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Management Summary

This aim of this deliverable is to establish a first relationship between the S-Cube project and industry partners, which currently use SOA and which are willing to provide best practices and industrial cases for validating the S-Cube research results. This deliverable reports on the first activities towards such an industry alignment, which was achieved in three steps: First, we collected a list of possible industrial contributors. Second, we asked each contributor to complete a questionnaire. This questionnaire was used not only to find out whether a particular company is willing to contribute to S-Cube but also to gather information about the current status of industrial SOA projects and their main problems to which S-Cube may contribute. Third, on the basis of the results of these questionnaires we propose seven potential industrial partners with which we plan to collaborate.

The research leading to these results has received funding from the European Community's Seventh Framework Programme [FP7/2007-2013] under grant agreement n° 215483 (S-Cube).

Members of the S-CUBE consortium:

University of Duisburg-Essen	Germany
Tilburg University	Netherlands
City University London	U.K.
Consiglio Nazionale delle Ricerche	Italy
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Published S-CUBE documents

These documents are all available from the project website located at http://www.s-cube-network.eu/

The list of deliverables currently includes:

- PO-JRA-1.1.1: State of the art report on software engineering design knowledge and Survey of HCI and contextual Knowledge
- PO-JRA-1.2.1: State-of-the-Art report, gap analysis of knowledge on principles, techniques and methodologies for monitoring and adaptation of SBAs
- PO-JRA-1.3.1: Survey of quality related aspects relevant for SBAs
- PO-JRA-2.1.1: State-of-the-art survey on Business Process Modelling and Management
- PO-JRA-2.2.1: Overview of the state of the art in composition and coordination of services

The S-CUBE Deliverable Series

Vision and Objectives of S-CUBE

The Software Services and Systems Network (S-Cube) will establish a unified, multidisciplinary, vibrant research community which will enable Europe to lead the software-services revolution, helping shape the software-service based Internet which is the backbone of our future interactive society.

By integrating diverse research communities, S-Cube intends to achieve world-wide scientific excellence in a field that is critical for European competitiveness. S-Cube will accomplish its aims by meeting the following objectives:

- Re-aligning, re-shaping and integrating research agendas of key European players from diverse research areas and by synthesizing and integrating diversified knowledge, thereby establishing a long-lasting foundation for steering research and for achieving innovation at the highest level.
- Inaugurating a Europe-wide common program of education and training for researchers and industry thereby creating a common culture that will have a profound impact on the future of the field.
- Establishing a pro-active mobility plan to enable cross-fertilisation and thereby fostering the integration of research communities and the establishment of a common software services research culture.
- Establishing trust relationships with industry via European Technology Platforms (specifically NESSI) to achieve a catalytic effect in shaping European research, strengthening industrial competitiveness and addressing main societal challenges.
- Defining a broader research vision and perspective that will shape the software-service based Internet of the future and will accelerate economic growth and improve the living conditions of European citizens.

S-Cube will produce an integrated research community of international reputation and acclaim that will help define the future shape of the field of software services which is of critical for European competitiveness. S-Cube will provide service engineering methodologies which facilitate the development, deployment and adjustment of sophisticated hybrid service-based systems that cannot be addressed with today's limited software engineering approaches. S-Cube will further introduce an advanced training program for researchers and practitioners. Finally, S-Cube intends to bring strategic added value to European industry by using industry best-practice models and by implementing research results into pilot business cases and prototype systems.

S-CUBE materials are available from URL: http://www.s-cube-network.eu/

Foreword

The authors thank the team Elisabetta di Nitto and Daniel Dubois for pretesting an early version of the questionnaire. In addition, we thank all S-Cube partners and Veronique Pevtschin for sending the questionnaire to their industry partners and to the NESSI mailing list respectively. We also thank the team from UStutt, Kim Lauenroth as well as Andreas Metzger for their comments on earlier versions of the industry questionnaire. We would like to especially thank Julia Hielscher for their patience in pretesting the questionnaire. Last but not least we thank the reviewers for their useful comments on this document.

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List of acronyms

3GPP	3rd Generation Partnership Project
BPM	Business Process Management
BPEL	Business Process Engineering Language
ESB	Enterprise Service Bus
OMA	Open Mobile Alliance
OWL	Web Ontology Language
OWL-S	Semantic Markup for Web Services
PKI	Public Key Infrastructure
RDF	Resource Description Framework
REST	Representational State Transfer
SLA	Service Level Agreement
SOA	Service Oriented Architecture
SOBA	Service-Oriented Business Application
SPARQL	SPARQL Protocol and RDF Query Language
WebSSO	Web Single Sign-On
WSDL	Web Service Description Language
WS-sec	Web Service Security

1 Introduction

This deliverable aims to target potential industry collaborators, which will contribute to the S-Cube project with industrial cases, best practices and which may validate the project's research results. We used a process containing the following three activities to select these industry partners:

1) A list of potential industrial contributors is compiled. Each S-Cube member adds its industry contacts, which are relevant for the project, to this list.
2) Each company of this list is asked to complete a questionnaire. The questionnaire contains questions regarding the willingness of the company to contribute to S-Cube which industrial cases and best practices. In addition, the questionnaire aims to find out the current status of Service Oriented Architecture (SOA) projects and the current industrial problems. These problems can later be used to align S-Cube's research strategy to the actual problems faced in the industry.
   The questionnaire is complemented with selections criteria, which are used to select those partners, with which S-Cube aims to collaborate.
3) Potential industry partners are selected are selected based on the survey results.

The main outcome of this deliverable is, therefore, twofold: First, the deliverable provides a list of industry partners with which S-Cube aims to collaborate. Second, the deliverable sheds light on the state of the art of industrial SOA implementation and their current problems.

2 Industry Questionnaire and Selection Criteria

2.1 Selection Criteria

Interesting industry partners for the S-Cube project should have the following properties (descending importance):

C1. *Importance of the company in the European SOA market*: Since S-Cube want to achieve an impact not only in research but also on the industry, we may also select companies because of their relevance in the European market, e.g. global players.
C2. *Strong interest in the service domain*: The company should have a strong interest in the service domain. This may be demonstrated by currently using SOA technologies or by a strong interest to start SOA projects. Another way of demonstrating the interest in the service domain would be to participate in other EU SOA projects.
C3. *Willingness to validate and/or use our research results*: The company should express its interest to validate the research results produced in the S-Cube project. This allows us to demonstrate the effectiveness of our approaches. Companies which express their interest of trying out some of our approaches in a limited setting, e. g. in a pilot project will be preferably selected.
C4. *Willingness to provide industrial cases*: The company should be willing to propose realistic industrial cases, e. g. from previous projects. We will use these industrial cases in S-Cube to validate early ideas and early approaches.
C5. *Willingness to share best practices*: The company should share some of their best practices with the S-Cube project so that we can learn from the experiences made in the industry, which in turn may be used to enhance our research results.
C6. *Willingness to start a cooperation*: Finally, the company should express its interest to collaborate with the S-Cube project, e. g. should devote some time and resources to S-Cube.

If more than twelve companies equally fulfill the before-mentioned properties, the final selection will be made according to the following criteria:

C7. *Application domain mix*: It would be advantageous to have companies addressing different domains, e. g. classical information systems, embedded systems, E-Health, E-Government, automotive.
C8. *SOA role*: The selected companies should have different roles regarding to SOA, e. g. service provider, service aggregator, service consumer and infrastructure provider.
C9. *Size*: It would also be advantageous not only to include big players in the company portfolio but also small and medium sized companies, which may be easier to access and which may have concrete problems when introducing and/or running a SOA.

2.2 The Questionnaire

According to the goals of this deliverable the industry questionnaire was designed to gather information in three different areas:

1) *General Information*: The first part of the questionnaire asks for general information about the company, its business domains, number of employees and the status of its SOA projects. This section is used to assess whether the company has a strong interest in the service domain (criterion C1) and to provide information about the application domain mix, role and size (criteria C7 - C9). This section should be completed by all companies .
2) *Problems and Hurdles*: The second section is used to gather information about the problems associated with running or planned SOA projects. We also use this section to evaluate the interest of the company in the service domain in case the company has just started to plan SOA projects (criterion C1). This section is different for those companies, which already have running SOA projects, for those companies, which plan to use SOA and for those companies, which do not use SOA.
3) *Interests in S-Cube*: The last section is related to the criteria C3-C6. It collects information whether the company is willing to cooperate with S-Cube. This section should be completed by all companies.

A preliminary version of the questionnaire was pre-tested at the “Second International Workshop and Summer School on Service Science, Management & Engineering” held in Palermo, Italy. The questionnaire was used for a structured interview conducted with Thales, Siemens and HP. The feedback was used to extend the questionnaire, to rephrase misleading questions and to reorganize the sequence of the questions.

3 Aggregated Survey Results

The results of the questionnaire are reported according to its structure. After the distribution of the questionnaire is explained in subsection 3.1, the data of the general questions are reported in subsection 0 followed by the data collected from those companies, which currently do not use and do not plan to use SOA (subsection 3.3). Subsection 3.4 contains the data of those companies, which do not use SOA at the moment but plan to do so in the future. The final subsection contains the data of those companies, which currently use SOA. Please note that this section is dedicated to reporting the data collected. Their interpretation is presented in section 3.6.

3.1 Distribution of the Questionnaire

The questionnaire was sent to the NESSI mailing list on the 7th of August 2008. At that time, the mailing list contains 307 members. Although quite a few of the members are academic institutions (52%), the list also contains large players in the information and communication technology field

(21%) as well as small and medium sized companies (21%), which are of particular interest to the S-Cube project. The remaining 4% are users.
In addition to sending the questionnaire to the NESSI mailing list, each S-Cube member was asked to send the questionnaire to his/her industry contacts. Due to the generally low response rates (see below), we resubmitted the request in the beginning of September 2008.
At the time of writing, we have received 15 completed questionnaires.

3.2 Part I: General Questions

3.2.1 Company Profile

The responding companies comprise:

- small companies with 1-50 (47%),
- medium-sized companies with 51-500 employees (20%)
- and large companies with >500 employees (33%).

In these companies there are on average 11-50 people working in designated SOA projects with an average SOA experience of 4-5 years. Only one company reported that they did not yet investigate SOA technologies and standards.

3.2.2 SOA Technologies (Question 9 and 10)

The technologies and standards investigated include (see Figure 1):

- Web Service Description Language (WSDL; 93% of the companies),
- Business Process Management (BPM; 29% of the companies),
- Enterprise Service Bus (ESB; 53% of the companies),
- Business Process Engineering Language (BPEL; 67% of the companies) and
- Service Repositories (31%).

Other technologies and standards, which were investigated mainly by individual companies, are:

- Semantic Web,
- Policy Management,
- Representational State Transfer (REST),
- 3rd Generation Partnership Project/Open Mobile Alliance (3GPP/OMA),
- Parlay X Web Services,
- Web Service Security (WS-sec),
- Directories, Resource Description Framework (RDF),
- Web Ontology Language (OWL),
- Semantic Markup for Web Services (OWL-S),
- Service Discovery & Matchmaking,
- SPARQL Protocol and RDF Query Language (SparQL),
- peer-to-peer Repositories,
- Service-Oriented Business Application (SOBA),
- SOA in pervasive computing environment,
- public key infrastructure (PKI) and
- Web Single Sign-On (WebSSO).

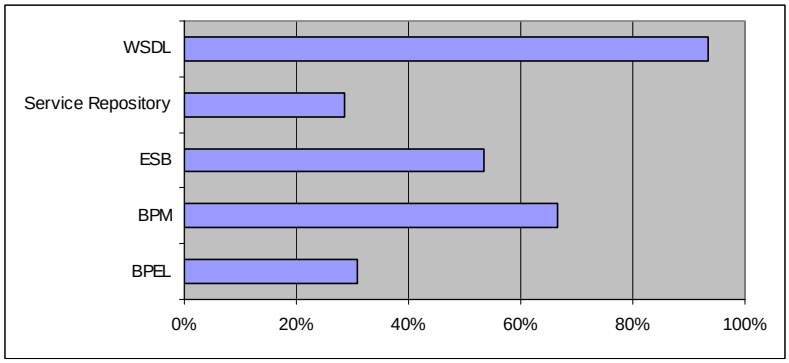

Figure 1: Investigated SOA Technologies and Standards

The companies were also asked to evaluate whether the techniques mentioned above would be applicable for current or planned SOA projects on a scale ranking from 0 (not applicable) to 4 (fully applicable, see Figure 2). They found WSDL most applicable (3.6, SD: 0.8), followed by ESB (2.4, SD: 1.4), service repositories (2.3, SD: 1.3), BPEL (1.9, SD: 1.1) and finally by BPM (1.8, SD: 1.4). In addition, to the applicability of existing technologies and standards, the companies were asked to evaluate whether they are sufficient enough to be used on a scale between 0 (strongly agree) to 4 (strongly disagree, see Figure 2). Companies were indifferent whether service repositories (1.9, SD: 0.7), ESB (1.8, SD: 0.8) and BPM (1.5, SD: 0.7) are sufficient. They clearly state that WSDL (1.3, SD: 1,2) and BPEL (1.0, SD: 0.8) is currently not sufficient to be used. The companies reported that existing technologies and standards are too simplistic or too virtual to be useful for the service industry. Another problem, which was reported, was inability of BPEL engines to support event-based service points. Lastly, one company found it too complex to incorporate services in running environments.

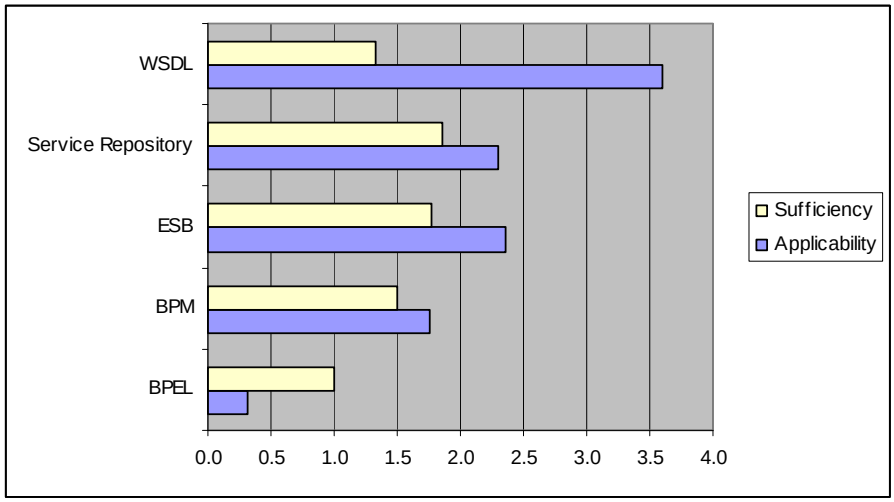

Figure 2: Degree of Applicability of SOA Technologies (0: strongly disagree - 4: strongly agree)

3.2.3 Service Usage (Question 14, 16, 17)

In the next section the companies were asked to report their experiences with existing services and 53% of the companies reported that they already investigated services. These 53% were than asked to evaluate whether existing services were usable for them on a scale 0 (strongly agree) to 4 (strongly disagree, see Figure 3). Companies have reported no problems converting in-house IT-systems to services both in terms of possessing the required knowledge (0.3, SD: 0.7) and in terms of have the necessary technologies for achieving this transformation (0.4, SD: 0.7). In addition, companies did not report problems when integrating external services in their architecture (0.8, SD: 1.0). Companies were indifferent about whether the current services match their requirements (2.2, SD: 0.4), whether the unavailability of services hindered their usage (2.2, SD: 1.2) or whether too expansive tools

prevented the usage of services (2.2, SD: 0,8). Trust of services is perceived weekly as problem (2.6, SD: 1.1).

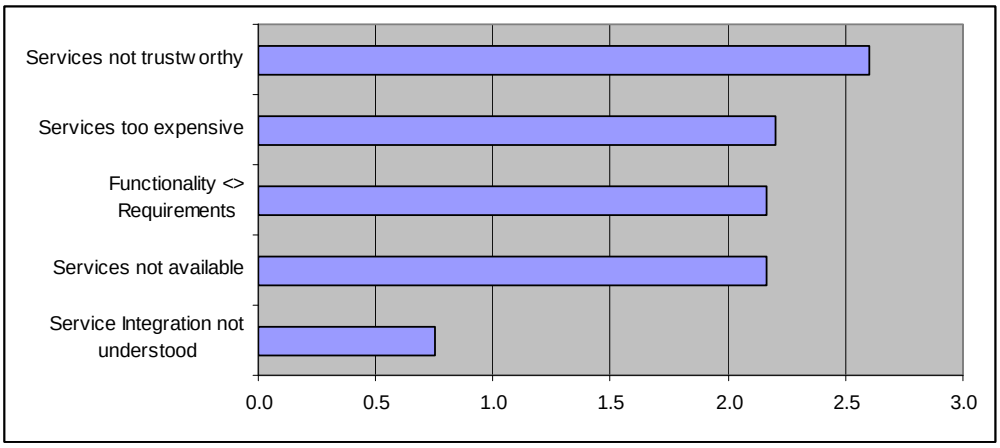

Figure 3: Usefulness of Existing Services (0: strongly disagree - 4: strongly agree)

We also asked the companies about their envisioned future SOA trends. The answers received, however, are not conclusive. They range from technological considerations such as BPM to development practices such as Model driven realization of SOA. We could only identify trust and security of services as possible future topics as this was mentioned by 23% of the responding companies. All answerers to this question are summarized in Table 1.

Table 1: SOA Trends

Technological SOA Trends	SOA Trends
Cloud Computing	Video & Image Analysis
ESB-based solutions	Software re-use
BPM	Business Alignment
Platform neutral integration	SOA as a Strategy
Legacy integration	Driven by business objectives
Replacement of client server approaches by P2P approaches	Understanding real world semantics of services
Data transformation and adaption	Application development kits
Orchestration of complex business processes (BPEL, WSCL)	Web services
Model driven realisation	ESB
Semantic web	
Integrated event handling	
SOAP	
Trust and Security *(mentioned three times)*	
SOBA	
SLA	
REST	
Service semantics	
Solutions for embedded systems	
Governance	
Service dependency management	

3.2.4 Collaboration with S-Cube (Questions 18, 27, 34 and 43)

The low response rate seems not to indicate that the industry is not interested in the S-Cube project, since 33% of the companies are willing to provide industrial cases, 33% are willing to use the S-Cube results in their company and 40% are willing to validate the usefulness of the results produced in the S-Cube project. In additions, we already received the following proposals for industrial cases, which the industrial partners aim to provide:

- ViSAGE – Video Stream Analysis in a Grid Environment
- WWATC – a presentation of the air traffic world wide
- Osmius Project – the open source monitoring tool
- Exposure of Telco Web Services to SOA contexts
- Semantic description of Web Services
- Policy definition and management
- Mash-up solutions for Telco capabilities
- Secure SOA
- Performance benchmarking
- Safety issues
- Resilience
- Webshop
- Vending Scenarios
- SOFIA in Artemis

3.2.5 Status of SOA Implementation (Question 20)

Regarding the current state of SOA implementation only two companies (14%) reported that they not use SOA and also consider not using it in the future, tow companies (14%), which does not use SOA but plan to use it and the majority of the companies (72%) which currently use SOA. Consequently we only have two companies to complete the second and one company to complete the third part of the questionnaire while the remaining 11 companies completed the fourth part of the questionnaire.

3.3 Part II: Reasons for Not *Applying SOA*

Since only two companies answered that they do not use SOA, we cannot statistically evaluate these results. Consequently, we only report the data of these two case. One company reported that they investigated in SOA and decided afterwards that they are not going to use it.
The main problems which prevented this company to use SOA are: the uncertainty about the benefits of SOA and the lack of methodological guidance and convincing industrial cases. The company was indifferent whether security and scalability aspects are hurdles for introducing SOA. The main problems of the other company with SOA were: the missing experience to start a SOA project, difficulties to calculate the return on investment, the fear to spend considerable external counseling resources and problem of estimating the performance of the SOA. Interestingly, the support from the management and IT department was not raised as a problem.
As additional reason for not using SOA, one company argued that SOA is still premature and that their customers require them to build "… fast, efficient, completely controllable, and most important, cheaper solutions."
Both companies stated that they would consider starting a SOA project, if there was methodological guidance on how to introduce SOA projects, if services for their domain were available, if the return on investment could be estimated.

3.4 Part III: Obstacles and Challenges when Planning SOA Projects

As in the previous section, only two companies stated that they plan to introduce SOA so that we report data for both companies only. Both companies reported that they feel to have insufficient knowledge about SOA, that performance aspects are not sufficiently addressed. One company additionally raised the point that SOA scalability may be a problem and that services are not yet available for their domain. One company was indifferent about security, trust and lifecycle aspects of services and disagreed that privacy, technology and return on investment is a problem. The other company was with respect to finding appropriate service while technologies, scalability, trust, privacy and security are not seen as problems.

3.5 Part IV: Hurdles and Challenges of Running SOA Projects

3.5.1 Reasons for Using SOA (Questions 36 – 38)

In this part, which was completed by 72% of the companies, they were asked about the motivation to introduce SOA and the remaining problem with this new paradigm. The reasons for using SOA can be grouped in three groups (see Figure 4). The most mentioned reasons for using it are: the possibility to reuse existing software (82%), the increased flexibility (73%) and the ability to address future market requirements (64%). The next group of reasons contain the integration of software systems (55%), the facilitation to start new cooperation (55%), the reduction in time to develop software (50%), the possibility to implements new business models and the possibility to support business process management (45%). Less important for implementing SOA is: the reduction of the time to adapt software systems (27%), the increase in software quality (18%), the reduction of software costs (18%) and an increase in the productivity (18%). In addition to the before-mentioned reasons for using SOA, one company stated that they use SOA to achieve an integration with external service providers and to enable new business models when providing services.

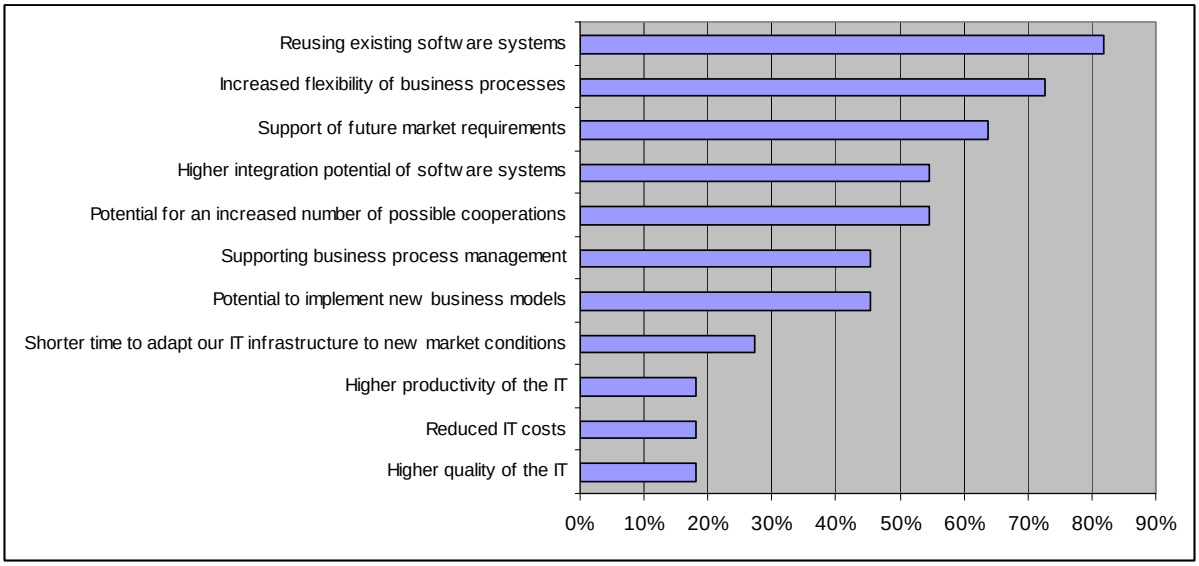

Figure 4: Reasons for Using SOA

In the next block of questions we were interested whether the initial expectations about SOA were finally realized. This was measured on a five point Likert scale ranging from completely not fulfilled (0) to completely fulfilled (4). Among the fulfilled expectations of SOA are: the implementation of new business models (2.9, SD: 0.9), the potential to integrate software systems (2.8, SD: 0.9), the reduction in software costs (2.7, SD: 0.6) and the possibility to meet future market requirements (2.5, SD: 1.4). The group of expectations where the companies were indifferent regarding to the fulfillment

of the expectations are: the possibility to increase the flexibility of software systems (2.2, SD: 1.0), the possibility to reuse existing software (2.2, SD: 1.2), the possibility to establish new cooperations (2.1, SD: 1.4), the possibility to support business process management (2.0, SD: 1.3) and the reduction in time to develop software (2.0, SD: 0.8). Finally, the initial expectations were not fulfilled for the increase in software quality (1.4, SD: 1.1) and the increase in productivity (1.4, SD: 1.0).

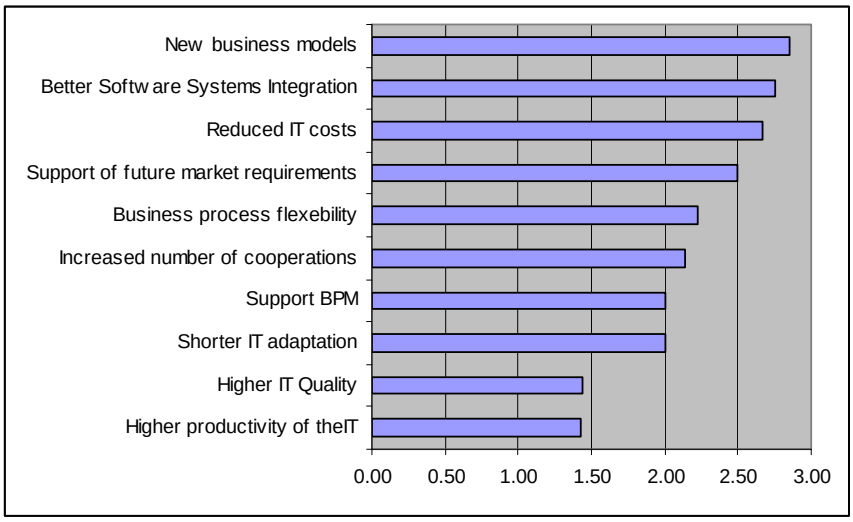

Figure 5: Expectations of SOA Technologies And Standards (0: completely disagree - 4: completely agree)

In addition, we wanted to know how the companies implemented SOA. Most of the companies (40%) implemented SOA in some departments only while the remaining companies implemented it as pilots (30%) or in all departments (30%) respectively. Two companies stated that SOA is not applicable in all their departments, while one company preferred to implement SOA incrementally in all departments in the near future.

3.5.2 Problems Implementing SOA (Question 40)

In the next block of questions we wanted to learn something about the current problems when implementing SOA in the industry. The companies' opinion were collected on a five point Likert scale ranging from strongly disagree (0) to strongly agree (4, see Figure 6). Most of the problems occur in the following fields: Service discovery (3.1, SD: 0.9), lack of semantically-enabled services (3.0, SD:1.0), unclear terminology (2.9, SD:1.2), insufficient performance (2.9, SD: 0.8), lack of methodological guidance when introducing and maintaining SOA (2.8, SD:0.8 and SD:0.9), ineffective tools (2.7, SD: 0.7), limited usability of services (2.5, SD: 0.8), difficulty to asses the return on investment (2.5, SD: 1.3), difficulties to develop a SOA methodology (2.5, SD: 1.1) and lack of suitable test environments (2.5, SD: 0.7). Companies were indifferent regarding the maturity of current SOA technologies (2.4, SD: 0.9), the scalability of SOA applications (2.3, SD: 1.3), the security of SOA (2.2, SD: 1.6), the life cycle of services (2.1, SD: 1.4), the availability of competing SOA architectures (1.9, SD: 1.3) and the availability of existing SOA technologies (1.7, SD: 1.2). Companies reported no problems in the following areas: delay of SOA project because of low priorities (1.2, SD: 1.1) or because of a lack of funding (0.9, SD: 0.8), the acceptance of SOA by the company's management (0.8, SD: 0.9) or by the IT department (0.7, SD: 0.9).

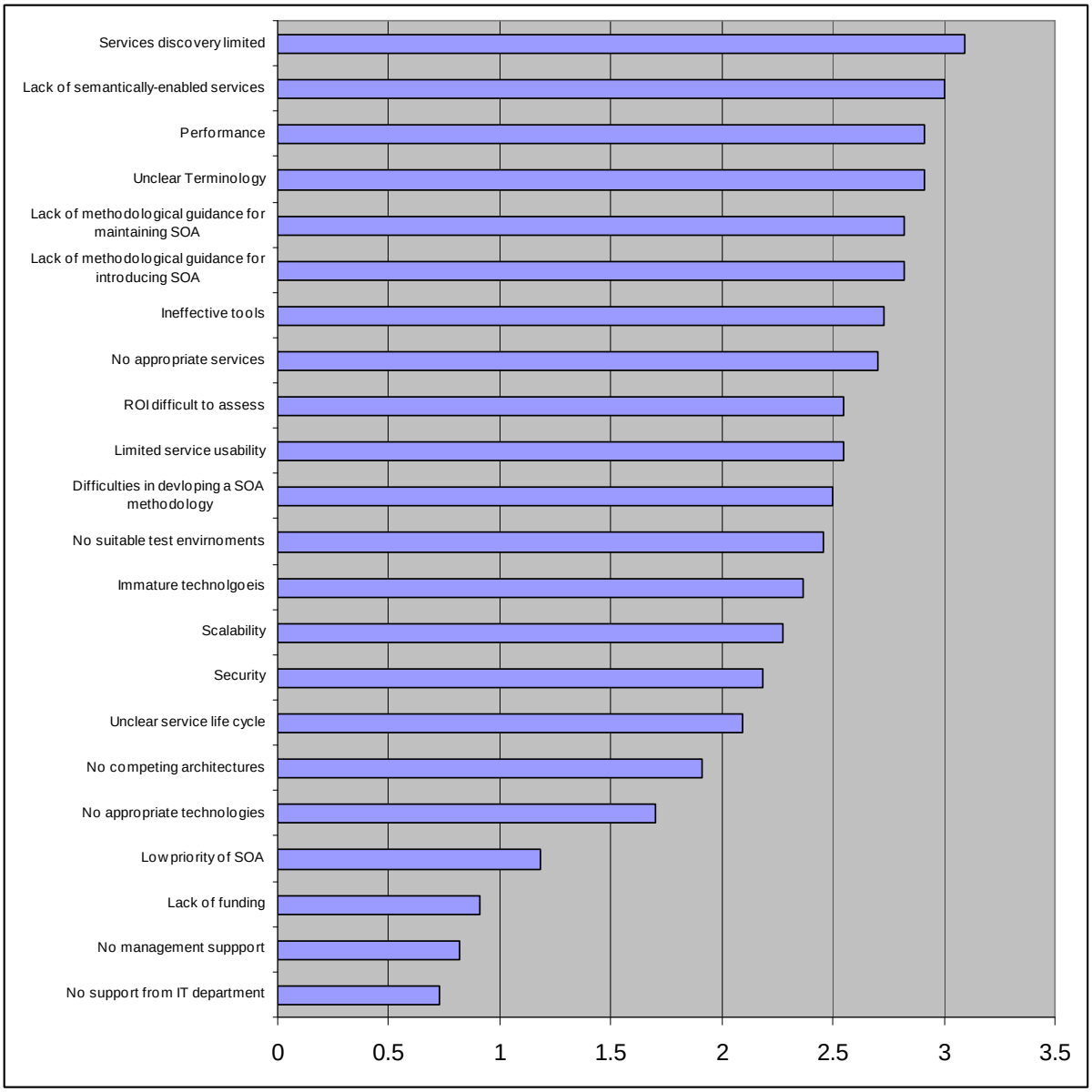

Figure 6: Problems When Implementing SOA (0: strongly disagree - 4: strongly agree)

3.5.3 Application Areas (Question 41)

The application areas are currently not conclusive, with a tendency towards business to business communication including e-collaboration and e-procurement. The full list of application areas is provided below:

- Data fusion
- Data mining
- Video and image processing
- Enterprise Information Management System
- e-Collaboration
- e-Procurement
- Portals
- Wrappers for legacy system conversion to services
- E-government services
- Embedded monitoring agents
- Communication with other departments

- Access of telephone service enabler to 3rd parties
- Web centric systems
- Embedded systems
- Near real time systems
- Business-to-Business Applications
- Communication between information and embedded systems
- Enterprise resource planning
- Application integration

3.6 Data Interpretation & Conclusions

Although we have only received thirteen questionnaires, the interest to provide particular validation scenarios was high, so that there is a good chance to establish industry cooperation in this respect. Given the current problems in the industry and the need for the S-Cube project to gain industrial partners, the project should particularly provide research results in the following fields:

- service discovery,
- semantically enabled services,
- terminology,
- performance of SOAs,
- methodological guidance for introducing and maintaining SOAs,
- effective tools,
- techniques to increase the usability of services and
- techniques to assess the return of investment of SOAs.

The problem areas sketched out previously map well to the S-Cube's research interests in technology, methodology and their relation to the business value.
The relatively low response rates to the questionnaire may be due to the fact that it was sent to the industrial partners during the holiday period in August. We have agreed on three strategies to enhance the response rate: Firstly, the questionnaire should be re-sent to the NESSI mailing list. Secondly, the S-Cube partners have been asked to approach their existing industrial contact more directly (interviews, personal contacts, etc.). Thirdly, we have asked the current members of the S-Cube industrial advisory board to circulate the questionnaire within their companies (if they have not done so already) and to send it to their partner companies.

Appendix – Industry Questionnaire

On the Current Situation of SOA Projects in Industry

A Survey performed in the context of the European Network of Excellence on Software Service and Systems

August/September 2008

Please return the completed questionnaire to:

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Disclaimer

This questionnaire is aimed at collecting information from industrial partners willing to cooperate with S-Cube. The data that will be collected will be used to create aggregated information for the purpose of surveying the status of the industries we are in contact with. The aggregated information will be incorporated in our public deliverables, but no information that will enable identification of any person or industry participating in the survey will be made public without explicit permission by the interested party.

We would like to thank you in advance for completing this questionnaire.

The S-Cube team

How to complete this questionnaire

This questionnaire contains a number of questions, which are not relevant for everyone. To structure the questionnaire we ask you to follow the arrows indicated next to the questions as in the following example:

Did you already investigate SOA Technologies? *Please select only one option.*
☒ Yes. ☐ No ➔ *Please continue with question 13).*

If there is no arrow pointing to another question, please answer the questions as they appear in the questionnaire.

There are four options for answering the following questions:

a) For most of the questions it is sufficient to tick *only one* of the boxes, for instance:

Would you like to receive further feedback?
☒ Yes. ☐ No.

b) For some questions you may tick *more than one* box as follows:

Which SOA technologies and standards did you investigate? *You may select multiple options.*
☒ Web Services (e. g. WSDL, SOAP). ☐ Business Process Execution Language (BPEL). ☒ Business Process Management System. ☐ Enterprise Service Bus.

c) We may also ask you to rate your answers. For example:

Which of the following technologies would be applicable in current or planned SOA projects?					
	Not Applicable				Fully applicable
Web Services.	☐	☐	☐	☐	☐

d) For some questions you can give your own answer as in the following example:

What are the current technological trends related to SOA?
Please write your answer here.

In addition, we provide space for most of the questions, which you can use for further comments. If this space is not sufficient, please use the last page of this questionnaire to add further comments.

Part 1 General Questions

1.1 Company and Contact Information

1) Contact Information *You may also attach your business card.*
Company Name: Contact Person: Department: Position: Tel.: E-Mail:

2) How many employees work in your company?
☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-500 ☐ 501-1000 ☐ >1000

3) Please provide some general information about your company.
Website: Our most important products are: Our most important services are:

Our business competencies include:

Our IT competencies include:

4) How many people are involved in SOA-related projects in your company?

- ☐ 0
- ☐ 1
- ☐ 2-5
- ☐ 6-10
- ☐ 11-50
- ☐ 51-100
- ☐ 101-500
- ☐ 501-1000
- ☐ > 1000

5) How many years do you personally work with SOA?

- ☐ < 1 year
- ☐ 2-3 years
- ☐ 4-5 years
- ☐ > 5 years

6) What kind of experience do you report?

Please select only one option.

- ☐ Experience of SOA projects in the entire company. ➔ *Please continue with question 8).*
- ☐ Experience of SOA projects in a specific department.
- ☐ Experience of a particular SOA project.

7) Please provide general information about the project or department for which you want to report your SOA experience.

Our competencies are:

Our responsibilities are:

8) Did you already investigate SOA Technologies? *Please select only one option.*
☐ Yes. ☐ No ➔ *Please continue with question 13).*

9) Which SOA technologies and standards did you investigate? *You may select multiple options and may add additional technologies.*
☐ Web Services (e. g. WSDL, SOAP). ☐ Business Process Execution Language (BPEL). ☐ Business Process Management System. ☐ Enterprise Service Bus. ☐ Service Repository. Additional Technology 1: Additional Technology 2: Additional Technology 3: Additional Technology 4: Additional Technology 5:
Additional Comments:

10) Which technologies mentioned in 9) would be applicable in current or planned SOA projects?
Please also evaluate any additional technology stated in question 9) regarding its applicability in SOA projects.

	Not Applicable				Fully applicable
Web Services.	☐	☐	☐	☐	☐
Business Process Execution Language (BPEL).	☐	☐	☐	☐	☐
Business Process Management System.	☐	☐	☐	☐	☐
Enterprise Service Bus.	☐	☐	☐	☐	☐
Service Repository.	☐	☐	☐	☐	☐
Additional Technology 1:	☐	☐	☐	☐	☐
Additional Technology 2:	☐	☐	☐	☐	☐
Additional Technology 3:	☐	☐	☐	☐	☐

10) Which technologies mentioned in 9) would be applicable in current or planned SOA projects?
Please also evaluate any additional technology stated in question 9) regarding its applicability in SOA projects.

	Not Applicable				Fully applicable
Additional Technology 4:	☐	☐	☐	☐	☐
Additional Technology 5:	☐	☐	☐	☐	☐

Additional Comments:

11) Which technologies mentioned in 9) are not sufficient? What is missing?
Please also evaluate any additional technology stated in question 9).

	Strongly Disagree				Strongly Agree
Web Services.	☐	☐	☐	☐	☐
Business Process Execution Language (BPEL).	☐	☐	☐	☐	☐
Business Process Management System.	☐	☐	☐	☐	☐
Enterprise Service Bus.	☐	☐	☐	☐	☐
Service Repository.	☐	☐	☐	☐	☐
Additional Technology 1:	☐	☐	☐	☐	☐
Additional Technology 2:	☐	☐	☐	☐	☐
Additional Technology 3:	☐	☐	☐	☐	☐
Additional Technology 4:	☐	☐	☐	☐	☐
Additional Technology 5:	☐	☐	☐	☐	☐

Additional Comments:

12) Why are the technologies mentioned in 9) not sufficient for your SOA?
Please answer this question only if some technologies were not applicable for your SOA.

13) Did you already investigate existing services?
Please select only one option.

☐ Yes.
☐ No ➔ *Please continue with question 16).*

14) Existing services from external service providers were not usable for us, because:					
	Strongly Disagree				Strongly Agree
Services for our fields are not available.	☐	☐	☐	☐	☐
Available service functionality does not match our requirements.	☐	☐	☐	☐	☐
Services available for our field are too expensive.	☐	☐	☐	☐	☐
Services available for our field are not trustworthy.	☐	☐	☐	☐	☐
We do not know how to integrate existing external services into our IT systems.	☐	☐	☐	☐	☐
Additional Comments:					

15) We had the following difficulties of providing in-house services:					
	Strongly Disagree				Strongly Agree
We do not know how to convert in-house legacy IT systems into web services.	☐	☐	☐	☐	☐
We do not have the required technology to convert in-house services into web services.	☐	☐	☐	☐	☐
Additional Comments:					

16) What are the current technological trends related to SOA?

17) What are the current trends when applying SOA?

18) What are the case studies that can benefit from collaboration within the S-Cube project?

19) What are your development practices in the context of SOA?

20) What is the status of your SOA project(s)? *Please select only one option.*
☐ We do not use SOA and we do not plan to use it. ➔ *Please complete Part 2*. ☐ We do not use SOA but we plan to use it. ➔ *Please complete Part 3*. ☐ We are currently using SOA. ➔ *Please complete Part 4*.

Part 2 Reasons for *not* applying SOA

Important: Please complete this section only if you currently do not use SOA and you do not intend to use SOA in the future.

21) What are the reasons for not using SOA?
☐ We have never considered SOA to be used in our company.
☐ We have analysed SOA and decided not to use it. ➔ *Please continue with question 23).*

22) Are you interested in learning more about SOA?					
	Strongly Disagree				Strongly Agree
I would like to learn more about SOA's concepts.	☐	☐	☐	☐	☐
I would like to learn more about emergent SOA technologies.	☐	☐	☐	☐	☐
I would like to learn more about SOA's methods.	☐	☐	☐	☐	☐
Additional Comments:					

23) What were the obstacles that prevented you from using SOA in your company?					
	Strongly Disagree				Strongly Agree
We felt that we did not have enough experience to start a SOA project.	☐	☐	☐	☐	☐
It was unclear what the benefits of SOA are.	☐	☐	☐	☐	☐
We did not know how to calculate the return on investment.	☐	☐	☐	☐	☐
The management does not support a SOA project.	☐	☐	☐	☐	☐
The IT department does not support a SOA project.	☐	☐	☐	☐	☐
We did not find any methodological guidance on how to introduce SOA.	☐	☐	☐	☐	☐
We did not find any convincing case studies.	☐	☐	☐	☐	☐
We felt that it would haven taken us considerable resources for external counselling when introducing SOA.	☐	☐	☐	☐	☐
Security aspects were so poorly addressed that we decided not to use SOA.	☐	☐	☐	☐	☐
Scalability aspects were so poorly addressed that we decided not to use SOA.	☐	☐	☐	☐	☐

23) What were the obstacles that prevented you from using SOA in your company?					
	Strongly Disagree				Strongly Agree
We did not know how to estimate the performance of the SOA.	☐	☐	☐	☐	☐
We did not find appropriate technologies.	☐	☐	☐	☐	☐
We did not find appropriate services.	☐	☐	☐	☐	☐
Additional Comments:					

24) Can you please state the reasons for the major obstacles mentioned in question 23).

25) Would you consider starting a SOA project, given that:					
	Strongly Disagree				Strongly Agree
SOA terminology was more precise.	☐	☐	☐	☐	☐
Methodological guidance on how to introduce SOA existed.	☐	☐	☐	☐	☐
Services for your domain were available.	☐	☐	☐	☐	☐
The service lifecycle was clearer.	☐	☐	☐	☐	☐
The return of investment could be estimated.	☐	☐	☐	☐	☐
Additional Comments:					

26) Do you intend to further contribute to the S-Cube project?
☐ Yes. ☐ No ➔ *Please continue with question 28).*

27) How do you intend to contribute to the S-Cube project? *You may choose multiple options.*
☐ We intend to contribute with industrial case studies. ☐ We intend to use new technologies and approaches developed in the S-Cube project. ☐ We intend to validate S-Cube's research results within our company. Other forms of contribution, please specify:

28) Do you want to receive further feedback? *You may choose multiple options. Please provide a valid E-Mail address if you want to receive further information of the S-Cube project.*
☐ I would like to receive the survey results. ☐ I would like to receive new on upcoming S-Cube events. ☐ I would like to receive further information about the S-Cube project. If you ticked one of the above boxes, please provide an E-Mail address:

We would like to thank you for your valuable time and your input to this questionnaire.

The S-Cube Project Team

Part 3 Obstacles and Challenges when planning SOA projects

Important: Please complete this section only if you are planning to use SOA in your company.

29) Do you plan to introduce SOA in the whole company?
Please select only one option.

- ☐ No.
- ☐ As pilots only.
- ☐ Only in some departments.
- ☐ In all departments. ➔ *Please continue with question 31).*

30) What are the main reasons for not introducing SOA in all departments?

31) What are the current practical problems that you faced when planning to use SOA?

	Strongly Disagree				Strongly Agree
We feel that we do not have enough knowledge about SOA.	☐	☐	☐	☐	☐
The lifecycle of a service is unclear.	☐	☐	☐	☐	☐
Security aspects in SOA are not sufficiently addressed.	☐	☐	☐	☐	☐
Privacy aspects in SOA are not sufficiently addressed.	☐	☐	☐	☐	☐
Trust aspects in SOA are not sufficiently addressed.	☐	☐	☐	☐	☐
Scalability aspects in SOA are not sufficiently addressed.	☐	☐	☐	☐	☐
Performance aspects in SOA are not sufficiently addressed.	☐	☐	☐	☐	☐

31) What are the current practical problems that you faced when planning to use SOA?

	Strongly Disagree				Strongly Agree
The return on investment of SOA projects is unclear.	☐	☐	☐	☐	☐
We did not find appropriate technologies.	☐	☐	☐	☐	☐
We did not find appropriate services.	☐	☐	☐	☐	☐

Additional Comments:

32) For which application areas (e. g. embedded systems, enterprise resource planning, etc.) do you plan to introduce SOA?

33) Do you intend to further contribute to the S-Cube project?

☐ Yes.
☐ No ➔ *Please continue with question 35).*

34) How do you intend to contribute to the S-Cube project?
You may choose multiple options.

☐ We intend to contribute with industrial case studies.
☐ We intend to use new technologies and approaches developed in the S-Cube project.
☐ We intend to validate S-Cube's results within our company.
Other forms of contribution, please specify:

35) Do you want to receive further feedback? *You may choose multiple options. Please provide a valid E-Mail address if you want to receive further information of the S-Cube project.*
☐ I would like to receive the survey results. ☐ I would like to receive new on upcoming S-Cube events. ☐ I would like to receive further information about the S-Cube project. If you ticked one of the above boxes, please provide an E-Mail address:

We would like to thank you for your valuable time and your input to this questionnaire.

The S-Cube Project Team

Part 4 Hurdles and Challenges of running SOA projects

Important: Please complete this section only if you are using SOA within your company.

36) What are the reasons for using SOA?

You may select multiple reasons for using SOA. In addition you may specify further reasons, which are not listed.

- ☐ Reusing existing software systems.
- ☐ Increased flexibility of business processes.
- ☐ Supporting business process management.
- ☐ Shorter time to adapt our IT infrastructure to new market conditions.
- ☐ Higher quality of the IT.
- ☐ Reduced IT costs.
- ☐ Higher integration potential of software systems.
- ☐ Higher productivity of the IT.
- ☐ Support of future market requirements.
- ☐ Potential to implement new business models.
- ☐ Potential for an increased number of possible cooperations.
- ☐ Shorter time to adapt our IT infrastructure to new market conditions.

Additional reason 1:
Additional reason 2:
Additional reason 3:
Additional reason 4:
Additional reason 5:

Additional Comments:

37) To which degree were your initial expectations fulfilled by introducing SOA?

Please do not forget to evaluate any additional reason stated in question 36) regarding its initial expectations. If one answer is not applicable, please do not tick any box.

	Not Fulfilled				Completely Fulfilled
Reusing existing software systems.	☐	☐	☐	☐	☐
Increased flexibility of business processes.	☐	☐	☐	☐	☐
Supporting BPM	☐	☐	☐	☐	☐
Shorter time to adapt our IT infrastructure to new market conditions.	☐	☐	☐	☐	☐
Higher quality of the IT.	☐	☐	☐	☐	☐
Reduced IT costs.	☐	☐	☐	☐	☐
Higher integration potential of software systems.	☐	☐	☐	☐	☐
Higher productivity of the IT.	☐	☐	☐	☐	☐
Support of future market requirements.	☐	☐	☐	☐	☐
Potential to implement new business	☐	☐	☐	☐	☐

37) To which degree were your initial expectations fulfilled by introducing SOA?
Please do not forget to evaluate any additional reason stated in question 36) regarding its initial expectations. If one answer is not applicable, please do not tick any box.

	Not Fulfilled				Completely Fulfilled
models.					
Potential for an increased number of possible cooperations.	☐	☐	☐	☐	☐
Additional reason 1:	☐	☐	☐	☐	☐
Additional reason 2:	☐	☐	☐	☐	☐
Additional reason 3:	☐	☐	☐	☐	☐
Additional reason 4:	☐	☐	☐	☐	☐
Additional reason 5:	☐	☐	☐	☐	☐

Additional Comments:

38) How did you introduce SOA in your company?
Please select only one option.

☐ As pilots only.
☐ Only in some departments.
☐ In all departments. ➔ *Please continue with question 40).*

39) What are the main reasons for not introducing SOA in all departments?

40) What were the main problems when implementing SOA?

	Strongly Disagree				Strongly Agree
The terminology used is unclear.	☐	☐	☐	☐	☐
There is no methodological guidance for introducing SOA.	☐	☐	☐	☐	☐
There is no methodological guidance for maintaining SOA.	☐	☐	☐	☐	☐
It was difficult to develop an appropriate SOA methodology.	☐	☐	☐	☐	☐
The return on investments of SOA projects are difficult to assess.	☐	☐	☐	☐	☐
The lifecycle of a service is unclear.	☐	☐	☐	☐	☐

40) What were the main problems when implementing SOA?

	Strongly Disagree				Strongly Agree
It was difficult to find appropriate technologies.	☐	☐	☐	☐	☐
It was difficult to find appropriate services.	☐	☐	☐	☐	☐
SOA was not accepted by the management.	☐	☐	☐	☐	☐
SOA was not accepted by the IT department.	☐	☐	☐	☐	☐
SOA projects were delayed because of its low priority.	☐	☐	☐	☐	☐
SOA projects were delayed because of a lack in funding.	☐	☐	☐	☐	☐
Security aspects in SOA are not sufficiently addressed.	☐	☐	☐	☐	☐
Scalability aspects in SOA are not sufficiently addressed.	☐	☐	☐	☐	☐
Performance in SOA is not sufficiently addressed.	☐	☐	☐	☐	☐
Current technologies are immature.	☐	☐	☐	☐	☐
Current Tools are not effective.	☐	☐	☐	☐	☐
Service discovery capabilities are not satisfactory.	☐	☐	☐	☐	☐
Lack of suitable test environments.	☐	☐	☐	☐	☐
Lack of semantically-enabled services.	☐	☐	☐	☐	☐
Services have a limited usability.	☐	☐	☐	☐	☐
Competing architectures are not available.	☐	☐	☐	☐	☐

Additional Comments:

41) For which application areas (e. g. embedded systems, enterprise resource planning system, etc.) do you plan to introduce SOA?

42) Do you intend to further contribute to the S-Cube project?
☐ Yes. ☐ No ➔ *Please continue with question 44).*

43) How do you intend to contribute to the S-Cube project? *You may choose multiple options.*
☐ We intend to contribute with industrial case studies. ☐ We intend to use new technologies and approaches developed in the S-Cube project. ☐ We intend to validate S-Cube's results within our company. Other forms of contribution, please specify:

44) Do you want to receive further feedback? *You may choose multiple options. Please provide a valid E-Mail address if you want to receive further information of the S-Cube project.*
☐ I would like to receive the survey results. ☐ I would like to receive new on upcoming S-Cube events. ☐ I would like to receive further information about the S-Cube project. If you ticked one of the above boxes, please provide an E-Mail address:

We would like to thank you for your valuable time and your input to this questionnaire.

The S-Cube Project Team