

Project IST-FP6-026476 SEAMLESS
“Small Enterprises Accessing the Electronic Market of the Enlarged Europe by a Smart Service Infrastructure”
STREP – Information Society Technologies (IST)

Deliverable D1.1
Requirements Specification

Workpackage WP1 – Collaboration Framework
Task T1.1 – Requirements collection and analysis

Abstract

This deliverable D1.1 – Requirements Specification presents the results of task T1.1 – Requirements Collection and Analysis of the SEAMLESS project. It is the first of three deliverables in work package WP1 – Collaboration Framework.

The main objective of this task was to collect facts and expectations of SMEs in the two target sectors to understand the actual collaboration potential of C&T companies, especially in cross-border activities. The resulting requirements will serve as a basis for the SEEM node ontological structure and linguistic support as well as for the design of the technological infrastructure and its applications and services.

The document starts with an executive summary and a brief introduction, followed by three main chapters dealing with an analysis of external sources, an analysis of interviews performed with companies and mediators and a description of the consortium vision regarding functional and non-functional requirements, and it ends with a brief conclusion.

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1 Executive Summary

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The main objective of this task was to collect facts and expectations of SMEs in the two target sectors to understand the actual collaboration potential of C&T companies, especially in cross-border activities. The resulting requirements will serve as a basis for the SEEM node ontological structure and linguistic support as well as for the design of the technological infrastructure and its applications and services.

In order to collect as much information as possible and thus to create a commonly accepted set of requirements for the project, three lines of actions have been pursued:

- Analysis of External Sources
- Interviews with Companies and Mediators
- Description of Consortium Internal Vision

The use of ICT technologies has become an essential part of our daily work. However, the reviews of the surveys conducted by eBusinessW@tch as well as surveys conducted in Bulgaria have shown that active participation in collaborative eBusiness plays a minor role for SMEs operating in the Craft&Trade sectors. This is somewhat astonishing due to the fact that SMEs are well aware of ICT technologies and mostly have broadband access to the Internet. However, communication between companies is still relying mainly on the exchange of paper documents and the use of unstructured electronic communication channels. The interviews performed with companies and mediators by the SEAMLESS project confirm this observation.

The SEAMLESS project wants to implement the concept of the Single European Electronic Market especially targeting SMEs operating in the Craft&Trade Sectors. To achieve a critical mass of participants, the required services will be offered by nodes operated by existing mediators like chambers of commerce, entrepreneurial associations and the like.

The requirements for the SEAMLESS solution envisaged by the project consortium are described in chapter 5. The functional requirements have been confirmed by the expectations expressed by the interviewed companies and mediators. The non-functional and architectural requirements are mainly in line with the requirements stated by the SEEMseed project.

The general requirements described in this document form the baseline for the development activities of the SEAMLESS project. They will be successively refined during the project. Therefore it is especially important to keep contact with the potential users of the SEAMLESS solution (e.g. the interviewed companies and mediators) to match the ongoing developments with their expectations.



2 Introduction

This deliverable D1.1 – Requirements Specification presents the results of task T1.1 – Requirements Collection and Analysis of the SEAMLESS project. It is the first of three deliverables in work package WP1 – Collaboration Framework.

2.1 Objective of Task T1.1

The main objective of this task was to collect facts and expectations of SMEs in the two target sectors to understand the actual collaboration potential of C&T companies, especially in cross-border activities. The resulting requirements will serve as a basis for the SEEM node ontological structure and linguistic support as well as for the design of the technological infrastructure and its applications and services.

2.2 Requirements Collection and Analysis Process

In order to collect as much information as possible and thus to create a commonly accepted set of requirements for the project, three lines of actions have been pursued:

- Analysis of External Sources
- Interviews with Companies and Mediators
- Description of Consortium Internal Vision

2.3 Structure of this Document

The following chapter presents the results from the analysis of external sources. It describes the current state of eBusiness adoption in Europe based upon the surveys conducted by eBusinessW@tch and a report about eBusiness in Bulgaria (provided by isoft) as well as a brief review of requirements and recommendations for the implementation of the SEEM developed in the SEEMseed project.

The fourth chapter presents the analysis of interviews performed with companies and mediators. The main goal of these interviews was to get in touch with the potential SEAMLESS end users and to learn about their current collaboration habits and expectations towards the SEAMLESS solution.

Chapter 5 contains a compilation of general expectations as well as functional and non-functional requirements expressed by the consortium members. The focus of this chapter is on requirements for the SEAMLESS architecture and requirements for ontologies.

The Appendix contains the interview guidelines used to perform the interviews with companies and mediators.



3 Analysis of External Sources

3.1 eBusiness W@tch

The European Commission, Enterprise Directorate General, launched the e-Business W@tch in 2001. The purpose of e-Business W@tch was to monitor, analyse and compare the increasing demands and to meet new challenges of competitive electronic business in different sectors of economy in the enlarged European Union and in the European Economic Area (EEA). To achieve this purpose, the following 10 sectors were selected on the basis of dynamics of e-business in the sector and the impact of Information and Communication Technology (ICT):

- Food and beverages
- Textile industry
- Publishing and printing
- Pharmaceutical industry
- Machinery and equipment
- Automotive industry
- Aerospace
- Construction
- Tourism
- IT services

3.1.1 Sectoral e-business differences – manufacturing, construction, services

Different companies from the above sectors from different countries were interviewed. The obtained results from the e-Business Survey 2005 and sector studies certify that the nature, intensity and impact of electronic business activity still differs between sectors, particularly manufacturing and service sectors.

3.1.2 Manufacturing

According to the survey in 2005, conducted among 7 manufacturing sectors, e-business has achieved the highest level in the automotive, pharmaceutical and aeronautics industries. The rapid development in these sectors is mostly driven by the large international companies.

Supply-chain integration and the streamlining of procurement processes are common objectives in these industries for which e-business solutions are attractive. Online procurement has become a part of everyday business and belongs to the most frequently adopted e-business applications. Thus, ICT have an impact on R&D efficiency and, thereby, on lowering the competitive pressure.

In the machinery and equipment industry, electronic business activity has not yet reached the same level of intensity. At first sight, this confirms the findings of the Survey 2003.

3.1.3 Publishing and printing

The publishing and printing industry (P&P industry) has a different e-business profile, as major segments of this sector operate in B2C markets. ICT has a considerable impact on production and internal work processes. Furthermore, customer-facing activities (online publishing, marketing, advertising) are critical. On the other hand, processes with a high e-business potential such as inventory and supply-chain-management are less critical in this sector.

3.1.4 Textile and clothing industries

In the textile and clothing industry (T&C industry), there are signs that the use of advanced ICT systems in large companies is quite in line with adoption rates among large firms from the most advanced manufacturing sectors.



Among large companies from the T&C industry, e-business activity has increased in the past few years. Small company size is reported as a main reason by many firms saying that e-business does not play a significant role in their operations. Survey results, in fact, show a clear digital divide within the industry between medium and large companies and small enterprises. Adding to the difficult economic conditions, the limited degree of computerisation and the diversity of technological equipment in place are constraints for the adoption of e-business among smaller companies.

In the T&C industry, there are signs that the use of advanced ICT systems in large companies is quite in line with adoption rates among large firms from the most advanced manufacturing sectors. Examples are Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) systems. It appears that a significant share of large textile firms have taken the lead towards supply chain integration and online trading with business partners.

3.1.5 Construction

The comparison of all sectors studied by the e-Business W@tch shows that ICT adoption and e-business activity in construction companies appears to be very limited and many small craft companies are not in position to explain this gap. Like in other sectors, e-business tools have the potential to benefit complex construction projects.

3.1.6 Service sectors

The ICT service sectors use information technology and e-business as their end product. Here, ICT plays a significant role in the way that this product is produced, promoted and provided. This specific way of using ICT distinguishes the IT services industry from the other sectors analysed by e-Business W@tch.

3.1.7 Disparities in ICT in EU

When comparing the above mentioned sectors in 7 EU countries (DE, UK, FR, ES, CZ, PL and IT), eBusiness W@tch discovered disparities between the member states. Only companies from two countries (DE and UK) tend to be most advanced in e-business among these countries, whereas larger companies from France and Spain are close behind. The e-Business Survey 2005 did not cover the Nordic countries, which are likely to be leaders within the EU. Another fact, detected in the study is that Spanish companies have demonstrated the most dynamic e-business development among the 7 countries.

3.1.8 Opportunities and challenges for smaller firms

The e-Business Report 2004 concluded in the executive summary that large companies continue to drive the development. While this holds true as a general trend, results of the e-Business Survey 2005 point at a peculiar gap in e-business adoption between the small firms (with up to 49 employees) and the medium-sized ones (50-249 employees). This reconfirms earlier observations by e-Business W@tch from the 2002/03 period.

3.1.9 Investments in ICT

On average, companies from the 10 sectors covered reported an annual expenditure of about €6.600 for investments in ICT infrastructure and software in 2004. Among micro and small companies, ICT investments were found to be highest (on average) in IT services and in the publishing and printing industry. The differences in ICT investments between company sizes are extreme. Findings for firms from the food & beverages and the textile industries could raise new questions about the reasons for the comparatively low adoption of e-business activity in these sectors. Interestingly, the investment in ICT appears to be at a similar level as in other manufacturing sectors, which are supposed to be more advanced in e-business.

3.2 Bulgarian Situation

According a recent analysis SMEs are the fastest growing segment of the IT market in Bulgaria. This results from the fact that most Bulgarian companies are SMEs and they make IT investment and buying decisions by themselves.



Bulgarian enterprises are not well acquainted with the opportunities provided by Internet for business development. This is confirmed by the fact that the Internet is used most massively for communication: 27% of the polled companies state they use e-mail. Less than 13% of the companies have advertised via the Internet and approximately 19% have obtained information about deliveries and sales.

The industrial structure of Bulgaria comprises 93% enterprises, which are SMEs with less than 100 employees. The majority of them are micro companies (less than 10 employees) and small companies (less than 50 employees), which generally have not enough facilities (hardware and software) to develop e-business activities. The picture of those using the Internet is also differentiated across the different sectors.

A study of the operations of 2.250 enterprises from the real sector (Survey completed in March 2002) shows that only a small part of the companies perceive the Internet as a serious and important source of information. To the question of their sources of information about markets only 11.5% have stated they use the WWW.

One of the positive tendencies evident from the results of the survey is the emergence of first signs of using the Internet for management of financial and inventory flows. Approximately 7% of the companies have stated that they use some kind of electronic banking and about 0.6% make e-commerce, defined as a full process of electronic purchase, sale and payment.

A similar survey conducted by the National Statistical Institute (NSI) by order of the Centre for Economic Development (CED) among an audience of about 350 companies shows similar results. Little less than half of the polled companies use the Internet for their work (51%). The main reasons for not using the WWW being the shortage of funds and the opinion that the Internet cannot improve the processes in the company.

According to the survey, little over 82% of the companies with access to Internet use it for e-mail, about 72% search and receive information related to the company's business, 9.4% use electronic banking and only 4.7% use e-commerce.

The most widespread and popular example of using IT in SMEs in Bulgaria is the accounting software introduced by most of the companies. It saves costs and facilitates the work of the accounting department and auditors.

Development and introduction of electronic signatures and e-Government are also a serious incentive for those who have not yet decided to use computers and the Internet for their work.

3.2.1 White Paper on ICT in Bulgarian SMEs

The white paper "ICT in Bulgarian SMEs" from 2002 presents an analysis of all relevant ICT sectors, i.e.

- Hardware
- Communication hardware and structure cabling
- Internet, VoIP, Web and e-business solutions
- standard and application software
- software solutions: ERP, CRM etc.
- ICT services, consulting, training

Investments in computer hardware represent the dominant share in IT budgets of small and medium-sized enterprises in Bulgaria. The prevalent value of annual investments is up to \$10,000 in 56% of SMEs. More than a half of these funds (59%) are meant for purchasing computer hardware, and almost one fourth of IT budgets (24%) are for software, 12% are for communication hardware and only 5% for other needs such as Internet access, training, etc.

The increased efficiency in the work process (with 83.3%) is the biggest benefit of implementing ICT in their companies according to the respondents, followed by increased level of services (73.1%), increased personnel qualification (71.4%) and decreased expenditures (64.2%). The basic obstacles for successful implementation of ICT in SMEs in Bulgaria are: financial problems (62.8%), followed by technical



(29.2%) and organizational (25.4%) problems. The lack of trained personnel is not an important obstacle for SMEs.

Among the most serious problems with IT vendors SMEs have pointed on the first place the expensive support services followed by the slow reaction in the situation of problems or needs (25.5%), lack of training in adopting the product (22.5%), poor organization of the vendor company, lack of understanding the client's needs and lack of after sale support.

Communication equipment forms 12% of the IT budgets of the Bulgarian SMEs. They are aware of the importance of good communications with their clients, partners and employees. About 56% of inquired SMEs use local area networks. These companies have more than 5 PCs installed. Companies with less than five computer systems do not use LANs.

The predominated type and speed of the networks are 10/100 Mbps switchable at 22.8% of respondents with LAN, followed by 10/100 Mbps shared - at 15.5%, 10 Mbps shared – at 14.2% and 10 Mbps switchable – at 12.9% of the companies. About 31.5% of SMEs don't know the type and speed of their network and this is normal as their managers are not IT specialists. Over 35.5% of the companies do not have IT managers and over 45.9% of SMEs do not have an IT department. They rely on IT companies to solve their problems in IT and in communications.

Almost one third of the companies with installed local area network (30.6%) plan to widen their networks in the next 3 to 6 months and 15.5% still don't know. Almost 10% of the companies are oriented already towards implementation of structured cabling. Wireless technologies penetrate more and more in SMEs, which rely on vendors to decide about their communication solution. Management of communication infrastructure and security are a must among the medium-sized companies in Bulgaria. So the building of modern communication infrastructures in the medium-sized companies is in hands of the Bulgarian IT companies.

Although the bigger number of companies has estimated that they are well grounded in IT and e-business technologies in 2002, 60% have stated that they need training in proposed subjects.

In 2001 82.2% of inquired companies had never been involved in e-business but under their opinion the implementation of e-business strategy would be beneficial for relationships with their clients. Among basic reasons why they would implement e-business strategy in their companies respondents have shown on the first place penetration into new markets, followed by competition, lowering the expenses, pressure on partners' side or Mother Company.

The greatest importance in establishment and development of e-business in Bulgaria the companies assign to "security of e-payments". The problem with existing systems for e-payments in the Internet definitely is not a matter of technology but of psychology.

The profile of the respondents in this study is: SMEs from 17 regions of the country with different subjects of basic activities; the predominant part are manufacturers (40.5% of all respondents base), the next groups are involved in business services (17%), constructions (11.6%), commerce (9.2%). 74.2% are private companies.

The predominant part of the companies involved in the study use the Internet at least one time daily (70%) and has Internet access in the company (79%). The responding SMEs use Internet in their office (80%), home (32.46%), in Internet clubs (9.76%). The respondents have chosen among all possible answers and that is why the total sum is over 100. The employees from Management and Administration Department use the Internet most frequently. They are followed by Marketing and Sales Departments, Finance and Accounting Departments and Information Technology Departments.

Although 79% of the companies have Internet access, only 30% of them have a Web site and only 36.7% of these update the information on their Web sites once per month. Only 3.5% of the companies with own Web sites have online operations and sell through the Internet. 5.3% stated that they support their clients via Internet pages of the company.

The biggest part of the SMEs considers their Web site in the Internet only as an additional marketing tool. It could be seen that the number of visitors of Web pages is too low: at 49.7% of SMEs this number is up to 100 visitors per month. The reason is that 47% of all companies still do not use Internet marketing to promote their Web sites. The predominant part of those which use Internet marketing (44% of inquired companies) allocate 1% of the whole ad budget for Internet marketing.



The ignorance regarding capabilities and advantages of Internet marketing and lack of experience restrain SMEs from more investments in Internet marketing. The appearance of a special package for SMEs, offered by the biggest Bulgarian Internet portal dir.bg (<http://reklama.dir.bg>), new opportunities for Internet advertising on low cost come for those companies. Regarding plans of investments in e-business technologies the survey shows that over 25% of respondents will invest in technologies to develop e-business, e-commerce, e-services and training till the end of 2002.

3.3 SEEMseed Project

In October 2002, the New Working Environments Unit F4 of the European Commission DG Information Society organised a workshop on the Single European Electronic Market (SEEM), where the basics for the SEEM vision were introduced and discussed. After the organisation of the workshop, a group of individual, self-funded volunteers, were grouped in the "SEEM Research Reflection Group" (SEEM RRG) which was active in disseminating the SEEM concept and achieving contributions from many industry sectors and communities from within Europe and abroad.

The process started with a Networking Session in the EU IST event in Copenhagen in November 2002 where, in a very crowded room, different sectors expressed their opinions on what SEEM should be and which research frontiers they envisaged for achieving such an objective. Chemical, agriculture, furniture, textile, and building and construction were some of the sectors that took the floor. These were coupled with different horizontal perspectives about the SEEM vision such as the research interfacing to standardisation and interoperability frameworks, education and training of engineers, and the constraints and opportunities of the legal issues.

Up to thirteen different meetings and workshops were organised or participated by the SEEM RRG. This process ended months later with the Plenary Panel of the CE2003 Conference in Funchal "Vision for a Single Electronic Market", where invited experts from the EU, USA, Australia, Canada and Korea exchanged their views about a common space of information for business from a world-wide perspective.

Resulting from this activity the SEEMseed project was designed as "the seed for the SEEM design and implementation". Partially funded by the European Commission in the frame of the EC Priority 8 "Policy orientated research", the project has a two-fold structure:

- The design of the basics for a logical SEEM infrastructure, and its application in a complex scenario to serve as "proof of concept" – the technological side of the project.
- The conducting of a study with the participation of all the SEEM stakeholders, feeding an open discussion on strategy and policy-related actions to be taken – the policy building side of the project.

The SEEMseed team applied a structured methodology to develop the SEEM roadmap, identifying the challenges and defining specific goals and actions to meet the detected gaps.

The SEEMseed project designed and performed a Delphi study to which over 1400 participants from 70 countries contributed. With 20% of participants from outside Europe, the European vision is appropriately complemented with international perspectives.

From the point of view of the stakeholders diversity, the study received contributions from research (43%), technology and eService providers (21%), industry (12%), policy makers (6%), standardization bodies and consortia (3%), and education and training (15%). Complemented with interviews of officers at the European Commission, the results of the study fed the roadmap design for SEEM concept implementation. This provided input to the SEEMseed roadmapping team, to start mapping near- and long-term needs, and to identify solution approaches to meet those needs. The SEEMseed team then conducted a focused workshop in Rome targeting each SEEM key area and defining time-based goals, requirements, and actions to develop the SEEM roadmap.

Based on the survey and workshop results, the roadmap document was developed and distributed to SEEMseed partners and external experts for review.

The SEEM roadmap is comprehensive. Each of the three key areas – Business Perspective, Technological Perspective and Regulatory Perspective – is broken down into a series of tiered "relevant themes" encompassing the important concepts in that domain.



For every relevant theme, the SEEM roadmap characterizes the current state, defines the desired future vision and actual gaps, identifies the goals required to achieve the vision and surpass the gaps, and defines tasks to achieve each goal. The tasks are re-organised into four main action lines, respectively towards awareness, policy, development and deployment, then time-phased to create the pathway to SEEM concept implementation.

The SEEM roadmap defines visions and supporting goals that can be used as a resource pool of recommendations for the EC on the formulation and implementation of community policies. The SEEM roadmap is a living document with its own lifecycle, requiring continuous surveillance and refinement.

The SEEMseed project also contributed to the SEEM concept implementation from a technical point of view by developing what could become the embryo of the SEEM technical –logical- infrastructure. Though the SEEM concept is very wide and many different technical issues are contemplated in its vision about the future, the SEEMseed project focused on registries and repositories of information, within the field of SEEM. The focus on registries and repositories has been made since these are often intrinsic as a basic level of infrastructure, which can then be later augmented with other conceptual layers such as execution mechanisms, business processes, transactions and semantics.

3.3.1 SEEMseed Architectural Basis

The SEEMseed Requirements Report identified a set of requirements for the SEEMseed architectural basis, which are summarized below.

The implementation of the SEEM concept requires some primary technical features to support the eBusiness processes as effectively as possible and to provide solutions for common problems faced by its domain. Some of these technical points are most important for the success of the SEEM and therefore must be provided by the system architecture itself. These primary features include:

- **Openness**
SEEMseed should use existing developments and technology wherever possible. Thus developments should utilize open technologies and standards to emphasize the open structure of SEEMseed. Furthermore, all technologies developed within the project should be based on existing or market recognised or adopted standards where they exist.
- **Flexibility**
The complete impact of the architecture is not yet known and therefore all possible applications of SEEMseed cannot be implemented or even fully architected. Because of this, the system has to provide a flexible way to integrate new “modules” and to enhance the basic functionalities with more detailed and more complex features and use cases.
- **Integration**
History of other projects has shown a delivered result can be good but not be accepted by the market if it does not provide good integration possibilities. Because of this, the system should provide a simple interface for easily enabling access without compromising on the primary features. Furthermore, a set of API functions should be provided to maximize interoperability.
- **Security**
One of the most important issues in the project is security. Within this topic, SEEMseed has to consider all relevant sub topics such as:
 - **Access Control**
The system has to make it as difficult as possible to manipulate, and to read, unauthorized data. The system has to make sure that it is almost impossible to access the system data with a foreign identity. For example, the system can generally only be accessed after identification as being a recognised user/application of the SEEMseed-system. Because critical company-related information is being dealt with, the data has to be protected from being accessible by unauthorized agents. One possibility to protect this data is fully managed access control by the SEEMseed infrastructure – i.e. the infrastructure should be able to provide only the data which is needed by the companies being involved in a process.



- Trust
It is most important to make sure that information, which is sent through SEEM, is received exactly in the same situation that it was offered. Furthermore, the parties/nodes have to be sure that their data is kept private and so they can continue to trust the system. This can be endorsed by using open, or at least well documented, technologies and by providing a broad description of the system's architecture to its stakeholders.
- Performance
Since the system will be used by companies with mission critical real-time applications, performance is an important reason for using eBusiness solutions. Therefore the system should provide a fast access to all necessary information in automated ways. It is desirable to provide the majority of information almost instantly.
- Scalability
Although SEEMseed started with a first deployment in the domain of pollutant waste management, it has to be able to serve a wider degree of use. The system should therefore be scalable to support different usages. This also means that SEEMseed should be able to deal with an increasing amount of users.
- Reliability
The stakeholders have to be sure that the system can be used whenever and wherever specific information is needed. Thus, since the architecture is used by companies, it must provide a 24*7 availability.

Although stated in the context of the SEEMseed project it is obvious that these requirements apply to the SEEM concept in general. Starting from these requirements the SEEMseed project derived the following core facets of the architecture:

- Layered, federated P2P approach
Peers interact in a P2P network making them completely independent from central environment.
- Reliable network that will continue to work even when parts of the network go down
Because of the P2P structure, the network will be able to react to queries even when certain peers go down or are unavailable.
- User and node security and access control
The architecture allows each peer to control the access rights of a file. As described in the technical specification of the infrastructure, access permissions can be granted or denied on a per-user or on a group basis.
- Full control of company data
A company that joins SEEMseed will be able to join on all layers. This makes it possible to make sure that the own company data is stored on company servers that can monitor and control the data flow thus making it possible to keep full control about the data that is exchanged with potential business partners.
- Separation of concerns
The layered architecture allows a "separation of concerns": For example, servers at the Core Repository layer won't have to care about the distribution. On the other hand, peers at the Distribution Layer do not have to know the exact storage mechanisms of the entries.
- Certificate and signing support
Since security is an important requirement for the success of the SEEM-idea, the support of appropriate security techniques is obligatory. All SEEMseed servers are therefore based on certificates and an encrypted https communication.
- Complete independence from a specific programming language
Since SEEMseed is using webservices for its communication between its components, it enables a company to use almost each modern programming language to enhance the network.
- Content neutrality and flexible query mechanisms
The architecture and the chosen registry mechanisms are completely content neutral enabling to manage any kind of information.



- Use of open standards including webServices and RDF for content meta data
Using standards fosters the ease of development of new applications for SEEMseed. It also guarantees the applicability of SEEMseed developments in the future.
- An extensible environment which can support other eBusiness layers
SEEMseed can also integrate other eBusiness solutions such as UDDI or ebXML RR. This makes it possible to connect different heterogeneous networks merging them to a complex distributed network or registries.

3.3.2 SEEMseed Recommendations

Following the course of the development segment of the SEEMseed project there have been several tracts which have led to issues and recommendations from the SEEMseed developers; the tracts being:

- A “Market and Technology watch” report, which has initially assessed SEEM applicable technologies, tracked their developments, and reported their usefulness to the project. From this has evolved several policy orientated recommendations.
- A “Validation Report”, which has surveyed a representative and knowledgeable set of stakeholders regarding the concept of the SEEM infrastructure.
- A development orientated “Issues and Recommendations” report, which highlights some of the problems, options, and eventual technical choices of the project as well as addressing some specific issues raised by impacted stakeholders. In some cases the choices/options have not been either the remit of scope of the project and thus these have also been passed on as recommendations.

For the detailed recommendations, the identified reports should be examined. However, some of the primary ones are as follows:

- To be available to all, by definition, SEEM must be an open infrastructure and thus be based on open, standardised technologies of proven worth. SEEM itself should not be a research playground but have solidity to support the business environment.
- The economics of implementation must be identified for business to realise such infrastructures
- Like the Internet itself, SEEM can only work if it is not a fully chaotic infrastructure and needs some form of organisation where different stakeholders can represent the general community. This needs to take care of policy, strategic, business and technology aspects
- SEEM technology needs to be a cohesive framework whilst still supporting niche, new, or heritage technologies where possible to ensure that investment is protected
- The technical framework itself needs policies and procedures to operate to manage change within these frameworks
- Unsurprisingly webServices technologies must play the essential connecting part of the SEEM and be taken up where possible. However, whilst the core webService technologies (XML, SOAP, HTTP, and WSDL) address the most necessary aspects supported by the slightly more peripheral UDDI, BPEL will most likely also need to be part of that core once its exploitation potential is clearly seen.
- In addition, complementary ebXML technologies can operate over and above webService technologies at a business level. Thus, industrial and policy stakeholders need to invest in and support both ebXML and webServices as well as encourage their convergence into a greater framework
- Key fora include UN/CEFACT and OASIS at the international level and CEN/ISSS as the regional level. These are largely responsible for ebXML and webServices respectively and already are cooperating together.
- Interoperability should be promoted through open interfaces and open standards and not just open source. Open Source and Commercial software are real world alternatives but as long as the open interfaces are supported then SEEM can, and should, support both



- There must also be interoperability with and support of popular existing stakeholder embedded technologies such as EDI at the standards level and J2EE/.NET at the development level
- Investments and research projects should be supported and promoted which make use of or further existing favoured technologies as described below. There is generally a good technical basis for SEEM to operate and new directions need not be pushed but this basis does need to be promoted, fine tuned, test-beds built, conformance suites generated and guidance material given

Favoured technologies and standards for SEEM are:

Layer	Technologies		
Modelling	UML	UMM (possibly)	
Frameworks	webServices	ebXML	
Registries & Repositories	UDDI	ebXML-RR/RS	SEEMseed technologies
Documents & Information	UBL	ebXML CC	EDI Documents must also be supported
Messaging	SOAP	ebXML MS	
Semantics	RDF, OWL	ebXML CC	
Query mechanisms	RDQL	SparQL	
Technical Agreements		ebXML CPP/CPA	
Mobility			No clear recommendation
Legal/Trust			No clear recommendation
Security	SSL, DigitalCertificates, SmartCards	PK XMLDsig	

Many of these technologies have been proved in isolation, although there are clearly some holes and some unknowns. However, even in 'framework' approaches such as with ebXML, there is little in the way of proven, extensive operation by, say, using the full stack of ebXML technologies. Thus investments must be made in pilots, which exploit and can tune/advise on this full stack of technologies

3.3.3 SEEM Roadmap

One of the main achievements of the SEEMseed project is the development of a roadmap for the SEEM implementation. Based on the results from the Delphi study and several workshops, a comprehensive gap analysis has been performed from three different points of view: Business Perspective, Technological Perspective and Regulatory Perspective. For every relevant theme, the SEEM roadmap characterizes the current state of practice, defines the desired future vision and actual gaps, identifies the goals required to achieve the vision and surpass the gaps, and defines tasks to achieve each goal.

Since the SEAMLESS project adopts the SEEM vision, especially the gap analysis is an important source of requirements. Therefore a short summary of the gap analysis is provided below. Details can be found in the SEEMseed deliverable D4.7.

3.3.3.1 Business Perspective

The business perspective of SEEM implementation refers to the possibility, for European companies, to gain visibility in the global market, find partners, be supported in negotiation and collaboration activities, with special attentions to the specific needs and expectations of SMEs.

The current state of practice can be summarized by the following points:



- eRegistries already exist, but their scope is limited and they are not interoperable
- SMEs must overcome investment and psychological barriers to use eBusiness platforms
- Electronic contract issuing and acceptance finds obstacles in languages and habits
- English is a sort of eBusiness lingua franca, but not always affordable by SMEs

The general vision is for “dynamic re-configurable peer-to-peer networked collaboration”, characterized by:

- Federated eRegistries supported by fully interoperable ontologies
- Easy and cheap (free) access to a suite of basic collaboration eServices
- Openness to further eServices owned and operated by individual organisations
- Harmonised processes and contract templates for easy negotiation
- Multilingualism and trusted translation services for business documents

Comparing the state of practice with this vision the following main gaps and challenges become evident:

- Development of a semantic framework allowing the integration of eRegistries and eServices
- Building a basic collaboration infrastructure to facilitate relationships between companies
- Providing a trusted, multilingual, harmonised collaboration and contractual framework
- Making all this accessible and affordable to SMEs (especially small companies)

3.3.3.2 Technological Perspective

The technological perspective of the SEEM implementation focuses on issues such as SEEM architecture, solutions for interoperability, technical specifications and use of standards.

The current state of practice can be summarized by the following points:

- B2C-like eBusiness systems are used for B2B transactions (but with full back office integration only on one side: seller or buyer)
- Web search and text-based retrieval technologies (like Google)
- Rare eMarketplaces or collaboration platforms for specific domains (e.g. automotive)
- Marginal ICT investments by SMEs, often imposed by their big suppliers/customers

The general vision is for “a secure infrastructure to support knowledge-based interoperable eRegistries and eServices”, characterized by:

- Key features are openness, flexibility, integration, security (access control, trust), performance, scalability, reliability
- Semantic-based support for registration, search, negotiation, collaboration, translation

Comparing the state of practice with this vision the following main gaps and challenges become evident:

- Supporting interoperability by building a basic technology-independent infrastructure
- Introduction of components to manage and map general and sector-specific ontologies
- Providing easy to use support tools for the entire dynamic collaboration life cycle
- Development of domain-specific applications to behave as living examples of the SEEM

3.3.3.3 Regulatory Perspective

The regulatory perspective of the SEEM implementation addresses the key legal and regulatory issues, such as law harmonisation, regulations, contractual frameworks, trust building and management.

The current state of practice can be summarized by the following points:



- Still limited awareness of the SEEM and its regulatory implications
- Strong inhibitors related to legal, business and cultural barriers in cross-border trading
- Lack of harmonisation of existing laws and regulations within the EU
- Studies on legal ontologies still under development and not yet applied
- People are not confident with respect to eMarkets because of distrusted technological supports

The general vision is for “a harmonised regulatory framework for trusted global eBusiness”, characterized by:

- Conditions and mechanisms for trusted and secure dynamic relations, negotiations, transactions, and information exchanges
- Harmonised legal, regulatory and contractual frameworks as foundations for eBusiness
- Satisfied legal and trust requirements on service scope, trading content, transaction process

Comparing the state of practice with this vision the following main gaps and challenges become evident:

- Accelerating and focussing the harmonisation process of laws and regulations
- Development of trusted support systems for secure dynamic relations and information exchanges
- Creating a number of success cases to increase confidence and help SEEM deployment
- Creating a common geo-cultural base including business language, technical knowledge and organisational culture



4 Interview Results

In order to get some direct input from potential users of the SEAMLESS solution, interview have been conducted by members of the SEAMLESS consortium in eight different countries, namely Bulgaria (BG), France (F), Hungary (HU), Poland (PL), Romania (RO), Slovakia (SL), Slovenia (SI) and Spain (SP). The industrial sectors addressed were textile and clothing (T&C) and building and construction (B&C), since these sectors have been chosen as testbeds for the SEAMLESS project. However, the SEAMLESS solution is intended to be generic in nature and therefore not limited to these sectors.

4.1 Interview Structure

In order to receive a structured feedback from the interview, interview guidelines were developed. The complete interview guidelines can be found in appendix A of this document.

Each interview started with a brief explanation of the SEAMLESS objectives. An example to-be scenario was used for this purpose. After this introduction the interviewees were asked a set of questions, which were grouped into five sections. In order to keep effort of the interviewee as low as possible, structured questions were used as far as possible. Required open questions were moved to the end of each section of the questionnaire.

The first section of the questionnaire contained a set of structured questions to collect general information about a company as well as about the availability and use of ICT technology.

Section two focused on current collaboration habits and also relied mainly on structured questions. Open discussions were only required regarding information/document exchange with customers and suppliers.

The purpose of section three was to collect expectations regarding the SEAMLESS solution. Structured questions were used as far as possible. Some open questions at the end of this section gave room for a discussion with the interviewee.

The fourth section aimed at collecting information about the products/services offered by a company. In case the companies already use classification schemes, these could be used to identify the products. Otherwise, the interviewee could express his view about the product categories (usually companies have some kind of a product taxonomy, although they do not know this technical term).

The final fifth section contained a baseline for an open discussion about production processes in manufacturing companies. This section was optional, because the required effort from the interviewee was rather high.

4.2 General Statistics

The interviews were conducted in both small and big companies, where the number of employees varied from 6 to 1310. To correlate the interview results to the company size, three categories of companies are distinguished based on the number of employees:

- small companies with employees up to 50
- medium companies with employees more than 50 and up to 250
- large companies with more than 250 employees

The following table shows the number of companies in each category and each industrial sector.

Categories	Textile & Clothing	Building & Construction	Total
small	6	11	17
medium	6	7	13
large	4	5	9
Total	16	22	39



The following two sections summarize the analysis of the interview results for the T&C and the B&C sectors.

4.3 T&C Analysis

The interviewees from the T&C companies were mainly working in management or sales departments. The majority of companies operates on a national basis. Only 25% of the large companies operate globally. Only 43% of the medium and 25% of the large companies have more than one establishment. The main field of activity is manufacturing (66%) followed by trade (18%).

The primary customers of all companies are consumers or other companies. The markets addressed correlate to the company size:

- Small companies: 33% regional and 50% national
- Medium companies: 57% national and 71% European
- Large companies: 25% national and 75% European

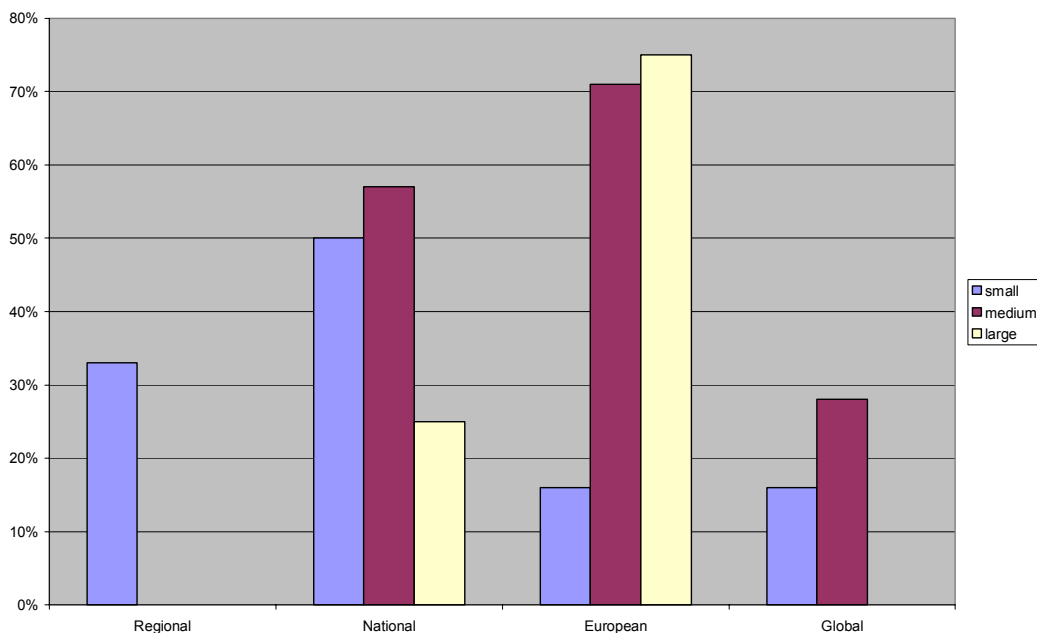


Figure 1: Most significant markets

4.3.1 Use of ICT

Companies in this sector are well aware of the benefits of IT technology. Some have Internet access for more than 15 years and the number of companies using the internet is growing. All interviewed companies have Internet access, mainly based on DSL connections. Only large companies currently make use of wireless technology. Figure 2 shows the use of Internet access technologies for the three categories of companies.

Resulting from the widespread use of DSL most companies access the Internet with a bandwidth between 200 kBit and 2 MBit. Details are shown in figure 3.

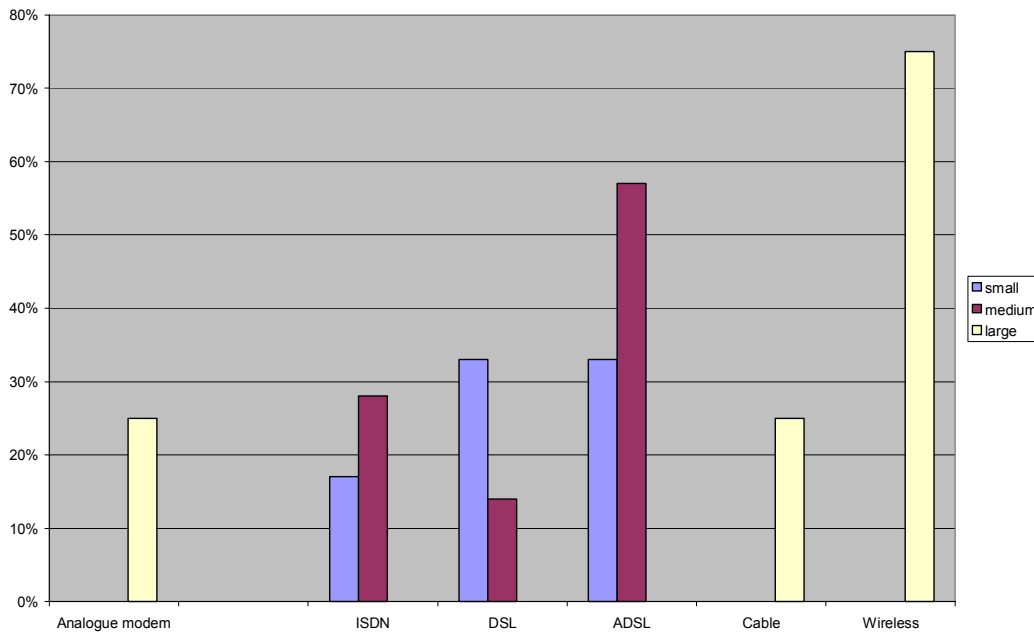


Figure 2: Internet access

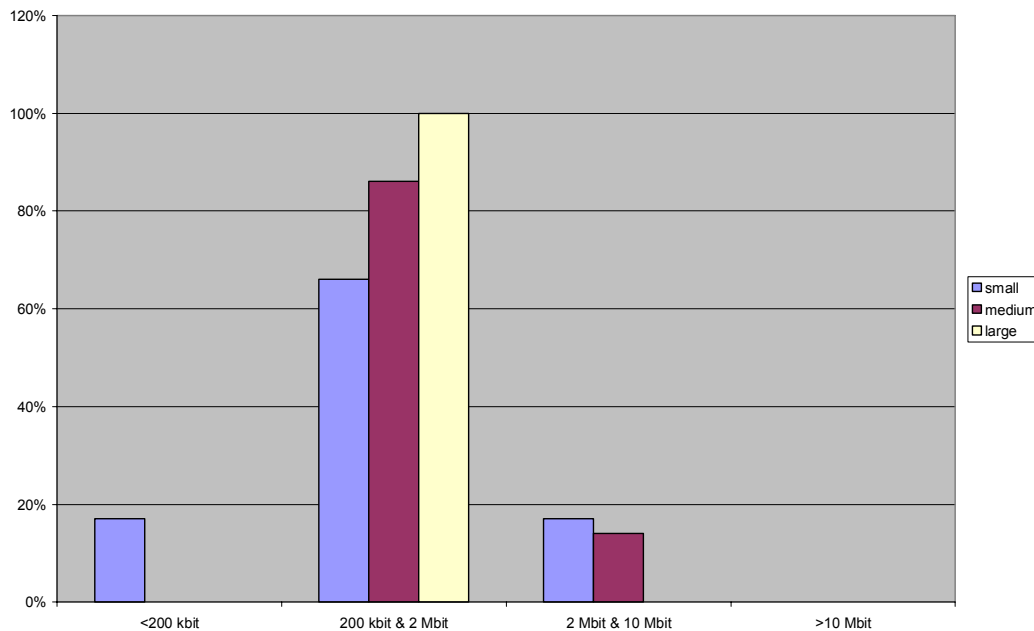


Figure 3: Available network bandwidth

Most companies use a local area network (LAN) to interconnect their computer systems, but only a few are using wireless technology. About 67% of the interviewed companies have their own web site, which is in most cases hosted by an Internet service provider.

The utilisation of software applications is mainly restricted to email clients, web browsers, office programs and programs to support sales and accounting activities. Only few small and medium companies – and astonishingly none of the large companies – use ERP and SCM software. Figure 4 shows the use of application software in the companies. Some companies use special other software, e.g. to support organisation and management or for production automation. Most companies (81%) do not use electronic market places for sales and procurement activities.



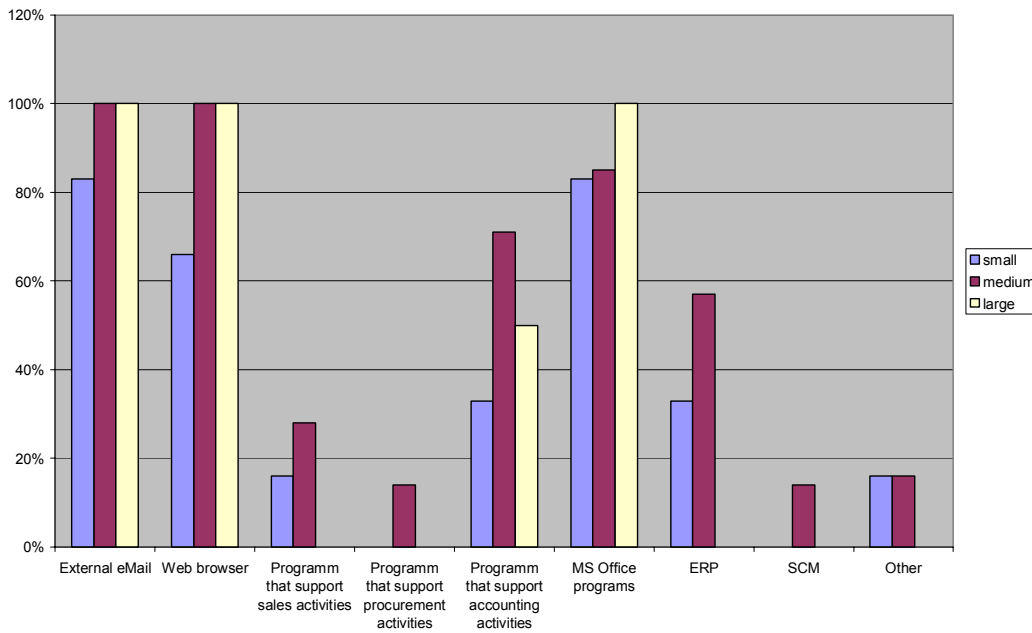


Figure 4: IT services used

The availability and number of employees with ICT skills is closely related to the company size. Therefore small companies usually outsource most ICT related services like maintenance of web pages, software and ERP systems as well as software development and system/network administration to external service providers. Larger companies use own personnel for these tasks.

4.3.2 Collaboration Habits

Despite the general use of the Internet, none of the company exploits modern ICT technology to compete in business. As figure 5 shows, none of the interviewed companies uses standardized electronic exchange of business document with customers and suppliers. The only communication media used are paper-based or non-standardized via fax and email. Paper is still the predominant communication medium, although medium companies show a tendency towards the use of electronic communication.

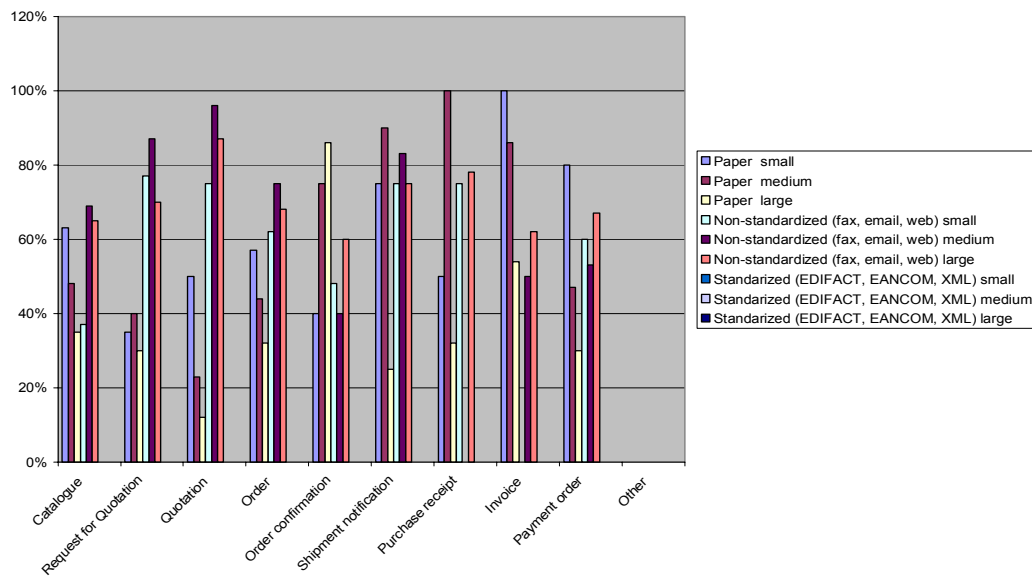


Figure 5: Document exchange



The interviewed companies mainly have regional or national suppliers and service providers, which they find through personal contacts, web searches, trade fairs and tenders. Medium companies are more active in searching new suppliers than small and large companies.

The number of suppliers varies from 3 to 50. The supplied products range from raw materials like sewing threads and yarns to clothing components such as shoulder pads, sleeve head rolls, ornamental parts and belts. This diversity reflects the broad product range of the textile and clothing industry.

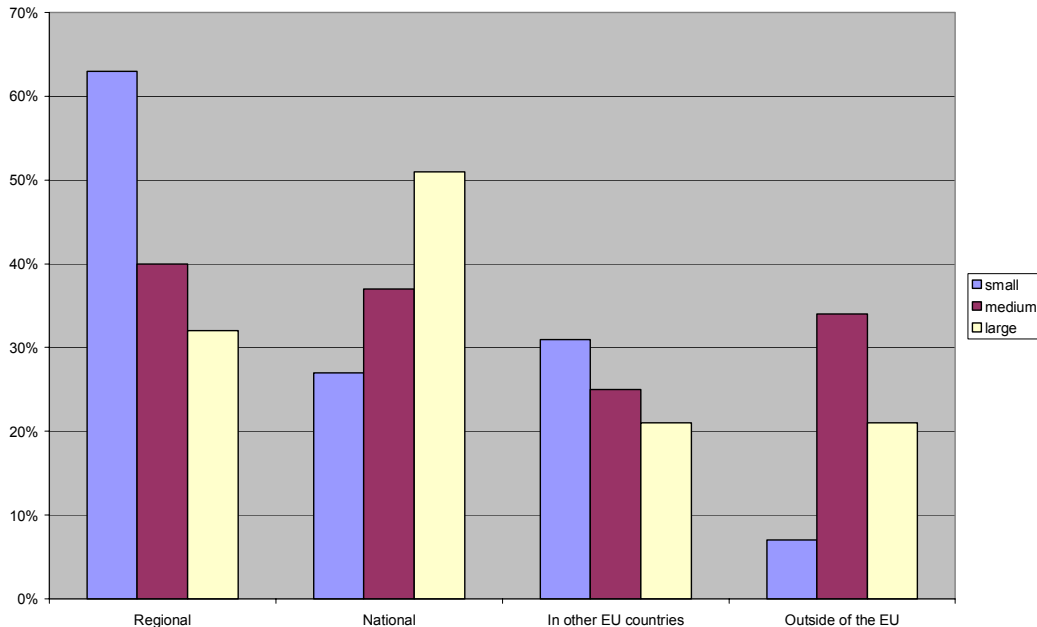


Figure 6: Geographical distribution of suppliers/service providers

The companies use different criteria to select their suppliers. The most important criteria are the quality of products, prices, shipment, payment terms and also prior relationship. The use of the Internet to choose goods is found to be below 5% for small and medium companies, whereas the large companies do not purchase online at all. Most of the online purchases take place on national level and then on European level.

The information exchanged during negotiation is related to catalogues, product quality, amount, supply, samples and technical files. Some suppliers publish their products on their web sites and also send their paper catalogues to their customers. These suppliers maintain proprietary identifications of their products, which makes it difficult to identify products and to compare them with the products offered from other suppliers.

Almost all the companies have national and international customers. Customers are mainly found based on personal contacts and through trade fairs, but also by searching the web. Most customers are found at a regional level, but also at national level and in other EU countries. Customers outside Europe play a minor role (below 10%). Details are shown in figure 7.

Currently none of the interviewed companies uses specific IT solutions to support the selection of suppliers or customers. Electronic platforms for selling and purchasing products are also not used.

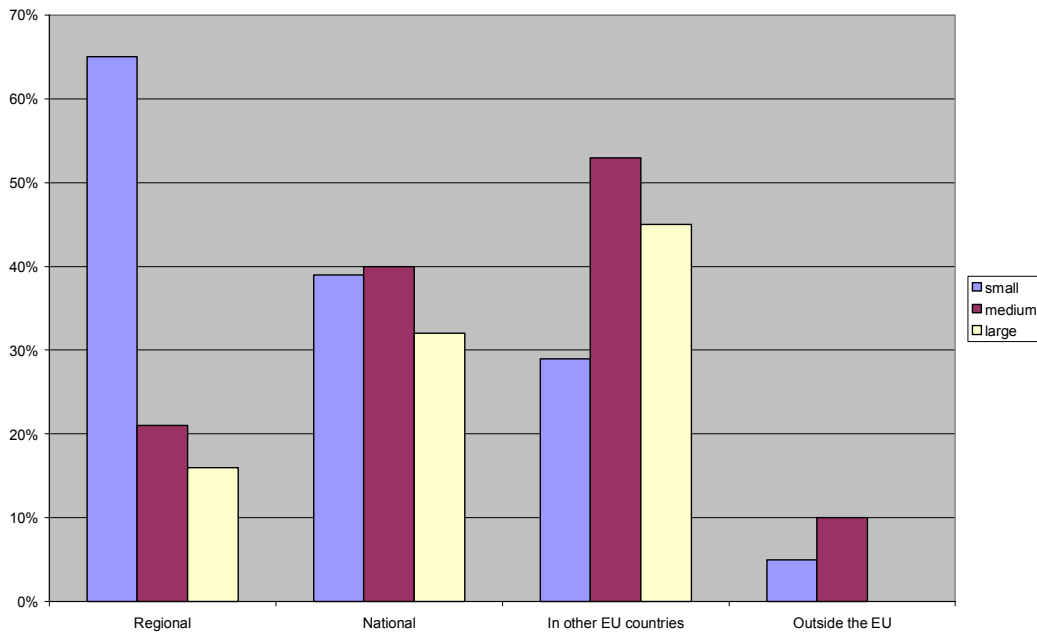


Figure 7: Geographical distribution of customers

4.3.3 SEAMLESS expectations

About 80% of the interviewed companies are interested in the SEAMLESS solution, the rest are not sure. The most interesting services for the companies are:

- Online search for business opportunities (71%)
- eCatalogues (66%)
- online ordering (50%)

Figure 8 shows all the services and the interest rates of the companies in detail.

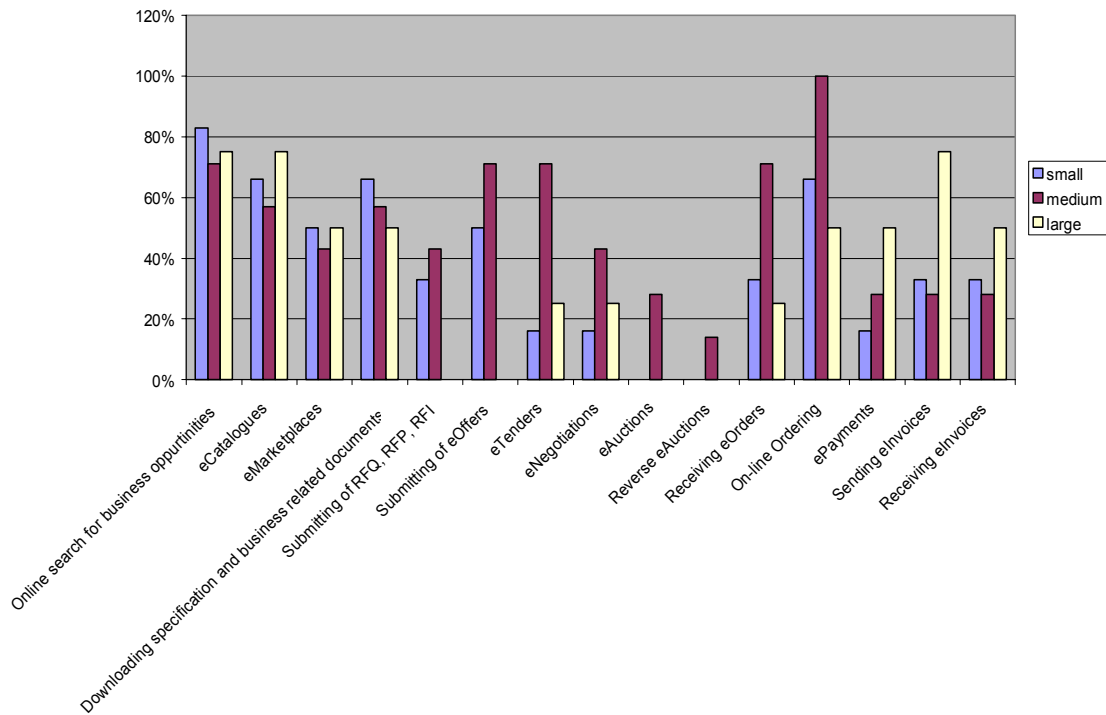


Figure 8: Expected services

The main expectations of most companies regarding the SEAMLESS solution are easy use and shortening the time required to find suppliers and customers. The companies were also asked about the problems they expect in using the SEAMLESS solution. In general, the small companies expected more problems than the medium and large companies. The problem expected by most companies (43%) was the cost for adopting the SEAMLESS solution.

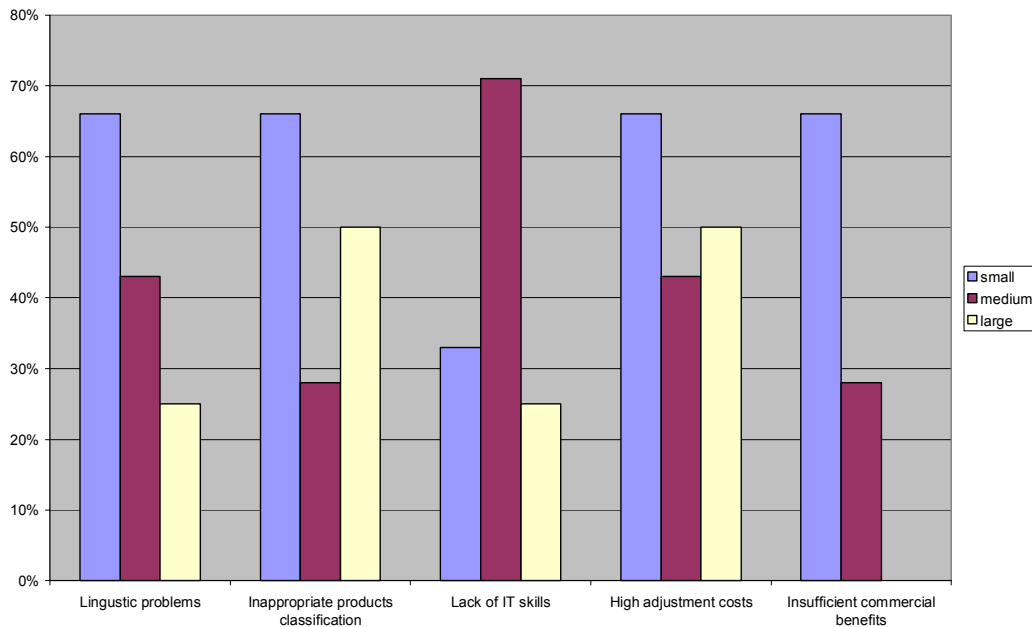


Figure 9: Expected problems



Asked about factors, which can limit the success of the SEAMLESS solution, the two main factors identified were:

- lack of information, how SEAMLESS works
- lack of trust in electronic tools

Figure 10 shows the details about the different factors. Besides the factors offered in the question, several companies expected a lack of technology to implement SEAMLESS in the companies. One company also expected problems in interfacing with their existing ERP system.

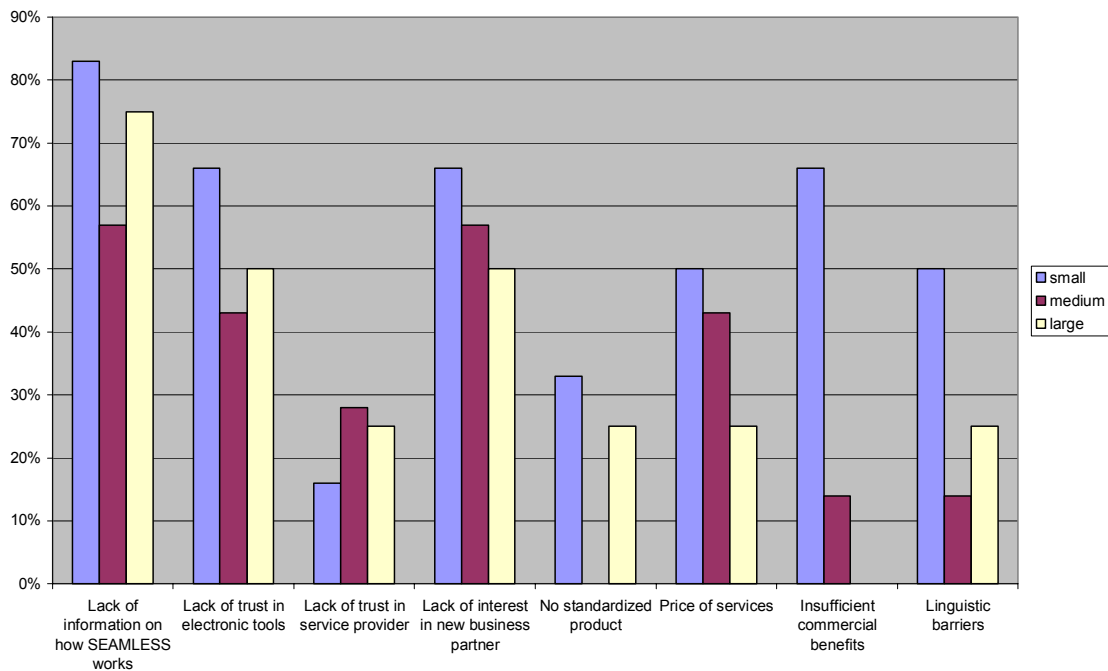


Figure 10: Limiting factors

The languages supported by a software tool are a critical success factor with regard to user-friendliness. Most companies desire to provide data in their own language, since this makes communication easier for them. They expect SEAMLESS to reduce operational costs, simplify their work, provide new opportunities to penetrate new markets and to make it easier for potential customers to find them. They expect SEAMLESS to create most opportunities in manufacturing, trade and service providing and want a progressive introduction of the SEAMLESS solution.

When asked about the most important success factors for SEAMLESS, the answers were similar across all company sizes. Two factors were seen as most important:

- Investment costs in ICT tools must be reasonable
- The required tools must be easy to use

Figure 11 shows details about all success factors.

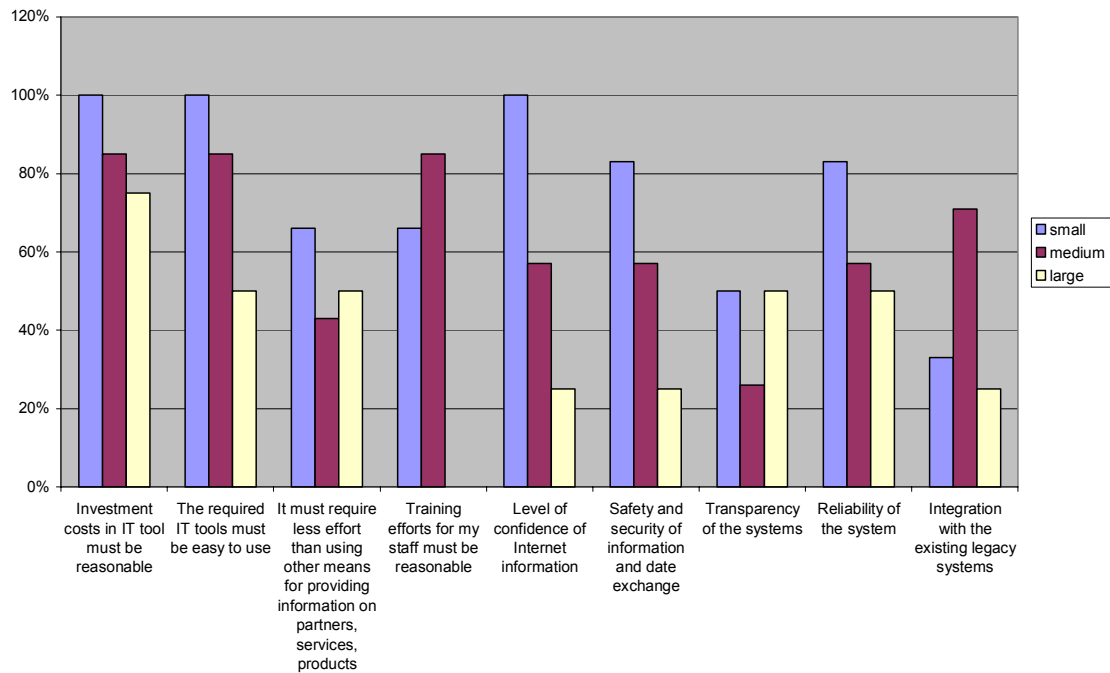


Figure 11: Important success factors

Regarding the functionality provided by the SEAMLESS solution, three main requirements were stated by the interviewed companies:

- Sophisticated services for partner search
- Services for negotiation support
- Trust building mechanisms

Trust building is of central importance for the companies. This fact is also reflected by the requirements regarding the information to be stored in the company profiles. Besides information like contact details, company background, products, services and business activities, the following information was requested:

- Reliability of product quality and delivery
- Information about previous company behaviour

The interviewed companies also identified several additional services that should be provided by the SEAMLESS solution:

- Trusted payment service
- Insurance of delivery and payment
- Guarantee of the problem solution
- Guarantee of transfer goods

Some companies stated that they do not want to use credit cards for payments due to bad experiences in the past.

The final section of the questionnaire about products and services was only answered by few companies. The most interesting fact found here is that almost all companies do not use standard product classifications. Instead they use their own classifications or none at all.

4.4 B&C Analysis

The interviewees from the B&C companies were mainly working in management or sales departments. More than 25% of the companies operate on a national basis, 6% of the medium and 25% of the large companies operate globally. Several companies have more than one establishment (28% of small, 27% of medium and 50% of large companies). The main fields of activity of the companies are trade and construction.

The primary customers of most companies are consumers and other companies. The most significant market for small companies is regional (81%), whereas medium and large companies mainly address their national market (57% for medium and 75% for large companies). Some medium companies also operate across Europe and globally. Figure 12 shows most significant markets of these companies in detail.

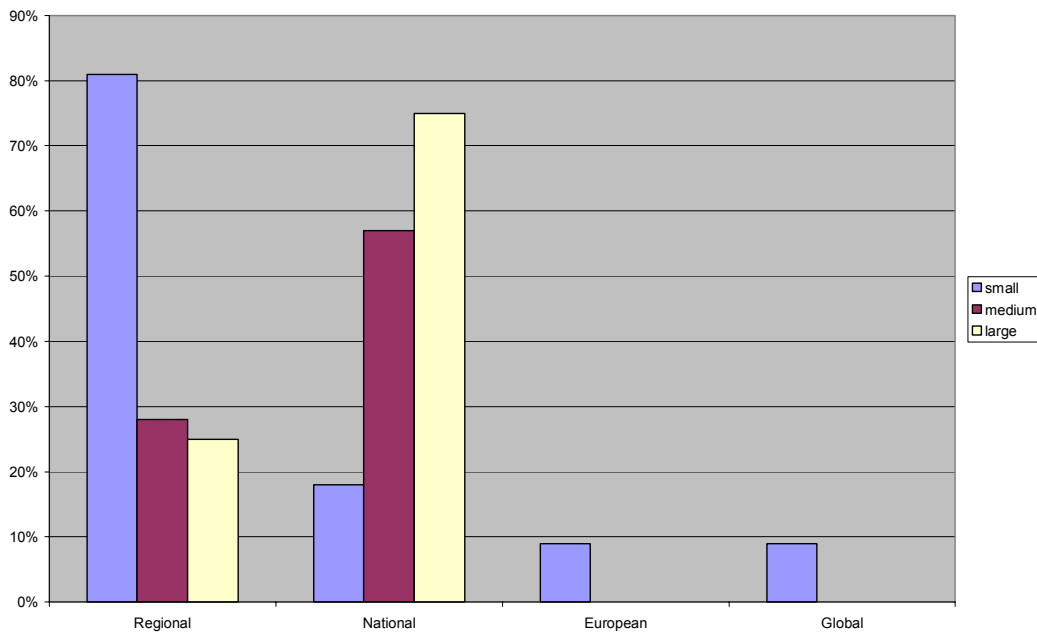


Figure 12: Most significant markets

4.4.1 Use of ICT

Like the companies from the T&C sector, the companies are well aware of the benefits of IT technology and almost all have Internet access. Most small and medium companies use DSL and cable for Internet access with a bandwidth between 200 kbit and 2 Mbit, whereas 50 % of the large companies have a bandwidth of 10Mbit and beyond and also make use of wireless technology.

Compared to the T&C companies, the companies from the B&C sector seem to be more aware of the benefits of computer networks and the WWW. A local area network (LAN) is used by 72% of small, 86% of medium and 75% of large companies. Additionally 29% of the medium and 75% of the large companies have an intranet and make use of wireless technology. Most companies have their own web site (55% small, 83% medium and 75% large companies).

Like in the T&C sector, the utilisation of software applications is mainly restricted to email clients, web browsers, office programs and programs to support sales and accounting activities. Details are shown in figure 13.

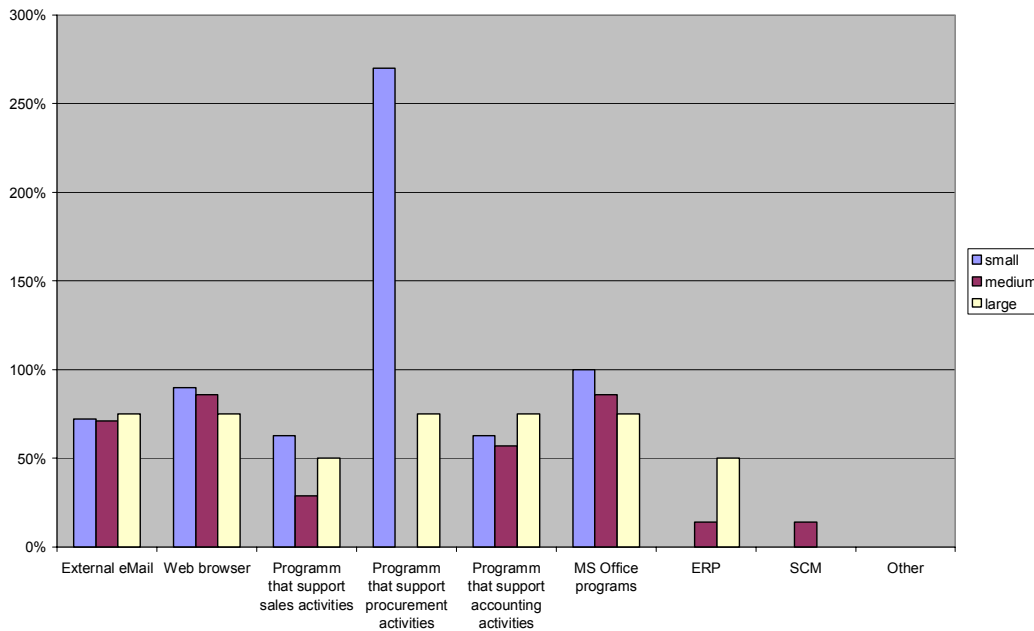


Figure 13: IT services used

The availability and number of employees with ICT skills is closely related to the company size. Only 18% of small but 50% of medium and 100% of large companies employ ICT personnel. ICT services like maintenance of hardware and software, web site and system administration are often outsourced to external service providers.

4.4.2 Collaboration Habits

Similar to the situation in the T&C sector the predominant medium for document exchange is paper. The use of different communication media is depicted in figure 14.

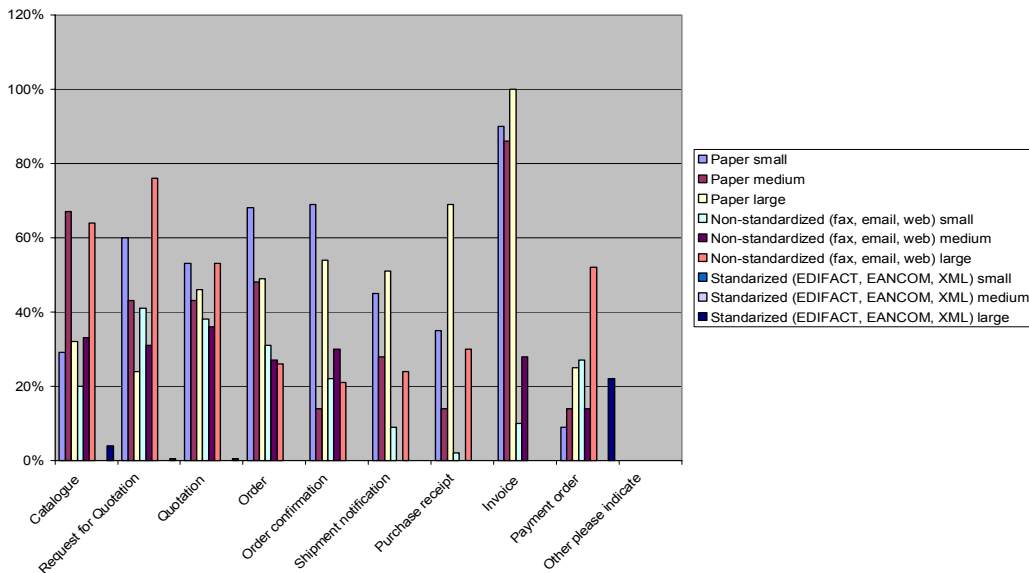


Figure 14: Document exchange

All companies have a relatively large number of national and international suppliers, which offer a wide variety of products and services to them. All companies use similar methods for selecting their suppliers.



The small companies all use personal contacts, but also tenders (63%), trade fairs (54%) and the WWW (45%). The medium companies use personal contacts (71%), tenders (57%), trade fairs 43%) and the WWW (28%). The large companies rely on personal contacts (75%) and tenders (50%). Obviously, personal contacts still play the most important role.

In general, the suppliers are not selected on a regional or national basis. They are also located in other EU countries or even outside the EU. The main criteria to select suppliers are prior relationships, quality of products, prices, trust, payment terms and shipment.

The ratio of online purchases and online sales activities is extremely low (3% for small and medium companies, 10% for large companies). Only 25% of the large companies use eMarketplaces, the small and medium companies do not use them at all.

The documents exchanged during negotiation with the suppliers are;

- Detail technical documents for the product description
- Contact details
- Request for the quotation documents that are usually supplied by the supplier
- Offers
- Order documents
- Quotation order
- Contract

Customers are found mainly based on personal contacts, tenders, web site and trade fairs. Some companies are also registered in national databases or at EUROCHAMBRE. Also the companies address national and international markets, most customers are regional and national. The ratio of customers in other European countries or outside Europe is very low. Some of the companies use IT solutions to support sales processes through CRM, SCM, web site and company specific software.

The exchange of information during negotiation mainly deals with:

- Quotation
- Technical specification
- Tenders documents
- Request/reply for quotation
- Design plans
- Delivery documents

4.4.3 SEAMLESS Expectation

The interest rate of the interviewed companies in the SEAMLESS solution was rather high, since 72% of small, 66% of medium and 50% of large companies expressed their interest. The following services found to be most interesting from the companies:

- Online search for business opportunities
- eCatalogues
- online ordering.

They also expect benefits from partner search services provided by SEAMLESS.



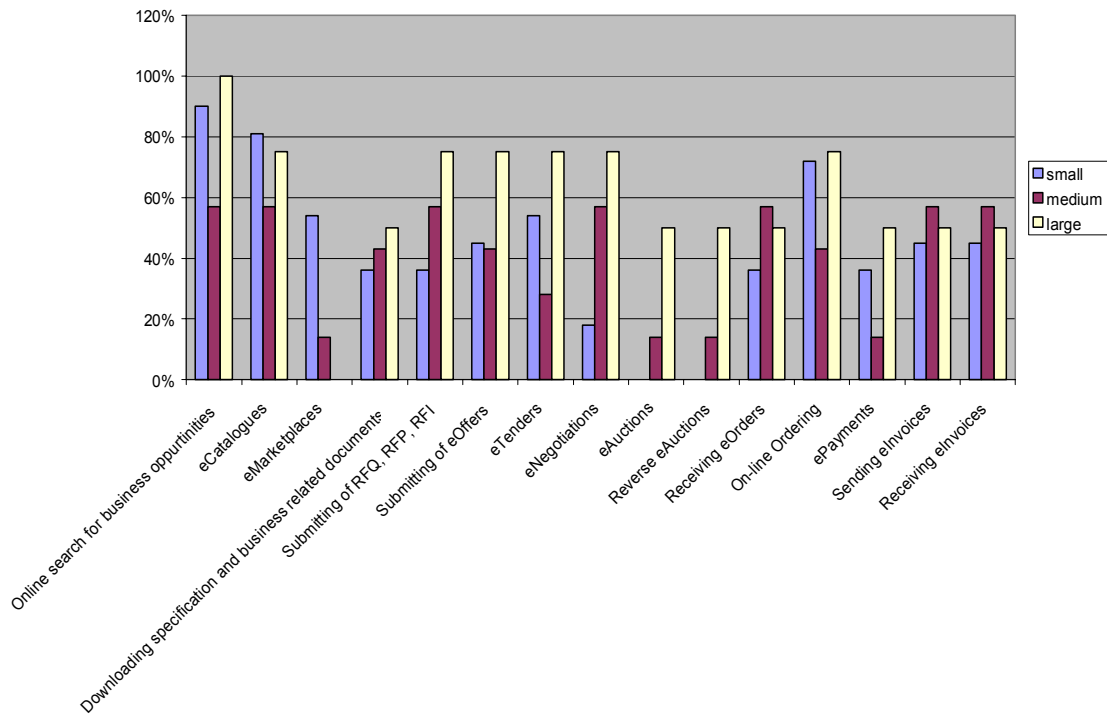


Figure 15: Expected Services

Two main limiting factors were identified by the companies: linguistic problems and inappropriate product classification. The small companies also expected their lack of ICT skills and insufficient commercial benefits to limit the success of SEAMLESS.

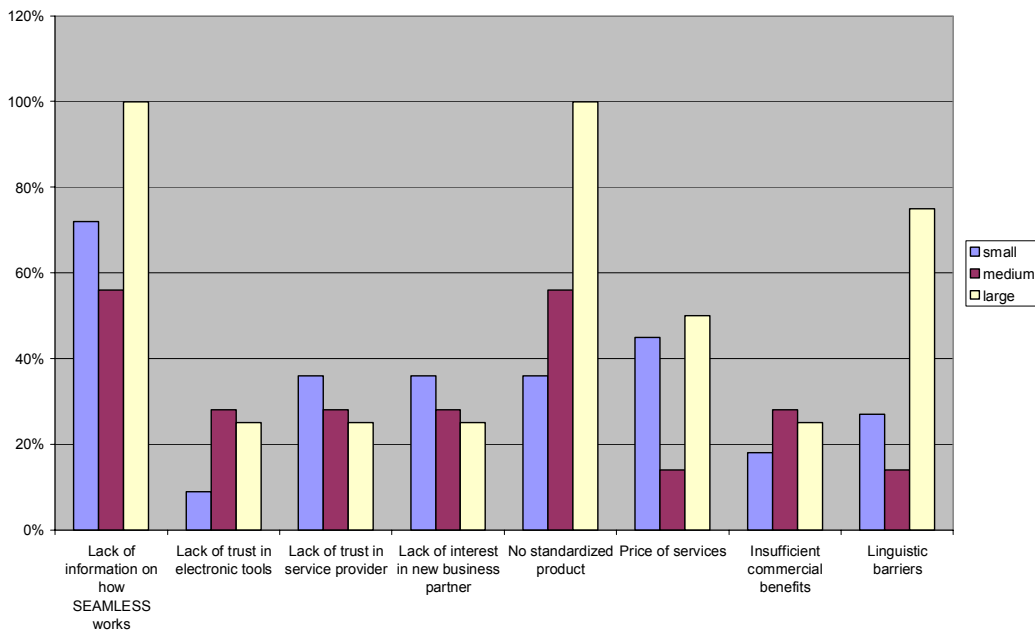


Figure 16: Limiting factors



The main benefits expected from using the SEAMLESS solution are:

- reduced operational costs
- simplification of work
- improved relations with business partners
- new opportunities for pertaining new markets

The companies expect SEAMLESS to create most opportunities in trade, manufacturing and service providing. Most of them voted for an immediate and progressive introduction of the project results.

Regarding the most important success factors for SEAMLESS, the answers were similar across all company sizes. The factors identified to be most important are:

- investment costs in ICT tools must be reasonable
- the required IT tools must be easy to use
- data security
- reliability of the system
- integration with the existing systems

Regarding the functionality provided by the SEAMLESS solution, three main requirements were stated by the interviewed companies:

- Sophisticated services for partner search
- Services for rating past business transactions
- Support for communities and interest groups

According to the interview results, company profiles should contain the following information:

- Contact details
- Product and service descriptions
- References
- Catalogues
- Company history
- Background of the company

Some of the companies use standardized national or international product classifications such as DIN, TEAOR, VTSZ, PRODPROM-2001, Hungarian standard and EU-construction norms. Other companies use own classification schemes based on different criteria.

4.5 Mediator Perspective

Because of their limited resources, SMEs and especially small companies have serious problems to be completely autonomous in an increasingly complex business world. Therefore, most of them are members of (sectoral, regional) entrepreneurial associations that help by providing a variety of services about, for instance, payrolls, taxes and legal questions. In other cases companies find the required support at chambers of commerce, local development agencies, technology transfer centres, software vendors, consultants and the like.

Obviously, SMEs are used to rely on the support of mediators. This is a favourable condition to involve them into the SEEM network since mediators are suitable candidates to start up and manage SEEM eRegistries/Repositories and to provide the registered companies with adequate SEEM-based services. In addition, each mediator can perform, at least partially and depending on its nature, the following actions in favour of the associated companies:



- Increase company awareness about the benefits that can come from dynamic collaborations and the adoption of explicit regulations and procedures. Process improvements also come from the openness of the involved companies to undergo qualification procedures that help them becoming credible actors in the electronic market.
- Improve the organisational model of the associated companies and enrich their knowledge base so as to overcome cultural and sectoral barriers. It means supporting the candidate companies to identify the services to offer through the eRegistries and select the collaboration protocols and contractual templates that better correspond to their nature and present behaviour.
- Behave as business catalysts to help the associated companies taking real advantage of their participation in SEEM. As a matter of fact, the target companies are often unable to capture business opportunities that go beyond their individual perception. This calls for a specific mediation activity that consists in undertaking proactive initiatives in favour of the associated companies.
- Help the single company to understand what is its position with respect to the enlarged market in continuous evolution. Having involved a critical mass of companies the mediator can, on the one side, measure market changes and trends and, on the other side, keep companies informed on how they can improve their respective positions.
- Make the adoption of the SEEM-supporting technology smooth and affordable. It means providing proper start-up and training services and working on easy applications that can hide the complexity of the SEEM infrastructure and the international standards on which it is based, and let the single company keep operating through simple and familiar tools.

The support assured by mediators is fundamental to introduce small companies into the SEEM network. Even though the envisaged SEAMLESS solution will be simple, direct, easy to use and cheap, the single small company can hardly face the problem alone. Mediators are the only actors that can correctly interpret the company needs, deploy the new solution, assist in adapting it to the expectations of the single company. Moreover, mediators can ensure the rapid introduction of a critical mass of companies, to make SEEM work on the large scale as a system.

In order to better understand the different types of mediators, the services they offer to their associated companies as well as their specific expectations with regard to the SEAMLESS project, typical representatives are briefly described in the subsequent sections:

4.5.1 AITEX (Spain)

AITEX is a private non-profit association formed by textile and related companies whose main objective is increasing the competitiveness of textile companies by promoting modernisation actions, introduction of new technologies and improvement of company and products quality. AITEX (80 people, 4 M Euro turnover) acts on behalf of the textile and clothing industries in Spain and overseas, with more than 800 associated companies and around 33% of the Spanish companies of the sector as regular customers (about 1500 in 2004).

The services offered to the associated and customer companies include the following activities:

- Standardisation and quality, including laboratory tests and support to certification (e.g. Eco Label)
- Advice on new textile technologies, on services of interest for the sector, on ICT innovation and tools
- Technical support to related sectoral associations (e.g. ASEPRI, the Spanish Manufacturers Association of Children's Products)
- Promotion of regional, national and European RTD projects involving textile companies and associations
- Information, demonstration, technological transfer and training, based on the first worldwide Textile/Clothing Technological Observatory (www.observatoriotextil.com)



In synthesis, the mediator role of AITEX is mainly on the technical side and is representative of what can be done to keep the associated and customer companies informed of technological evolution and business opportunities in Spain and abroad.

AITEX's general expectation regarding the SEAMLESS solution is to offer the basic services developed in the project to their associated companies, in order to bring them an opportunity of participating in a global electronic market. It will also help them to increase their visibility internationally and also to find new potential partners and clients. After the project, other new added value services can be developed using the SEAMLESS infrastructure, for example integration services, to integrate the legacy systems of the companies into the Seamless infrastructure.

From AITEX's point of view it is also very interesting to use the SEAMLESS project in order to spread some technology and tools that AITEX already has and that can be useful for other partners, for example a tool for managing ontologies and a search tool and also to extend the taxonomies and the data model already used in the textile sector.

AITEX can also develop materials and perform training activities for other Technological Institutes in Spain, in other sectors, in order to integrate them into the SEEM network.

4.5.2 PRC SCCI (Slovakia)

The Prešov regional chamber of commerce is a public entity, belonging to the Slovak Chamber of Commerce and Industry (SCCI), which started its new history in 1992. Members of the chamber are companies and individuals, adhering voluntarily, whose activities are in all areas of commerce with the exception of agriculture and food industry.

The primary aim of PRC SCCI is to provide high-quality services to the business community in the Prešov region, to assist in tackling their business-related problems, to predict and analyse the needs of entrepreneurs, and to offer solutions in form of both tested and first-time services.

Standard services provided by PRC SCCI include:

- Counselling and consultancy in the area of export and import of goods.
- Development of foreign trade relations and missions, and participation in fairs and expositions, to gain new business contacts.
- Publication of business offers and other business information, and search for business partners.
- Information services, education and training, as well as issue and distribution of specialist publications.
- Collaboration and relations with other relevant association, such as the Slovak Association of Small Business and the public portal (www.po.sopk.sk) used mainly by small companies.

PRC SCCI wants to promote the SEAMLESS solution in Slovakia, in order to give Slovakian companies visibility across Europe and beyond.

4.5.3 T-Online (Hungary)

The T-Online Group is the principal provider of telecom services in Hungary and, through the coordinated activities of T-Online Hungary and its member companies, it covers four business areas: fixed-line services provided to business and to residential customers, mobile telephony, Internet and CATV. The majority shareholder is Deutsche Telekom AG, while 41% of the shares are publicly traded.

T-Online Hungary represents another relevant type of mediator for SMEs. The Internet business (Axelero Rt.) is very successful with about 50% market share and its content service portal is one of the most popular Hungarian websites. Its primary strategic objective is the acceleration of Internet take-up, consequently it is taking a leading role in the introduction of new technologies and services:

- Management of eBusiness and individual Internet communications projects, and consultation services.
- Marketline Business Solutions together with Marketline, the largest electronic market place operating in Hungary.



- eAuction service provided in ASP form for eProcurement by different types of organisations, especially public institutions.
- SCM and CRM services provided in ASP form to support business collaboration of its 3.000 registered customer SMEs.
- Document management service provided in ASP form for paperless communication and original document substitution.

Since Marketline currently is a closed, domestic B2B market, the main expectation for the SEAMLESS solution is to migrate Marketline towards a single, open market. This will result in an improved visibility of Marketline customers on a European level.

4.5.4 KELYAN (Italy)

KELYAN, a company of the Franco Bernabè Group, designs and creates integrated information solutions for the extended enterprise. Therefore, although being primarily a software vendor, the company can also be seen as a mediator, because it provides technical solutions to SMEs and mediators. Since its foundation in 1999, KELYAN invested a lot in web-based applications. Its experience cover three main aspects:

- Sales management.
It created its own software product (ORDEX) to support catalogue browsing and order acquisition via the seller web site, and installed it at a number of important companies, such as SONY and VM MOTORI. These experiences showed that multilingualism and adoption of standards for product classification are mandatory requirements to make the web an effective sales channel. Then, instead of continuing investing in its own product, KELYAN decided to join the INTERSHOP network (www.intershop.com) and installed some tens of such Java-based applications all over Italy. In addition, KELYAN is now offering a product configurator module to empower the product identification phase.
- Thematic portals.
KELYAN realised www.tessilmoda.com, a thematic portal to give visibility to the textile and garment companies associated to CNA, the main Italian entrepreneurial association of micro and small companies.
- Supply chain management.
KELYAN is offering K-BUY, a Java-based software application for monitoring order progress along the supply chain.

In spite of these continuous investments, sales of B2B applications have been far lower that expected.

The main reason is that the success of a B2B application is measured in the number of partners to involve (customers for CRM and suppliers for SCM), and by now only the 10-20% of partners in the average accept to adopt the proposed web-based interaction approach. This is particularly true for SCM, which involves a number of micro and small companies (at least in Italy, where subcontracting is usual). Main perceived obstacles are:

- B2B applications are considered too expensive. Most companies are much more inclined to invest in new ERP systems instead of in collaboration applications reaching only a subset of the target partners.
- Integration with legacy systems is indeed expensive. KELYAN already realised interfaces between a numbers of ERPs, quite spread at the international and national level, but the number of “home made” solutions is very high, then the combination of 1:1 mapping to realise is impressive.
- Thematic portals ensure limited visibility. Although CNA is well known in Italy and tessilmoda.com has been properly advertised, the number of accesses to the portal are lower that expected. Then, connections with other portals are needed. In addition, B2B services in this moment are not offered through the portal due to the market limitation described above.



Therefore, the general expectation for the SEAMLESS project is to find the “silver bullet” to increase the number of companies willing to interact with other companies through the web.

4.5.5 SEAMLESS Expectations

The interviews performed with mediators confirm the results from analysing the interviews performed at individual companies. Their expectations are similar to those of the companies. However, they do not only want to actively promote the SEAMLESS solution by serving as network nodes. Much more, they want to use SEAMLESS as a basic platform for offering additional services to their associated companies.

Like the companies, the mediators stress the importance of trust building for the success of the SEAMLESS network. Due to the already existing trust relationships between the mediators and their associated companies as well as between the companies associated to a certain mediator, setting up SEAMLESS nodes at the mediators will help to bring companies into the network. However, mechanisms must be provided to build and ensure trust between companies associated to different mediators.

4.6 Summary

The questionnaire used for the interviews was rather extensive. Therefore it was not easy to convince companies to participate in the interviews and to answer all questions. As expected, the optional section regarding an open discussion about production processes required too much effort. Therefore it was only partially answered by few companies and the results for this section are not significant.

All interviewed companies, irrespective of their size or geographical location, use ICT technology and have access to the Internet with relatively high bandwidth. However, online sales and purchases currently only play a minor role. Most surprisingly, the most communication between business partners is still paper based or relies on unstructured electronic communication channels. However, especially medium companies show a tendency to start online sales and purchase activities. These observations are mainly in line with the results of the surveys performed by eBusinessW@tch.

Most of the interviewed companies expressed their interest in the SEAMLESS solution. Their main requirements are:

- Reasonable investment cost for ICT tools
- Easy to use tools, which can be easily understood
- Support for local languages

The expected functionality matches the functional requirements identified by the SEAMLESS consortium. Services for trust building are of central importance for the interviewed companies.



5 Consortium Internal Vision

There are several reasons preventing companies, in particular most small companies, to play an active role in the electronic market. They include:

- Limited visibility, meaning the difficulty to be found and selected by potential customers within the huge number of web sites of any kind, as well as the difficulty to represent offered products and services and collaboration conditions.
- In turn, the difficulty to discover candidate partners and suppliers, as well as the difficulty to understand and compare their profiles and qualifications.
- Lack of regulations and contractual norms, to establish the conditions for dynamic business relations with other companies based on reciprocal trust and confidence.
- Interoperability problems, i.e. the difficulty to integrate internal enterprise processes (active and passive cycles) with external collaborations.

The answer to these problems is the constitution of the Single European Electronic Market (SEEM), which has to be based on two main pillars:

- A collaborative framework, which is intended to establish the rules for companies and users to access the SEEM, enter and update profiles and offers, search for possible partners, contact them, negotiate, exchange information and documents. The SEEM must allow any entity to come into and leave without obstacles, support the establishment of value-creation relationships and ensure a high level of security, trust and confidence.
- A technological infrastructure, which is intended to ensure the required support to access, registration, communication, negotiation, collaboration, information exchange and the other envisaged SEEM-related activities. It is based on the development of an intelligent and distributed eRegistry/Repository service and the provision of information necessary to set-up, run and terminate eBusiness interoperations, and to control and manage business transactions.

Obviously, a pure top-down approach for the SEEM constitution, i.e. by constructing and populating brand new registries and repositories to realise a perfectly homogeneous infrastructure from scratch, is hardly affordable, especially in the perspective of involving thousands of SMEs. A much more realistic approach is based on those organisations already acting as SMEs catalysts (the so called “mediators”). They will provide the nodes of the SEEM network and thus connect their associated SMEs to the SEEM.

The SEAMLESS project is application-oriented, in that all the RTD studies and achievements are aimed at solving the huge amount of obstacles that prevent the spontaneous creation of networks of interoperable peers. Therefore a combination of top-down and bottom-up approaches will be used.

In order to achieve interoperability across the SEAMLESS network and to make the creation of new nodes as easy as possible, some aspects have to be addressed in a top-down fashion:

- Knowledge management mechanisms based on a Global-As-View approach will allow the mediators to become familiar with ontologies already available and created/updated by standardisation bodies and domain experts. In recent years the idea to construct a single, universally accepted ontology, which supports all interoperability needs across all industrial sectors, has definitely been abandoned. Therefore mapping between (hopefully few) “global” ontologies must be ensured.
- Partner search and B2B interaction must be supported by an open, scalable architecture.
- Each mediator must be put in condition to offer basic search, negotiation and collaboration services to all the associated companies, so as to make them immediately able to interact with each other and across the whole SEAMLESS network.

However, since the SEAMLESS network will be constructed from existing mediator nodes, there are also aspects to be treated using a bottom-up approach:

- Mediators and their associated companies can keep using their own language, provided that concepts and terms are mapped into English with reference to one selected “global” ontology.



The infrastructure must ensure language-to-language automatic translations, provided that all the needed mapping exist.

- Each company shall be free to maintain its current knowledge base, no matter if provided by existing enterprise applications or other web-based applications already in use. The only obligation to enter in the SEEM is to map customer/supplier profiles and business document data structures into the corresponding “global” ones.
- Each mediator (or third party) shall be free to offer specific added-value services, which exploit the SEAMLESS infrastructure.

5.1 Functionality of the SEAMLESS Solution

The main aim of the SEAMLESS solution is to support dynamic collaboration relationships between companies (especially SMEs) connected to the SEAMLESS network. Thus support services for the entire lifecycle of collaborations are required, i.e. for the preparation, negotiation and execution of business collaborations. These basic services will be offered to the individual companies via the SEAMLESS nodes maintained by the mediators.

The following five categories of services are required:

- **Profile definition.** It includes the services allowing the associated company to gain visibility in the SEAMLESS network by showing its profile, offered products/services and supply conditions.
- **Partner search.** It includes the services allowing the associated company to search for possible partners independently of whether they are associated to the same mediator or to another SEAMLESS node.
- **Negotiation.** It includes the services allowing the associated company to establish relations with a candidate partner by exchanging information on the respective demand/offer up to requests for quotation and bids.
- **Collaboration.** It includes the services allowing the associated company to continue after negotiation by issuing orders, planning resources, managing distributed workflows, possibly up to invoicing and payments.
- **Trust Building.** It includes services for assessing collaborations executed via the platform as well as the provision of certificates or references from previous collaboration partners.

Some of the services mentioned above, e.g. order creation, resource planning, are already provided by existing enterprise applications. Furthermore, the SEAMLESS solution will allow companies connected to the network to use their local languages. Therefore the following services are required:

- Import/export functions with existing systems (to exchange business documents).
- Ontology-based automatic translation of business documents.

It is important to stress that the envisaged SEAMLESS solution is not intended to be yet another eMarketplace. Of course, it will comprise functionalities and services, which are already available for some eMarketplaces, such as:

- Support for e-procurement practices
- Partner search based on profiles
- Taxonomies/classification of products to support the search process
- Mechanisms to publish companies’ profiles to their potential clients

However, the SEAMLESS solution will provide an open infrastructure for cross-border and cross-sectoral business collaborations and include advanced functionalities such as:

- e-procurement for specific products not based on catalogues
- Support for “best value” instead of “lowest price” procurement strategies



- Support for creating and managing strategic supply chains among clients and suppliers
- Support for order processing for products demanding design activities from the supplier

Since the detailed definition of the services offered by the envisaged SEAMLESS solution is subject to work package WP3 Technological Infrastructure, the initial collection of requirements from the consortium partners focussed on the general architectural requirements and requirements on the ontologies, which form the backbone of the envisaged services.

5.2 Non-Functional Aspects

In addition to the functional requirements there are several non-functional aspects, which are of central importance for the success of the SEAMLESS solution:

- **Usability**
The SEAMLESS solution must be intuitive and very easy to use. End users do not like complex solutions, especially SMEs that do not have IT experts in most cases. Therefore the SEAMLESS solution must be capable to hide all the complexities behind the e-business transactions.
- **Genericity**
The basic SEAMLESS services should provide general solutions. It is better to support 99% of the intended users in 50% of their business cases, instead of supporting 10% of the intended users in 99% of their business cases.
- **Completeness**
The SEAMLESS solution should provide all services necessary for a collaborative business relationship. This will make it especially attractive to small companies, which currently do not use any IT support for doing business.
- **Configurability**
The SEAMLESS solution should be configured to the specific needs of a user, i.e. only those services should be offered, which are really required.
- **Affordability**
The software tools required to access the SEAMLESS network should be cheap or even better free of charge. However, this does not mean that the use of the SEAMLESS services is free of charge, but the necessary investments in ICT technology by the companies should be kept as low as possible.
- **Sustainability**
Business models for collaborative business and eBusiness are still evolving. Therefore the SEAMLESS solution must not be limited to current eBusiness scenarios, but bring sustainable benefits to its users in a changing business environment.

5.3 Architectural Requirements

It is intended to derive the SEAMLESS architecture from the architecture studied and used in the SEEMseed project. Furthermore, the technologies developed in the DBE project will be studied and integrated if feasible.

- **Openness/Integration**
The SEAMLESS solution must provide open mechanisms that support the integration of third-party services or existing applications.
- **Interoperability**
Mechanisms must be provided, which allow interaction and information exchange between the SEAMLESS solution and other applications. Standards should be used wherever possible.
- **Modularity**
Each functional module of the SEAMLESS solution should be as functional "complete" as possible so that it will be possible to identify functionalities (services) with implemented modules in a 1:1 relationship. In this way it is possible to specify the modules, their functionalities and behaviours as well as their interfaces and dependencies with other functional



modules. Furthermore, this will allow to replace a general module by a more specific one, e.g. for a specific sector, which can still interact with the other modules (services) via the pre-defined interfaces.

- **Extensibility/Flexibility**
The SEAMLESS solution should ensure vertical and horizontal extensions, i.e. covering other industrial sectors by extending the corresponding ontologies and developing additional functionality for covering new e-business requirements.
- **Scalability**
The SEAMLESS solution is intended to support thousands of companies inside and outside the EU in performing collaborative business. Therefore it must be scalable with regard to the number of users, the amount of data handled and the number of business transactions performed.
- **Reliability**
The services provided by SEAMLESS will play a vital role in day-to-day business. Therefore it is important that companies can rely on the availability of these services, i.e. the services must be available 24 hours a day, 7 days a week and 365 day per year.
- **Efficiency**
Although the interactions between companies under study are not time-critical, the response times should be acceptable. This can impose strong efficiency requirements especially on the translation services involved in the exchange of business documents.
- **Security**
Since the SEAMLESS solution will be used to store and transfer confidential business information, it must provide mechanisms, which protect data from unauthorized access. Therefore access control should be based on digital certificates and secure mechanisms should be used for data transfer.
- **Portability**
The software required to access the SEAMLESS services must be available on any combination of computing hardware and operating system. The same degree of portability is also desirable for the implementation of the SEAMLESS services, but not strictly required.

Obviously, the requirements stated above have some technological implications:

- **Service-oriented Architecture**
The requirements for openness, integration, modularity, extensibility and flexibility can be met by a service-oriented architecture relying on web services. However, full interoperability between .net and Java services must be ensured with regard to interoperability.
- **Use of Standards**
With regard to interoperability and portability existing standards should be used for data formats (e.g. OWL for ontologies, ebXML, UBL for business documents), communication protocols and implementation methodologies (e.g. UML).
- **Layered, federated Peer-to-Peer Approach**
Nodes in the SEAMLESS network will interact in a P2P fashion, making them completely independent from any central control. Therefore the network will be able to react to queries even when certain peers go down or are unavailable. This approach addresses the requirements for scalability, reliability and efficiency.

5.4 Requirements on Ontologies

One of the main goals of the SEAMLESS project is to support multilingualism by providing automated translation services for business documents. This goal can only be achieved by providing a semantic basis in terms of ontologies, which comprise data structures, taxonomies and vocabularies.

Much emphasis has to be put on ontology contents. The SEAMLESS projects will propose one or more "global" ontologies, as well as their translation into the mediators local languages, and real-life examples of mappings between the local ontology of a single company and a mediator ontology. Thus existing



standards, both formal and de-facto standards, will be promoted, properly simplified to make them usable by mediators and SMEs.

With regard to ontologies the following functionalities are required:

- **Ontology Management**
Tools are required for creating/editing/updating ontologies, mapping between ontologies, automatic translation to transform a query/business document from one ontology to another. However, ontology mapping is meant here as an interactive function that allows a company to relate its concepts to that of the mediator ontology (translated from a global one), as well as a global ontology manager to relate its concepts to those of another global ontology. A fully automated mapping of ontologies is outside the scope of the SEAMLESS project.
- **Ontology Evolution**
Since ontologies reflect an evolving world, the SEAMLESS ontologies cannot be fixed. They will evolve through adding new elements and also through changing existing structures. This will result in new ontology versions, while older versions have to be kept available for compatibility reasons.

The ontologies used for the SEAMLESS solution should be based on existing standards as far as possible. Although it is clear that there will be more than one “global” ontology, the number of these global ontologies should be reduced to a minimum. However, the ontologies adopted by SEAMLESS should be promoted, but not enforced.



6 Conclusions

The use of ICT technologies has become an essential part of our daily work. However, the reviews of the surveys conducted by eBusinessW@tch as well as surveys conducted in Bulgaria have shown that active participation in collaborative eBusiness plays a minor role for SMEs operating in the Craft&Trade sectors. This is somewhat astonishing due to the fact that SMEs are well aware of ICT technologies and mostly have broadband access to the Internet. However, communication between companies is still relying mainly on the exchange of paper documents and the use of unstructured electronic communication channels. The interviews performed with companies and mediators by the SEAMLESS project confirm this observation.

The SEAMLESS project wants to implement the concept of the Single European Electronic Market especially targeting SMEs operating in the Craft&Trade Sectors. To achieve a critical mass of participants, the required services will be offered by nodes operated by existing mediators like chambers of commerce, entrepreneurial associations and the like.

The requirements for the SEAMLESS solution envisaged by the project consortium have been described in chapter 5. The functional requirements have been confirmed by the expectations expressed by the interviewed companies and mediators. The non-functional and architectural requirements are mainly in line with the requirements stated by the SEEMseed project.

The general requirements described in this document form the baseline for the development activities of the SEAMLESS project. They will be successively refined during the project. Therefore it is especially important to keep contact with the potential users of the SEAMLESS solution (e.g. the interviewed companies) to match the ongoing developments with their expectations.



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Appendix: Interview Guidelines

Introduction

The goal of Task 1.1 “Requirements collection and analysis“ is the collection of facts and expectations of the SMEs of the two target sectors as well as of the mediators, so as to understand the actual collaboration potential of C&T SMEs, especially in cross-border activities. The information will be collected in interviews with representative companies and mediators.

In order to give the interviewee an idea of the SEMALESS vision, the following section briefly describes a possible to-be scenario.

Section 3 contains a set of structured questions to collect general information about a company as well as about the availability and use of ICT technology.

Section 4 focuses on current collaboration habits and also relies mainly on structured questions. Open discussions are only required regarding information/document exchange with customers and suppliers.

Section 5 is intended to collect expectations regarding the SEAMLESS solution. Structured questions are used as far as possible. The open questions at the end of this chapter give room for a discussion with the interviewee.

Section 6 aims at collecting information about the products/services offered by a company. In case the companies already use classification schemes, these can be used to identify the products. Otherwise, the interviewee can express his view about the product categories (usually companies have some kind of a product taxonomy, although they do not know this technical term).

Finally, section 7 describes the baseline for an open discussion about production processes in manufacturing companies. This section is an optional module for an interview. It can provide valuable information for complex SEMALESS scenarios, however it requires some efforts from the interviewer and the interviewee.

Presentation of SEAMLESS goal

The main goal of the SEAMLESS project is to provide an infrastructure, which eases the co-operation of companies at a European level. The following scenario illustrates the project vision for the near future. It correspond to the behaviour of Small Ltd, a small company associated to Small Association, a certain day of year 2008:

- Small Ltd is invited by Small Association to join the SEEM and become a credible actor in the electronic market. Small Ltd accepts and receives a URL, a user code and a password.
- Through the URL Small Ltd accesses the Small Association site, is recognised as newcomer and guided in the representation of its features. It means coding and storing in the Small Association company registry/repository its profile, skills and experiences, preferred collaboration forms and contractual templates, as well as its offer of products and services. To this purpose it supported by the local ontology providing lexicon and concepts to associate the right metadata to the stored data. The work is done in the company (and association) home language.
- Few hours later Small Ltd receives an unexpected bid request for the supply of a specific product from Foreign Co, a potential new customer established in a different country. The request is issued according to one of the forms proposed by Small Ltd and made available in its home language.
- The same application suggests to Small Ltd the list of possible reactions it can take (accept, ask for more info, reject, negotiate, etc.). Small Ltd suspends the answer because the requested product calls for the collaboration of partners able to perform special activities that Small Ltd cannot cover.
- Small Ltd plans the required activities, indicates as additional resources its usual partners and fixes scheduling conditions and constraints. On the basis of the scheduler outcome, Small Ltd



uses the system to automatically send the relative bid request to the scheduled partners, including Partner Ltd for a certain activity.

- Small Ltd decides that it is time to search for a new partnership in alternative to Partner Ltd. Then it sends to the Small Association site a request for candidate partners meeting a specific profile (region, company size, desired activity, supply time, etc.). the request is broadcasted to the interesting SEEM nodes.
- Within the fixed deadline Small Ltd receives indications of three candidate partners discovered by the system in the respective registries. One of them, New Ltd, is particularly interesting and Small Ltd starts negotiating with it until a bid has been obtained.
- Small Ltd takes its time to compare the two bids coming from Partner Ltd and New Ltd. The day after it decides and concludes the negotiation with the selected company (while the system automatically closes the negotiation with the other).
- Now all the data needed to answer the Foreign Co request are available. Small Ltd reacts accordingly and the negotiation continues up to the electronic signature of the contract. On this basis, also the contract with the scheduled partners are finally signed.
- Following these contracts, a number of info and document exchanges take place during the following weeks, according to the specific collaboration protocols. Small Ltd is involved, on the one side, in the envisaged collaborative work with the selected partners and, on the other side, in communications with the customer Foreign Co. Both these relations are regulated and supported by the SEAMLESS workflow manager.

Background Information

General Information

Q 1. Please, specify what is your field of work:

- Management
- Sales
- Purchasing
- IT

Q 2. Please indicate in which industrial sector your company is active.

- Textile
- Building and Construction

Q 3. Please indicate type of organisation.

- Company
- Business association

Q 4. Please indicate the main sector of activity.

- Manufacturing
- Services
- Construction
- Trade
- Other Please indicate: _____



Q 5. Please indicate the type of your business association.

- National
- European
- International
- Other Please indicate: _____

Q 6. How many employees does your company have in total?

Q 7. Does your company have only one establishment, or more than one establishment?

- Only one
- More than one

Q 8. If more than one: How many?

Q 9. If more than one: Please indicate in which countries.

Q 10. What does your company offer?

- Products
- Services
- Both

Q 11. In general, which of the following groups are the primary customers of your company?

- Consumers
- Other businesses
- Public sector
- No primary customers

Q 12. What is your companies most significant market?

- Regional
- National
- European
- Global

Availability and Use of IT-Technology

Q 13. Does your company have access to the Internet?

- Yes, since _____
- No
- Intend to have it within 1 year



- Q 14. For accessing the Internet, what does your company use? (multiple answers are possible)
- Analogue dial-up modem
 - ISDN
 - DSL connection
 - Cable
 - Wireless
 - Another broadband connection Please specify: _____
- Q 15. What is the maximum bandwidth of your company's connection to the Internet?
- < 200 kbit
 - between 200 kbit and 2 Mbit
 - between 2 Mbit and 10 Mbit
 - between 10 Mbit and 100 Mbit
 - > 100 Mbit
- Q 16. Does your company have a web site?
- No
 - Intend to have it within on year
 - Yes, hosted on a server located in the company
 - Yes, hosted by an Internet service provider
- Q 17. Has your company established any of the following networks? (multiple answers possible)
- Local Area Network (connecting computers at one building or site)
 - Intranet (internal private website)
 - Extranet (providing external web access to part of your companies computer network for a restricted group of users)
 - Wireless connectivity
- Q 18. Which of the IT systems/services does your company use when doing business? (multiple answers possible)
- External eMail (i.e. to contact others outside your company)
 - Web browser
 - Program that supports sales activities
 - Program that supports procurement activities
 - Program that supports accounting activities
 - Office programs (e.g. MS Word, Excel...)
 - ERP (Enterprise Resource Planning)
 - SCM (Supply Chain Management)
 - Others Please indicate _____



Q 19. Does your company employ staff with specialised ICT skills?

- No
 Yes Please indicate how many _____

Q 20. Has your company outsourced ICT services to an external service provider?

- No
 Yes Please indicate which services _____

Collaboration Habits

Q 21. Please indicate the way of document exchange with business partners:

	Paper	Non-standardized (fax, email, web)	Standardized (EDIFACT, EANCOM, XML)
Catalogue (products/services)	_____ %	_____ %	_____ %
Request for Quotation	_____ %	_____ %	_____ %
Quotation	_____ %	_____ %	_____ %
Order	_____ %	_____ %	_____ %
Order confirmation	_____ %	_____ %	_____ %
Shipment notification	_____ %	_____ %	_____ %
Purchase receipt	_____ %	_____ %	_____ %
Invoice	_____ %	_____ %	_____ %
Payment order	_____ %	_____ %	_____ %
Other Please Indicate _____	_____ %	_____ %	_____ %

Q 22. Do you use an eMarketplace?

- Yes, for procurement Please indicate which ones: _____
 Yes, for sales Please indicate which ones: _____
 No

Collaboration with suppliers/subcontractors/service providers

Q 23. How many suppliers/subcontractors/service providers do you have?

- Number of national suppliers _____
 Number of international suppliers _____

Q 24. What types of suppliers/subcontractors/service providers do you have? (What types of products/services do you purchase?)



Q 25. How do you search for suppliers/subcontractors/service providers?

- Personal contacts
- Trade fairs
- Tenders
- Searching the web
- Web site
- National eRegistries Please indicate: _____
- International eRegistries Please indicate: _____
- eMarketplace Please indicate: _____
- Other Please specify: _____

Q 26. Where are your suppliers/subcontractors/service providers located?

- _____ % regional
- _____ % national
- _____ % in other EU countries Please indicate: _____
- _____ % in countries outside the EU Please indicate: _____

Q 27. On which criteria is the decision to select a supplier/subcontractor/service provider based?

- Prior relationships
- Reliability of supplier
- Trust
- Quality of products/services
- Price
- Payment terms
- Shipment/delivery terms
- After sales services
- Other Please indicate: _____

Q 28. Does your company use the Internet or other computer-mediated networks to purchase goods or services online?

- No
- Yes Since when? _____

Q 29. How large a share of total purchases is conducted online?

_____ %

Q 30. Are online purchases mainly from regional, national, European or global suppliers?

- _____ % regional
- _____ % national



- _____ % in other EU countries Please indicate: _____
- _____ % in countries outside the EU Please indicate: _____

Q 31. Does your company currently support the selection of suppliers or procurement processes by specific IT solutions?

- No
- Yes Please indicate: _____

7.1.1.1 Open Discussion

Q 32. What kinds of information and documents are exchanged during negotiation with suppliers/subcontractors/service providers?

Collaboration with customers

Q 33. How many customers does your company have?

- Number of national customers _____
- Number of international customers _____

Q 34. How do your customers find you?

- Personal contacts
- Trade fairs
- Tenders
- Searching the web
- Web site
- National eRegistries Please indicate: _____
- International eRegistries Please indicate: _____
- eMarketplace Please indicate: _____
- Other Please specify: _____

Q 35. Where are your customers located?

- _____ % regional
- _____ % national
- _____ % in other EU countries Please indicate: _____
- _____ % in countries outside the EU Please indicate: _____

Q 36. Does your company sell goods or services online on the Internet or through other computer-mediated networks?

- No
- Yes Since when? _____

Q 37. Please estimate how large a share of your total sales is conducted online.

_____ %



Q 38. Are online sales mainly to the regional, national, European or global market?

- _____ % regional
- _____ % national
- _____ % in other EU countries Please indicate: _____
- _____ % in countries outside the EU Please indicate: _____

Q 39. Does your company support marketing or sales processes by specific IT solutions?

- No
- Yes Please indicate: _____

7.1.1.2 Open Discussion

Q 40. What kinds of information and documents are exchanged during negotiation with customers?

SEAMLESS Expectations

Q 41. Would you like to use SEAMLESS services for searching partners, products, services?

- Yes
- No
- I don't know

Q 42. Which of the following services would you expect from SEAMLESS?

- Online search for business opportunities
- eCatalogues
- eMarketplace services
- Downloading specifications and business related documents
- Submitting of RFQ, RFP, RFI
- Submitting of eOffers
- eTenders
- eNegotiations
- eAuctions
- Reverse eAuctions
- Receiving eOrders
- On-line ordering
- ePayments
- Sending eInvoices
- Receiving eInvoices
- Other Please indicate: _____



Q 43. In your opinion, are there any substantial differences between searching for business partners, products, services by using SEAMLESS?

- Yes
- No
- I don't know

Q 44. Which, if any, problems would you expect when using SEAMLESS?

- Linguistic problems
- Inappropriate products classification
- Lack of IT skills
- High adjustment costs
- Insufficient commercial benefits
- My business is not suited for using SEAMLESS
- Other Please indicate: _____
- I don't see any problems
- I don't know

Q 45. Which factors do you think may limit the generalised use of SEAMLESS?

- Lack of information on how SEAMLESS work
- Lack of trust in electronic tools
- Lack of trust in service provider
- Lack of trust in new business partners
- No standardized product (service) classification
- Price of the service
- Insufficient commercial benefits
- Linguistic barriers
- Other Please indicate: _____
- None of the above
- I don't know

Q 46. Is it important for you that data is available in your language?

- Yes
- No
- I don't know

Q 47. What benefits do you expect by using SEAMLESS? (multiple answers possible)

- Reduced operational costs



- Simplification of work
- Improved relations with business partners
- New opportunities for penetrating new markets
- Customers will find us sooner
- Other Please indicate: _____
- None of the above
- I don't know

Q 48. In which sectors do you think that use of SEAMLESS will create most opportunities?

- Manufacturing
- Services
- Construction
- Trade
- I don't know

Q 49. In what way do you think that SEAMLESS should be introduced in textile/construction industry within the EU?

- Immediately
- Progressively
- Maybe in 5 years
- Never
- I don't know

Q 50. In relation to SEAMLESS, which of the following aspects would you consider most important? (multiple answers possible)

- Investment costs in IT tool must be reasonable
- The required IT tool must be easy to use
- It must require less effort than using other means for providing information on partners, services, products
- Training efforts for my staff must be reasonable
- Level of confidence of Internet information
- Safety and security of information and data exchange
- Transparency of the system
- Reliability of the system
- Integration with the existing legacy systems
- Other Please indicate: _____



Open Discussion

Q 51. Do you have any concrete requirements regarding partner search, negotiation support, trust building?

Q 52. What information should be stored in company profiles?

Q 53. What additional functionality should be provided?

Products and Services

Q 54. Do you use a classification scheme for your products/services?

- Yes, national classification Please indicate: _____
- Yes, international classification Please indicate: _____
- No

Q 55. Which products are manufactured by your company?

Q 56. Which services are provided by your company?

Q 57. If no standard classification is used: In which categories can these products/services be subdivided?

Production Processes – Open Discussion

This part is only relevant for companies manufacturing products. The objective is not to perform a detailed in-depth analysis, but only a rough outline to illustrate the problem areas as well as problems/difficulties of the enterprise.

Selection of representative products

Classification according to criteria like turnover, production process, product structure. Those products which substantially contribute to the enterprise success are especially important.

Q 58. Which products make the biggest turnover?

Q 59. Are these products representative with regard to the production process and the product structure?

Q 60. If not: Which products represent the „typical“ production process resp. the „typical“ product structure?

Analysis of Product Structure

7.1.1.3 Product Assembly on component Level

Q 61. The products consist of which components?

Q 62. Is a further division into subcomponents possible?

7.1.1.4 Product Assembly on single parts level

Classification of single parts according to the following criteria:

- In-plant-production part



- Planning relevant purchased parts
- Planning relevant raw material

Q 63. Which in-plant-production parts are used in the components?

Q 64. Are there purchased parts in the components, which are relevant for planning?

Q 65. Is there raw material, which has to be procured order-related or which is relevant for planning?

7.1.1.5 Variants and Customer Involvement

Q 66. At which level of the product structure do customer-specific features influence the production?

Q 67. Which features can be influenced by the customer?

Q 68. Which impact do they have?

Q 69. To what extent can the variants be influenced by the customer (standard variants vs. Customer-specific variants)?

Analysis of Manufacturing Structure

The goal is a description of the manufacturing structure, esp. the production cycle for the representative products.

7.1.1.6 Overview of the Organisational Production Structure

Q 70. In which areas of responsibility is your production subdivided?

Q 71. With which products do they deal with?

Q 72. Are other products than the representative ones handled by these areas of responsibility?

Q 73. Which products are these?

7.1.1.7 Production Cycle

Q 74. How do in-plant-production parts flow through the areas of responsibility?

Q 75. Is there outside production of parts?

Q 76. Do alternative production cycles exist?

Q 77. Where are the influences of customer specifications?

Q 78. Which materials have to be supplied to the areas of responsibility (in-plant-production parts, planning relevant purchased parts, planning relevant raw material)?

Analysis of Order Processing

Procedures, responsibilities, interfaces and inter dependencies of order processing have to be analysed.



7.1.1.8 Order Types

- Customer Order:
A product has to be manufactured once for the customer; therefore production starts after receipt of the order.
- Running Order:
A total quantity is purchased over a fixed period. Calls for delivery trigger partial deliveries at particular points in time.
- Stock Order:
Stock orders result from sales forecasts or minimum inventory. They arise in customer-anonymous manufacturing.

Q 79. Which order types occur in your company?

Q 80. What is the approximate percentage of the order types?

7.1.1.9 Order Processing

Q 81. How are orders processed with regard to

- Tasks to be carried out
- Assignment to areas of responsibility
- Temporal and logical relations
- Assignment of Input/Output
- Assignment of lead times at sector level

The following points have to be extracted and defined in terms of interfaces, information flow, responsibilities, input/output, etc.

- Offer processing
- Offer creation, offer checking by customer, order confirmation to customer
- Order scheduling
- Capacity balancing
- Engineering
- Order release and availability check
- Order feedback/production data capture (PDC)
- delivery

