

SOA, Web services and QoS - perception on the Polish market

Technical report

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Abstract. The aim of this technical report is to present a few key issues in the development and potential of SOA and Web services technology on the Polish market. Our findings are mainly based on the conducted survey, but also we take advantage of the market research presented in several recent reports. The results of our survey show the awareness of SOA, Web services and business-related aspects of IT among Polish companies as well as allow us to comment on trends in the Semantic Web services adoption.

1. Introduction

The Service oriented architecture (SOA) paradigm along with the technology of Web services undergone evolution over time and has reached the point where many companies all over the world use it or seriously consider to do that [1]. However, the level of adoption of Web services and SOA-based solutions differs in various countries as well as across various industrial sectors.

The Web services technology and SOA market continuously evolves when it comes to the number of publicly offered Web services¹ as well as their applications in business context. Whichever country we consider, the first stage of application of the Web services technology is usually characterized by an intra-organisational approach under which companies adopt the Web services technology for the needs of integration and system development. The focus is assigned to decoupling of existing systems into independent and encapsulated services [5, 6]. Within the second stage, Web services are mainly used as a wrapping mechanism that allows for inter-communication of technologically different systems inside as well as outside enterprises [7, 8]. Within this stage, the usage of the Web services technology allows for software reuse and discovery by software engineers [9]. Within the next stage, along with the growth of the number of Web services available on the national or vertical markets, Web services start to be considered as a gateway to new business models² [10]. In a consequence, Software as a Service (SaaS) model of software delivery, where the software company provides maintenance, daily technical operation, and support for the software provided to their client [10] appeared. Under this model, the ability to efficiently and effectively share services on the Web becomes a critical step towards the development of the service on-line economy [11].

In addition to new business models, currently a very popular trend, postulated by the research, is to automate and facilitate interactions with Web services and their application in business context by using the Semantic Web technologies. Thus, the concept of Semantic Web services (SWS) emerges. Although, the SWS concept is strongly supported by the research environments all over the world, the industry has not yet fully accepted this idea and it is extremely difficult to assess the future level of adoption of this technology.

¹ There were over 20.000 publicly available services in 2005 [2], whereas about 1200 in 2004 [3]. According to the latest research of Al-Masri and Mahmoud the number of publicly available Web services between October 2006 and October 2007 increased by 131% [4]

² Some big players on the software market noticed the potential of Web services and loosely coupling of their products allowing choosing only those components that are needed by the company.

As already pointed, the evolution of Web services technology and the stage of its adoption differs in various countries and across various industrial sectors. It is due to the level of country development, popularity of ICT technologies within mentioned sectors and the dynamicity characterising given business. Within this report, based on the performed studies, we analyse the SOA and Web services market in Poland and try to assess the stage of their adoption as well as to evaluate the attitude towards the adoption of the Semantic Web services.

In order to fulfil these aims, the technical report is structured as follows. First, the short overview of the performed survey is given. Then, the analysis of the provided answers follows. Finally, some conclusions and a prognosis of future trends are given.

2. Survey overview

The survey was conducted in collaboration with the Polish Society for Certification and Standardization of Software (*Polskie Stowarzyszenie na Rzecz Atestacji i Standaryzacji Oprogramowania*).

The aim of the survey was to find out how the SOA paradigm along with the technology of Web services is perceived in Poland and to assess the stage of their adoption. We were especially interested in surveying people responsible for IT management (infrastructure) in their organizations. Another point of interest were also opinions of IT users (end-consumers) (especially in terms of QoS understanding and expectations) who use IT tools to perform their daily tasks.

The survey was performed in Polish. The participants were asked 32 questions related to particular aspects of SOA and its technologies as well as main concepts. The findings reported in this article are based on 53 surveys gathered within a two month period from March to May 2008. Although from the statistical point of view, the number of surveys does not allow us to reason on the whole community of Polish users (the results of the survey are not statistically valid), the results give us some interesting insights into the Polish market.

The survey may be divided into four parts. The “personal information” part consisted of 4 questions describing the most important facts about each participant that answered our survey. The second part, called “IT in organization”, contained 7 questions. This part was dedicated to estimate how organizations in which the interviewees were employed handles the management of IT infrastructure. Especially the issues connected with networking (collaboration with external parties) and outsourcing of software functionalities were of interest. Third part, “Quality” comprised of 15 questions that address the perception of quality of IT services and other business related aspects by surveyed. Last 6 questions, grouped in “software adaptability” part were intended to let us know to what extent Polish companies are willing to use SOA together with semantic technologies.

The study covered close-ended questions. The participants were either allowed to choose multiple choice answers or to rank certain elements in a decreasing order. Four questions contained an option “other” to be filled in.

The survey was carried out electronically and e-mails were sent to several mailing lists and discussion groups to request for volunteers. Moreover, several personal invitations to IT managers or expert practitioners were sent.

3. Survey analysis

The following sections present the analysis of the answers provided by the respondents. The analysis is divided into four, already mentioned, parts.

3.1 Personal information analysis

Although the sample surveyed was not too numerous, we are satisfied with the recall.

The distribution of interviewees among different branches of economy was satisfactory. The survey was filled in by representatives of different companies (from 13 branches). Most of them marked “IT” as their sector of economy (42%), 7 persons were from government and public administration, whereas the logistics sector and finances and insurances summed up to 4% each. For more details on the sector distribution of surveyed please see Figure 1.

Sector distribution of surveyed

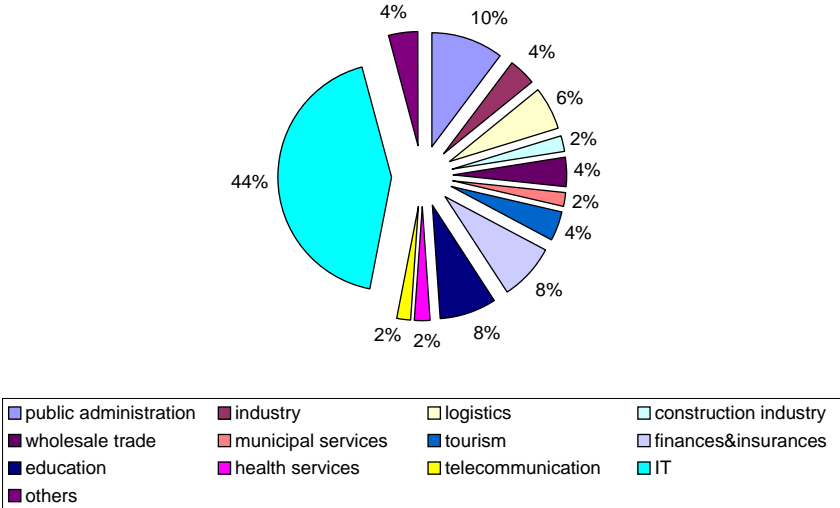


Figure 1 – Industrial sectors distribution of respondents

Majority of respondents (circa 60%) work for small and medium enterprises, whereas the rest declared to be working for large enterprises.

Around 90% of respondents use the IT tools on daily basis in their work, the rest of the respondents manage the IT infrastructure in their companies or have the IT background.

Over 44% of the respondents have been working over 3 years, nearly 30% up to 3 years and only 27% of respondents has been working for less than a year in their companies (see Figure 2).

Work experience

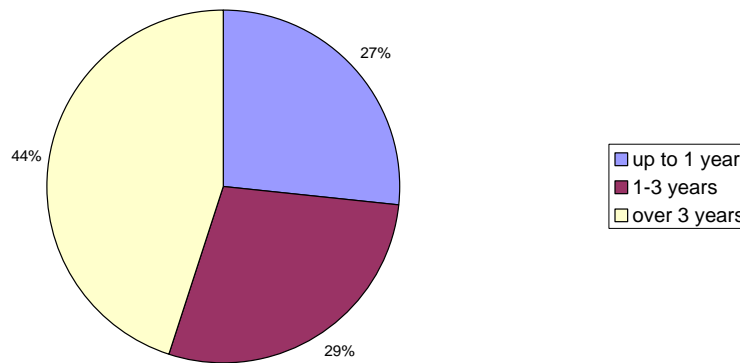


Figure 2 - Work experience of survey participants

3.2 IT in Polish organizations

In more than 50% of cases the IT technology was evaluated as being the indispensable element allowing companies to perform various business activities while in 45% the IT technology was treated as an important but supporting element.

Almost 80% of respondents need to exchange data and information with the external systems and/or parties. They either make their services available to other parties or are thinking to do so in the very near future. Around 70% of respondents use functionalities made available on-line by other parties.

In addition, approximately 75% of respondents use the Internet to find new business partners and their services.

Surprisingly, taking into account the current prognosis and assessment of the level of adoption of IT outsourcing within Polish companies, in 86% of cases the respondents stated that given company manages the IT infrastructure itself. Only in 14% of cases the IT management was outsourced to external companies. However, according to recent market research [12], IT outsourcing in Poland is gaining more and more interest and therefore this situation is going to change. Over 1000 Polish companies already take advantage of IT outsourcing³ and this market is intended to grow by more than 200% till the year 2012.

When it comes to the type of systems used by the respondents, virtually 68% of respondents stated that they use both the out-of-shelves software systems/products as well as customized systems that were adjusted for the needs of their companies. However, the performed analysis indicates that the flexibility of the systems and their adaptability to the changing requirements (together with the personalization possibilities) become more and more important aspects. The other criteria that influence the choice which system to use are discussed within the next section.

3.3 Quality perception

In general, the survey showed the growing awareness of business-related aspects in IT.

Almost 95% of respondents stated that there is a need to use Service Level Agreements to secure the quality level of provisioned services while using the services offered by other parties. Surprisingly, almost 50% of respondents admitted that although they think that the

³ Polish consulting company Audytel claims that 87% of big enterprises (yearly income more than 600 mln PLN) use outsourcing. In case of companies with income up to 180 mln PLN, 50% of them do so.

SLA should be introduced they do not use them from various reasons (e.g. lack of standards, lack of written description of a service etc.).

In addition, we asked in the survey which non-functional characteristics are important while deciding which system to use in a company. Respondents could choose from three options: “not important”, “important” and “very important”. We assigned weights to these options: 0 for “not important”, 1 for “important”, 2 for “very important”. Respondents could indicate their preferences towards the following characteristics:

- Price
- Functionality
- Quality
- Trust
- Brand
- Popularity of system.

We put the functionality as an option in order to identify the most important motivation for selecting a given software or service. Indeed, the functionality was marked as the most important criterion, but other NFPs turned out to be also very important. If we treat the importance of functionality at the level of 100%, the ranking looks as presented in the Figure 3. The importance of quality is 95%, trust and price got 68%, popularity 56% and brand 46%.

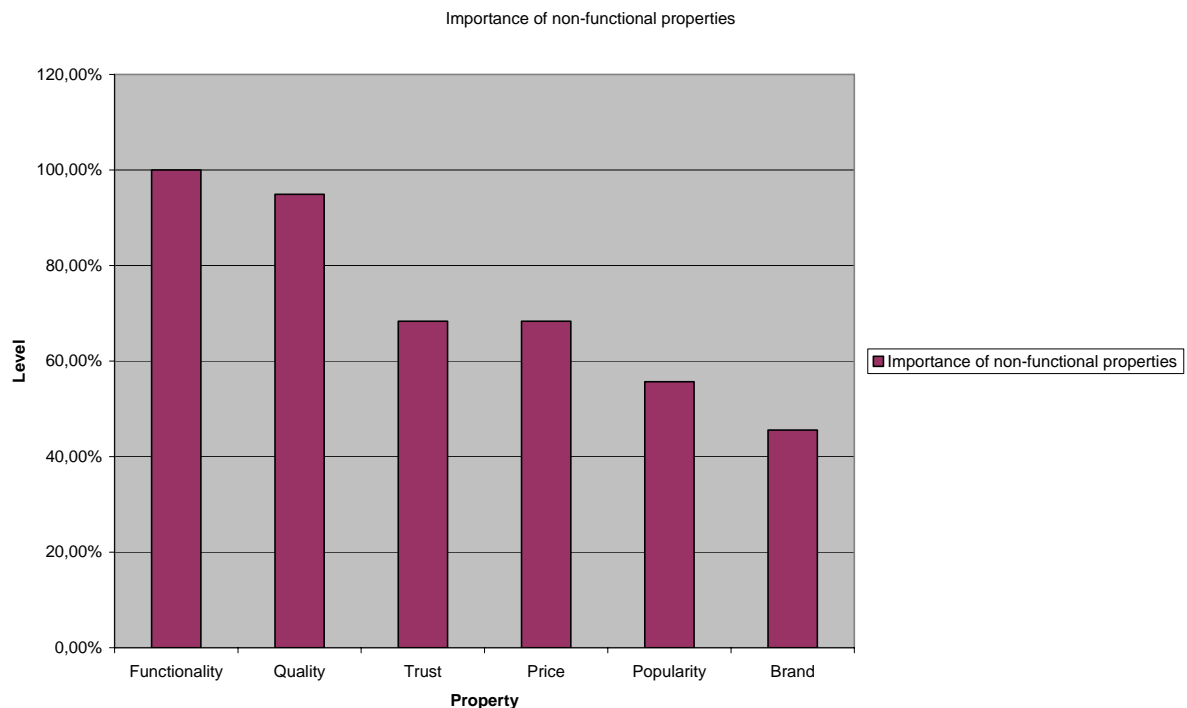


Figure 3 - Rating of non-functional properties

Not surprisingly, the price of the service/software is not the most crucial factor anymore. This rating shows clearly that the quality of service, in accordance to the trends in other countries, is the most important factor influencing the buyers’ decisions and not the price. It also means that IT professionals and managers require that software they use within their daily tasks and the systems that support their companies should be reliable and behave in a predictable manner. The price becomes even less important, when the successful running of an enterprise is required (in cases where the IT technology was evaluated as being the indispensable element allowing companies to perform various business activities).

We also checked whether there is any regularity in choices of important NFP if we take into account the profession and experience of surveyed person. The results are quite

interesting, as one could say that regular IT users may have another perception of important software attributes. Quite the opposite, our survey shows that the rating is similar for each group:

- in the group of end IT users – functionality 100%, quality 97%, price 70%, trust 69%, popularity 54%, brand 47%.
- in a group of IT professionals: functionality 100%, quality 83%, popularity 67%, price and trust both 50%, brand 33%.
- for IT managers the functionality and quality were equally important.

An interesting remark may be that the price gets less attention if the IT expertise rises. However, the differences between different groups are not very significant.

The results obtained in that part of the survey are confirmed by the next question related to parameters that differentiate service/software substitutes (i.e. systems providing the same or quite similar functionality). Here, another property is of great importance, namely the compatibility with existing IT infrastructure (see Figure 4). Apart from this characteristic, again the quality of service turns to be the most important one. Comparing to previous data, the price gets more interest than trust. Once more, the brand of a software/service provider is the less important criterion.

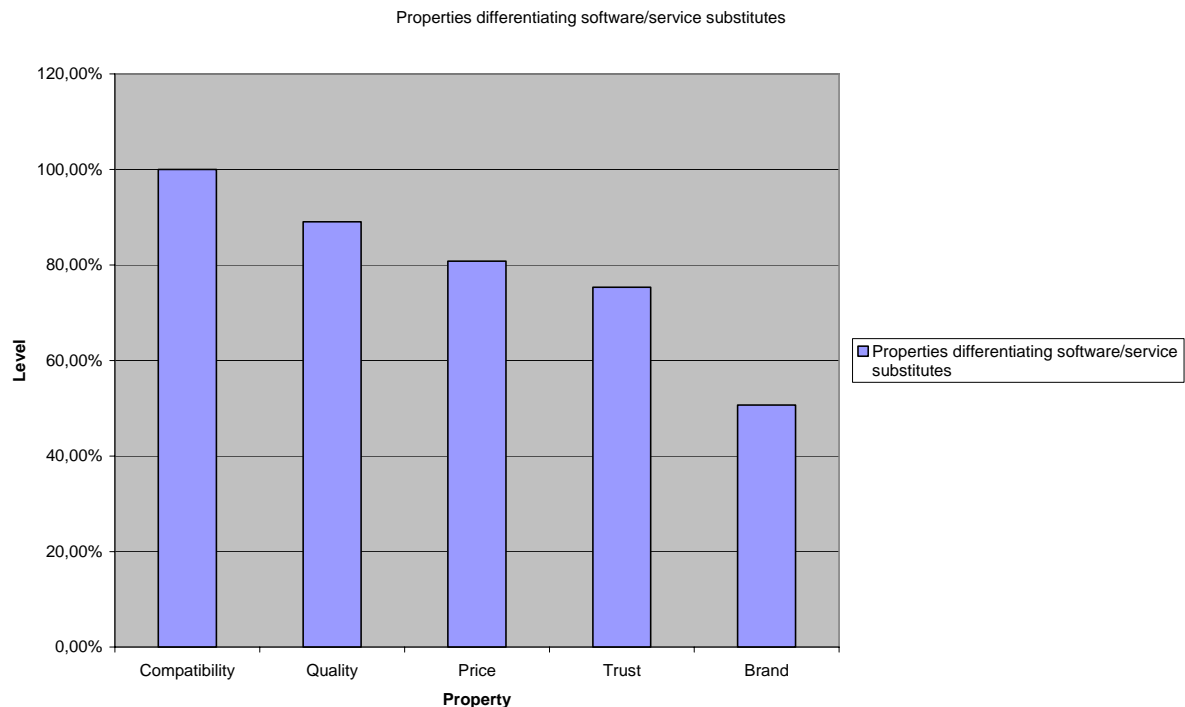


Figure 4 - Selection criteria of software/service substitutes

In addition, in our survey we asked respondents which characteristics out of possible: provider/brand, price, independent tests and specification, guarantee the quality of offered software or services. Multiple answers were possible here. Independent tests got the most marks (32), then the provided/brand (26) specification (24) and price with only 5 picks. However, when asked if the company would agree to provide anonymously the logs from the software they use in order to help collecting data for independent testing, only 32% of respondents answered positively.

3.4 Software governance

Various industrial sectors are characterised by different level of changeability. The dynamism of the environment that the Polish companies operate in requires numerous changes to the existing IT infrastructure, however, within different timeframes (e.g. 25% of companies need

to introduce changes on the weekly basis, 24% on the monthly basis and also 24% need to do that quarterly. Only 27% of companies need to adjust their infrastructure within a time horizon greater than on year).

Almost 80% of respondents (most of them coming from the most dynamic environments and evaluating their systems as indispensable to perform their tasks) stated that the time of introducing the changes is critical from the point of view of their organizations. 40% of respondents complaint that although in the company there exist appropriate resources, the modifications to the system are very time and resource consuming and the improvement is needed. 45% of respondents stated that the changes are introduced fast enough.

The dynamicity of the environment and a need to quickly adapt to the changing conditions forces companies to look for the most convenient IT solutions suited to their needs. The answers provided by the respondents may allow to conclude that the level of adoption of Web services technology is increasing and the companies are interested (if not already doing that) in designing their systems using the SOA paradigm as well as utilising software in accordance to the SaaS model. They believe that it will allow them to reach the desired level of flexibility.

In addition, 90% of the respondents stated that they like the idea of Semantic Web services and the automation that they offer. Although most of the IT professionals as well as company managers is in favour of the application of semantic technologies, they are willing to do that only if certain conditions are met. According to the respondents those conditions are as follows:

- the appropriate level of security need to be ensured,
- the mechanism need to be precise and guarantee the reliability of the proposed changes to the system.

However, in their opinions, these requirements are not yet fully met.

4. Conclusions

Based on the conducted studies, we may conclude that the adoption of the Web services technology in Poland is right now somewhere between the second and third stage. The SOA and Web services are not longer used only internally or as a communication layer, but they are used to collaborate and consume various functionalities. The development of the Polish market is going into the direction of wider collaboration between various partners and most of the respondents agreed that introduction of the SOA and Web services may be beneficial to their companies and tasks performed by them. First and foremost they believe that SOA together with Web services technology may ensure the required level of flexibility and allow them to faster respondent to the changes in their environment. The performed study reveals the potential of growth in the area of SOA and Web services. The described results constitute good conditions and state for the application of SOA-based systems together with SaaS model. This statement is backed by the amount of SOA initiatives in Polish companies⁴ identified by studies conducted by other entities.

Another important finding is the increasing level of awareness of business-related aspects of IT and the more focus that is assigned to the quality of the delivered and consumed services. Data analysis revealed that companies that companies in which IT systems are crucial for their businesses and use outsource IT management to external companies, either use or agree on importance of Service Level Agreements. Only 4% of such companies do not use SLA to secure the appropriate level of quality of service provisioning.

When it comes to semantics based solutions allowing for automation of various interactions within the systems, although much desired, they need first to provide the expected

⁴ According to the research from April 2008 [13], 36% of surveyed companies were in the course of SOA implementation. Next 16% was planning to do this during incoming 3 years.

level of quality and precision before being fully accepted by polish companies. Regarding a use of semantics within companies, the need for knowledge transfer from research to an industry is of utmost importance. However, the possibilities of exploitation of semantically enhanced Web services must be shown before in prototypical implementations. High level of interest in the technology of SWS does not explicitly mean that Polish companies are completely open for risky and unproven solutions. The awareness of pros and cons of semantics should be raised by innovative companies that conduct respective research aiming at industrial application of this technology.

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