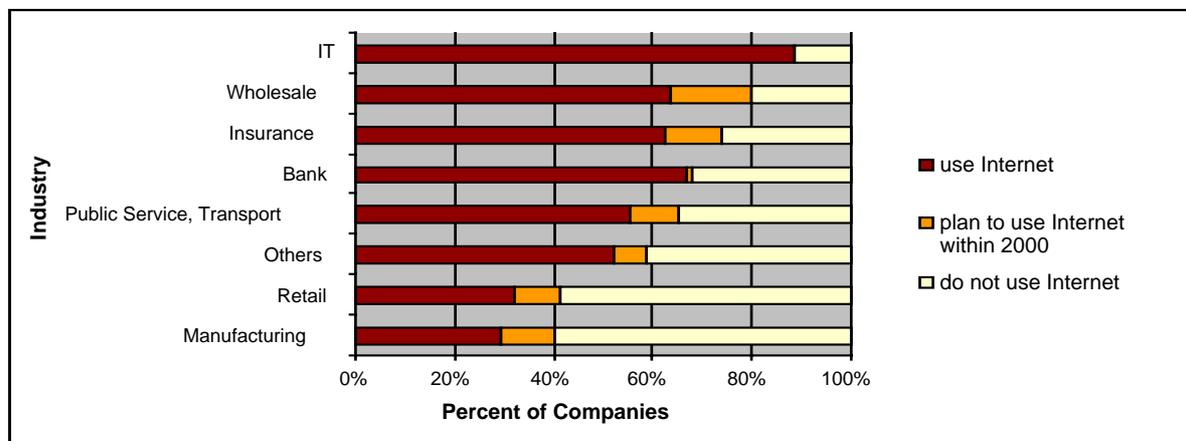


Figure 5: Internet access by industry

Figure 5 shows that the use of the Internet is, among others, dependent on the industry in which the company operates. As one would expect, IT companies are ranked first, followed by companies working in the wholesale trade, the insurance business and banks. In Switzerland 67% of banks already use the Internet but for the year 2000 they come in only fourth behind the wholesale trade, the insurance companies, and of course the IT companies. By the end of the year 2000 about 80% of the wholesale companies (plus 16%) and 73% of the insurance companies (plus 12%) will be using the Internet. The lowest use of the Internet is in the retail sector and by manufacturing companies.

The larger the company, the higher the probability that the Internet is in use. Of companies with more than 20 employees 80% use Internet; for companies with more than 100 employees Internet use is over 90%. However, the overall percentage of companies with Internet access at the beginning of the year 2000 was 47%. It is interesting to note that all categories, except companies with one to five employees, were above this average. The overall average is pulled down by small companies, which make up the majority of Swiss companies.

A comprehensive analysis of the use of Internet in small and middle-sized Swiss companies in 1999 is provided by [Sieber/Hunziker 1999]. A classification of the companies gave 30% Internet users and 14% planning to use Internet within 1999. Thus today, half of all companies in Switzerland are using internet technology.

An increase of over 20% in Internet use within small and middle-sized companies was expected between 1999 and 2000. This encouraging tendency is confirmed by the inquiries made by [Harabi/Schoch 2000] who observed similar developments in other European countries.

117,000 (42%) of the 280,000 companies in Switzerland will have their own website by the end of 2000.

At the time of the survey, 25% of the companies had their own website. Furthermore, 17% of the companies planned to have their own website during the year 2000. This means that by the end of the year 2000, 42% of all companies will be present on the WWW.

The classification by industry revealed the leading position of IT and banks with over 40%, closely followed by insurance companies. Wholesale trade and ‘others’ come in with about 30%. The strongest increase is to be expected in the IT industry: a further 29% of the companies of this industry will have gone online by the end of 2000.

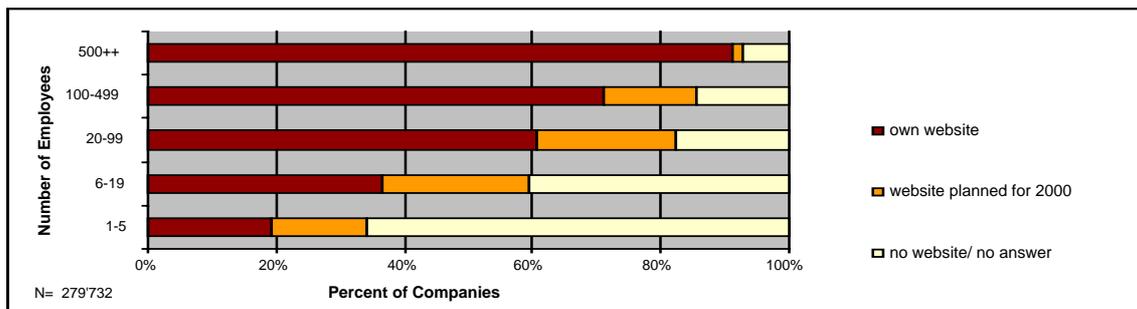


Figure 6: Companies with own website by size

There is a positive correlation between the size of a company and the existence of a homepage. This is clearly shown in figure 6. In fact, nearly all companies with more than 500 employees have their own website, though the small and middle-sized companies are catching up rapidly. This can be seen in the expected growth ratios. Only companies with one to five employees lag behind.

In the year 2000, 74% of companies using the Internet also have their own website.

Compared with other European countries, Swiss companies are well placed. The European Information Technology Observatory found that 24% of European companies with less than 250 employees use the Internet. According to this study, 10% of small and medium-sized companies have their own website [EITO 2000].

3.3. Objectives related to Electronic Business

So far, we have looked at the development of IT equipment, the proliferation of the Internet and the use of the WWW as a prerequisite for electronic business. Now we analyse in more detail what companies wish to achieve with electronic business, how they do it and what problems they encounter.

The principal objectives in electronic business are to improve customer relations, to increase the order processing speed and to reduce order processing cost.

Figure 7 shows the objectives of companies in electronic business sorted according to importance. It is interesting to see that customer relationship management and the improvement of order processing are the top priorities. Finding new customers and increasing turnover are also considered important. Increase in turnover is an objective mainly aimed at by banks, insurance companies, wholesale trade and manufacturing companies.

Customer focus is important to every company and this was recognised long before anybody talked about electronic business. The importance of the objective of improving customer relationships shows that managers hope to be able to act like a local grocery that knows the customers personally while at the same time taking advantage of large companies' economies of scale.

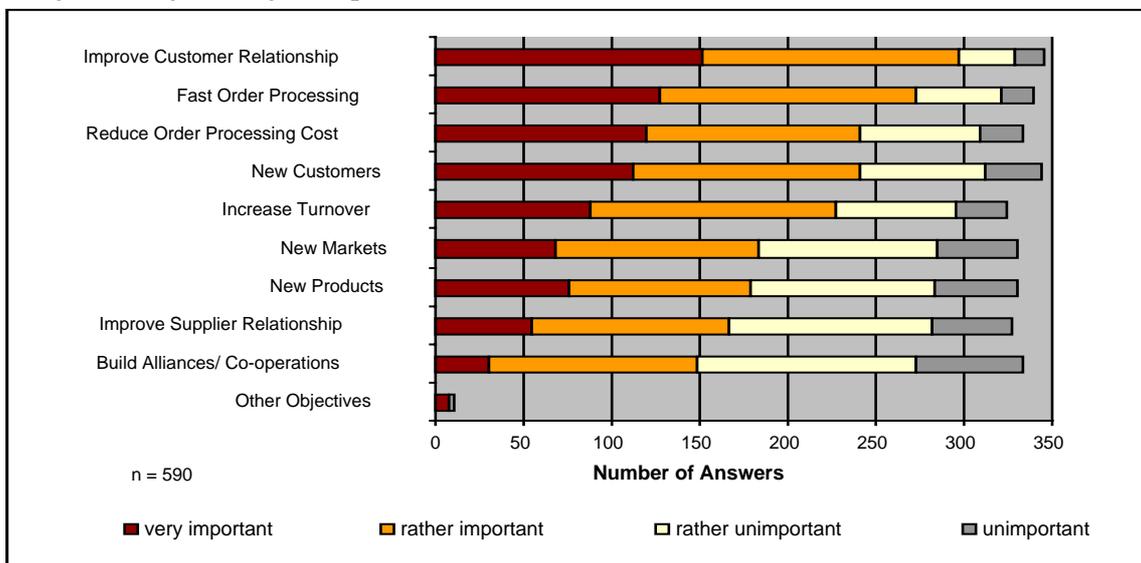


Figure 7: Objectives for electronic business

Of less importance is the launching of new, possibly digital products or services, closer relationships with suppliers, and the setting up of Internet-based co-operations and alliances.

The important question is, however, whether companies have achieved the objectives they have been aiming at. For this analysis a comparison was made between the objectives and subjective evaluation and appreciation of whether these objectives have been attained. The data presents a controversial picture, as very few companies are totally satisfied with the results they have attained (cf. figure 8). Best results in this comparison have been attained in improving the processing speed of orders and reducing their cost. In fact, nearly 22% of the companies answering were completely satisfied with the improvements in order processing and 43% were rather satisfied. The customer relationship was successfully improved by more than 50% of the companies responding.

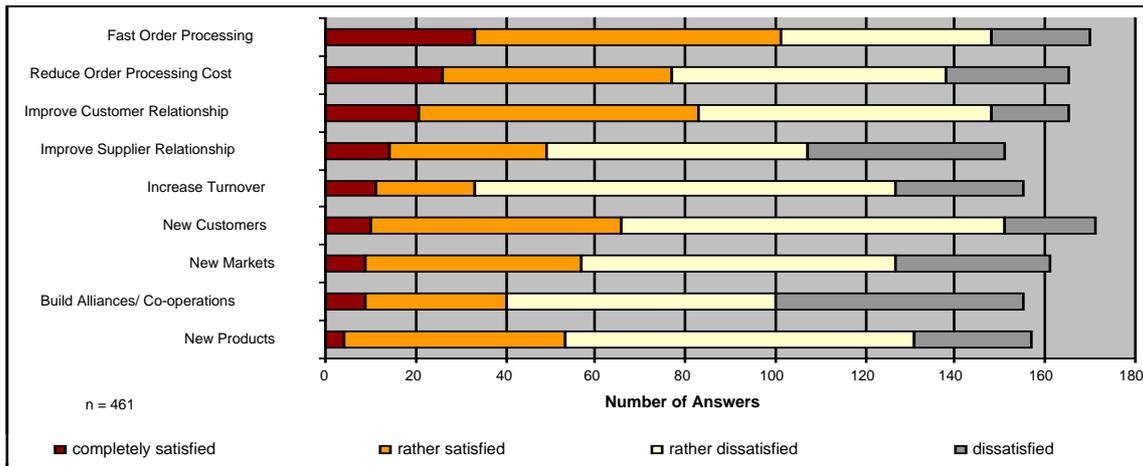


Figure 8: Achievement of objectives

Turnover increase was rated as an important objective, but very few companies are satisfied with the results attained. This means that the expectations in this field are perhaps too ambitious.

In regard to faster order processing electronic business projects have largely lived up to their expectations.

From this we can conclude that electronic business initiatives can be quite useful for business process improvement. One reason for the fact that speed and time aspects are improved more easily than others may be that they mainly depend on company-internal factors. There is no compelling need for interaction with partners or customers to minimise order-processing time. Furthermore, cost and time are objectively measurable, while customer satisfaction or the number of new customers may depend on subjective criteria.

The setting up of co-operations and alliances, the marketing of new products and the conquest of new markets were not given priority as objectives. The results are still not satisfactory, despite the low expectations for these objectives.

3.4. Success Factors for Electronic Business

Recently, there has been extensive reporting of electronic business initiatives which have failed. We showed in the previous section that many expectations are not met. At the same time companies tell us about substantial positive results. So what are the causes of the success of electronic business?

The most important success factors for electronic business are respect for data confidentiality and security, the setting up of reliable solutions in information technology and the efforts made with business partners to assure a high level of acceptance.

Figure 9 shows a list of success factors. Significant differences can be claimed when a ranking is made based on factors considered as very important.

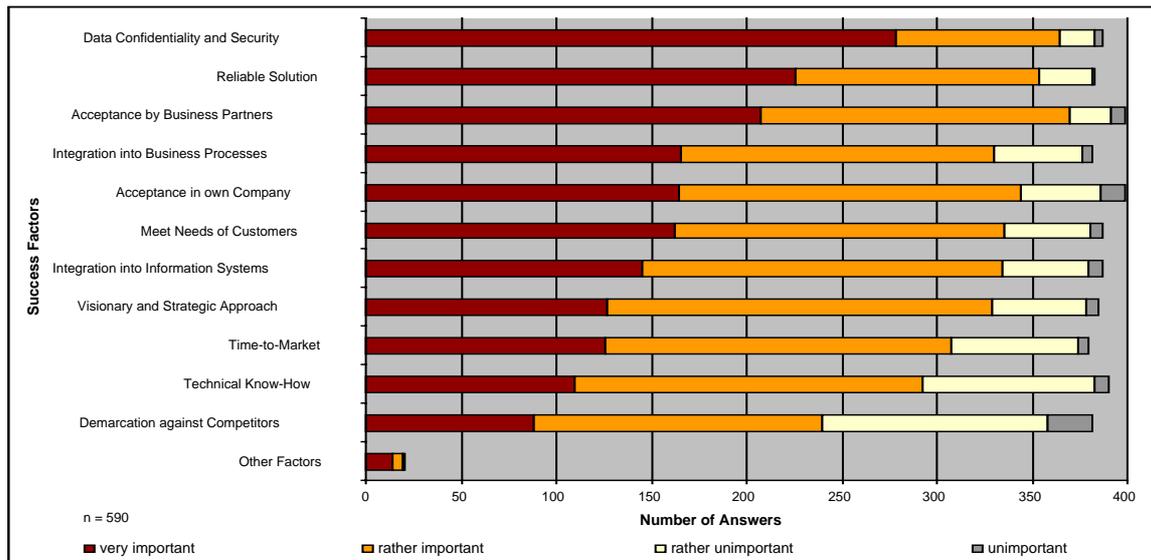


Figure 9: Success factors for electronic business

It is no surprise that data confidentiality and security are considered critical success factors, when we remember that we are working within a worldwide network. An effective and safe worldwide communication system is the prerequisite for any electronic business. This aspect was considered important by 365 of 390 answers, that is 94% of the companies. The establishment of confidence towards customers and business partners also has a very high priority (93%). This second point is obviously closely linked to the first factor, as confidence in the systems can only be gained once the problem of data security has been solved.

This shows that electronic business is not only a question of information technology (cf. chapter 2). Success is extremely dependent on psychological factors. If a customer does not trust a company in all aspects she will not place an order or disclose information about herself. Companies who want to do electronic business have to work hard to gain the confidence of partners and consumers. A recent McKinsey study [Agraval/Arjona/Lemmers 2001] stated that real-time assistance for online-buyers could significantly increase turnover. We think that this is one way to reassure potential customers who are one click away from ordering. Confidence, however, can be lost rapidly if negative news about a successful hacker attack on another company or institution network is unveiled.

Further factors that contribute to the success of electronic business are acceptance within the company itself, meeting the needs of the customers, and the integration of electronic business systems within existing information systems.

3.5. Problems during the Implementation of Electronic Business Projects

The number of companies which have carried out projects in the field of electronic business and reported on their experience is 234 (cf. Figure 10).

The major obstacles to the implementation of electronic business are a lack of human resources and of technical know-how, integration difficulties with existing systems and immature software.

More than half of the 234 companies with experience in the field of electronic business projects complained about shortages of qualified personnel. These can be explained by the current situation in the market for IT personnel. Closely related to this shortfall is lack of technical know-how, which was given as a problem by 35% of the companies in the survey, which were carrying out an electronic business project. The lack of technical know-how is partly bridged by outsourcing certain activities, but this does not solve the problem.

Apart from problems based on lack of human resources, technical problems also appear to be of some importance. About 40% of the companies answering had problems in assimilating the new systems within existing information systems. Very rarely are electronic business solutions integrated or linked electronically with existing enterprise resource planning systems, call centres and marketing systems. It is only companies working in the field of wholesale and retail which have made substantial efforts to bridge this gap.

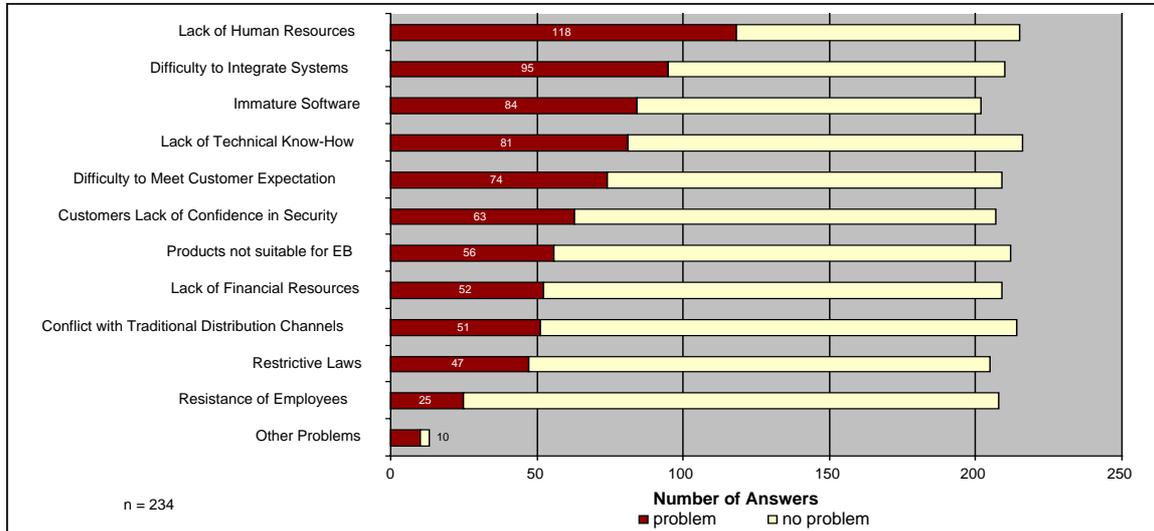


Figure 10: Problems implementing electronic business projects

Problems with immature software were blamed by about 35% of the companies with experience of electronic business projects. The reason for this may be that the majority of the companies are working with in-house software solutions. This means the software is not based on an open standard. An explanation for the high rate of home-made solutions is that the usual standard software packages have not yet fully matured, that they do not meet the requirements of the business, or that such solutions were not even taken into consideration:

Software solutions for electronic business are very often company owned in-house developments or further developments of standard solutions. Out of the 221 companies answering, more than half (113 companies) have developed their own software for electronic business.

In addition to the eight software products proposed for electronic business in the questionnaire, the companies added 30 supplementary software developers which they had done business with. This is a clear indication that no one software company is currently in a dominant market position with its solution.

Although there was no legal basis in Switzerland up to the beginning of 2001, such as a law to confirm the legal acceptance of electronic signatures [BJ 2001], Swiss companies seem to have no problems in doing business over electronic channels. This was also confirmed by a study made by KPMG for Europe, including Switzerland [KPMG 1999].

4. CLASSIFICATION OF COMPANIES WITH ELECTRONIC BUSINESS

The use of the Internet has increased substantially during the last few years, both by private persons and by companies. The use of e-mails as a means of communication has become an integral part of business life. At its beginning, the World Wide Web was mainly an instrument which made available static information. Today, the situation has changed, with the WWW being used for interactive information exchange, for information which is customised for clients, or serving as an instrument for business transactions.

We see four steps on the way to full use of the potential of electronic business:

1. *Information*, such as general information on companies, product catalogues or job offers

2. *Communication*, with services such as search engines, frequently asked questions, e-mail, newsletters/ newsgroups, chat or discussion forums
3. *Order processing*, with online offers, ordering services or electronic payments
4. *Integration*, such as assimilation of electronic business solutions into enterprise resource planning systems, customer retention through one-to-one marketing, online order tracking, and digital agents for consulting and sales.

The current status of web-presence and electronic business activities in Switzerland have been described in previous sections. Companies which have their own website were placed in one of the four groups described above, based on the services they offer and the way they implemented their solution. The results are shown in figure 11.

Approximately 9% of the 590 companies classified are not engaged in electronic business, as we understand it, though they are present on the WWW. They limit their presence to publishing static information. The majority of the companies with their own homepage (57%) offer their target audience an opportunity for interaction, that is, visitors to the website have the possibility to react to the information published. Nearly one quarter of the companies questioned work at the third level where business or private customers can order products and services online. Only 8% of the companies with a homepage have also integrated their online solutions into the existing systems and are making use of the potential to automate and customise order processing.

Comparing the above figures with the average values in a European study [KPMG 1999], Switzerland takes the following positions: for levels 2 and 3 Switzerland scores 57% and 26% compared to 51% and 22% for neighbouring countries; for level 4 Switzerland lags behind somewhat, scoring 8% compared to 12% for the adjacent countries.

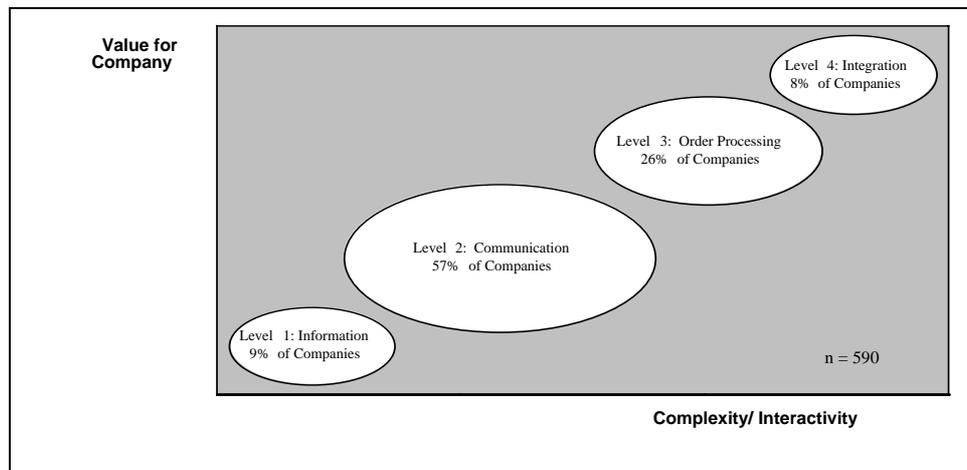


Figure 11: Classification of companies accounting to services offered on their websites

Looking back at the analysis of objectives and what has been achieved we have to conclude that cost and speed aspects can be improved significantly if a company reaches level 3 of our classification. At the integration-level companies can close their feedback-loop electronically. This makes them reliable, fast and flexible, since they can track changes in customer behaviour like a vendor in the local grocery. Once such closed-loop systems run reliably, and provided that they meet customer needs, the potential for successful electronic business is highest, although success is never guaranteed.

In conclusion, the studies in Switzerland and the surrounding countries in Europe clearly show a strong increase in electronic business in the years 1999 and 2000. This is true above all for small and medium-sized companies. Organisations refusing to accept the Internet era will have more and more difficulty competing.

APPENDIX: METHODOLOGY AND AMPLITUDE OF THE MARKET ANALYSIS

A postal survey was carried out during the months of March and April 2000. A total of 5,124 questionnaires each with 30 questions [ITEE 2000] were mailed and 891 companies returned the forms.

Industry	Total	Sample	Return	Rate of Return
Public Service, Transport	37,199	734	178	24.3%
Bank	1,933	514	82	16.0%
Insurance	1,796	444	82	18.5%
Retail	48,825	726	90	12.4%
Wholesale	18,481	574	88	15.3%
Information Technology	7,122	435	83	19.1%
Manufacturing	69,565	843	137	16.3%
Others	94,811	854	151	17.7%
Total	279,732	5,124	891	17.4%

Table 1: Elements of the sample classified by industry

Number of Employees	Total	Sample	Return	Rate of Return
1 to 5	221,343	1,847	248	13.4%
6 to 19	41,992	907	184	20.3%
20 to 99	13,437	1,219	230	18.9%
100 to 499	2,555	818	150	18.3%
500 ++	405	333	79	23.7%
Total	279,732	5,124	891	17.4%

Table 2: Elements of the sample classified by the number of persons working in a company

The random sample is based on the overall total of companies registered in Switzerland referring to the Swiss Federal Census of Companies (cf. Swiss Federal Statistical Office [SFSO 1999]).

The overall total of 279,732 companies is split into eight industries (cf. Table 1) and five groups of different sizes according to the number of persons working in a company (cf. table 2). Of the companies questioned 17.4 % returned a completed questionnaire.

Due to the wide scattering of the companies that answered the questionnaire and due to the structure of the questions we exclude a response bias. Companies without information technologies were reached this way.

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