

ICT and learning in Small-and Mediumsized Enterprises (SMEs)

Report on the Business survey in

Austria

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1 Introduction

Starting in the 70ies economic power and competitiveness of small and medium sized enterprises (SMEs) got more and more linked to the use of new technologies and the introduction of more efficient production processes. In recent years another factor is getting more and more important: the development of skills and qualifications of employees.

In order to ensure that the knowledge of their employees is up-to date knowledge and skills, SMEs are more and more discovering the possibilities and advantages of ICT based learning. For optimised application it is necessary to provide a frame that takes into account the given limitations: Increasingly they have to deal with limited personnel, organisational and financial resources. The situation is furthermore stimulated by the difficulty to formulate detailed training strategies that will enable their employees to be better qualified in order to cope with increased competition. Above all, e-learning technologies, methods and strategies have mostly been developed for the needs of large enterprises and cannot be easily transferred to the needs of SMEs.

This report, published in the framework of the ICT-VET project, describes the processing of the business survey and its results in Austria and tries to point out some of the key issues of eLearning in SMEs.

The survey was targeted at small and medium sized enterprises in the two western regions of Austria: Tyrol and Vorarlberg. These are industrialized, export oriented regions with a highly service-oriented employment structure, which is mainly dominated by tourism sector.

Results of the survey once again show the difficulty to give a coherent picture of the "eLearning situation" in SMEs: SMEs operate in almost every sector of the economy, they have very different organisational and personnel structures, institutional background etc. As a consequence they vary widely in their learning and training needs and it is nearly impossible to make general statements on them.

Nevertheless there seem to emerge two groups of SMEs: The first one being very open minded towards the application of new technologies whereas the second group is more resistant to ICT. It is unclear whether the latter group does not need ICT or is reluctant to use information and communication technologies. Furthermore it is not possible on the basis of the Austrian sample to give a precise statement whether different business branches or the size of the SMEs (or other variables) are the reason for SMEs to belong to one or the other group.

In general, SMEs have the technical capabilities and personal skills to use ICT for learning and many of them make use of them for learning purposes.

Results of the survey have to be seen as a starting point as obviously learning is understood in very different meanings. Therefore the case studies conducted during the project can give a more multi-faceted picture of learning (formal, non-formal, informal) taking place in SMEs.

Important statistical results are outlined in the text, an overview on the statistics performed is given in the appendix.

2 Method

2.1 Schedule:

- November 2003:
 - Translation of questionnaire
 - Development of online questionnaire
- December 2003:
 - Testing of online questionnaire
(it was decided to wait for the delivery of the questionnaire till the end of the Christmas holidays)
- 1st week in January 2004:
 - Printed questionnaires sent out
- 3rd week in January 2004:
 - After eliminating wrong addresses and already received questionnaires a reminding letter was sent to 462 enterprises
 - Questionnaire sent per e-mail to 206 enterprises

- 4th week in January 2004:
 - After eliminating wrong addresses and already received questionnaires a reminder sent per e-mail to 185 enterprises.
- End of February 2004:
 - Online Questionnaire removed from the website
- March – April:
 - data analysis and generation of national report
 - data forwarded to University of Utrecht for transactional analysis

2.2 Data collection procedures

The sample from Austria was based on a random selection of small and medium sized enterprises (SMEs) from Tyrol and Vorarlberg (2 regions in the west of Austria) based on databases provided by the Chambers of Commerce of Tyrol and Vorarlberg.

SMEs were classified according to the definition provided by the European Union:

Enterprise category	Headcount	Turnover	or	Balance sheet total
medium-sized	< 250	≤ € 50 million		≤ € 43 million
small	< 50	≤ € 10 million		≤ € 10 million
micro	< 10	≤ € 2 million		≤ € 2 million

(http://europa.eu.int/comm/enterprise/enterprise_policy/sme_definition/index_en.htm)

IFS decided to deliver the questionnaires in two ways:

- A printed survey was sent to 500 enterprises. Enterprises were asked to submit the filled in questionnaires via mail, fax or fill in the online-questionnaire if they would prefer this method;
- A link to the online questionnaire was sent per mail to 206 enterprises. The online questionnaire was secured by the setting of cookies and the logging of IP-address and other data from the user to avoid misuse of the questionnaire.

Overall the questionnaire was delivered to 682 enterprises in Tyrol and Vorarlberg in total (wrong addresses excluded).

37 enterprises filled in questionnaires (2 via the online questionnaire). Two of them did not match the criteria for SMEs, as their number of employees exceeded 250. Therefore the rate of return is 5,43. The rate of return for the online questionnaires was very disappointing (only two companies submitted the questionnaires online). Based on these results IFS is rethinking the application of online questionnaires in the future.

As a result of the small sample size only limited statistic can be performed. Analysis was done using standard statistical procedures on the basis of SPSS. Detailed data can be found in the statistical appendix. Analysis on transnational level will be done in the overall report including the national reports.

3 Results

3.1 Company background and information

The questionnaires were predominantly filled in by executives or owners of the enterprises (34,29%), CEOs (22,86%) and managers (5,71). 22,86% of the persons had some other position in the enterprise (secretary, assistant, etc.). 5 persons filling in the questionnaire did not specify their position (cf. table 6).

The majority of enterprises (67,57%) answering the questionnaire are micro-SMEs with less than 9 employees. Seven enterprises (18,92%) had between 10 and 50 employees and only 3 enterprises (8,11%) had 51 to 250 employees. Two enterprises have more than 250 employees and are not considered in the further calculations (cf. table 7). This gives a good impression of the situation in Austria compared with statistics provided by the Chamber of Commerce. A direct comparison is not possible as the Chamber of Commerce uses different size clusters for SMEs (<http://wko.at/statistik/kmu/Kmu01.pdf>).

Most enterprises work in the field of service (62,86%) and production (20%). Three enterprises (8,57%) indicated retail as their type of business and three enterprises as well did not specify their type of business (cf. table 8).

40% of the enterprises indicated that their employees work on one location (2 locations: 17,14%; 3 locations: 14,29%). Surprisingly 9 enterprises (25,71%) indicated that their employees work on 4 or more locations (cf. table 9). A possible reason for this could be that the enterprises also counted freelancers working at home.

There seems to be a huge gap between enterprises having very few graduate employees and very many of them: In 42,86% of all enterprises less than 20% of employees have a college or university degree. On the other side 20% of all enterprises indicated that they have 81 or more percent of graduates (cf. table 10). A comparable split can be found in the share of skilled workers: 40,63% of all enterprises have a share of zero to twenty percent of skilled workers and seven enterprises (21,88%) employ 81-100% of skilled workers (cf. table 11). This data suggests two polarised groups of SMEs: one more reliable on (formal) qualifications, the other with more employees having no or very little (formal) qualifications.

The following results support this finding:

In 32,35% of all enterprises, 81 to 100% of all employees follow training organised by the company. In 26,47% of all enterprises only 0-20% of all employees follow training (cf. table 12).

64,71% of all enterprises indicated that 81-100% of their employees have a computer for their own use at work. Surprisingly no enterprise stated that 61-80% of their employees have an own computer. On the other end 8 enterprises indicated that 0-20% of their employees have a computer (cf. table 13).

In 60% of the enterprises 81-100% of the employees have an e-mail address at work. In 9 enterprises (25,71%) 0-20% of employees have a work related e-mail address (cf. table 14).

Results concerning the ratio of man and women and the age structure are not surprising: More men than women work in 51,43% of all enterprises (4 enterprises employ men only). 31,43% of all enterprises have a 50:50 ratio of men and women and women have the majority in only 6 (17,14%) enterprises (Type of business: 4 Service; 2 Retail; none in Production) (cf. table 15).

The majority of employees (71,43%) is aged between 26 and 40 with 40% of all enterprises indicating that their employees are between 26 and 35 years old on average. Only 17,14% of all enterprises indicated that their employees are older than 40 years on average and 11,43% indicated that employees are younger than 25 on average (cf. table 16).

Table 1: Enterprise make use of ICT-tools in the following order (cf. table 17 for more details):

Mail	97,14 %
Administr. Software	88,57 %
Presentation Software	68,57 %
CD Rom	45,71 %
Newsgroups	34,29 %
Online Courses	31,43 %
Videoconferences	5,71 %

Two aspects of these results are surprising:

1. The broad use of email for communication (97,14%).

Although the newest results from the Austrian media statistics (<http://mediaresearch.orf.at/>) suggest a high proportion of email usage among enterprises this high value was surprising. This result seems to underline the importance of the Internet for communication in SMEs. Brouwer et al. already found out that Micro-SMEs (less than 9 employees) and small enterprises significantly improved their ICT equipment and internet access in recent years (cf. Brouwer et al. 2002, S. 26). It would be interesting to specify this question more in detail whether they used email specifically for business purposes or for private usage. Furthermore a hint on the regular usage of email is missing.

2. The high number of enterprises making use of Online Courses (31,43%).

There might be a misunderstanding of the question as from our practical experience and field research done in comparable regions in German (cf. Fogolin and Zinke) such a high number seems to be impossible. From our point of view many people in Austria use the terms "online" in a similar meaning than "working with a PC". So it is possible that these persons used CD-ROMs or other learning materials via the Computer and rated it as "online learning" although in our understanding "online learning" would more relate to "web based training".

Other software indicated by enterprises include desktop publishing programmes (e.g. Corel Draw, Photo Draw), CAD-programmes (e.g. Auto Cad), statistical software (e.g. SPSS), software for desktop streaming and other branch specific software (Regis, Nemetschek, etc.).

3.2 Frequency of the use of ICT for specific purposes

Table 2: Use of ICT for specific purposes
(cf. Table 19 for more details and the questions posed)

Item	Mean (n)
Q 24 Searching the Internet	4,36 (n=33)
Q 18 Communication with suppliers	3,83 (n=35)
Q 19 Communication with customers	3,83 (n=35)
Q 20 Communication with other work relevant people	3,74 (n=35)
Q 17 Communication with colleagues in other comp.	3,66 (n=35)
Q 16 Communication within the company	3,54 (n=35)
Q 23 Help for current work	3,34 (n=35)
Q 21 Communication with associations	3,29 (n=35)
Q 22 Learning and/or training	2,20 (n=35)

Questions (rating from 1=not at all to 5=very frequently)

Overall ICT is broadly used for the given purposes in questions 16 to 24 with the exception of learning and/or training. Searching for information is the most important use of the Internet by enterprises – learning and/or training only plays a minor role (mean: 2,20). Learning is understood in a very narrow sense by SMEs as searching the Internet, getting help or the communication with suppliers and relevant people in many cases implies (informal) learning. Communication is overall very important for enterprises and widely used, especially with suppliers, customers, other relevant people and colleagues in other companies. Communication within the company (mean: 3,34) and the communication with associations (mean: 3,29) are slightly behind the other purposes.

These results give a good picture about the perception of learning by enterprises: The perception of learning is very much connected to formal training. Non-formal learning and informal learning processes, e.g. by searching the internet and communication with other people is not regarded as “learning”.

3.3 Role of ICT in SMEs

Table 3: Rating of SMEs for questions 34-41
(cf. Table 21 for more details and the questions posed)

	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41
	need computers to do work	employees use Internet daily	employees are able to use the computer	use ICT to share information	use ICT to collect information	employees are encouraged to use e-mail	employees are encouraged to use Internet	company should support professional (skill) development better
Mean	4,29	3,91	4,21	4,09	4,06	4,09	4,06	3,26
N	34	34	34	33	33	34	34	34
Std. Dev.	1,17	1,60	1,41	1,40	1,22	1,46	1,48	1,31

(rating from 1=does not apply to 5=applies to a considerable degree)

Results from questions 34 to 41 demonstrate that ICT is broadly used by SMEs and companies encourage their employees to use the provided tools (e-mail, Internet) and collect information. Employees in companies need computers to do their work (mean: 4,29) and many of them do this on a regular basis (mean: 3,91; relatively high Std. Dev. of 1,60). Furthermore most SMEs are convinced that their employees are able to use the computer (mean: 4,21). There is a considerable support for the statement that the companies should support professional (skill) development better (mean: 3,26). This result shows that there is still space for improvement in professional (skill) development.

3.4 Role of Branch-organisations (or other relevant associations)

Table 4: Rating of SMEs for questions 42-46
(cf. Table 24 for more details and the questions posed)

	Q42	Q43	Q44	Q45	Q46
	employees are encouraged to ask branch organisations for information	branch organisation actively encourages its members to share information	branch organisation actively encourages its members to use ICT to share information	branch organisation plays an important role in developing training for our sector	branch organisation plays an important role in developing ICT based training for our sector
Mean	2,94	2,71	2,90	2,41	2,00
N	33	31	31	32	32
Std. Dev	1,37	1,22	1,22	1,13	0,98

(rating from 1=does not apply to 5=applies to a considerable degree):

Branch organisations and other relevant organisations do not play a prominent role in supporting the application of ICT in SMEs. The ratings for questions 43 to 45 about branch organisations encouraging SMEs to share information (by using ICT) (mean: 2,71 and 2,90) and developing training (mean: 2,41) are average. The role of branch organisations in developing ICT based training got a low rating (mean: 2,00) by SMEs. On the other side enterprises do not really encourage employees to ask branch organisations for information.

3.5 Shortcomings in the use of ICT in SMEs

Table 5: Rating of SMEs (size clusters) for questions 47-55 (cf. Table 26 for more details and the questions posed)

	Q47	Q48	Q49	Q50	Q51
	Our employees have insufficient hardware	Our employees have insufficient software	Our company has insufficient Internet-connection	Our employees have insufficient time to use ICT	Our company has insufficient experience to use ICT
Mean	1,46	1,34	1,39	1,73	1,52
N	33	32	33	33	33
Std. Dev.	0,83	0,60	0,86	0,94	0,94

	Q52	Q53	Q54	Q55
	Our employees have insufficient experience to search for information on the Internet	Our employees do not consult their colleagues for help with ICT	Our company needs an ICT-expert for help	There is insufficient support to use ICT
Mean	1,70	1,88	1,61	1,72
N	33	33	33	32
Std. Dev.	1,13	1,02	0,93	0,92

Questions (rating from 1=does not apply to 5=applies to a considerable degree):

According to the answers given SMEs do not identify many shortcomings in the use of ICT. The quality of the available hard- and software (mean: 1,34 and 1,39; low Std. Dev. of 0,60 and 0,86) and the quality of the Internet-connection (mean: 1,39) are seen as minor problems. More important obstacles in the use of ICT are insufficient time, insufficient experience (for searching the web and using ICT) and lack of cooperation with colleagues (mean: 1,88), but are no insurmountable barriers. Furthermore SMEs do not rely on external ICT-experts and have enough support for using ICT. Overall companies do not lack technology and resources (know-how, support and time) for using ICT for learning and/or training.

3.6 Final comments

The comments given by the interviewees (cf. table 29) give a broad impression on the attitudes of the person towards ICT. 16 persons gave comments ranging from strong support and use of ICT-tools for further training in SMEs to strict rejections, e.g. *"In our area a carpenter does not carry a laptop with him on the roof."*

Nevertheless most enterprises, independently from their business had a very positive view on the use of ICT, although the idea of using ICT for further education and training was not at the heart of most enterprises. They stated that they were using ICT and see them as an important and integral part of their businesses but were uncertain whether ICT could play a role in training, e.g. *"As we are a handcraft business, we do not need information and communication technologies for further vocational training."*

Some enterprises even stated that they wanted to improve their training by the use of ICT, e.g. *"The strategic dimension of using E-information technologies for the development of Know-How is a source of improving the value of our enterprise that we want to extend in the future."* and *"We have*

got an excellent IT-structure and are able to use it even better in the future for further vocational training.”.

Interestingly some enterprises are concerned about misuse of the Internet and the amount of information available. These enterprises seem to have developed a very reasonable view on the Internet and know about advantages as well as disadvantages: *“Everything has advantages and disadvantages. Too much information has the same effect as the lack of it.”* and *“- too little security - too much SPAM - too high dependency on ONE software developer”.*

4 Conclusion

The results of the survey once more show the difficulty to provide a coherent picture of SMEs. As they operate in almost every sector of the economy, they have very different organisational and personnel structures, institutional background etc. It appears to be inappropriate to make general statements on the whole entity of enterprises. Future research has to be targeted more specific, e.g. focussing on branches.

One possible starting point for doing so could be branch organisations although in Tyrol and Vorarlberg they do not play a prominent role in offering training and ICT based training for their business sectors. In analysing these results one has to take into account that Chamber of Commerce and Chamber of Workers (umbrella organisations for branch organisations) have their own “independent” training institutions. These institutions do play major roles in offering training as well as ICT based training in Vorarlberg and Austria.

Overall the results of the survey demonstrate again the “problem” of diversity of SMEs. SMEs do not only differ in size but in very many other aspects as well (branch, organisational structures, personnel, etc.). Future research has to narrow the approach, e.g. to certain branches and has to take care about the background of SMEs, e.g. business law, public subsidies, infrastructure etc. The statement *“...a carpenter does not carry a laptop with him on the roof.”* highlights the problem. Although there certainly are possibilities for carpenters to use ICT for learning (they definitely use mobiles to communicate) this group has other ideas and needs than graphic designers for example. In general, Austrian SMEs have sufficient hard- and software available, employees know how to work with computers and other ICT tools and internet connections are satisfactory.

The question whether all SMEs really do need ICT based learning still remains unanswered. In general SMEs in Tyrol seem to be clustered in two extremes:

- The first group of SMEs makes (intensive) use of ICT and predominantly has a high number of skilled workers and a high proportion of employees/managers. These enterprises are well equipped with computers and a majority of employees has email-addresses. Many employees follow training programs organised by the company.
- The second group is contrary to the first one characterized by low usage of computers and email-addresses, low share of skilled employees and

university graduates. Training is still quite important for these SMEs but not in the same amount as in the first group.

- Only few enterprises can be found "in the middle" between these groups.

But no indication can be given whether the second and third group does not need ICT based learning or whether they need more targeted solutions to overcome skills shortages.

These results may partly be caused by the composition of the sample but also reflect the general situation of SMEs. Many of them work in Know-How intense fields and heavily rely on ICT. On the other side a lot of SMEs simply do not need different ICT tools and training but work in traditional handcraft or in more artistic fields. These enterprises seem to have a very traditional view on using technologies, i.e. they do not take into consideration the possibilities of mobile phones, PDAs, etc. and neglect (informal) learning taking place along business processes. Managers and/or employees in companies like this would need basic information about the costs and benefits of ICT tools and an improved learning culture that broadens the understanding of "learning".

Therefore it is necessary to raise awareness especially among managers (cf. Dart and Causally) and employees about non-formal and informal learning processes. Overall better integration, support and acknowledgement for informal learning is needed. A huge part of "learning" - Tough states that more than 80% of learning in enterprises is informal learning (cf. Tough 2002) - takes place along informal learning paths via ICT tools. The problem is that SMEs do not have the knowledge to make this learning operable.

One important result of this survey was the conclusion that enterprises are not enthusiastic in participating in online-surveys via questionnaires. Only two enterprises filled in a questionnaire online, another enterprise felt quite annoyed ("spammed"). Overall, there is no clear indication whether the companies received the questionnaire at all, as probably many of them do use SPAM-filters.

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Links

Mediaresearch Austria: <http://mediaresearch.orf.at/>

European Union SME definition:

http://europa.eu.int/comm/enterprise/enterprise_policy/sme_definition/index_en.htm

Wirtschaftskammer Österreich: Klein und Mittelbetriebe in Österreich.

<http://wko.at/statistik/kmu/Kmu01.pdf>

Statistical Appendix

a) Company background and information

Table 6: Q4 - Your position in the company.

Item	N	Percentage
Owner of the enterprise	12	34,29
CEO	8	22,86
Employee	8	22,86
Manager	2	5,71
no answer	5	14,29
Total	35	100,00

Table 7: Q5 - How many people are employed by your company (including yourself and any freelance employees)?

Item	N	Percentage
<9	25	67,57
10-50	7	18,92
51-250	3	8,11
more than 250	2	5,41
no answer	0	0,00
Total	37	100,00

Table 8: Q6 - Which of the following categories describes your type of business the best?

Item	N	Percentage
Retail	3	8,57
Service	22	62,86
Production	7	20,00
Other	3	8,57
no answer	0	0,00
Total	35	100,00

Table 9: Q7 - At how many locations do your employees work (e.g., home, different buildings, at customer's place)?

Item	N	Percentage
1	14	40,00
2	6	17,14
3	5	14,29
4 or more	9	25,71
no answer	1	2,86
Total	35	100,00

Table 10: Q8 - How many employees have a college or university degree? (size clusters)

Number of employees		0-20%	21-40%	41-60%	61-80%	81-100%
9 or less	Count	9	2	5	2	7
	% within 9 or less	36,00	8,00	20,00	8,00	28,00
	% of Total	25,71	5,71	14,29	5,71	20,00
10-50	Count	4	2		1	
	% within 10-50	57,14	28,57		14,29	
	% of Total	11,43	5,71		2,86	
51-250	Count	2	1			
	% within 51-250	66,67	33,33			
	% of Total	5,71	2,86			
Total	Count	15	5	5	3	7
	% of Total	42,86	14,29	14,29	8,57	20,00

Table 11: Q9 - How many employees are skilled workers (e.g., have some kind of vocational competence certificate)?

	0-20	21-40	41-60	61-80	81-100	Total
N	13	5	2	5	7	32
Percentage	40,63	15,63	6,25	15,63	21,88	100%

Table 12: Q10 - How many employees follow training organised by the company?

Number of employees		0-20%	21-40%	41-60%	61-80%	81-100%
9 or less	Count	7	1	3	3	10
	% within 9 or less	29,17	4,17	12,50	12,50	41,67
	% of Total	20,59	2,94	8,82	8,82	29,41
10-50	Count	2,00	1,00	1,00	3,00	
	% within 10-50	28,57	14,29	14,29	42,86	
	% of Total	5,88	2,94	2,94	8,82	
51-250	Count		1,00		1,00	1,00
	% within 51-250		33,33		33,33	33,33
	% of Total		2,94		2,94	2,94
Total	Count	9	3	4	7	11
	% of Total	26,47	8,82	11,76	20,59	32,35

Table 13: Q11 - How many employees have a computer for their own use at work?

Number of employees		0-20%	21-40%	41-60%	61-80%	81-100%
9 or less	Count	6	1	0	0	17
	% within 9 or less	25,00	4,17	0,00	0,00	70,83
	% of Total	17,65	2,94	0,00	0,00	50,00
10-50	Count	2	1	0	0	4
	% within 10-50	28,57	14,29	0,00	0,00	57,14
	% of Total	5,88	2,94	0,00	0,00	11,76
51-250	Count	0	1	1	0	1
	% within 51-250	0,00	33,33	33,33	0,00	33,33
	% of Total	0,00	2,94	2,94	0,00	2,94
Total	Count	8	3	1	0	22
	% of Total	23,53	8,82	2,94	0,00	64,71

Table 14: Q12 - How many employees have an e-mail address at work?

	0-20	21-40	41-60	61-80	81-100	Total
N	9	1	1	1	21	35
Percentage	25,71	2,86	2,86	2,86	60,00	100,00

Table 15: Q13 - What is the ratio of men to women in your company?

Type of business		100% Men	more men than women	50:50	more women	100% women
Service	Count	3	8	7	3	1
	% within Services	13,64	36,36	31,82	13,64	4,55
	% of Total	8,57	22,86	20,00	8,57	2,86
Retail	Count			1		2
	% within Retail			33,33		66,67
	% of Total			2,86		5,71
Production	Count	1	4	2		
	% within Production	14,29	57,14	28,57		
	% of Total	2,86	11,43	5,71		
Other	Count		2	1		
	% within Other		66,67	33,33		
	% of Total		5,71	2,86		
Total	Count	4	14	11	3	3
	% of Total	11,43	40,00	31,43	8,57	8,57

Table 16: Q14 - What is the average age of the employees in your company?

	<25	26-35	36-40	41-50	>51	Total
N	1	20	10	3	1	35
Percentage	11,43	40,00	31,43	8,57	8,57	100,00

Table 17: Q15 - Use of ICT-tools according to SME size classes (n=35)

Number of employees		Mail	Video-conf.	News-groups	Online courses	CDRom	Administr. software	Presentat. software
9 or less	Count	24	1	7	5	12	21	17
	%	68,57	2,86	20,00	14,29	34,29	60,00	48,57
10-50	Count	7	1	3	4	2	7	5
	%	20,00	2,86	8,57	11,43	5,71	20,00	14,29
51-250	Count	3	0	1	2	2	3	2
	%	8,57	0,00	2,86	5,71	5,71	8,57	5,71
Total	Count	34	2	12	11	16	31	24
	%	97,14	5,71	34,29	31,43	45,71	88,57	68,57

Table 18: Correlations of characteristics of employees and the workplace with ICT applications used.

	Mail	Video-conf.	News-groups	Online courses	CDRom	Administr. software	Presentat. software
Q 10	0,24	0,20	0,23	0,02	0,46	0,11	0,26
Q 11	0,27	0,18	0,47	0,18	0,57	0,31	0,72
Q 12	0,26	0,18	0,43	0,15	0,55	0,24	0,68

No significant correlations with $\alpha = 0.05$ (Spearman's ρ)

Q8: How many employees have a college or university degree?

Q11: How many employees have a computer for their own use at work?

Q12: How many employees have an e-mail address at work?

b) Frequency of the use of ICT for specific purposes

Table 19: Rating of SMEs (size clusters) for questions 16-24

Number of employees		Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24
9 or less	Mean	3,32	3,52	3,80	3,92	3,76	3,24	2,28	3,36	4,33
	N	25	25	25	25	25	25	25	25	24
	Std. Dev.	1,6	1,5308	1,19	1,08	1,16	1,23	1,28	1,38	0,82
10-50	Mean	3,71	4,00	3,71	3,57	3,86	3,29	1,86	3,43	4,67
	N	7	7	7	7	7	7	7	7	6
	Std. Dev.	1,70	1,00	1,25	1,51	1,46	1,25	0,69	1,13	0,52
51-250	Mean	5,00	4,00	4,33	3,67	3,33	3,67	2,33	3,00	4,00
	N	3	3	3	3	3	3	3	3	3
	Std. Dev.	0,00	1,00	1,15	1,53	2,08	1,15	1,15	1,73	1,00
Total	Mean	3,54	3,66	3,83	3,83	3,74	3,29	2,20	3,34	4,36
	N	35	35	35	35	35	35	35	35	33
	Std. Dev.	1,60	1,39	1,18	1,18	1,27	1,20	1,16	1,33	0,78

Table 20: Rating of SMEs (category clusters) for questions 16-24

Business category		Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24
Service	Mean	3,95	4,05	4,05	4,27	4,27	3,32	2,55	3,77	4,73
	N	22	22	22	22	22	22	22	22	22
	Std. Dev.	1,43	1,36	1,25	0,98	0,98	1,17	1,22	1,27	0,55
Retail	Mean	3,00	3,00	3,67	3,00	3,33	4,00	1,33	2,00	3,67
	N	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00
	Std. Dev.	2,00	0,00	1,15	1,00	0,58	1,00	0,58	1,00	0,58
Production	Mean	2,29	2,43	3,00	2,71	2,14	2,43	1,71	2,43	3,33
	N	7	7	7	7	7	7	7	7	6
	Std. Dev.	1,50	1,13	0,58	0,76	0,69	0,98	0,95	1,13	0,52
Other	Mean	4,00	4,33	4,33	4,00	4,00	4,33	1,67	3,67	4,50
	N	3	3	3	3	3	3	3	3	2
	Std. Dev.	1,73	1,15	1,15	1,73	1,73	1,15	0,58	0,58	0,71

Questions (rating from 1=not at all to 5=very frequently):

16. Communication within the company

17. Communication with colleagues in other companies

18. Communication with suppliers

19. Communication with customers

20. Communication with other, for your work relevant people

21. Communication with associations and groupings (e.g., Chamber of Commerce, Branch Organisations, governmental institutes)
22. Learning and/or training
23. Help for current work (e.g., computer help programs or product manuals)
24. Searching the Internet

c) Role of ICT in SMEs

Table 21: Rating of SMEs (size clusters) for questions 34-41

Number of employees		Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41
9 or less	Mean	4,38	3,92	4,25	4,13	4,09	4,08	4,04	3,17
	N	24	24	24	23	23	24	24	24
	Std. Dev.	1,13	1,61	1,33	1,39	1,12	1,41	1,43	1,31
10-50	Mean	3,86	3,57	3,86	3,71	3,71	3,71	3,71	3,57
	N	7	7	7	7	7	7	7	7
	Std. Dev.	1,46	1,90	1,95	1,70	1,70	1,89	1,89	1,40
51-250	Mean	4,67	4,67	4,67	4,67	4,67	5,00	5,00	3,33
	N	3	3	3	3	3	3	3	3
	Std. Dev.	0,58	0,58	0,58	0,58	0,58	0,00	0,00	1,53
Total	Mean	4,29	3,91	4,21	4,09	4,06	4,09	4,06	3,26
	N	34	34	34	33	33	34	34	34
	Std. Dev.	1,17	1,60	1,41	1,40	1,22	1,46	1,48	1,31

Table 22: Rating of SMEs (category clusters) for questions 34-41

Business category		Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41
Service	Mean	3,95	4,05	4,05	4,27	4,27	3,32	2,55	3,77
	N	22	22	22	22	22	22	22	22
	Std. Dev.	1,43	1,36	1,25	0,98	0,98	1,17	1,22	1,27
Retail	Mean	3,00	3,00	3,67	3,00	3,33	4,00	1,33	2,00
	N	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00
	Std. Dev.	2,00	0,00	1,15	1,00	0,58	1,00	0,58	1,00
Production	Mean	2,29	2,43	3,00	2,71	2,14	2,43	1,71	2,43
	N	7	7	7	7	7	7	7	7
	Std. Dev.	1,50	1,13	0,58	0,76	0,69	0,98	0,95	1,13
Other	Mean	4,00	4,33	4,33	4,00	4,00	4,33	1,67	3,67
	N	3	3	3	3	3	3	3	3
	Std. Dev.	1,73	1,15	1,15	1,73	1,73	1,15	0,58	0,58

Questions (rating from 1=does not apply to 5=applies to a considerable degree):

34. In our company we need computers to do our work.
35. Most of our employees use the Internet on a daily basis.
36. Every employee in our company is able to use the computer.
37. In our company we use ICT to share information.
38. In our company we use ICT to collect information.
39. Our employees are encouraged to use e-mail.

40. Our employees are encouraged to use the Internet.
 41. Our company should support professional (skill) development better.

d) Role of Branch-organisations (or other relevant associations)

Table 23: Rating of SMEs (size clusters) for questions 42-46

Number of employees		Q42	Q43	Q44	Q45	Q46
9 or less	Mean	3,10	2,65	2,86	2,43	2,00
	N	21	20	21	21	21
	Std. Dev	1,37	1,14	1,15	1,03	1,00
10-50	Mean	2,33	4,00	4,00	3,00	2,33
	N	3	2	2	3	3
	Std. Dev.	1,15	0,00	0,00	1,00	1,53
51-250	Mean	2,43	2,43	2,71	2,29	1,86
	N	7	7	7	7	7
	Std. Dev	1,40	1,51	1,60	1,50	0,90
Total	Mean	4	3	3	1	2
	N	2	2	1	1	1
	Std. Dev	1,41	1,41			
9 or less	Mean	2,94	2,71	2,90	2,41	2,00
	N	33	31	31	32	32
	Std. Dev	1,37	1,22	1,22	1,13	0,98

Table 24: Rating of SMEs (category clusters) for questions 42-46

Business category		Q42	Q43	Q44	Q45	Q46
Service	Mean	3,10	2,65	2,86	2,43	2,00
	N	21	20	21	21	21
	Std. Dev	1,37	1,14	1,15	1,03	1,00
Retail	Mean	2,33	4,00	4,00	3,00	2,33
	N	3	2	2	3	3
	Std. Dev.	1,15	0,00	0,00	1,00	1,53
Production	Mean	2,43	2,43	2,71	2,29	1,86
	N	7	7	7	7	7
	Std. Dev	1,40	1,51	1,60	1,50	0,90
Other	Mean	4	3	3	1	2
	N	2	2	1	1	1
	Std. Dev	1,41	1,41			
Total	Mean	2,94	2,71	2,90	2,41	2,00
	N	33	31	31	32	32
	Std. Dev	1,37	1,22	1,22	1,13	0,98

Table 25: Correlations between the characteristics of employees and the role of branch organisations in learning.

	Q42	Q43	Q44	Q45	Q46
Q 8	0,24	-0,01	-0,06	0,10	-0,06
Q 9	-0,15	0,17	0,10	-0,11	0,04
Q 12	0,38	0,04	0,13	0,02	0,07

No significant correlations with $\alpha = 0.05$ (Spearman's ρ)

Questions (rating from 1=does not apply to 5=applies to a considerable degree):

8: How many employees have a college or university degree?

9: How many employees are skilled workers (e.g., have some kind of vocational competence certificate)?

12: How many employees have an e-mail address at work?

42. Our employees are encouraged to ask branch organisations for information.

43. Our branch organisation actively encourages its members to share information.

44. Our branch organisation actively encourages its members to use ICT to share information.

45. Our branch organisation plays an important role in developing training for our sector.

46. Our branch organisation plays an important role in developing ICT based training for our sector.

e) Shortcomings in the use of ICT in SMEs

Table 26: Rating of SMEs (size clusters) for questions 47-55

Number of employees		Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55
9 or less	Mean	1,57	1,36	1,39	1,65	1,61	1,57	1,83	1,71	1,87
	N	23	22	23	23	23	23	23	24	23
	Std. Dev.	0,95	0,66	0,94	0,78	1,03	0,95	1,03	1,04	1,01
10-50	Mean	1,29	1,29	1,43	2,29	1,43	2,29	2,29	1,33	1,17
	N	7	7	7	7	7	7	7	6	6
	Std. Dev.	0,49	0,49	0,79	1,38	0,79	1,70	1,11	0,52	0,41
51-250	Mean	1,00	1,33	1,33	1,00	1,00	1,33	1,33	1,33	1,67
	N	3	3	3	3	3	3	3	3	3
	Std. Dev.	0,00	0,58	0,577	0,00	0,00	0,58	0,58	0,58	0,58
Total	Mean	1,46	1,34	1,39	1,73	1,52	1,70	1,88	1,61	1,72
	N	33	32	33	33	33	33	33	33	32
	Std. Dev.	0,83	0,60	0,86	0,94	0,94	1,13	1,02	0,93	0,92

Table 27: Rating of SMEs (category clusters) for questions 47-55

Business category		Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55
Service	Mean	1,52	1,24	1,14	1,57	1,43	1,38	1,81	1,38	1,57
	N	21	21	21	21	21	21	21	21	21
	Std. Dev.	0,98	0,54	0,48	0,75	0,87	0,80	0,98	0,67	0,87
Retail	Mean	1,50	1,50	1,50	1,50	1,50	2,00	2,00	1,33	2,00
	N	2	2	2	2	2	3	2	3	2
	Std. Dev.	0,71	0,71	0,71	0,71	0,71	1,00	0,00	0,58	0,00
Production	Mean	1,43	1,71	2,14	2,29	2,00	2,29	2,00	2,14	2,29
	N	7	7	7	7	7	7	7	7	7
	Std. Dev.	0,53	0,76	1,46	1,38	1,29	1,60	1,15	1,21	1,11
Other	Mean	1,00	1,00	1,33	1,67	1,00	2,50	2,00	2,50	1,00
	N	3	2	3	3	3	2	3	2	2
	Std. Dev.	0,00	0,00	0,58	1,15	0,00	2,12	1,73	2,12	0,00

Table 28: Correlations between the characteristics of employees and the workplace and the perceived barriers of ICT and learning.

Business category	Q48	Q50	Q51	Q52	Q53	Q54	
Q 8	-0,16	-0,39*	-0,24	-0,39*	-0,17	0,08	
Q 12	-0,24	-0,50	-0,45	-0,68	-0,54	-0,18	

* significant correlations with $\alpha = 0.05$ (Pearson's r)

Questions (rating from 1=does not apply to 5=applies to a considerable degree):

8: How many employees have a college or university degree?

12: How many employees have an e-mail address at work?

47. Our employees have insufficient hardware (computers, printers, modems) to use ICT.

48. In our company, employees have insufficient software (computer programmes) to use ICT.

49. In our company, we have insufficient Internet-connection to use ICT.

50. Our employees have insufficient time to use ICT.

51. In our company, we have insufficient experience to use ICT.

52. Our employees have insufficient experience to search for information on the Internet.

53. Our employees do not consult their colleagues for help with ICT.

54. Our company needs an ICT-expert for help.

55. There is insufficient support to use ICT.

f) Final comments

Table 29: Q57 – Final comments

Ohne die Technologie kann unsere Firma nicht existieren.

Translation: Without technology our enterprise can't exist.

Es hat alles seine Vor- und Nachteile! Zu viel Information bringt gleich viel wie wenig. Der Mißbrauch der Technologie nimmt natürlich zu.

Translation: Everything has advantages and disadvantages. Too much information has the same effect as the lack of it. Of course, abuse of technologies is increasing.

Sowohl intern als auch auf nationaler Ebene über die Sparkassen-Akademie wird versucht die IKT so einzusetzen, dass diese sowohl für das Unternehmen als auch für die MitarbeiterInnen den größten Nutzen bringen. Dabei wird auf einen vernünftigen Mix zwischen anderen Lern- und Fortbildungsmöglichkeiten größten Wert gelegt.

Translation: On national and international level via the Sparkassen-Akademie it is intended to use ICT in a way that brings maximum profit to the enterprise as well as to the employees. Therefore a strong focus is put on the right mix with other further training opportunities.

*Translation: IKT für die berufliche Weiterbildung spielt nur eine sehr geringe Rolle in unserem Geschäftsbereich
ICT in further training only plays a minor role in our business sector.*

ich glaube nicht, dass ich für das Projekt ein geeigneter Partner bin. Ich arbeite freiberuflich alleine mit einer Halbtagssekretärin. Trotzdem: viel Erfolg mit dem Projekt!

Translation: I do not think that I am a useful partner for the project. I am working as a free-lancer with just one part-time secretary. Nevertheless, good luck for your project!

- zu geringe Sicherheit - zu viele SPAM's - zu hohe Abhängigkeit von EINEM Software Hersteller

Translation: - too little security - too much SPAM - too high dependency on ONE software developer

Wie schon aus dem Fragebogen hervorgeht, spielt der Einsatz von IKT eine sehr wichtige Rolle, die nachhaltig gestärkt und zukünftig weiter gefördert werden muss.

Translation: As emerges from the questionnaire, the use of ICT has an important role that has to be strengthened and supported in the future to be sustainable.

Wir verfügen über eine ausgezeichnete IT-Struktur und können diese zukünftig noch besser für die berufliche Weiterbildung nützen

Translation: We have got an excellent IT-structure and are able to use it even better in the future for further vocational training.

Computer Programme sind zum Teil sehr teuer - was einer Weiterentwicklung beim eigenen Wissen hinderlich ist! Auch kommt dazu, dass gerade hier in Vorarlberg der Markt sehr klein ist -> Wissen ist Macht -> daher der Austausch mit Kollegen sehr schwer ist! Leider!

Translation: Some computer programmes are very expensive - which constrains the development of ones knowledge! Furthermore the market here in Vorarlberg is very small -> knowledge is power - > that's why the exchange with colleagues is often difficult! Worse luck!

Diese hat aufgrund unserer Branche einen hervorragenden Stellenwert.

Translation: [ICT] has an outstanding position in our business sector.

Der Einsatz von Informations u. Kommunikationstechnologien sind in kleinen Betrieben nicht mehr wegzudenken. Der Wirtschaftsraum hat sich gewaltig vergrößert und die Kunden sind auf eine andere Art anzusprechen.

Translation: You can't think of SMEs without using information and communication technologies. Business has enlarged enormously and customers have to be addressed in different ways.

Intern werden in unserem Unternehmen zum einen technologische Weiterentwicklungen geschult, in diesen Fällen selbstverständlich unter Nutzung sämtlicher IKT-Möglichkeiten. Zum anderen erfolgt die Schulung von social skills, diese sollten unserer Ansicht nach (auch unter Berücksichtigung der hohen technischen Ausbildung der Mitarbeiter) in persönlichen Weiterbildungssituationen vermittelt werden, daher erfolgen inhouse-schulungen mit Anwesenheit, Gruppenarbeiten, . Extern erfolgt die Schulung der Kunden oft über Seminare im Haus oder beim Kunden, weitergehende Problemstellungen werden

interaktiv via Desktop-Streaming direkt mit den Kunden bearbeitet. Der gesamte Bereich Support wird zum 100 % via Telefon bzw. Desktop-Streaming abgewickelt.

Translation: Internally, training is including new technological developments, in that case of course by using all possibilities of ICT. On the other side trainings focus on social skills, which should be mediated in personal training situations, therefore in-house-trainings with presence, group works, are conducted. Externally training is often carried out in house or at the customer, further problems arising are solved interactively via desktop-streaming directly with the customer. The whole support is done 100% via telephone resp. desktop-streaming.

Wir sind ein kleines Unternehmen, und in einem speziellen Marktbereich tätig. Die Koordination aller im Betrieb notwendigen Informationen nach innen und nach außen steht tagtäglich vor neuen Herausforderungen. Kommunikationstechnologien wie Internet, E-Mail, Telefon etc. sind Grundlage, aber die menschliche Nähe zum Kollegen, Kunden usw. ermöglichen eine intensivere Zusammenarbeit, und ermöglicht uns optimales unternehmerisches Management. Die strategische Dimension E-Informationstechnologien zum Aufbau von Know-How nutzen zu können ist eine unternehmenswertsteigernde Quelle, die wir auch weiter ausbauen werden.

Translation: We are a small enterprise working in a very special market segment. The coordination of all information necessary for the enterprise internally and externally is an everyday challenge. Communication technologies like the Internet, e-mail, telephone etc. are the basis, but the social closeness with colleagues, customers, etc. enables an intense cooperation and facilitates optimal business management. The strategic dimension of using E-information technologies for the development of Know-How is a source of improving the value of our enterprise that we want to extend in the future.

Da wir einen handwerklicher Betrieb haben, brauchen wir eigentlich keine Informations- und Kommunikationstechnologien für die berufliche Weiterbildung

Translation: As we are a handcraft business, we do not need information and communication technologies for further vocational training.

IKT wird in unserem Betrieb (Kleinbetrieb) für die Weiterbildung der Beschäftigten nicht verwendet.

Translation: ICT is not used for further training of employees in our enterprise (small enterprise).

Da wir ein Handwerksbetrieb sind, ist es logisch, dass IKT hauptsächlich im Büro verwendet wird und nicht auf den Baustellen. Ein Zimmermann nimmt bei uns nun mal keinen Laptop mit auf das Dach!

Translation: As we are a handcraft enterprise it is logical, that ICT is preferentially used in the office and not on the building site. In our area a carpenter does not carry a laptop with him on the roof.