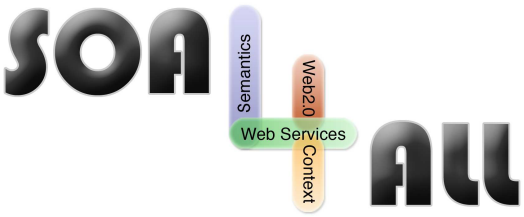

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Author(s):	Jean-Pierre Lorré (EBM), Alain Boulze (INRIA), Sonja Meyer (SAP), Matteo Villa (TXT), Sven Abels (TIE), Alistair Duke (BT), Karita Luokkanen-Rabetino (Atos), Yosu Gorroñogoitia (Atos), Belén Serrabou (Atos), Nuria de Lama (Atos)
Reviewers:	John Davies (BT) Nuria De Lama (Atos)

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Glossary of Acronyms

Acronym	Definition
CWSP	Commercial Web Service Provider
D	Deliverable
EC	European Commission
FWSP	Free Web Service Provider
IaaS	Infrastructure as a Service
MVNO	Mobile Virtual Network Operator
OSS	Open Source Software
PaaS	Platform as a Service
QoS	Quality of Service
SaaS	Software as a Service
SLA	Service Level Agreement
SSBS	Software and Software-Based Services
WP	Work Package
XaaS	Everything as a Service

Executive summary

In this deliverable we analyze SOA4ALL as an integrated solution from the business model point of view. This deliverable is the updated version of *D10.1.1 Business Scenarios and Models v1* submitted in M12. We have carried out a deeper analysis of the business value and suitable business models as well as a complete scenario based analysis.

First of all we describe the **link between technical results and business approach**. The **main roles in a business context** are (1) the SOA4ALL integrated solution provider, (2) the hardware infrastructure provider, (3) end users, (4) third party service providers who can offer their services for free or commercial web service providers (offering paying services) and (5) supporting roles such as consultants, systems integrators and technical solution providers.

Value chain analysis provides valuable information that allows organizations to improve their value system and define the core interactions where the company can pursue a competitive advantage. In short, it can be stated that the business model explains the way the company makes money out of the exploitation of SOA4ll by specifying its position in the value chain. In addition to that, this deliverable analyzes the value creation of SOA4ALL in a value chain. **The SOA4ALL value network** illustrates the dynamic relationships between different market actors, and tangible, intangible and economic flows between them. Moreover, it reveals the revenue logic behind SOA4ALL, addressing how costs and revenues are generated and shared between different market actors.

Two different exploitation approaches/contexts have been identified: what we have called *the open ecosystem* and the *service ecosystem*.

The ***open ecosystem*** is based on the idea of "a web of billions of services" in an open environment. It is an environment where an unlimited number of services can be offered, found, consumed and created. The interaction of different services and market actors is then enabled by SOA4ALL technology. We analyze the most popular internet-based business models and provide deeper analysis on the most significant companies such as Google and Facebook. There is a wide range of business models for using a broad user base to generate profit, ranging from advertising to content licensing. From this analysis, we identify the most suitable business models for SOA4ALL, such as selling advertising space on the SOA4ALL site, to acting as reseller of products offered on the SOA4ALL site or creating two different versions of SOA4ALL: one free basic version and an alternative extended commercial version. What is remarkable is that that all major successful internet companies are deriving the majority of their income by generating very small incomes per person while serving very large volumes of customers at the same time (the phenomenon known as Long Tail in the Telco sector). SOA4ALL is also relevant to this model. SOA4ALL offers added value in the open ecosystem approach, as it is a flexible and scalable solution for modern architectures, getting advantage of the most updated technological solutions to provide functional and non-functional properties that no other platform can provide nowadays.

The ***service ecosystem*** builds on the idea of federated service platforms and service parks, where prosumers can find and consume services of different providers through a single platform. Often the service ecosystem focuses on specific communities or sectors. Here two suitable business models have been identified. The first one shows open-source "pure-players" (e.g. EBM Websourcing), acting as technical solution providers whose revenues come from services directly related to the SOA4ALL federated infrastructure (WP1), such as training, expertise and support. Other SOA4ALL partners could get revenues from support around the SOA4ALL platform services and components, like the Studio, in the same way, and according to the same kind of business model. The second one shows providers in the

context of service ecosystems (could be actors like BT, SAP) whose revenues come from XaaS ("Everything as a Service") -like business models (SaaS, PaaS, IaaS). Such providers could act as technical solution providers, system integrators, consultants, or prosumers. Such providers and actors could really be new players in service ecosystems and major competitors in the industry of service parks. The general value in the service ecosystem is that SOA4All can be used as a federated architecture and infrastructure well suited to this kind of service provision. The prosumer gets benefit from the community and the ecosystem and can generate its own business value. The SOA4ALL integrated solution provider creates a natural partnership between providers, and reinforces the credibility and visibility of the solution.

Besides analyzing the SOA4All value chain, value network and suitable business models for the different exploitation contexts, this deliverable goes into the **details of SOA4All exploitation within concrete vertical sectors**. For this, we take advantage of the use cases already defined in the project. After two years of project development we are just at the right moment to provide such an analysis thanks to the fact that now, after many months of work, there is a clear understanding of SOA4ll in the context of such use cases.

As a result, **we analyze the way SOA4ALL can be exploited in different market domains: Public Sector, Telecommunication sector and Web Commerce (e-business).**

The **Public Sector-specific market** situation is discussed and analyzed in detail. The use of different business models from a WP7 view is explained and several business partners are identified. In the last subsection, the selected use case-specific revenue model is presented and a detailed value network analysis is obtained. The result of this use case is a prototype that demonstrates how enterprise services can be efficiently composed and consumed by (business or individual) end users. The service delivery platform will allow non-technical end users to search, model, modify, share, and execute lightweight business processes. These processes are composed of Enterprise Services (hosted by Enterprise Service providers), public Web Services (hosted by third party service providers), and human activities (to be executed by end users).

In the **telecommunications sector,** we identify potential exploitation routes for the SOA4All technology within a context of the great transformation that companies in this sector are suffering. As a result of declining revenues from existing business models, telecommunication companies (telcos) are turning to the web not only as a way to reach new customers with their existing products and services but as a means to offer radical new value-added services and the SOA4All approach and technology have a key role to play. The nature of the telco market is outlined including a description of an approach to transform the way in which telcos do business – known as Telco 2.0. Following this, potential business models within Telco 2.0 are introduced with a particular focus on how SOA4All can support these. Finally, a particular scenario, under development in WP8, is described, which allows an enhanced representation of how SOA4All can be applied in a specific business setting.

The analysis of the **web commerce area** is performed based on the context and the experience made in work package 9 (C2C eCommerce use case). The Web Commerce market benefits from SOA4All developments in various ways. From a business perspective, those benefits will lead to reduced time and effort needed for maintaining eCommerce solutions, improved incomes thanks to new possibilities and better usage of context information and reduced costs based on higher flexibility and better management of processes.

Even if we understand that this study may be incomplete and many additional possibilities could be researched such as the application of SOA4All to wider scenarios and other application domains, it is clear that **the three use cases selected by the project provide representative examples not only for the technical validation of the technology as**

such, but also for the validation of the different business approaches presented by this report.

The three application domains are facing important changes in the way they do business, and the common element in all cases is that they are looking at the Internet, or the Web, as the underlying infrastructure to operate. In the case of the telco sector, this transformation started some time ago and concepts like telco 2.0 illustrate this very well. In the case of e-business, being it b2b or b2c, Internet was already present, but the advent of technological and social trends like Web 2.0 has made the web a participatory platform, and this has opened the spectrum of actors that can make business without much complexity. SOA4All provides here the resources needed for the creation and consumption of services in such an open environment taking into account the technical challenges to be faced if we want that this complexity is hidden to the final user realizing the vision of the "4All" concept, and thus being an engine to foster also the c2c model on the web.

Finally, the public sector is also living its own transformation. Collaboration and interoperability services are essential to cooperate with other administrations. Processes cannot be understood anymore in isolation and furthermore, the heterogeneity of actors taking part in public processes is so high that they are obliged to find a solution that allows an easy creation of IT services (ex. WS) by people that are knowledgeable about those processes but are not necessarily experts in technology. The public sector is also pushed to be more open, more traceable, and more participative, involving citizens not only because of social reasons, but also because of economic aspects. Once again, the web seems to be the promising and suitable "universal" infrastructure to enable this (with the necessary trust and security measures) and here is where the value of SOA4All cannot be ignored.

The classification of our use cases into the exploitation contexts that we have referred to as open ecosystem versus service ecosystem is provided as a matter of example and should not be understood as a restrictive element, since both ecosystems could be compatible in the same sector.

In any case **we can conclude that, assuming that SOA4All is successful from the scientific and technical points of view, there is a clear business potential, which is coherent with current and emerging market transformations** and furthermore coherent with the expected market transformation in the future as a result of technological trends (ex. Future Internet). **The analysis of business elements**, such as the value chain as well as value networks and related business models presented in this deliverable as a theoretical exercise, **in conjunction with the process of "instantiating" abstract business concepts into concrete use cases, provides a sound methodology for this deliverable, reinforcing the credibility of our conclusions.**

1. Introduction

1.1 Introductory explanation of the deliverable

One aim of WP10 is to define an integrated exploitation approach that discusses how the SOA4ALL framework can be exploited either as an integrated solution or by specific components. In this deliverable, we focus on analysing SOA4ALL from a business model point of view, excluding the technical details and component specific analysis. This deliverable is complementary to D10.2.1c Exploitation Strategy and Plans. There, information about business analysis of each component as well as set of components (bundles) is provided, together with the exploitation prospects of individual partners and the consortium as a whole. Therefore, if you are interested in the analysis of SOA4All exploitable assets, exploitation plans or market and context analysis go to D10.2.1c. However, if you are looking for the analysis of business models that could be suitable for SOA4All to get money out of SOA4All, the different ecosystems in which these business models could take place, as well as revenue flows, value chains and the reflection of all of this into the SOA4All use cases, then, you are reading the right deliverable.

1.2 Purpose and Scope

This deliverable is the updated version of D10.1.1 submitted in M12. This document reflects the main progress through the project.

The purpose of this deliverable is to define service scenarios and business models for SOA4ALL, specifically:

- To define the business value of SOA4ALL
- To analyze the SOA4ALL value chain and value network
- To identify different ecosystems for SOA4ALL exploitation
- To identify suitable business models for the different ecosystems in SOA4ALL
- To analyze the different scenarios and their SOA4ALL business opportunity

1.3 Structure of the document

This deliverable is divided in two different sections:

- Chapter 2 provides an analysis of SOA4ALL from the business model point of view. Firstly, it describes the link between technical results and exploitation to fully understand how SOA4ALL works and the key market roles. We analyze the value chain and value network and the relationship between the market roles. We identify two different exploitation approaches: open ecosystem and service ecosystem and the suitable SOA4ALL business models for each approach.
- Chapter 3 describes the way SOA4ALL results can be exploited in different market domains. Each use case (representing a market/domain) contains a market analysis, an analysis of suitability with respect to the different approaches and a reflection of the concepts into SOA4ALL scenarios.

2. Business value of SOA4ALL

This section provides an analysis of SOA4ALL from the business model point of view. It firstly describes the link between technical results and exploitation, and introduces and defines the main market actors, which have or may have a role in exploitation. We analyze and link those actors through the value chain and value network of SOA4ALL.

Two different exploitation approaches for a SOA4ALL integrated solution have been identified: open ecosystem vs. service ecosystem. These ecosystems will be analysed from the viewpoints of value creation. Suitable business models for both ecosystems will be described.

2.1 Building the link between technical results and integrated SOA4ALL business approach

In order to understand what the SOA4ALL integrated solution really is and what its successful exploitation requires, it is important to discuss two issues:

1) What the integrated solution consists of, and
2) Who are the main market players (key roles) needed to *provide and consume* it

Figure 1 provides a simplified illustration of the technical results and their relation to key market roles (more market roles exist, just the most essential are included). The roles included in the boxes with continuous lines present the roles that may be performed by SOA4ALL consortium members (at least in the short term). Roles included in the boxes with dashed lines describe those ones that may be more probably performed by external actors. However, whether roles are performed by SOA4ALL consortium members or external actors depends on the applied business model. In the same fashion, applied business model defines which roles are necessary in the exploitation of an integrated solution. Moreover, one actor can have one or more roles in practice.

SOA4ALL integrated solution (high-level approach)

SOA4ALL integrated solution consist of three main elements, which makes it fully functional:

- SOA4ALL Studio (end-user interface)
- SOA4ALL Platform services (services and components that make the platform functional)
- SOA4ALL Infrastructure (federated distributed services bus, distributed semantic space and monitoring)

The complexity of the solution is hidden to end-users who simply access the SOA4ALL Studio in order to create, describe, consume and monitor services. The SOA4ll Studio provides a full-fledged suite of editors and tools suitable for average Web final users, with no previous background and expertise on service technologies. The Studio runs on top of the SOA4ALL Federated infrastructure (federated distributed service bus, distributed semantic space infrastructure, and monitoring infrastructure) which enables Web-Style communication and collaboration via semantic spaces and service bus technology, and yields the core runtime infrastructure. The SOA4ALL Federated infrastructure provides main innovations combining distributed service bus, semantic space and monitoring, offering virtualization of a large-scale distributed data layer, and a common semantic data space for a better analysis of

infrastructure, services, and processes.

SOA4ALL Platform services offer specialized functionality intended to support the Studio to

i) design new processes by composing existing services and process fragments (templates) creating adaptable, context-aware, optimized, executable processes that are executed at runtime, with support for mediation and adaptation,

ii) extract process schemas out of past execution logs

iii) discover and rank existing services that match final-user requirements, for consumption purposes,

iv) logically reason over service descriptions

Roles

SOA4ALL integrated solution provider refers to an organization that provides the whole, integrated solution (studio, infrastructure, platform services) to the end user. This also means that a provider hosts the solution at the software infrastructure level, assuming the hosting and maintenance costs. It is even possible that two or three different market players provide the different elements though it is more probable that one actor provides the whole solution due to the interconnected nature of the elements. This is supported by the fact that most of the SOA4ALL software components are planned to be open source. Solution providers are most probably SOA4ALL consortium members (especially commercial/industrial members) at least in a short and midterm. However, this depends on the applied business model and product strategy (examples available in the following sections).

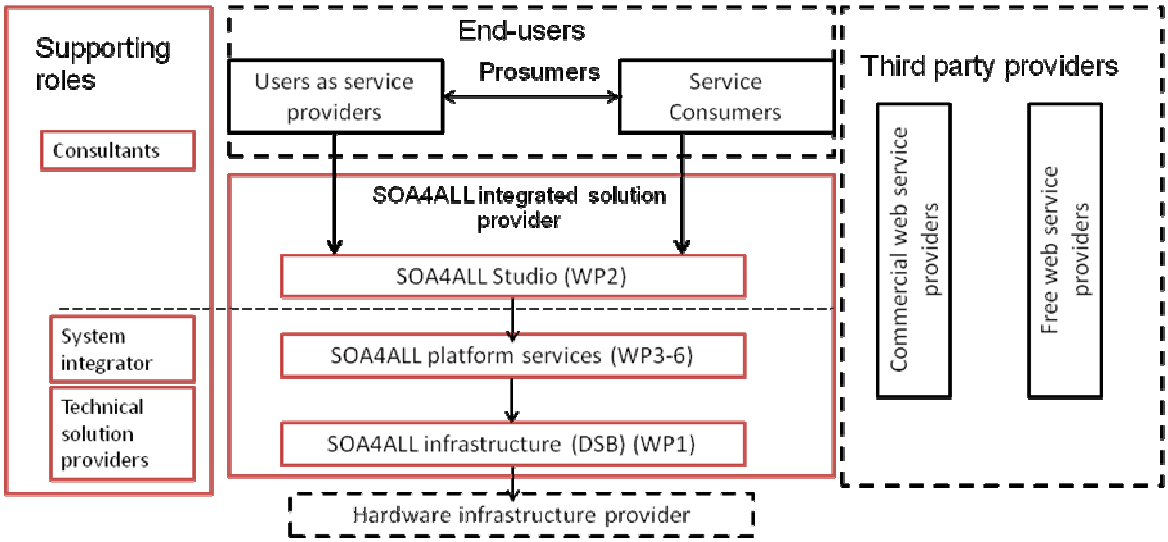

Figure 1: SOA4ALL integrated solution and key market roles

Hardware infrastructure provider has an essential role in the deployment of SOA4ALL. It provides the hardware resources, communication infrastructure and other virtualized resources required for hosting the integrated solution, and supporting (on demand) the dynamic adaptation of hardware resources up to the appropriate scale. This role can be performed by any company providing hosting services, e.g. companies with big data centres, cloud and grid computing providers etc. such as Amazon EC2, Google Apps Engine, etc

End-users

Prosumers are the end-users of SOA4ALL and they interact with the solution through the SOA4All Studio. These prosumers consist of two groups: Users as *service providers* (Internet users who create, advertise and provide services) and *service consumers* (Internet users who consume the services). The concept of prosumer describes well the relationship between service provider and consumer. An end-user may be purely a provider or consumer, but these two roles can merge in such a way that the end-user is both providing and consuming the services.

Third party service providers

The role of third party service providers is rather complicated due the fact that this general concept refers to various market players who have different kinds of roles in SOA4ALL market scenario, and who interact in different parts of the SOA4ALL solution and/or solution users. In this deliverable we divide third party service providers in two groups that differ from one another in terms of contractual and economical relationship to the SOA4ALL integrated solution provider:

- *Commercial web service providers*: These services are consumed by prosumers who get access to them through the SOA4ALL platform. These services are usually not free for prosumers, and are provided either by IT industry market players or by IT professionals. Thus, contractual and economic transactions between SOA4ALL solution provider(s) and the commercial web service provider are involved.
- *Free web service providers*[1]: the SOA4ALL platform may include services that are available on the internet and can be described semantically and registered on the platform. These services are discovered by the SOA4ALL solution and incorporated as potential consumable services. They are provided to prosumers for free, and no economic transactions between free service providers an prosumers take place; in many cases no economic transactions between these service providers and SOA4ALL platform provider will happen either.

Supporting roles

The last group consist of supporting roles which may exist (but are not mandatory) in the SOA4ALL exploitation scenario, and in the short term are most probably performed by SOA4ALL consortium members. To which extent the supporting roles are needed depends strongly on the profile or the organization exploiting the SOA4ALL integrated solution:

- *Consultants:* guide prosumers/end-users to get familiar with the Studio, start to use its applications or to get more expertise on different domain scenarios.
- *System integrators:* provide consultancy and integration services at three different levels of the integrated solution (studio, platform services, bus) for the solution provider. They may for example mediate to federate different SOA4ALL nodes that belong to separate organizations, or mediate between a SOA4ALL node and a third party service provider.

[1] Note: we have chosen these names to facilitate the understanding of the concept; of course this does not mean that a provider that offers a service for free is not a commercial service provider

- *Technical solution providers:* provide special technical knowledge, components and services that make SOA4ALL integrated solution functional and/or improves it. These services are not domain specific, and are not consumed by end-users. In a short and midterm, these services may be probably provided by WP1-6 members but can be external providers as well.

The table below summarises the main roles describe earlier:

Role	Description
SOA4ALL integrated solution provider	Provides the whole integrated SOA4ALL solution
Hardware infrastructure provider	Provides hardware resources
End-users	Use the SOA4ALL solution: Users as service providers and service consumers
Third party service providers	Provide services: Commercial web service providers and Free web service providers
Supporting roles	Provide support to the different roles: Consultants, Systems integrators and Technical solution providers

Table 1: Summary of key market roles in the SOA4ALL market scenario

2.2 Value Chain

Value chain analysis provides valuable information that allows organizations to improve their value system and define the core interactions where the company can pursue a competitive advantage. In short, it can be stated that the business model explains the way the company makes money by specifying its position in the industry value chain.

The value creation of SOA4ALL is illustrated in a simplified value chain (figure 2). The main roles are included in arrows with continuous lines (obligatory in order to exploit the solution in the market) whereas supporting roles are included in arrows with dashed lines. Even though supporting roles may not be needed, their role - especially in the early exploitation of SOA4ALL - is probably required due to fact that many of the technical developments and software components will still need additional development in order to be ready for commercial exploitation.

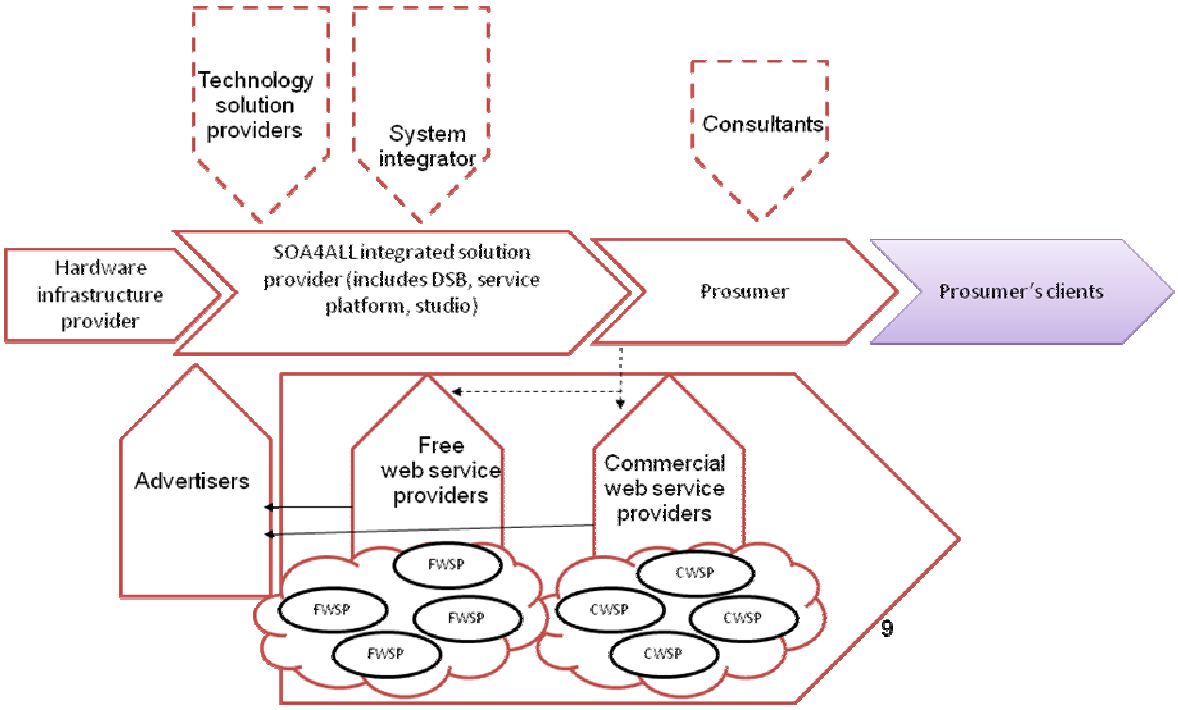

Figure 2: SOA4ALL value chain

Hardware provider provides an infrastructure on top of which SOA4ALL runs.

SOA4ALL integrated solution provider provides a platform where *prosumers* can find, develop and consume services. Prosumers may be either business customers or consumers, and both of them can be either final users or have their own clients. In the latter case prosumers have their own value chains and value network with special earning logic (not included in this analysis, examples available in section three). Moreover (and depending on the profile of a prosumer) prosumers *may* become commercial or free web service provider.

Free and commercial web service providers (FWSP and CWSP) have an important role in the value chain since they create the critical mass of web services required for commercial survival of SOA4ALL as integrated solution. Their services can be found and made available for prosumers through SOA4ALL technology, and only if the amount of them is big enough the platform is interesting for the main stakeholders (prosumer and F/CWSP). The amount of free and commercial web service providers is critical also in the sense that they can provide essential incomes for SOA4ALL integrated solution providers in terms of advertising revenues.

Advertisers have an essential role as revenue sources. While commercial and free web service providers are the most probable advertisers also other enterprises may be interested in advertising their products and services (e.g. hardware providers or special communication device providers), having their target group among prosumers.

SOA4ALL solution provider may need *technology solution providers*' services to upgrade, improve and add new functionalities for the platform, and to keep the solution functional. In addition, *system integrators* may be needed to adapt the use of SOA4All to specific solution provider's needs and requirements. Prosumers may need support and guidance in order to use the studio and its applications. This consultancy can be provided by external *consultants* as well as the SOA4ALL solution providers.

2.3 Value Network

SOA4ALL value network (figure 3) illustrates the dynamic relationships between different market actors, and tangible, intangible and economic flows between them. Moreover, it reveals the revenue logic behind SOA4ALL, addressing how costs and the revenues are generated and shared between different market actors. Our analytical focus is on the SOA4ALL solution provider, and next we briefly describe the main interaction with cost and revenue sources whereas more detailed business model discussion is included in sections 2.4.2 and 2.5.2.

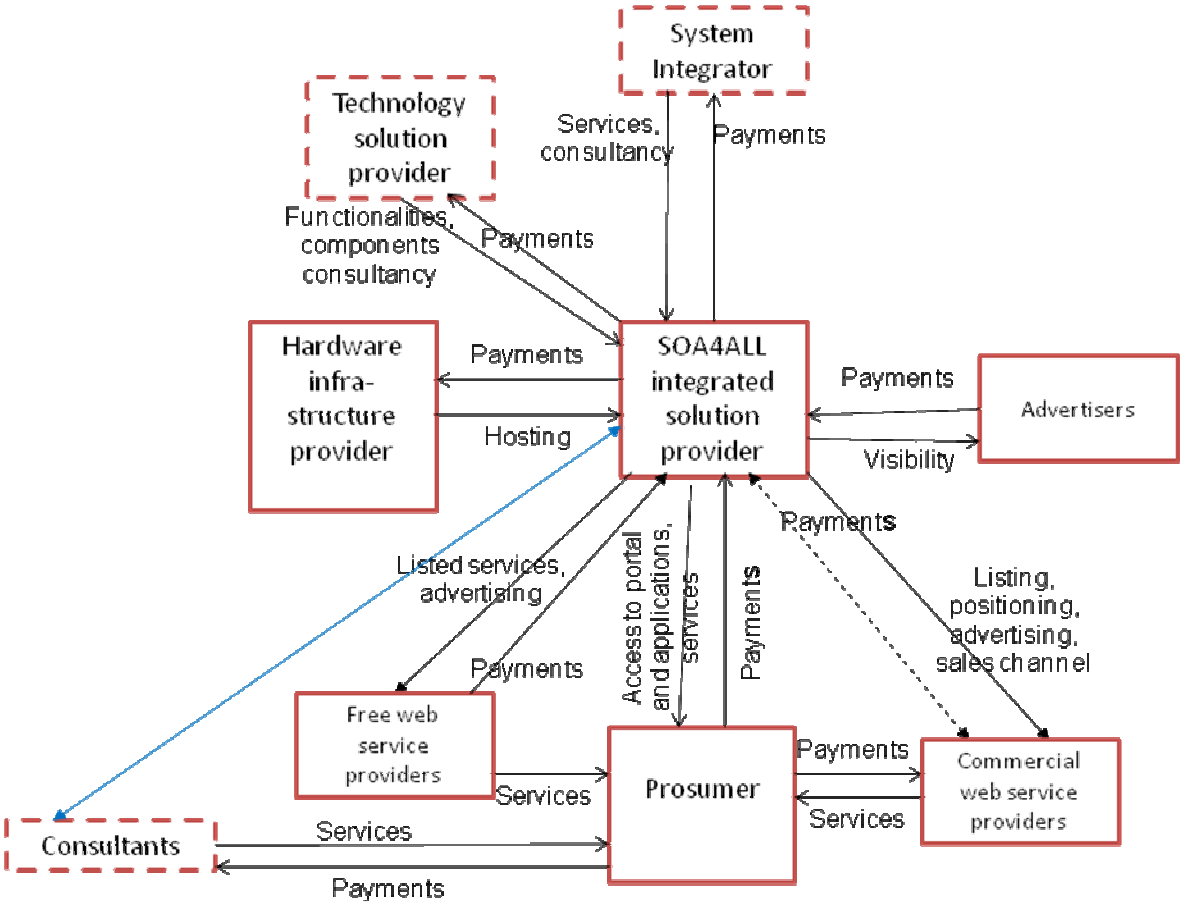

Figure 3: SOA4ALL value network

The picture shows the possible flows that may happen in the real world when exploiting SOA4All. Of course some of the roles and some of the flows may be argued, but as said, the main purpose here is to show the validity of some exploitation approaches without restricting necessarily only to these ones.

For example, we could think about different possibilities in terms of payment flows when a service is not free.

It could be charged to the customer by the service provider or it could be done by the SOA4All platform provider as intermediary; in the second case it could happen that the SOA4All platform provider had reached an agreement related to the price of the service with the service provider, then becoming free to choose the way of charging the user (it could even happen that the SOA4All provider does not charge the user even if it has paid for the service to the service provider or on the contrary, it could charge the user a higher price than

the one paid to the service provider). The scenario described here would consider the service as an application that service providers develop for the SOA4All provider more than the provision of a service as such. This is the model many mobile operators have been using to get a huge base of mobile applications.

If the service is free for the user it could happen that the service provider had to pay to use the SOA4All platform in any case because using the SOA4All services as such may not be free.

As said, there is a huge spectrum of options and choices based on the business model. Despite that, let's have a more careful look at the explanation of the costs (related to one actor) and payment flows (linking two actors) as they have been represented in the previous picture.

- *SOA4ALL integrated solution provider*

  Platform infrastructure and maintenance costs related to running and maintaining the platform operational (in other words it has to face the costs associated to the provision of the SOA4ALL integrated solution.

- *SOA4ALL integrated solution provider and hardware infrastructure provider*

  SOA4ALL integrated solution provider pays to Hardware infrastructure provider a fee for hosting the solution. This fee can be based on traditional hosting fee (fixed amount) or Infrastructure as a service (IaaS) model. In the latter case, QoS and SLAs have to be clearly defined.

- *SOA4ALL integrated solution provider and Commercial web service provider (CWSP)*

  The relationship between SOA4ALL integrated solution provider and CWSP can take many forms. In the simplest form SOA4ALL solution would provide CWSP's services to the users when they fitted the prosumers' requests. This functionality could be offered for free or not (see example of google providing search functionalities for free; in this case we would refer to the same but applied to services: kind-of google for services. Another option could be that CWSP pays in order to be well positioned (be in a high position in the service ranking). In that case, CWSP would make use of more functionalities that would be charged to him by the SOA4ALL platform provider. A third case could be that the SOA4ALL platform provider sells and provides the service on the behalf of the CWSP. In that case SOA4ALL platform would work as a sale/distribution channel for CWSP, and SOA4ALL platform provider would pay to the CWSP the services sold, charging commission fee from the sales. This would be a variation of the scenario described at the beginning of this section. Other hybrid models would also be possible (this will be discussed in more detail in the next section).

- *SOA4ALL integrated solution provider and free web service provider (FWSP)*

  The relationship between the FWSP and the integrated solution provider can take at least two different forms. The simplest one is that SOA4ALL lists the FWSP's services when they fit user's needs without contractual or economic relationship is involved. Nevertheless, if more functionalities are used (like advertising), then an economic flow would happen from the FWSP to the platform providers independently on the fact that the service as such is offered to users for free.

- *SOA4ALL integrated solution provider and Prosumer*

  Prosumers use SOA4All through the studio in order to create, provide and consume services. Thus, prosumers could get access to portal, services and applications and in return, they may pay for it. This could be based on a subscription fee or

SaaS/PaaS model. In the latter case QoS and SLAs have to be clearly defined. In the case that SOA4ALL solution provider sold services on the behalf of CWSP, prosumers may also pay for these services. Additionally, the SOA4All provider may provide consultancy services for prosumers to help them to use the studio and applications. In that case they would take the role of Consultants in the value chain and network. It is important to notice that different business models are not mutually exclusive, and hybrid models are possible, as it has been repeated several times along this document.

- Prosumers and Free and Commercial web service providers (FWSP and CWSP)

  Depending on the business model applied by SOA4ALL integrated solution provider there are at least two types of possible relationships: 1) all the interactions take place through SOA4ALL platform and the prosumer does not have a direct contact with service providers, or 2) the prosumer finds, tests, consumens services through the SOA4ALL platform but gets/buys the services from the FWSP and CWSP.

- *SOA4ALL integrated solution provider and Advertiser*

  This relationship is based on different web advertising models (e.g. banners, pay per click etc.). Here advertisers would pay for SOA4ALL based on the applied model (more information available in next section).

- *SOA4ALL integrated solution provider and Technology solution provider and System integrator*

  In both cases SOA4ALL provider pays for the services received based on the fees agreed between the parties.

- *SOA4ALL integrated solution provider or Prosumers and consultants*

  SOA4All integrated solution providers and Prosumers (depending on the case) pay consultancy fees based on the agreement between them and consultants.

2.4 Open ecosystem business models

2.4.1 Value creation

The open ecosystem is based on the idea of “a web of billions of services”. It refers to an environment where an unlimited number of services can be offered, found, consumed and created with no special domain focus. The interaction of different services and market actors is enabled by SOA4ALL technology, which hides the technical complexity from the users. ***The success of this kind of open ecosystem is based on the critical mass of services***, which make the SOA4AL platform attractive for the main stakeholders, and ensures acceptable revenue flow for the SOA4ALL integrated solution provider.

2.4.2 Suitable business models

2.4.2.1 Internet-based Possible Business Models

A good survey on most popular internet-based business models can be found at Box.Uk [1] (source: http://www.boxuk.com/blog/monetizing-your-web-app-business-models)

The following table summarizes such models.

	Model	Variation	Notes
I	Immediate Revenue		Models for generating regular income, cash-flow ('Self-Sufficient' models)
I.S	Subscription		Charge the end-user a regular, recurring fee. Consider: • Minimum contract lengths • Buy X (days/months/weeks) get Y (d/m/w) free • First X (d/m/w) free ('Trial period') • Discount periods • Pay to remove adverts • Pay for additional ('premium') content • Pay for API/advanced features • Pay for support subscription
I.S.F		Fixed	A single, fixed subscription cost (e.g. to access an online magazine or a specific service).
I.S.V		Variable	A number of fixed-price subscriptions are available to the end-user; fee dictates feature/usage limitations, etc. This includes the 'Freemium' model; a (usually limited) 'free' option alongside one or more paid options.
I.T	Third-Party Supported		The end-user receives the service for free; a third-party pays the fee for a returned service.
I.T.A		Advertising	One or more third-parties place clearly defined adverts within the website/application. Variations of adverts include graphical banners, text, inline, pop-over, interstitial, etc. Normally charged by cost per click, cost per action, or cost per thousand impressions.
I.T.S		Sponsorship	One or more third parties become the 'official' sponsor(s) of the website. This could include fixed (non-rotating, typically prominent) adverts, integration of third-party branding (colours, slogans) and/or licensing agreements.
I.T.C		Paid Content	Advertorials: third-parties pay to include marketing-led content on the website.
I.T.P		Paid Placement	Third-parties pay to be included in lists or in the application (e.g. comparisons, reviews, entertainment listings).
I.T.R		Referrer	End-users are directed to third-party sites, which pay a fee to the website owner for any referred transactions (e.g. comparison sites).
I.T.L		License	Third-Parties are given access to re-use the content from the web-site for their own purposes.

		Content	
I.P	Payments		The end-user makes individual, ad-hoc transactional purchases.
I.P.U		Pay-per-use	Micropayments: the end-user is charged a fee to use an online service (one-off, or for a limited time). This includes the 'brokerage' model, where user(s) are charged a fixed-price or percentage per transaction (e.g. ebay). This also includes the purchase of 'credits' e.g. 10 uses of the service for a fixed cost. Discounts can be offered for bulk purchases.
I.P.P		Physical Products	The typical e-commerce model; includes books, CDs, holidays, tickets, etc. Typically each 'physical product' has a non-arbitrary cost associated with its production.
I.P.V		Virtual Products	The end-user purchases a 'digital' product that typically has a negligible cost of replication. This includes virtual gifts (e.g. Facebook), in-game items (e.g. World of Warcraft), and other virtual assets (e.g. land in Second Life).
I.P.R		Related Products	The end-user has free access to the main product/service. An additional, optional charge is made for related 'added value' products/services, e.g. documentation, support, commercial versions, related iPhone or Android application, etc.
I.P.D		Donations	The website relies on voluntary end-user donations (e.g. a 'Tip Jar').
L	Long-Term Revenue		Strategic, 'Invest and Reward' models where costs are incurred initially for a longer-term 'pay off'.
L.E	Establish and Exploit		Attract a substantial audience before monetizing.
L.E.R		Re-use/Re-sell	Re-sell/re-use the data/content, usually from User Generated Content websites e.g. create books, posters or other purchasable products from data/content created on site.
L.E.P		Platform	Establish a platform, then charge for third parties to participate once an audience has been established e.g. iPhone. See also Facebook.
L.E.B		Branding	Build a 'personal brand' for yourself/your company. Once awareness is raised, go on Conference/Workshop/'Expert' circuit, or release a book, etc.
L.S	Sell/Exit		Create a popular application/website, then make it someone else's problem to monetize e.g. YouTube

Table 2: Most popular internet-based models

The following business models can also be applied in a combined way with the revenue models described above.

	Model	Variation	Notes
M.R	Revenue Share		End-users are offered a cash incentive to make the website/application generate revenue, by sharing a percentage of revenue with them (usually based on their personal referrals or popularity of their content).
M.R	Re-Seller		The end-user can re-sell the online service.
M.R.A		Affiliate	The end-user is paid to direct customers to the website, typically by listing/selling the products/services elsewhere.
M.R.W		White Label	The end-user can brand/tailor the online service and re-sell it as their own (typically taking a percentage of the generated revenue, or paying a fixed subscription cost to the original service).

Table 3: Additional *internet-based models*

The chart below shows the results of the analysis of the business model(s) adopted by the 100 Top Web Apps, according to a survey performed by the Webware at: http://www.webware.com/html/ww/100/2008/winners.html.

Results show that **34% use Advertising**, 12% a **Variable Subscription** model, and 8% each for Virtual Products (typically digital downloads), Related Products (typically a large software company offering a free product to attract you to their platform) and Pay-Per-Use.

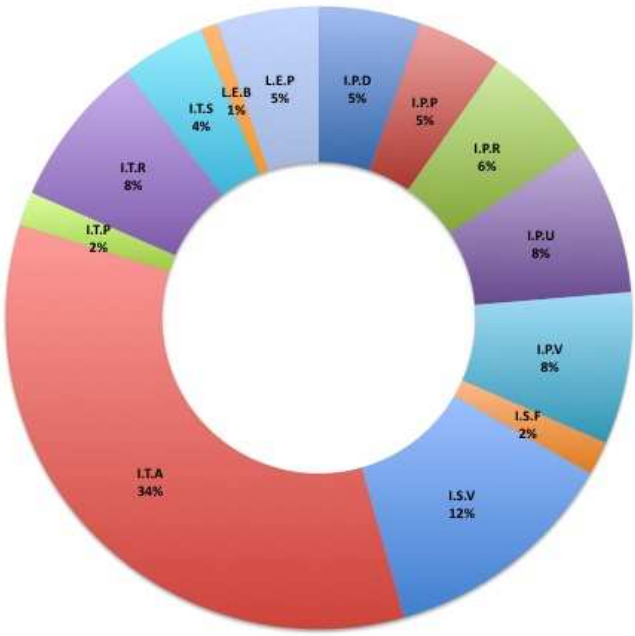

Figure 4: analysis of business models used by Top 100 web apps

Given the central role of **advertising** as a revenue source, the following sections analyze more in detail two cases of successful open internet-based environments exploiting advertisement: *Google* and *Facebook.*

Further analysis of successful internet-based business models can be found at: http://internetbusinessmodels.org/

2.4.2.2 Google

It is well recognized that Google's main revenue source is advertising, with models such as AdSense and AdWords. Google's total advertising revenues were **USD$22.9 billion** in 2009, which represents **97%** of Google's revenues, while remaining 3% comes from licences. AdWords represents about 68.9% of total advertising revenues, while AdSense the remaining 31.1%.

On the other hand, the cost of revenues represents only a 37% of revenues [source: http://investor.google.com/fin_data.html]

According to FaberNovel: *"advertising is not a market but a business model; any market that attracts advertising is a target for Google" [source: http://www.slideshare.net/misteroo/all-about-google-presentation]*

2.4.2.2.1 Google AdWords and AdSense

AdWords is Google's flagship advertising product and main source of revenue: it offers pay-per-click (PPC) advertising, and site-targeted advertising for both text and banner ads. The AdWords program includes local, national, and international distribution. Google's text advertisements are short, consisting of one title line and two content text lines.

Advertisers also have the option of enabling their ads to show on Google's partner networks. The "search network" includes AOL search, Ask.com, and Netscape. Like www.google.com, these search engines show AdWords ads in response to user searches [source: Wikipedia].

Reasons of this success are well summarized in Google AdWords product definition [source: http://google.com/adwords]

- **Advertiser's ads appear on Google:** when people search on Google using one of advertiser's keywords, his Ad may appear next to the search results: this way, he is advertising to an audience that's already interested in him.
- **Attract customers:** People can simply click an ad to make a purchase or learn more about the advertiser: he doesn't even need a web page to get started – Google will help to create one for free.
- **Flexible budget setting:** there's no minimum spending requirement – the amount that an advertiser pays for AdWords is up to him: he can, for instance, set a daily budget of five dollars and a maximum cost of ten cents for each click on his ad.
- **Avoid guesswork:** Google provides keyword traffic and cost estimates so that an advertiser can make informed decisions about choosing keywords and maximising budget.
- **Pay only for results:** the advertiser is charged only if someone clicks his ad.

AdSense is an ad serving application run by Google Inc. Website owners can enroll in this program to enable text, image, and video advertisements on their websites. These advertisements are administered by Google and generate revenue on either a per-click or a per-impression basis.

Many websites use AdSense to monetize their content. AdSense has been particularly important for delivering advertising revenue to small websites that do not have the resources for developing advertising sales programs and sales people. To fill a website with advertisements that are relevant to the topics discussed, webmasters implement a brief script on the websites' pages. Websites that are content-rich have been very successful with this advertising program, as noted in a number of publisher case studies on the AdSense website [source: wikipedia]

According to Google AdSense product definition [source: https://www.google.com/adsense]:

- **AdSense for content** automatically crawls the content of your pages and delivers ads (you can choose both text or image ads) that are relevant to your audience and your site content, ads so well matched, in fact, that your readers will actually find them useful.

- **AdSense for search** allows website publishers to provide Google web and site search to their visitors and to earn money by displaying Google ads on the search results pages.

Site owners get paid whenever someone on their site clicks on one of the AdSense ads. Advertisers can also bid to appear on their site on a CPM (cost per thousand impressions) basis. Both CPC and CPM bids compete in Google's AdWords programme to ensure that site owners optimise their ad revenue.

2.4.2.2.2 Google Ad competitors

Google AdWords' main competitors are Yahoo! Search Marketing and Microsoft adCenter.

- **Yahoo! Search Marketing** is a keyword-based "Pay per click" or "Sponsored search" Internet advertising service provided by Yahoo! [http://advertising.yahoo.com]

- **Microsoft adCenter**, is the division of the Microsoft Network (MSN) responsible for MSN's advertising services. Microsoft adCenter provides pay per click advertisements [https://adcenter.microsoft.com/]

2.4.2.3 Facebook

A January 2009 Compete.com study ranked Facebook as the most used social network by worldwide monthly active users, followed by MySpace.

The website is free to users and generates revenue from advertising, such as banner ads.

Facebook board member Marc Andreessen said last year that he projected the company would break **$500 million** revenue in 2009, and that it had the potential to be a **billion-dollar** company already, but that it was acting conservatively [source: http://www.reuters.com/article/idUSTRE56531X20090706]

On the other hand, it should be noticed that it is not possible to get precise information about Facebook revenues from Advertising, since the company is privately held.

With an incredible number of about 400,000,000 profiles users (source: http://www.facebook.com/press/info.php?factsheet) , Facebook can easily attract advertisers:

the fact these users have a profile represents a very high added-value to advertisers, who can then provider highly focused ads.

Microsoft is Facebook's exclusive partner for serving banner advertising, and as such Facebook only serves advertisements that exist in Microsoft's advertisement inventory [source: wikipedia].

But Facebook has never taken kindly to traditional display advertisements, choosing instead to experiment with "engagement ads" integrated into the social-networking experience--a product it may potentially extend into Facebook Connect's participating sites, which now number over 10,000.

Additionally, Facebook has been working toward an alternative revenue stream with its "credits" system, a virtual currency that for now is restricted to the company's in-house "Gifts" application. Sometime in the not-so-distant future, the Facebook currency system will be made available to developers using the social network's API, which could produce a significant new source of revenue for Facebook as it takes a cut of transactions [source: http://news.cnet.com/8301-13577_3-10280207-36.html].

Very recently, Omniture, an Adobe company and a leading provider of online business optimization software, and Facebook, announced on March 3rd 2010 that they will provide online marketers with solutions to optimize Facebook as a marketing channel (source: http://www.marketwatch.com/story/omniture-and-facebook-join-forces-to-optimize-social-media-for-marketers-2010-03-03?reflink=MW_news_stmp)

2.4.2.3.1 Facebook Ads

According to Facebook Advertising site (http://www.facebook.com/advertising), advertisers are supported in the process of:

- Quickly creating image and text-based ads.
- Advertising their own web page or something on Facebook like a Page or an Event.
- Choosing pay per click (CPC) or impression (CPM) in their local currency.

Facebook also provides support tools in order to:

- Track advertisers' progress with real-time reporting.
- Gain insight about who's clicking on their ad.
- Make modifications to maximize their results.

Advertising investment is flexible: advertisers can decide a daily budget, pay for clicks or pay for views.

Advertisers can also attach **social actions** to increase relevance: social actions are the usual News Feed and Mini-Feed user-generated stories created when users interact with a business' Facebook Page or choose to share activity from external sites participating in Facebook Beacon. Social actions are distributed between a user's friends organically and shown in friends' News Feeds based on many factors including their relevance based on the friendship level. These spontaneous social actions can also be paired with sponsored content and advertising to create a Social Ad.

2.4.2.3.2 Facebook Apps

Facebook provides guidelines to help Facebook Application developers generate revenues out of their applications (http://wiki.developers.facebook.com)

Common Business Models suggested are:

- Advertising
- "Freemium" (or Subscription)
- Virtual Credits / Virtual Goods
- Affiliate Fees
- Merchandising

2.4.2.4 Income Models

Taking into consideration the analysis of the previous sections, we can derive different income models used by major internet players.

Site (Google, Facebook)

This model allows internet businesses to generate incomes directly by marketing their own website and services.

Possible application within SOA4All:
Within SOA4All this model could be used by selling advertising space within the SOA4All applications. For example, the Dashboard could be used to display ads and to sell advertising space.

End-users Site Owners (i.e. Google AdSense)

Instead of generating incomes with their own websites, another possible approach is to generate incomes through other websites. This model is successfully used in combination with a revenue share that allows the website provider to benefit from the usage of the website space.

Possible application within SOA4All:
Within SOA4All this approach could be used by displaying ads within SOA4All enabled applications/services. As such, every application that runs on top of SOA4All would display ads that would generate incomes for the SOA4All infrastructure providers.

Ad Brokers (i.e. Microsoft for Google)

Similarly to end-users site owners, ad brokers are providing space for advertisements for the benefit of sharing revenue. However, in contrast to end-users site owners, Ad brokers usually have much more control about the process, including ads selection and placement and are usually providing a much higher number of impressions.

Possible application within SOA4All:
SOA4all could realize this model by displaying ads for Google or other companies. Those ads could then be displayed within the Dashboard or within other SOA4All components such as SWEET.

Product sellers

Websites may generate incomes by acting as a seller or reseller of products. Those might be software products (e.g. downloadable applications) or even physical goods.

Possible application within SOA4All:
This model cannot be transferred to SOA4All as such (because it is not the main objective of the project) but it could be used by domain specific applications such as eCommerce applications that have been buiit on top of SOA4All.

Value-Added Services

A very common income model is the provision of free services in combination with the possibility to purchase additional added-value services for a specific price. Examples are pro-accounts that allow users to use more features or better services.

Possible application within SOA4All:
Within SOA4All this model could be used by creating two different versions of SOA4All: A free basic version with basic components and an extended commercialized version. For example, specific components such as the monitoring functionality could be offered only as a payable service in the extended version of SOA4All.

Looking at the big picture, it is remarkable that all major successful internet companies are deriving most of their incomes by generating very small incomes per user while dealing with huge volumes of users at the same time. For example, a single ad click at Google usually leads to an income of 0,05 – 1 € within Google Adwords. However, the large volume of clicks on the one side and the payments from advertisers on the other side generate a high income. This is typical for internet businesses and is a common approach for all successful websites nowadays. As such, **a key requirement for successful internet businesses is the attraction of large amounts of users. Looking at the SOA4All environment, this would mean that the best possible revenue model would most likely be based on addressing large numbers of users with low fees or incomes per user**.

2.4.3 SOA4ALL value assessment in open ecosystem

As we have already seen, business models currently used on the web can be reduced to a few set of them that are usually combined as a way to increase benefits. ***Advertising*** seems to be a basic concept because Internet users are used to access many services, applications and contents for free. Therefore, either the distinctive offering of the product/solution does solve a clear need in the market or it is very difficult to ask for money for the usage of the platform. Nevertheless, that seems to be clear for end-users, referring by that to non-skilled standard Internet users using the web for leisure/tourism/media services.

The most obvious positioning of SOA4All in this market would be the consideration of SOA4All as a *google of services*, providing search mechanisms for services in the same way google is doing with contents. This could be an option that should be complemented with added-value services reflecting the real value of the overall SOA4All solution. For example, providing an easy-to-use interface for creating services and making business out of them could be marketed as a very interesting tool for different target markets. The other important concept that has appeared in this analysis, besides advertising, is the one of the ***"the long tail".*** Achieving a critical mass of users is imperative to be successful because it will allow enough incomes even if revenues per user are very low. Many users should have an impact on the number of services exposed and offered by SOA4All. No one will be interested in it if SOA4All is not able to come up with the most suitable services to satisfy specific user needs, and this means that a huge base of services need to be available (for discovery and composition). These considerations are further analysed in the Exploitation Plans.

So far we could think that SOA4All is trying to copy what others are already doing. However, the suitability of business models depends very much on what SOA4All is able to offer. The more convincing USP[2] SOA4All can offer the more profitable options we will have in terms of business. We firmly believe that SOA4All brings the most advanced technologies to deal with

[2] USP: Unique Selling Proposition

some of the challenges of the Future Internet of Services.

Therefore, it should not be compared with a normal website even if the GUI could give a wrong impression (specially taking into account the "4All" approach). SOA4All is addressing the complex world of services in a context where all economies are every time more service-based. If SOA4All is able to face service discovery, service consumption based on user context, service composition...in an easy way for the user, then, it will be a very powerful tool to realize the vision of *a web of billions of services*. The general statements provide some of the benefits that SOA4All can bring to the Open Ecosystem environment:

General value of the technical solution:

- Flexible and scalable solution for modern architectures, especially important in the context of using the web as underlying infrastructure
- SOA4All provides all the elements (DSB, Semantic spaces) to bring SOA to a next step by enabling the implementation of SOA-based systems on the web.
- Easy-to-use tools will enable quick reactions to market needs by creating services in a cheaper, more reusable and faster way
- SOA4All has been designed to reuse cutting edge ontologies (like GoodRelations), building again on the concept of reusability

SOA4All is ready to face current market needs/gaps, such as:

- Quality depends on quality of services, but SOA4All is working on rating mechanisms for service ranking so that users are provided with the most suitable and trusted ones
- Nowadays technical skills are required for any kind of integration; SOA4All will try to hide as much as possible the complexity of integration; users will be provided with easy-to-use tools that will require minimal skills

Added value for the prosumer:

- Based on latest trends in eCommerce
- Easy-to-use rich interfaces thanks to the use of Cutting-edge technologies (Ajax, web 2.0 elements)
- Suitable for a wide range of applications and not restricted to any application domain
- Based on open Standards and modern, yet proven technology
- Graphical process designer for adapting processes to own needs

Benefit for the SOA4ALL integrated solution provider:

- Outstanding flexibility allows easy integration of future trends
- SOA4All integrates semantic technologies in a coherent and comprehensive way with clear benefits and impact on the performance of the system
- Fully integrated solution (input, service mapping and output)

Benefits for service providers

- Interaction of large amounts of people (e.g. social service providers)
- eCommerce scenarios are envisaged
- One-to-many solutions with large volumes of users (e.g. high-traffic websites)

2.5 Service ecosystem business models

2.5.1 Value creation

The Service ecosystem concept builds on the idea of federated service platforms and service parks, where prosumers can find and consume services of different providers through a single platform – the SOA4ALL integrated solution.

Service ecosystems allow inter-organizational sharing across organizational domains without technology barriers, and provide services that are consumable across a wide range of platforms. Often these service ecosystems focus on specific communities or sectors. The SOA4ALL platform is controlled by a focal business actor, whose main motivation is to sell its own services, and provide access to other services (commercial or free) in order to make his platform more attractive and gain more revenues.

Value creation within a service ecosystem is illustrated by the rise of "Service Parks", as recently discussed in an IEEE publication [3][2]. Issues of trust, reliability, and data heterogeneity make it unlikely that there will be access to a set of free and heterogeneous (Web) services and tools to combine them on the Internet anytime soon. One approach is that "service parks" will rise and succeed in the near future as execution environments that support simplified data integration and service reliability. As service park owners establish and leverage branding of their efforts, they will likely build trust within the (Web) service user community. The most successful service parks will allow users ("prosumers") and service providers other than the park owners to easily provide and modify services.

A few companies are now establishing (Web) service communities that constitute industrial service parks that offer, or will offer soon, sets of services with their own sets of rules for combining and modifying them. Each service park will provide sets of business objects with their appropriate semantics, and its own technologies for composing services and letting consumers use and modify them. Each will likely let external (third party) service providers play in the park if they follow the rules. The SOA4ALL integrated solution may be suitable to support such service ecosystems (service parks).

Support of the SOA4ALL platform to a service community

The following picture shows an example and an illustration of how the SOA4ALL integrated solution, based on the SOA4ALL Federated infrastructure may help and enable interconnection of the different kinds of providers as identified and discussed in this document. This section directly refers to the section "5.2 Scenario-specific configuration" related to the D1.4.2A deliverable, describing the SOA4ALL Reference Architecture, proposed by WP1, and exploits the paradigm of Federated Architecture at the level of a service ecosystem, according to the principles described above.

[3] C. Petrie and C. Bussleer, "The Myth of Open Web Services: The Rise of Service Parks", *IEEE Internet Computing*, Vol. 12, no. 03, pp. 96, 94-95, May/June 2008, doi:10.1109/MIC.2008.65

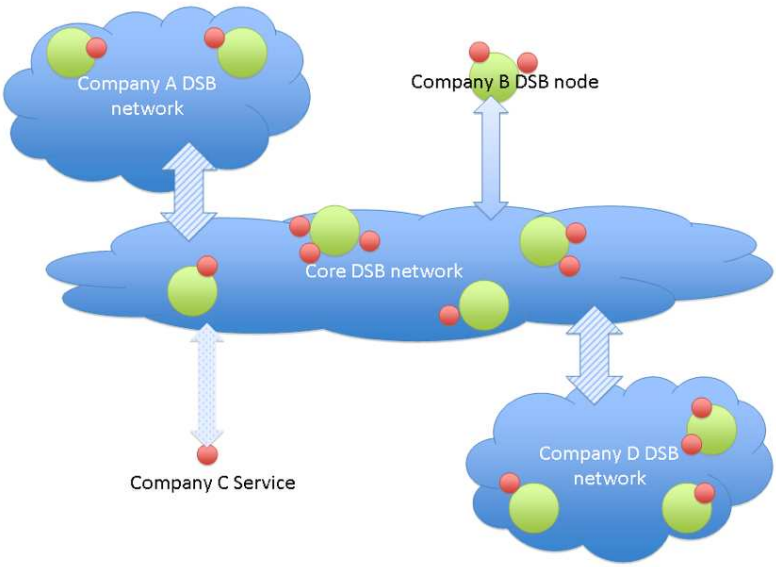

Figure 5: A service ecosystem supported by SOA4ALL

The so-called “Core DSB network” can be considered as the basis of the integrated infrastructure, nowadays built by the SOA4All project partners acting as hardware resource and software providers. This network of DSB nodes contains all the features and platform services needed to provide the minimal SOA4All infrastructure. We could extend this network to the “core SOA4ALL network(s) or ecosystem(s)”, providing the SOA4ALL integrated solution.

Companies A and D are connected to the Core DSB network by federation links (dashed arrows on the figure). These companies host internally a DSB network, assuming that they are open and collaborative organizations, to be part of the service ecosystems. These company networks and the Core DSB network comply with the federation architecture pattern. This federated network is extended to SOA4ALL-based federated service ecosystem(s), where providers and end-users are interconnected, and share common business objects, rules and semantics for an inter-connected business.

Company B hosts a single DSB node, which is exposed and connected to the Core DSB network. Such a company, as a single unit, wants to open its business and connect to a service ecosystem.

Company C provides a single service. This service binds it in a loosely way to the Core DSB network, compared with the former connection of company B which is part of the Core DSB network. Company C acts a third-party service provider.

2.5.2 Suitable business models

The following figure proposes two specific kinds of business models that seem to fit quite well to the characteristics of the service park concept. The two typologies take into consideration (1) a pure Open Source approach for the exploitation of the whole SOA4All and (2) a XaaS approach, being this one compatible with both Open Source SW and proprietary solutions. The distinction has been made because the pure OSS approach obliges stakeholders to put the focus of the SOA4All value on VAS, while the other model makes possible getting revenues not only from VAS, but also from the access to the SOA4All platform, putting more value on the use of the software system and assuming that SOA4All

stakeholders take care of the hosting and maintenance of the SOA4All infrastructure.

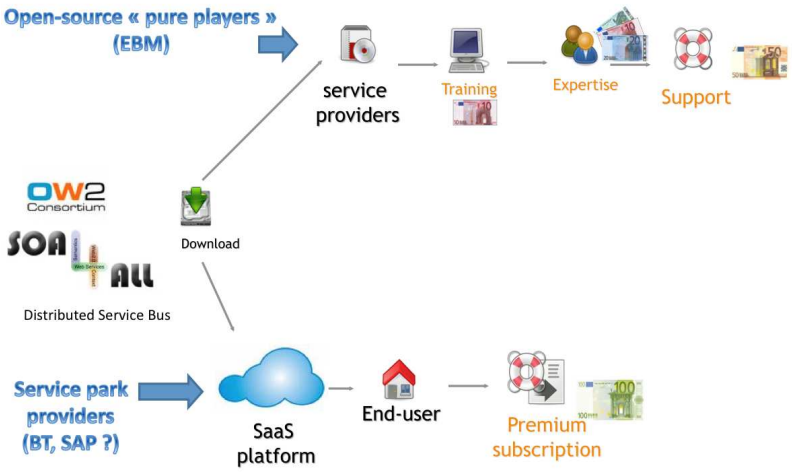

Figure 6: Possible business models (samples)

The first one shows pure open-source "players" (e.g. EBM Websourcing), acting as technical solution providers (as identified in figure 6), whose revenues come from services directly related to the SOA4ALL federated infrastructure (WP1), such as training, consultancy and support. Other SOA4ALL partners could get revenues from support around the SOA4ALL platform services, or the Studio, in the same way, and according to the same kind of business model. This model would be suitable if for, example, no SOA4All partner or external party wanted to host the different elements of the SOA4All infrastructure. In that case, the consortium should work to provide all the SW components in a way that deployment of the solution is feasible. Despite the provision of guidelines and deployment resources, the complexity of the technologies involved would require partners with important IT skills. This complexity would demand for high-level professional to do the integration, deployment and maintenance job, which is usually the source of benefits in OSS-based business models.

The second option relies on the provision of SOA4All functionalities following the XaaS paradigm. XaaS can also be implemented if the software is released as open source, but as we have said, the intention here is to think about how to go further on this business model that assumes that partners in the consortium will cover at least the role of SOA4All platform provider.

The XaaS ("Everything as a Service")-like business models (SaaS, PaaS, IaaS) are compatible with a service ecosystem (service parks) because this business context would enable all the actors in the value chain to get revenues making SOA4All profitable. As it has been said, approaching a wide and unknown constituency on the Web changes the "rules" and has proven to be more successful when considering the long tail approach. Of course advertisement could be a revenue source here too (it makes sense when many providers want to get a visible and trusted position in a business network and have to compete among them) but probably would not be enough to justify the costs of maintaining and running the overall SOA4All infrastructure.

We may imagine big players like SAP and BT as SOA4All providers in the context of service ecosystems. In fact, this business model would be aligned with Ribbit, such as described in the BT-led use case. Because of the need of getting more revenues, Telcos have opened some of the resources for other third parties to use them in order to create innovative applications and services, or in the minimum case, in order to act as resellers of the existing resources. The dynamics of this –from the business point of view- are quite similar to those

of service parks. However, thanks to the advanced solution provided by SOA4All we believe that business opportunities will be exponentially increased. Some of these benefits can be appreciated in the description of deliverables associated to the BT use cases, as well as in some of the aspects involved in the Public Sector use case led by SAP.

2.5.3 SOA4ALL value assessment in service ecosystems

Current SOA solutions are still difficult to deploy in industrial environments even if the technology as such is quite mature. Integration efforts can lead to very long and painful projects inside organizations. If we extrapolate this to an environment with many organizations (a business network or even more, a network of networks) we come up with a complex technological context where service-orientation is very convenient. To make it feasible it is imperative that the technical solution is flexible, scalable and modular.

Since SOA4All has always targeted the Web as underlying platform, collaboration between many entities is expected, and therefore, solutions for data and processes are envisaged at all levels (process edition, service composition, etc). This makes SOA4All become a sound and solid service-oriented collaboration platform for the context of service parks.

Many of the advantages of the SOA4All technology have the same positive impact both exploitation ecosystems: open ecosystems (with billions of services interacting on the open space of the Web) or service ecosystems/ service parks. Aspects highlighted below, such as federation, make SOA4All a very well solution to suit the service park model. In any case, as it can be appreciated in the next sections, many value provided by SOA44All is in the flexibility of the business models it enables and the right choice of those ones will realize or not the potential value of the solution.

General value:

- Federated architecture and infrastructure well suited to service ecosystem organization

Added value for the prosumer[4]:

- The SOA4ALL integrated solution as proposed is vendor-lock and domain independent and the prosumer does not have to develop infrastructures and tools (commodities) to focus on its business domain and generate its own business value. In some cases a new interface can be created for specific purposes to aggregate more sector-specific services, as it is the case of the e-commerce framework developed in WP9
- SOA4All uses semantics for different purposes; among them, and with direct impact on the prosumer, we can distinguish contextual capabilities. Prosumers when activing as consumers will not be disturbed with services they are not interested in; at the same time, when acting as service providers they will experience all the advantages of providing the right services to the right people at the right moment; all these

[4] In this context a prosumer could be an organization that participates in the Service Park and makes business by creating and consuming services in a trusted environment. Of course, the user of SOA4All has at the same time its own users. For example several Institutions of the Public Sector collaborating over the Internet through the SOA4All infrastructure would be users of SOA4All. In the same way, public servants would be the real physical entities interfacing with SOA4All and as a result users of the system too. We will use the word *user or prosumer* to refer to both in this context

elements are essential to increase revenues out of the service provision

- The SOA4All Studio provides easy-to-use tools, such as the editor that will help users without technical skills to find, create or compose services as well as monitoring them once they are executed/consumed.

Benefit for the SOA4ALL integrated solution provider:

- SOA4All creates a natural partnership between providers, and reinforces the credibility and visibility of the solution
- Many different business models are possible in the context of service parks to get revenues out of the use of the SOA4All platform depending on who uses the platform and the way SOA4All is used

Main application areas (application or sector specific) and target market:

- SOA4All does not target any specific application domain but it is conceived to solve the needs of any sector. The fact that we have three very different case studies in different sectors (telco, public sector and e-commerce) shows the suitability of the solution for very different working environments

3. Scenario based analysis

This section describes the way SOA4ALL results can be exploited in different market domains. Each scenario analyzes the market characteristics, the suitability of different approaches and a reflection or application of this in a concrete SOA4ALL scenario.

Chapter three has been elaborated with the close cooperation of leaders and partners involved in the respective use case WPs of SOA4All, thus building the link between technical and business concepts at the application level.

3.1 Public administration

The WP7 use case is about building a service delivery platform for the Public Sector. While our focus is on a scenario around the EU Services Directive[5], this scenario actually is only an example that could be implemented on top of such a platform (see D7.2 and D7.3 for details). The SOA4All Service Delivery Platform (SSDP) will allow civil servants to handle typical administrative procedures (such as a permit approval process). More specifically, using the web-based tools of the SOA4All Studio, public servants can search, model, annotate, modify, share, analyze, and execute administrative procedures in the form of lightweight business processes. These processes may be composed of enterprise services (hosted by SAP), public web services (hosted by third party service providers), and human activities (to be executed by end users). For Public Administrations, the main benefit of such a flexible and open SSDP is the possibility to quickly address new challenges and requirements, e.g., such as the ones formulated by the EU Services Directive.

The use case “End-user Integrated Enterprise Service Delivery Platform” led by SAP investigates how so-called enterprise services can be integrated into the open, dynamic, lightweight, and end user-driven SSDP that is envisioned by SOA4All. Enterprise services comprise a plethora of complex functionalities and have therefore very large interface descriptions. This is also what is meant with the term “heavyweight” services. Together with the other SOA4All WP’s, it will develop (1) a novel tool with an intuitive user interface for lightweight process and service composition and consumption, and (2) a “virtualization” layer in order to close the usability gap between ordinary end users and state-of-the-art enterprise process development and service delivery. The result of this use case is a prototype that demonstrates how enterprise services can be efficiently composed and consumed by (business or private) end users.

This SSDP will be flexible and scalable to allow Public Administrations to easily maintain and update the content-side (i.e., the services), it will support the single point of contact to handle a diverse range of service requests, it will improve the cooperation among national and international authorities, it will ease the interaction among constituents and administrations, and it will lower the TCO for the administration when compared to a traditional software application.

The next section describes how the results of SOA4All can be used in the Public Sector market domain and provides a WP7 specific benefit analysis. This will address the Public Sector-specific market characteristics, the competitive situation and a detailed SWOT analysis. Next section then deals with the business ecosystem of the SOA4All Platform which generally identifies possible business models and business partners in a market context. In the third section, the two previous sections are reflected and analyzed on the WP7 scenario. All SOA4All components which are used in WP7 are identified and a value

[5] http://ec.europa.eu/internal_market/services/services-dir/index_en.htm

network analysis is obtained. In conclusion, the selected revenue model from the use case is presented.

3.1.1 Market Characteristics

3.1.1.1 Target Market

The SOA4All scenario of SAP primarily aims at Public Sector in general. Therefore, in this section we will give an overview of the demand side regarding European countries and their local, national and federal authorities and Government department's structure. This overview will include the different levels of Public Administrations, as well as statistics concerning the market potential of SOA4All by analyzing different sizes and levels of different municipalities in general.

The Public Sector domain will benefit in terms of having a software solution to address the application of the EU Service Directive. This will make it easier for businesses to provide and use cross-border services in the EU, thus increasing cross-border cooperation in service markets, bringing greater competitiveness, and improving quality and choice for consumers. In addition to this, they will benefit from a relevant background on consultancy services aimed at supporting the software implementation. Besides, the consultancy background to customers is a key differentiator element. In a market where consumers demand more options and flexibilities, offering customer a different experience has become one of the main relevant objectives to be achieved by the providers. This growth will depend on the capacity of the company to improve this experience in all the access channels to the client, including on-line transactions.

The SOA4All product within this scenario targets the Public Sector in Europe on different governmental levels. Nevertheless, **the municipal or communal level, with services for citizens and companies, promises to have the most benefits and therefore makes it a worthwhile target of choice**. These benefits include directly visible benefits for citizens through the use of the SOA4All product, due to optimized administrational processes, as well as synergies among the different local administrations due to analogies in the way many processes are operated in each municipal Public Administration. Therefore **a bottom-up approach for introducing the SOA4All method in Public Administrations is recommended in order to achieve the most impact right at the start.**

Within the segment of local Public Administrations another differentiation must be made to choose the most promising municipalities from some several thousand local municipalities in each country. Here we suggest to **first focus on medium-sized and also large local Public Administrations (measured by the population they serve)** since their SOA4All outcomes will have a key impact on how well the SOA4All solution will be noticed and accepted by other local administrations and last but not least the people that will work with it and benefit from it in the future.

Medium-sized Public Administrations according to our professional business experiences **should serve at least 5,000 citizens, better more than 20,000 citizens**, so that results from SOA4All projects can show a significant impact in gap analyses comparing the status quo before and after a SOA4All implementation. The architecture of SOA4All basically allows the use of new distribution and business models such as Software Hosting, Software-as-a-Service and business process outsourcing. Especially, **medium-sized companies could benefit from these new opportunities,** since they suffer most from the lack of IT specialists.

Large-sized Public Administrations (serving more than 100,000 citizens) are also a good choice since they will usually have the highest amount of processes and are

much more complex due to the large number of employees and subdivisions in their organization. On the other hand, large-sized administrations will also have the highest number of cases concerning each process and could thus justify the higher amount of initial resources for SOA4All projects, since the short-term and long-term benefits (i.e. cost savings for process times, etc. depending upon the goal of the SOA4All project) will tend to outweigh the once-off input by far. In addition, one could also argue that larger sized administrations are in greater need of process re-organization or organizational restructuring [3], have more funds for information and communication technology investments and are more likely to employ or be aware of measurement methods (e.g. ISO procedures) and interested to perform impact measurement. Besides these quantitative arguments further characteristics for prioritization to tackle should be taken into account:

- Public Administrations that have complex processes (a critical mass of processes is needed in order for the Public Sector to benefit from the impact measurement on the process landscape)
- Public Administrations that develop information and communication technology investment strategies (e.g. requested by government, by law, or in line with its overall strategy)
- Public Administrations that have available funds for information and communication technologies (usually larger, central cities such as capital municipalities)
- Public Administrations that are not using information and communication technologies or using legacy information and communication technologies

Depending upon the line of argumentation (smaller, more focused projects with quick but less significant results or long and large SOA4All projects with highly significant outcomes after a longer period of implementation) both medium-sized and large-sized Public Administrations are thus a good choice in many European countries. Nevertheless, as shown different administration specific factors like complexity of the process landscape and information and communication technology funds are also important to be taken into account when choosing the first municipalities for SOA4All implementations.

Estimations, however, on the exact demand are very difficult to make due to the large amount of possible target municipalities, insufficient data sources and different individual needs of Public Administrations due to local politics. A critical success factor for SOA4All will therefore be how well SOA4All promoters can manage to “cultivate the market” in order to give and deliver a wide-spread understanding of the full value of SOA4All.

3.1.1.2 Competition

After the presentation of fundamentals, the SOA4All scenario scope, and the target market analysis, this section includes the competition of Public Sector tools. The Public Sector is a traditional software market, but it will start to move in the next few years. Innovative software solutions are still in their infancy and currently not offered. Furthermore, the competitors will come in a positioning phase and hence the market will be in a development and definition phase within the next years.

Currently, there is a number of European and international research initiatives that develop prototypes like SOA4All and also address the EU Services Directive. Most of these projects are completed and ongoing RTD projects funded by the European Commission (FP7/ FP6 projects). At this stage it is not yet clear when one of these prototypes will become a product in the economy and what its core competencies will be.

This section will not provide a complete analysis to define the vendors in the market and a review of existing Public Sector tools, because the current competitive situation and offered commercial solutions are confidential within SAP. Based on a general evaluation of the current offered tools, this section summarises the key findings.

- **Development Stage:** Many vendors cavort in the Public Sector space. Furthermore, the market and the tools will come in a state of flux and will define new market leader. However, there are already vendors that distinguish themselves from the rest by their ability of completeness of their offered solution. SAP provides, for example, an extensive industry-specific solution based on a SOA-platform for the Public Sector. The latest version of the SAP CRM system allows already a simple implementation of mashups that integrate internal enterprise and external web services.
- **Integration:** Public Administration tools are getting closer to business needs. Modern software companies enter the market with web-based solutions to create awareness and acceptance. Furthermore, including new features in existing software is part of their long-term strategy, like in CRM or ERP products.
- **Immature Tools:** Future Public Sector tools consist of the up-to-date software and content. Content will be provided in form of Web Services within a repository and provides the data for Public Administration scenarios. Today, there is a lack of content in large numbers, but vendors need to close this gap. Beyond, the number of already applicable SOA- and web-based Enterprise Public Administration tools is rare and security aspects, availability and authority of the tools are still under discussion.
- **Software-as-a-Service:** Only a few of the current Public Sector tools are browser-based. The rest of the vendors are planning to provide browser-based solutions within the next years. Therefore, Software-as-a-Service will be the dominant distribution model for Public Sector tools.
- **Content:** Currently, most research prototypes focus on the actual technical environment. However, in the domain of the Public Sector there are just a few services available that could be integrated into Public Administration processes. However, the actual content in the form of services for business users is still missing.

3.1.1.3 SWOT Analysis

The following section represents a detailed analysis of the SSDP within the Public Sector market. As a strategic planning technique, shown in Figure 7 a '**S**trengths', '**W**eaknesses', **O**pportunities' and '**T**hreats' (SWOT) analysis is accomplished. Strengths and weaknesses show the internal factors of SOA4Alll while opportunities and threats show the external market influential factors. To carry out a detailed SWOT analysis we assume for the next section that a similar SOA4All research solution is commercialized by the consortium, even though if it may not be the case.

Strengths	Weaknesses

• Core capabilities
  o End-User Process Implementation
  o Semantics enabled features
• Consortium Knowledge from related prototypes
• Power of the Consortium
• Integrative and compatible with existing public administrative services
	• Research tool (development stage)
	• Usability of some SOA4All tools concerning Business Users (Service Provisioning, Service Consumption, Data Flow Definition during Service Composition etc)

Opportunities	**Threats**
• Dynamic Public Administration market • Cost pressure / efficiency increase • Absence of direct competitor offering a SSDP • Low number of vendors which will offer a solution similar to the one of SOA4All	• Huge number of vendors in the total enterprise software market • Rivalry within the market is given • The willingness to pay for such a SSDP • Difficulty to develop a pricing policy for SOA4All

Figure 7: SWOT Analysis of the SOA4All Platform

Strengths: To identify the strengths, it is important to look at to what extent the SSDP manufacturer does well by analysing the things that give the provider a competitive edge in the market. Therefore, the planned core capabilities can be identified as strengths of the SSDP. This includes the functionality of the SOA4All Studio, which enables the end-user to search, adapt or model business processes. Additionally, the integration of semantics enabled features; especially the register for storing and indexing distributed Web Services can be a core distinguishing advantage. Some partners of the consortium such as SAP are developing own related tools besides SOA4All.

Consequently, they already provide necessary knowledge. In relation to that, the consortium is composed of large and powerful companies (e.g., SAP) which hold an important position in their industries and have the capabilities to advance the project and therefore the development of the tool. The SSDP has its strengths in the relation with other applications as well, because it is integrative and compatible with existing enterprise software.

To exploit the full business power of the SOA4All Studio within the Public Sector, the integration of existing and future Public Administration services and service bundles is very important. A UI development environment would be an additional feature to quickly realize mashups and to generate web interfaces for associated processes.

Weaknesses: Weaknesses are negative aspects internal to SOA4All. They refer to areas where the SSDP provider does not have the corresponding tools, technology or competencies to be competitive. Consequently, weaknesses need to be identified in order to correct or avoid them. The goal of SOA4All is to develop a research tool (prototype), which will be therefore in a kind of development stage and does not present mature software.

However, SOA4All will be evaluated on different industrial use cases and will warrant not only the technological level, but also the business expertise. The capabilities of the tool aim more at the technical segments of repository, transformation and aggregation tools. This can reveal a weakness in the future, but it can be a possibility to generate a distinctive core competence within this segment as well. In addition, the usability of some SOA4All tools concerning aspects such as Service Provisioning, Service Consumption and Data Flow Definition during the Service Composition are not business-user oriented.

Opportunities: An opportunity is a condition that could positively affect SOA4All. There are many trends and technological advances, which lead to success, as for example extremely individualised and improved business processes or new distribution channels through Software Hosting or Software-as-a-Service. We need to distinguish between demand perspective and the supply perspective of key market opportunities. From a demand perspective, there is a large size of Public Administrations across Europe, with an identifiable segment of potential users and staff within Public Sector that could use SOA4All. The benefits of the SSDP are concrete and substantial for Public Administrations, as long as they are marketed appropriately. As mentioned before, because of the cost pressure in the market, efficiency could highly be increased in the Public Sector. From a supply perspective, it does not exist a direct competitor offering an integrated product like SOA4All.

Threats: A threat is something that is in way and prevents from realising opportunities. In this regard, the Public Sector market itself is a threat because of its infancy and the high dynamic force that will be in it. These facts will lead to a huge number of vendors in the total market and risks new entrants to tap market share. Consequently, rivalry between competitors is common and the risk of losing customers or users always exists. Furthermore, it is not possible to fix a strategic planning in this market. In addition, the willingness to pay for tools such as SOA4All is unknown so far. In addition, a pricing policy for SOA4All is difficult to define at this moment due to the absence of competition. A more detailed analysis of market risks in the Public Sector is provided in D10.4.1.

Many drivers are affecting the SOA4All market positively rather than negatively. To improve the final research solution for the Public Sector space, the SOA4All consortium needs to play to strengths, act on weaknesses, leverage opportunities, and develop strategies to overcome possible threats. The presented SWOT analysis identifies a high potential for a SSDP and its functionalities by considering the four factors.

3.1.2 Suitability of Different Approaches

This section describes the consideration of the ecosystem for the SSDP based on the WP7 scenario. In this scenario, the SOA4All manufacturer enables the delivery of business and industry-specific applications to companies, which for example require such applications to operate their administration. The business model and its ecosystem, which is established simultaneously, offers users and prosumers a new way of interaction. In the following section, the use of the business model is conceptually and constitutively defined. That means that the observation is made in isolation from a real existing company. As a starting point for various business model options, the service of the SSDP is defined in order to develop possible value propositions. The value proposition is central to the business model.

The SSDP will allow non-technical end users to search, model, modify, share, and execute lightweight business processes. These processes are composed of Enterprise Services (hosted by Enterprise Service providers), public Web Services (hosted by third party service providers), and human activities (to be executed by end users). The value proposition describes the offer by the provider of the SSDP to his customers. Generally the value proposition determines also by what the company earns money. One exception is indirect

income opportunities, such as advertising or commissions.

The options for this scenario can be developed along the architecture of the SSDP. Traditionally, the SSDP could be sold as a product or service directly through the manufacturer. In addition, the distribution of sector-or function-specific applications in form of services and service bundles is conceivable, but also the provision of software integration, consulting and value added services. Potential customers for the SSDP are end-users who use the SSDP in production mode, but also other software manufacturers who integrate them into their own products or distributors. The following concrete value propositions can be derived from these options:

3.1.2.1 End-Customer License Agreement

In the software industry of the Public Sector Market, the classical and still predominant distribution principle is the distribution of a product under a license. Also for SOA4All, a license sale of the entire platform is one possible approach. In this case, the SSDP is delivered to the customer as a monolithic software product without Public Sector-specific customization. This section assumes that the platform is supplied without services for the mapping of business processes. The installation and adaptation to existing systems is performed by the customer. Preconditions for this are appropriate interfaces and configuration descriptions. Since the use of the SSDP is conceivable in principle in every industry and in every phase of product life cycle a large part of the Public Sector market can be addressed. The operational performance requirements for the company are low in this case. The interaction with the customer for this type of "mass product" can also be considered as low. Distribution and development of the platform can be assumed as a core activity of the company. In this case a reasonable additional service is the software support, which can be secured by a continuous turnover. Distribution is made under licensing agreements. Conceivable are company licenses (network / volume licenses) or single-user licenses. It is worth noticing that this type of distribution requires the corresponding semantic technology knowledge on customer-side. SOA4All is not standard software and requires an appropriate configuration and integration into the emerging IT landscape of the relevant administration.

3.1.2.2 Software Vendor License Agreement

In addition to direct sales to end customers SOA4All can be distributed to other software vendors in the Public Sector. They integrate their existing products in form of Semantic Enterprise or Web Services in SOA4All or SOA4All is reversely integrated into their existing products. It is also convenient to the SSDP that software manufacturers combine third-party services for reselling them to end customers. In the Public Sector market, the number of direct customers will be much lower than indirect sales to end customers. Presumably, a far larger number of end customers will be reached by the distribution channels of the software manufacturer. Through the integration of existing products the software solution can be specialized to the requirements of Public Administrations. The pricing should involve the SOA4All manufacturers in every sold license. Moreover, a one-time initial payment may be provided by the retailer, which minimizes the risk on the manufacturing side.

3.1.2.3 Sales by Distributors

Another form of indirect sales is outsourcing to a distributor. In the Public Sector, this makes sense, because the width of the integrable application requires extensive industry know-how. The sales partner or contributor can be, for example, a consulting company. The pricing can

be carried out sales or commission based.

3.1.2.4 Software Integration / Consulting

The provider of the SSDP can also provide the integration of services and consulting in addition to the pure software sales. In this context, software integration means the customization of the SSDP to the customer needs and the development of customized applications. In the area of semantic technologies little expertise is available in Public Administrations. This gap can be addressed through technical consulting. Supplementary, consulting for business applications and process analysis can be offered and the customer can be supported with special Public Administration knowledge. In this case, the pricing is done, either individually effort-based or fixed-based.

3.1.2.5 Industry or Function-Specific Applications

Besides the distribution of the SSDP and the development of customized solutions the distribution of Public Sector-specific or function-specific applications in the form of services or full service bundles is possible. In this way, the Public Sector market may be specifically operated. This could be about monolithic software as well as a modular system. Customers can thus be addressed more directly than through a generic SSDP, so that the customer benefit of the specific application becomes clearer. This procedure is also used in combination with the sale of the entire platform [3.2.1.1].

3.1.2.6 Industry or Function-Specific Ontologies

Besides specific applications also function-specific ontologies can be offered in the Public Sector. The adaptation of a general Public Sector ontology to specific customer requirements can be offered as a service.

3.1.2.7 Hosting for End-Customers

Besides the distribution of product, the service-oriented architecture approach of the SSDP allows, in particular for Public Administrations, a distribution of services. Services, service bundles, sub-components or the entire platform are hosted in this case through the SOA4All manufacturer or through other providers. The offer can be distributed as a service bundle or as modular combination of various available services according to the customer needs. We necessarily distinguish between pure Service Hosting and Software-as-a-Service, which already includes different levels of service. The settlement can be both transaction dependent (volume / calls) and transaction independent (fixed price / subscription).

3.1.2.8 Information Provider

An important basis for the SSDP is the integration of services of other vendors, which finally allow the complete mapping of Public Administration business processes of Public Administrations. With regard to the market size this thought is of great importance. Even at this point the value proposition of SOA4All provider can access. In terms of a value-added reselling the SOA4All provider can conclude contracts with service providers and integrate their services. The services are made available to end users via the SSDP. This creates a close link of the SSDP and the services that were promising in different innovative business models.

3.1.2.9 Platform Provider

Instead of assuming the role of the information provider, the SOA4All provider can also act as a platform operator in the Public Sector. The SSDP will represent a sort of Public Sector marketplace for providers of various services. Service providers can make available their own semantically enriched Enterprise or Web Services as application source. This approach allows a variety of invoicing and pricing options. The SOA4All provider may require a payment of the service providers for the use of the platform. This could be a one-time fee for each service that is provided or he could simply take advantage of additional users that are obtained through a broader range of information. The service providers have the possibility of a direct sale of their services over the platform and can charge their services to the account of Public Sector customers. In this case, there is a possibility of a percentage shareholding for the SOA4All manufacturer.

3.1.2.10 Extension of an Existing Product

If the SOA4All provider already has an existing Public Sector product in his portfolio, which is expandable through the SSDP, SOA4All can be marketed as an extension of an existing Public Sector solution similar to the scenario described in 3.2.2.2.

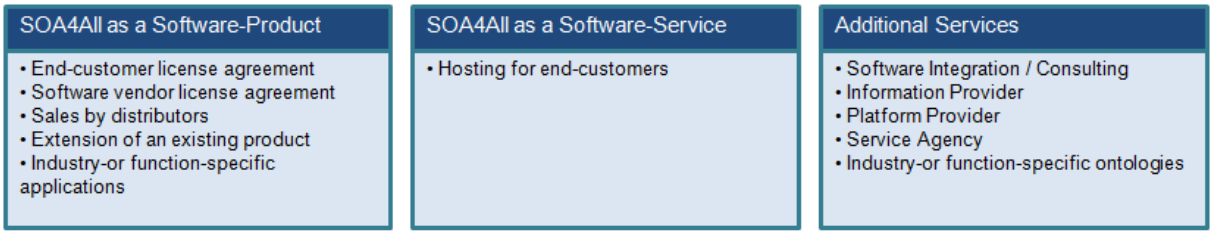

Figure 8: Scenario based classification of the value proposition

Figure 8 is even an overview of the described value propositions in the Public Administrations and classifies them according to their content. Many of the value propositions provide the distribution of the SSDP as a software product. Also possible is the distribution as Software-as-a-Service. In addition, various options for additional services have been identified.

3.1.3 Reflection in SOA4ALL scenario

3.1.3.1 Scenario Description

To be able to express in the following sections of this chapter the various aspects of developing a business model from a SAP point of view this section will briefly describe the scenario of the use case. The scenario describes the administrative procedure to open a new business at the responsible Public Administration. The detailed descriptions can be found in D7.2.

Within this use case, Barbara is a process expert in the City of X. When the SOA4All service delivery platform is introduced to the City of X in order to realize a constituent-friendly one-stop e-Government solution, her task is to create process models for selected standardized administrative procedures for the City of X. In our example, Barbara models the process of registering a business using the process editor (the so-called composer) of the SOA4All

Studio (also see D2.6.1). Before this process is ready to be deployed, the responsible manager Claudia verifies that it actually complies with all legal requirements and regulations.

Sometime later, the City of X decides to simplify payment procedures for its citizens and now wants to support payment by credit card in addition to the traditional invoicing scheme. Consequently, all administrative processes that involve a payment need to be adapted. Thanks to SOA4All, this modification is rather simple and therefore the workload for these adjustments can be distributed among the employees of the City of X. In our example, Egon usually handles the incoming "Registration of a Business" requests and as a domain expert therefore is able to modify the existing process model to include an alternate payment method. Using a goal (see D1.4.1A) instead of a concrete payment service, the modified process now automatically chooses between payment via credit card or invoice depending on the data entered by the client in the registration form of the city's Internet portal, i.e., depending on the user's context.

In the final phase of the sample scenario, the citizen Jose uses the Internet portal of the City of X to register his newest coffee shop: Jose is a Spanish citizen who owns the coffee store chain "Café Solo" that has been founded and located in Madrid, Spain. The coffee chain was very successful in recent years due to the overall boom for luxurious and trendy coffee stores in Spain. In order to further expand his business and enter a new regional market, Jose decides to invest into a new branch in the City of X, Germany. Usually this process would be weary and take up a considerable amount of time and money for travelling and for researching information. With the single point of contact principle implemented by the City of X, Jose is able to manage the entire procedure via the web interface from his office in Madrid. In the corresponding form of the city's Internet portal, Jose fills in all required information including his preferred payment method (credit card). The according administrative procedure is then handled by Egon, who executes the human tasks and uses the SOA4All Studio to monitor the process status (see D2.3.1).

3.1.3.2 Role of the SOA4All Technology

The SOA4All components will be used to build an integrated service platform. This platform will be under the control of a Public Administration so that they can compose SAP and 3rd party services to provide citizens and enterprises with services. (Further details in D7.1)

To do this, the WP7 scenario will need components from all SOA4All WPs, basically:

- WP3 for annotating services with semantics
- WP5 for discovering 3rd party services
- WP6 for creating and executing processes (which are combinations of several services)
- WP1 for the unified communication among all components and the data storage
- WP2 as the graphical frontend to all these components

3.1.3.3 Value Network Analysis

This section describes the different actors and their roles which are involved in the scenario.

Jose is a Spanish citizen and acts as constituent. He requests and handles the administrative procedure to register a business via the Internet Portal of the City of X. In terms of the SOA4All project, Jose is an indirect service consumer or a so called prosumer.

The Public Administration of the City of X is presented by three different employees with

different roles working at the back and front office of the administration:

Barbara is a process expert at the City of X and helps to create process models using the process editor of the SOA4All Studio. She also writes the manuals for the process models and annotates them with different meta data so that they become searchable and usable for the service consumers. Barbara acts as a service consumer and service annotator.

In addition to Barbara**, Claudia** is a legal expert at the City of X and needs to check the compliance of a process before it becomes executable. She acts a service annotator.

Egon is a domain expert for handling administrative procedures at the City of X related to new and existing small and medium size enterprises. He resides in the administration's front office and uses the SSDP to handle specific service requests by constituents and executes some of the human tasks involved in such procedures. He uses the SSDP as a service composer and a service consumer.

Barbara, Claudia and Egon all blur the traditional distinction between service provisioning and service consumption. They consume existing services by integrating and annotating them into newly built processes.

Beside the human actors, there are some companies involved in the use case. With respect to the SSDP they take three more roles:

The **Public Administration** of the City of X is acting as a platform provider and hosts the SOA4All service delivery platform within the city's Intranet. Other **service providers** make their Web Services accessible via the service platform. A **Public Sector specialized service provider** and the **SOA4All manufacturer** develop the components of the service platform that are customized to the specific needs of Public Administration.

As described in the above analysis some actors are involved in the WP7 scenario. This is only one possible form of exploitation of the SSDP for the scenario that has already been selected in D7.2. Figure 9 presents the value network analysis graphically. The blue colored boxes represent the Public Administration of the City of X and its associated employees. Exchanging, annotation and composition of services to processes within the network of the Public Administration is free of charge. The SSDP is hosted by the City of X and has been adjusted to the individual needs of the administration of the City of X by the consulting department of the SOA4All manufacturer in the framework of a software introduction. In addition, an appropriate SOA4All Public Sector solution was bought from another company that acts as a partner company of the SOA4All manufacturer. The SOA4All manufacturer sells in this case, the industry-specific application of another service provider together with his own product (dashed line) the SSDP. The service provider offers service bundles individually assembled for Public Administrations. The service bundle consists out of services that are developed by the service provider itself and additionally bought and integrated foreign services. As part of the purchased software license, the city administration of the City of X requires maintenance and support services from the SOA4All manufacturer as well as from the Public Sector service provider. With the successful introduction of the industry-specific software solution a service via the web portal of the administration is offered to the citizens and businesses of the City of X, which act as prosumers. Depending on the respective services and the related scale of fees of the City of X there are free and chargeable services available. The colored purple boxes represent the other service providers which make their services and all the Public Administration applications available via the platform. The billing model is dependent on the respective provider.

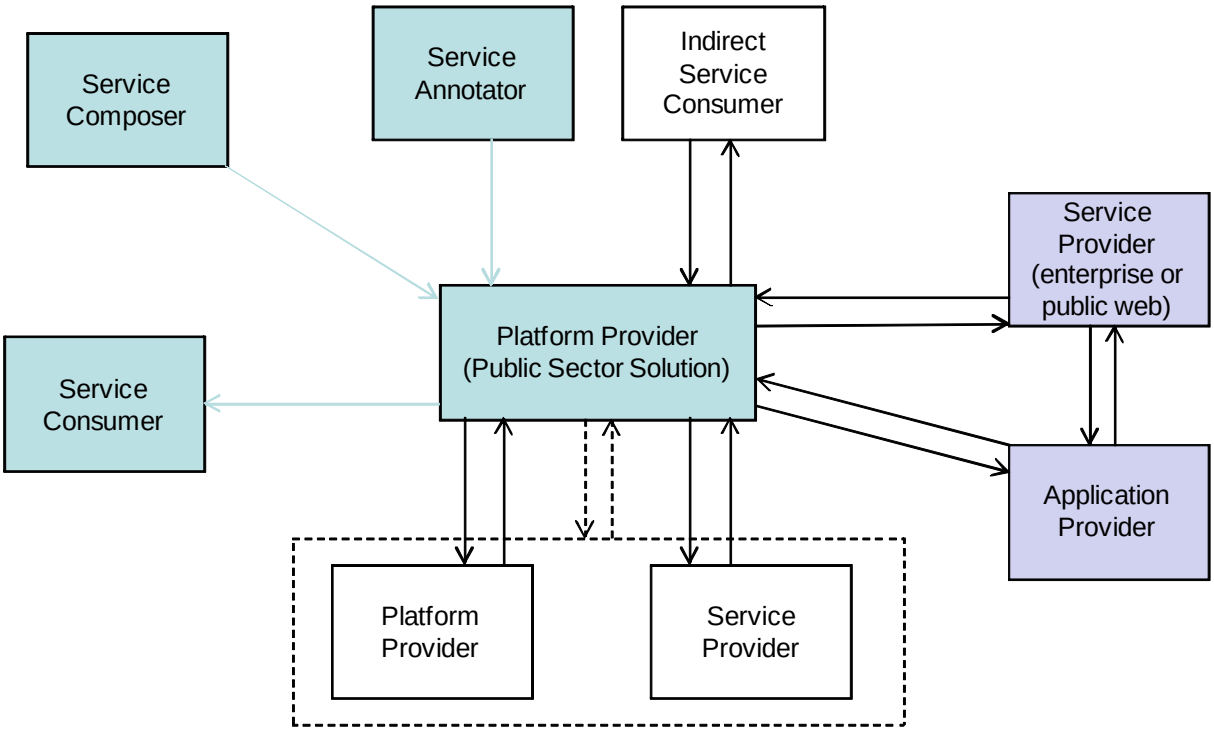

Figure 9: Revenue Model

3.1.4 Conclusions

Based on the findings of this deliverable, we will elaborate on first commercial strategies for the SSDP. In this year of the project, we elaborated on a business case of the Public Administration for the SOA4All project in the frame of WP7. The foundation of the analysis and investigation (SWOT analysis) is based on the aggregated data of this deliverable extended with updated information. Besides quantitative and qualitative KPIs, the business case focuses on business aspects as well. Summing up, the findings of this document will build the foundation of the project exploitation (D10.1.2) and position the SOA4All project in the dynamic Public Administration market (D10.4.1).

3.2 Telco sector

The WP8 case study focuses on the use of the web as a channel to deliver telecommunications services and on the way in which telecommunications companies (telcos) can provide service platforms offering both value-added telecoms services and 3rd party services; allowing them to be combined to generate new revenue opportunities.

In the following sections we describe how SOA4All will be used to support emerging business models in the telco sector. In section 3.2.1 we focus on the nature of the telco market (including the pressures of increased competition and erosion of profit margins) before describing an approach to radically change the way in which telcos do business – known as Telco 2.0. In section 3.2.2 we describe possible business models within Telco 2.0 which particular focus on how SOA4All can support these. In section 3.2.3 we describe a particular scenario which allows us to more fully represent how SOA4All can be applied in a specific business setting. SOA4All Deliverable D8.5 discusses many of these aspects in more detail and places them in the strategic and competitive context of the telecommunications sector.

3.2.1 Market Characteristics

3.2.1.1 Market Background

Traditional telco business models have been based upon offering services directly to customers and receiving revenue either on a usage or flat rate basis. The infrastructure required to support this has been predominantly fixed copper or fibre networks relying on centralised routing which are expensive to provision and maintain with an inherent lack of flexibility. A variety of factors have combined to bring about change in the industry including the advent of mobile communications and wireless networks, new pricing models such as pay-as-you-go and product bundling, regulation resulting in many more players (from a variety of backgrounds) entering the market and finally the Internet which in itself has had a myriad of effects such as technological (e.g. VoIP), economic (radical business models) and customer expectation (e.g. for flexibility and personalisation). The net result is a decline in revenue and profitability from the fixed voice business and a realisation that traditional models are not sustainable.

In response to the challenges discussed above, telcos are considering how best to re-structure in order to meet the new and increasing competitive pressures. For existing telcos, and especially former incumbent operators, the most popular emerging structural model is that of the vertically integrated communications service provider (VICSP). In this model, the telco both builds on its historic strengths (such as ownership of significant network assets and expertise) while also adopting a more open approach - more reminiscent of typical webco[6] structures - where appropriate.

VICSPs own the network(s) and IT systems over which products, services and – crucially – *capabilities* are made available, as well as creating and delivering the products, services and capabilities themselves to the marketplace. In a key change from traditional models, IT changes from being principally a means for back office functions (customer support, billing, etc.) to being a source of value. IT functionality can be exposed as 'capabilities' which can be used by both internal developers and external customers. Furthermore, *telecommunications* capabilities ('place a voice call,' 'send an SMS message,' 'set-up a conference call,' etc.) can be similarly exposed – typically via the Internet - allowing novel services and applications to be built either by the telco or by external developers. Since the telco is effectively making available a platform for onward development rather than an end-user product, exposure of functionality in this way is often referred to as a *platform play*.

Some customers become 'prosumers' (producers and consumers) and a source of value in their own right. Telcos continue to offer customers traditional voice, data and network products and services, along with newer offerings such as IPTV but they also become value generators by using the exposed capabilities discussed above to generate novel products, service and applications to meet the demands of an increasingly fragmented and sophisticated market where one size no longer fits all.

The move by telcos to offer services via the web can be seen as part of the emerging 'Internet of Services' where many webcos are particularly active. This brings the telcos into contact with new customers with differing expectations in terms of price and flexibility. Certainly, the expectation that services on the web are free at the point of use poses a greater problem to telcos due to their large infrastructure and process related costs and raises the key commercial issue of what are valid business models for telcos offering open service ecosystem platforms and services.

[6] Webco – web company, such as Amazon, eBay, Google, etc.

3.2.1.2 Telco 2.0

The Telco 2.0 initiative[7] introduces the notion that telecoms should use the opportunity provided by their position in the value chain in order to develop new "2-sided" business models. 2-sided business models exist where an organisation is able to extract value from 2 sides of a value chain. An example outside the telecommunication domain would be credit card companies, who are able to charge card users fees and/or interest payments on one side and are able to charge merchants a percentage of the transaction value on the other.

In the telecommunications context, one revenue 'side' consists of essentially traditional revenues from core telco services such as voice and messaging; the other revenue side is made possible by the telco's position as a platform provider. This second revenue stream is derived from offering platform services to other businesses who then build on those services to offer services and applications to their own customers. An important aspect of this second 'side' is the leveraging of the telco's customer relationship to add value to the offerings of the upstream customer's offerings (e.g. by utilising customer data to provide better targeting of adverts).

This upstream platform 'play' can be broadly divided into B2B value-added services (VAS) platforms and distribution platforms (as seen in Figure 10).

Creating value-added services will enable third party organisations in multiple vertical sectors to become much more effective and efficient in their everyday interactions and business processes by allowing them to access and tailor services to their own specific needs and/or to build novel applications and services to meet the particular needs of their own customer base in a fast-changing technological environment.

The distribution platform opportunity can be defined by four criteria:

- The distribution service is essentially concerned with moving electronic data from one location to another. Distribution revenues relate to this alone. The terms 'upstream' provider and 'downstream' customer relate to the commercial relationship and not to the flow of data. Distribution services can apply to moving data in either or both directions.
- The service may include an 'above-standard' technical specification and quality of service to meet specific performance requirements, generally associated with the nature of the application for which the data is being sent.
- The service is being paid for by the upstream third-party provider, but is often initiated by the downstream customer.
- The distribution service is a minor telecoms component of the primary non-telecoms service or goods being accessed by the downstream user. Mostly, the distribution service is enabling interaction between the upstream third-party provider and downstream customer. For example, a Kindle user is paying Amazon for an e-book that is delivered over a network. Amazon pays the telecoms operator (in the US, this was Sprint and is now AT&T) for the delivery of the e-book (the main non-telecoms product) – this criteria is the distinction between two-sided distribution and traditional wholesale activity.

[7] http://www.telco2.net/

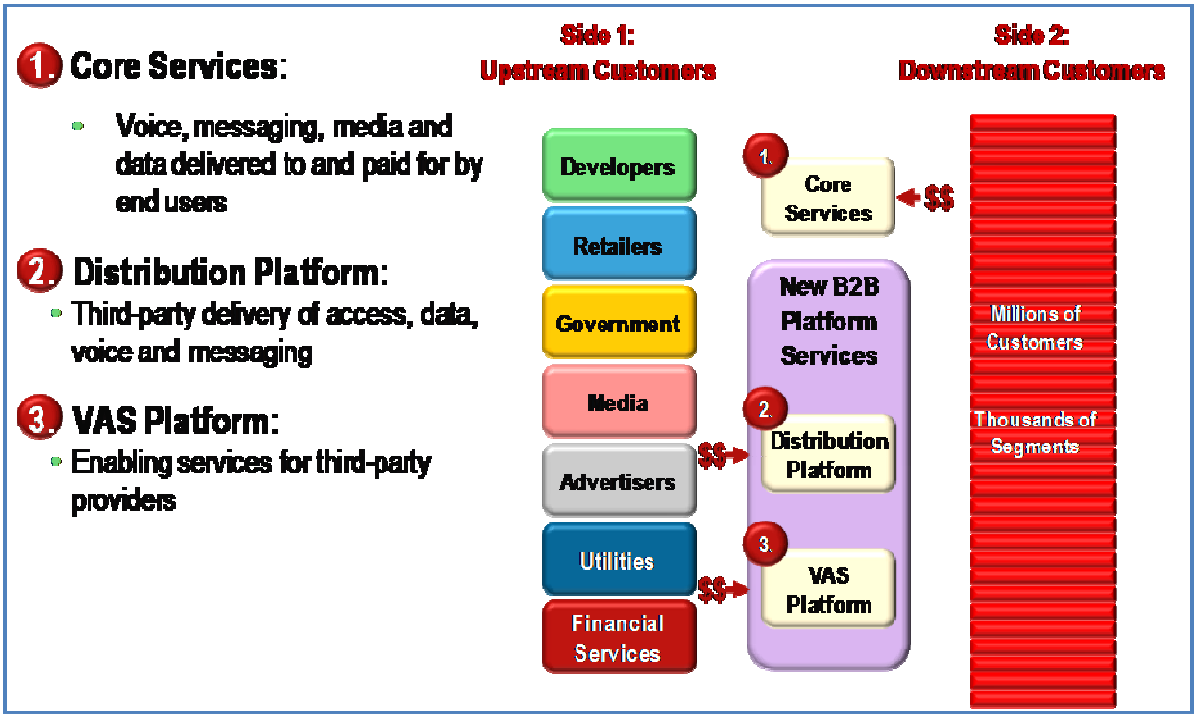

Figure 10: 2-sided business model framework

There are clear parallels between the aims of the Telco 2.0 approach and those of SOA4All. In both there is a need to support large numbers of services and prosumers. In Telco 2.0 there is a need for a platform which allows the telco to offer its value added services to customers such that they can integrate them into their own products and services. This platform should consist of a developer portal plus the infrastructure required to deliver the services to an agreed level of quality, both of which are being developed in SOA4All.

It is also clear that SOA4All could enhance the Telco 2.0 offering of a telco. A key aim of SOA4All is to reduce the complexity and increase the automation associated with interacting with a service platform (in the description, discovery, composition and use of services) e.g. via the use of semantics. By lowering the entry barrier to its usage, a platform is differentiated vs. the competition and the likelihood of mass-market adoption is increased. The use of semantics, context and web 2.0 principles would also support a Telco 2.0 provider in delivering a multi-disciplinary platform i.e. allowing 3rd parties to offer services outside of the telco domain. Without the support of SOA4All the additional complexities of this approach may prove to be prohibitive.

3.2.1.3 Competition

Competition will come both from new entrants to the Telco 2.0 domain and from existing Webcos who will further blur the distinction between web markets and telco markets.

New entrants may well be existing competitors to incumbents in the existing telco markets e.g. TalkTalk in the UK. These organisations have quickly obtained market share here due to their novel marketing and agility (due to their small relative size in terms of people and infrastructure). Having proved to be successful in the Telco domain they are well placed to be equally successful in Telco 2.0.

As already discussed, Webcos are also well placed for success. Skype and Google are

examples of Webco who have built up a customer bases by employing fundamentally different business models to those of Telcos. There is no doubt that such organisations will continue to be major players in Telco 2.0 and a particular threat is that they disintermediate the telcos by relegating them to commodity providers.

3.2.1.4 Target market and market size

As described earlier, the target market is very wide. It ranges from individual consumers of telco services to large corporations in e.g. advertising, financial services, media and retail domains.

Naturally, the size of such a diverse market is difficult to predict but in order get a better idea of the potential size of markets appropriate to SOA4All and Telco 2.0 we have considered the findings of a number of analyst studies:

- The *Economic and Social Impact of Software and Software-Based Services* report published by Pierre Audoin Consultants in July, 2009 finds that "the overall SSBS market accounted for 228.6 billion Euros in 2008 and is expected to grow at a 3.7% CAGR by 2012 to reach 264.8 billion Euros" [8].
- In the Telco domain, a study by STL partners on the potential for the Telco 2.0 approach found that by 2017 the potential size of the opportunity (Western Europe and US) for platform-based value added services is $125bn[9]
- Forrester has analysed the Platform as a Service market where offerings include workflow facilities for application design, application development, testing, deployment and hosting. It predicts that as Software as a Service vendors move away from proprietary platforms towards standards-based, multi-tenant ones, the PaaS market will grow over eight years to a size of $15.2 billion in total volume.[10]
- Finally, considering the shift towards, agile context-aware services, Gartner found that by 2012, the global market for business-to-consumer (B2C) services based on "What you need is what you get" services will be greater than $215 billion per year.[11]

Naturally, these markets and the figures are not mutually exclusive. However, the predictions together show that there is significant potential for the exploitation of SOA4All technologies.

[8] SSBS stands for Software and Software-Based Services

[9] STL Partners: The 2-Sided Telecoms Market Opportunity, Sizing the new $125Bn platform services opportunity, http://www.stlpartners.com/telco2_2-sided-market/index.php

[10] Stefan Reid: 'Platform-as-a-Service Market Sizing', Forrester Research, July 2009

[11] William Clark, Bob Hafner & Ken Dulaney: Four Communication Trends Will Trigger the Necessity for 'WYNIWYG' Services, Gartner Research Report, 24 October 2007

3.2.1.5 SWOT analysis

The following is a SWOT analysis for a telco addressing the Telco 2.0 approach:

Strengths	Weaknesses
• Latent assets (customer billing relationship, subscriber profile, social graphs, identity, location information, large customer base – volumes / scalability) • Infrastructure (access, core transport networks – both private and public; data centre infrastructure) • Know-How (authentication, policy control, resilience, assurance, overload control and network management, fixed-mobile convergence, unified communications, etc.) • Capital	• Lack of flexibility • Need to evolve to ensure agile service delivery • Lack of appropriate senior support for new business models (to fully exploit community innovation) • Silos – need to evolve service execution and OSS architecture to enable integrated services (capabilities should be reusable and exposed as objects following an SOA approach) • Legacy of monopoly/ public-owned culture
Opportunities	**Threats**
• Leverage existing assets (customer billing relationship, subscriber profile, social graphs, identity, location information, large customer base) • Offer a richer, more integrated customer experience with differentiation on functionality, relevance, richness, ease of use • Use existing infrastructure and know-how (reducing time & cost) • Exploiting third party capabilities and harnessing community innovation by exposing own assets to third parties via open APIs • Explore successful webco business models while retaining strengths of telco	• Telecoms' networks are used as pure access, services are consumed from The Cloud ('dumb pipes') • Alternative players (Webcos) that can deliver services via the Internet (real-time communications services multimedia content; Software as a Service to make enterprises infrastructure-less) • Device Manufacturers selling mobile services outside the MNOs' walled garden – exploiting the potential of their customer base (e.g. Apple) • Competitors integrating innovation from in-house capabilities, open APIs and developer ecosystems (collective intelligence) • Rich integration of real-time communications with online services drives traditional telco customers away

Figure 11: Telco - SWOT Analysis

The following is a SWOT analysis for SOA4All as it addresses the Telco 2.0 opportunity:

Strengths	Weaknesses
• SOA4All capabilities i.e. reduced complexity and increased automation via use of semantics and process composition. • Scalable infrastructure • String multi-disciplinary consortium	• Immature technology – research prototypes • Critical mass required to show benefits of approach
Opportunities	**Threats**
• Telco sector is in period of transition creating new business opportunities • Absence of direct competitors in Telco sector • Existing Service Delivery Platforms have been identified as not meeting requirements for Telco 2.0	• Competition from large number of existing webcos and telcos • Existing Service Delivery Platform providers e.g. Oracle are huge and have large resources • Return on investment is not clear vs simpler solutions

Figure 12: Telco - SWOT Analysis for SOA4All

3.2.1.6 Market risks

The risks associated with the business model include the following:

- The SOA4All technology developed to introduce automation to service discovery; composition and usage do not reduce the complexity sufficiently to enable mass-market adoption.
- The dominant players in the current web arena provide telecom services and due to their existing customer base and agility the telcos become disintermediated and are relegated to 'dumb pipe' providers
- Security and privacy concerns of telco customers become large or security and privacy issues are poorly addressed by the telcos reducing the effectiveness of the two-sided business model
- Consumers, entrenched with the 'free at the point of usage' view are unwilling to pay for telco services delivered over the web
- Device specific 'app stores' retain their current position of power (due to customer relationship and guaranteed compatibility) and more open approaches are unable to flourish
- Platform-based infrastructure proves to be too expensive when compared to an ad-hoc 'mashup' approach supported by the existing Internet architecture

Further information about market risks as well as other risks falling under different categories can be found in D10.4.1.

3.2.2 Suitability of different approaches

Figure 13 below shows a high-level view of the possible platform and tools a Telco might

offer to allow telco and other services to be published and combined into applications. As discussed, externalising current capabilities can be seen as a way that will create new growth opportunities and allowing both the Telco itself and third party developers to address long tail demand. The technologies used include telecom web services, enabling the Telco to access long tail revenues via innovative niche applications from third party developers where the Telco is taking the role of a web services aggregator. Of course, some Telcos may not want to embrace all aspects of this model: some may choose, for example, to offer only their own services via their platform to the exclusion of third party services. This model would seem inappropriate in the open environment of the Web and would probably drive users to other sites.

Such platform plays are essentially two-sided, offering a platform that facilitates the two groups on the buy-side and sell-side to interact with each other. This lowers transaction costs, builds scale and offers Telcos new opportunities.

Telcos will need to change their market assumptions away from the well-understood one-sided market ("we will buy equipment, integrate it into a platform, and then launch and sell new services, thus adding value") towards the less familiar two-sided approach, where the platform facilitates buyers and sellers to interact directly. There are already limited examples of this in the telco sector, such as freephone services, and advertising via IPTV.

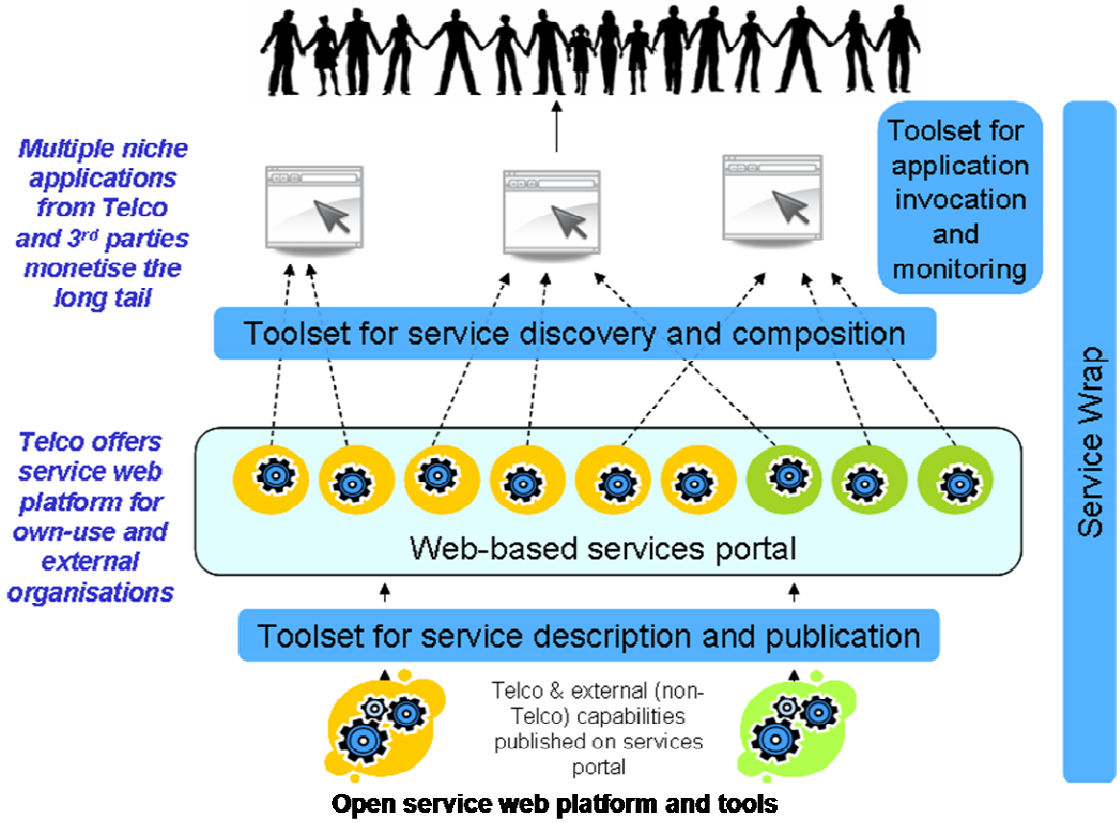

Figure 13: Platform as a Service

Within this model telcos can have one or more roles, in particular:

- Platform Provider – here the telco offers a platform from which its own and/or other organisations' capabilities can be exposed;
- Service (Capability) Provider – the telco exposes some of its own capabilities, either on its own platform or via a platform belonging to another organisation;

- Application Provider – the telco creates applications and services built from compositions of its own and/or third party capabilities;
- Application Reseller – the telco offers an environment wherein application developers can publish their applications for sale, effectively making the telco a reseller of these applications with an appropriate revenue sharing agreement.

All the roles are of course dependent upon the existence of the platform.

Incumbent telcos, such as BT, already own the infrastructure and most of the necessary back-end systems to (re)enter the market with their offerings. Traditional telcos must enhance the user experience in an environment where there is a variety of standalone networked devices, applications and services that don't easily exchange information between themselves. The telecom operators have the unique opportunity to take the role of an aggregator/mediator between the different players and data sources, providing a richer and more personalised experience to the user. In addition, telcos as platform providers can provide usage statistics and other relevant data, enforce Authentication, Authorisation and Accounting (also known as AAA) or Service Level Agreement (SLA) policies for the services available on the platform.

Potential revenue sources lie in the dormant assets telcos have about their users and their habits, mostly collected through triple and quad play bundles – such as the customer's location, expenditure, communication patterns, location, online shopping and web usage behaviours, social circle, and so on. However, in order to exploit this revenue source, major changes are required – from dealing with privacy and legal issues, to aggregating the data and exposing it in a secure way. Also, based on their relationship with the customer base and the wider offerings, telecommunication providers are capable of reaching their customer base via several channels – devices (e.g. via mobile phones/sending texts, broadband/sending emails, set top boxes/video ads), method of contact (direct phone or via call centres) or traditional postal services.

Choosing the appropriate business model and market strategy will be a challenge for a mature telco – as many factors have to be taken into consideration, in particular how to get the maximum revenue from the new opportunities while not undermining existing offerings (or finding a right balance between new and old). Several constants have been identified [2]:

- Opportunity for 70/30 revenue share between application/content provider and the service provider
- Need for simple, published rules with limited commercial assessment
- Need for greater application/content provider control over branding, pricing and promotion

Alongside these, to ensure success, service providers should:

- Differentiate their offerings by extending, enhancing and combining network assets, developing compelling new applications (in-house or by third party)
- Attract developers/application providers/content providers by enabling the environment they are looking for – with APIs, network capabilities, authentication, back-end support and developers support in a form of a portal, SDK, sandbox environment etc.
- Provide a toolkit that allows easily integrated functionality for promotion and monetization
- Provide monitoring and management capabilities

3.2.2.1 Value network and revenue models

The market roles described above can be used to form a value network. Consideration of the Telco 2.0 players shown in Figure 14 is also required to form the network.

At the centre of the network is the Telco 2.0 platform provider which as a minimum hosts its own services but more generally also those from other service providers. One possibility is that service providers without a platform will pay the platform provider to host their services. An alternative is that platform providers will host services free of charge. This may be because the services are essential to the platform provider in order to attract more customers. These services will be offered to consumers (downstream in Figure 4.1). In some cases these services will be paid for by the consumers in which case, revenue will either flow to the platform provider who passes on some or all of it to the service provider or directly to the service provider. Where the services are not paid for by the consumer, it is assumed that value is created elsewhere in the network.

The application provider creates applications using its own and/or third party capabilities. Again, these would be hosted on the platform so the application provider would generally pay for that, either via a revenue sharing arrangement or a fee-based approach (either one-off or time-based). Similar to the services of service provider, they are offered to consumers who either pay (the platform provider or the application provider) or do not.

In supporting the service and application provider, the platform provider is acting as a service / application reseller.

The prosumer is a consumer who uses the services offered on the platform by offering to their own customers (either as discrete services or in combination with other services). They may offer them directly and/or publish them back to the platform (in which case they are acting as an application provider).

Platform providers may form agreements with other platform providers e.g. in other markets or countries where they share resources and allow each other to publish services on each others platforms. A typical example would be where a platform provider offers its service to another platform provider to improve the experience of its customers who may be roaming in the country of the second platform provider. Another motivating factor is that of *interoperability* – allowing a prosumer to build an application on your platform which may use services published on a third party's platform. This of course is well supported by SOA4All's distributed platform architecture.

The Telco 2.0 perspective draws on the relationship of the telco with its customer. Although it relies on the existence of a platform it is not essential that the telco runs and manages its own platform and may choose to use the infrastructure of another or indeed combine its platform with that of another provider (which is possible due to the distributed nature of the platform and is likely to be attractive when telcos form alliances).

Via the platform, the telco is able to offer services to upstream customers. The value of these services is generated from the relationship of the telco with its downstream customers. Here revenue flows from the upstream customers to the telco (again either via the platform or directly to the service provider). In some cases the revenue gained here allows the services offered to downstream customers to be free (as mentioned above). A particular case is in the arena of advertising where the advertiser pays the telco provider to include adverts with their core telco services and that service is then offered free to the downstream customer.

Figure 14 shows the value network pictorially. The black arrows show a flow of revenue and are labelled with the nature of this revenue. The blue arrows show service operations i.e. either an upload of a service to a platform or an invocation of a service on the platform. It should be noted that in many cases, though a usage-based revenue structure is most likely,

there is also the possibility to offer other options, for example a flat “all you can eat” fee, allowing a service provider to publish as many services on the platform as they wish.

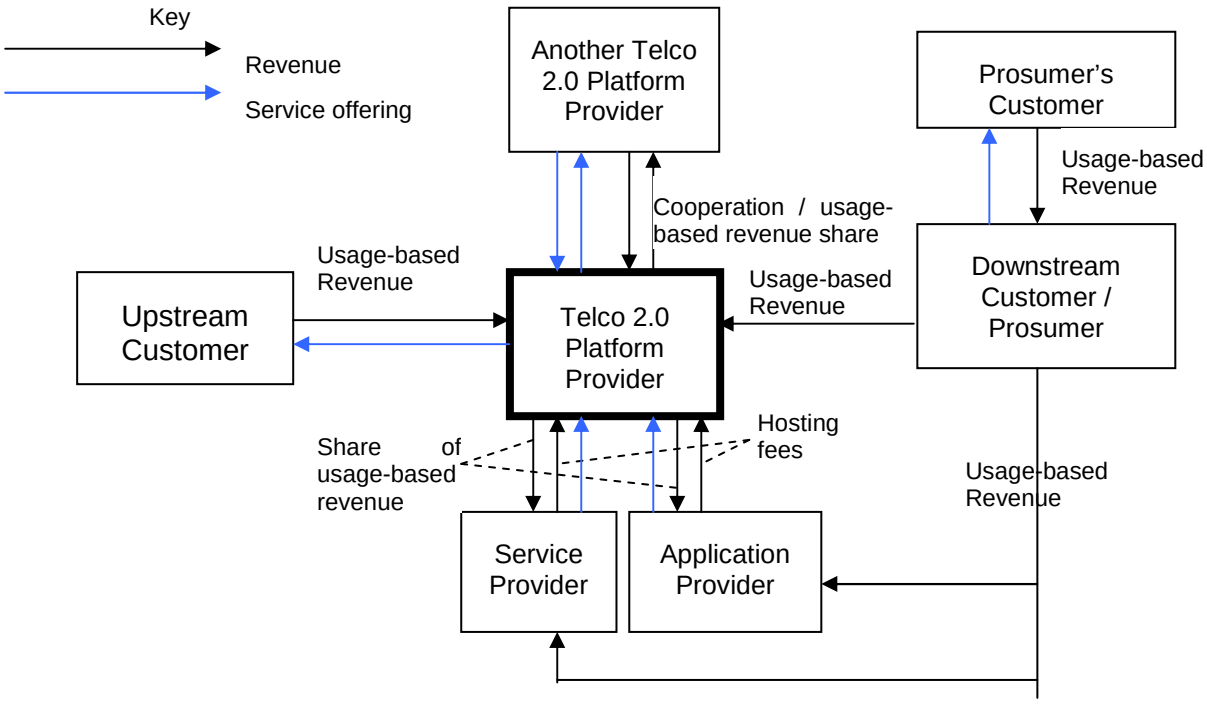

Figure 14: Telco 2.0 Value Network

3.2.3 Reflection in SOA4ALL scenario

In this section we introduce a case study scenario in order to more fully describe how the SOA4All approach and technology is able to support Telco 2.0 and in particular the platform provider acting within this.

The scenario is based around a service called Offers4All which could be a service offering of a retail division of a telco such as BT Retail or a non-telco company. For the purposes of the description we will assume that Offers4All is provided by a company OfferNet who in the Telco 2.0 sense can be seen as an upstream customer of BT.

OfferNet has formed a commercial relationship with BT, the terms of which include:

- that BT provides OfferNet with access to its customers i.e. that OfferNet through BT can approach BT Customers inviting them to sign-up to Offers4All
- that OfferNet uses BT and 3rd party web services offered through the BT SOA4All platform.

The Offers4All service allows companies e.g. retail organisations, entertainment providers, travel / hotel companies to advertise offers to the Offer4All subscribers. These offers might be “last-minute” travel or entertainment deals or predefined campaign offers from retail organisations. The Offers4All service allows an offer provider to create a new offer by describing what the offer is and who and how many people it wants to target with the offer. An appropriate set of subscribers are then chosen and are made aware of the offer via a communication channel. Offer providers pay to use the service but subscribers do dot. Possible charging models for offer providers include:

- Flat rate per offer

- Variable rate based on number of people contacted
- Variable rate based on number of people contacted and communication channel used
- Variable rate based on number of conversions to sales
- A combination of the above

When generating the offer, the offer provider describes the offer they wish to make including:

- A categorisation of the offer (using an Offers4All taxonomy)
- When (dates and times) the offer should be made
- Number of subscribers to make the offer to
- Nature of subscribers to make the offer to e.g. target age group, gender, location, interests, salary range
- Content associated with the offer e.g. text description, audio content, multimedia content
- Preferred communication channel
- Terms and conditions of the offer including instructions for taking up the offer e.g. voucher codes, sales channel, etc.
- An indication of whether the offer should be specific to a user (e.g. via a unique code) or whether it can be shared by subscribers i.e. allowing viral distribution.

Based on this information a set of subscribers are chosen to receive details of the offer. On joining the service subscribers will be invited to provide information on their interests and willingness to receive certain kinds of offers. This will be incorporated with data already held by BT such as address, age, devices and contact details to form a profile. The profile is then used to match subscribers with appropriate offers and determine an appropriate communication channel for the offer message. A key element of value add for the service from BT is that the communication channel is selected based upon what BT knows about the current status of the user e.g. they may have signed up to location based services allowing BT to determine their location and suitability for the offer on those terms. Alternatively, they may have recently used their home phone and would probably be contactable via this medium or they may be currently watching television using BT Vision and may be receptive to multimedia offers delivered to their television during advertising breaks.

In addition to the central offers distribution service, additional services will be required to allow offer providers to track the take-up of offers and adjust the nature of existing offers and to allow subscribers to adjust their profiles and browse for existing offers. OfferNet will require monitoring services to assess quality of service, conversion rates, etc.

This section describes the various actors involved as they interact either directly or indirectly with SOA4All.

Alex is a delivery manager in BT. He is in charge of the recently launched BT SOA4All Platform. He wants to add BT's services that are offered over the web with a RESTful API to the platform. He uses SOA4All studio, to semantically describe the various services and adds them to the repository.

Bonnie is a developer at OfferNet. She is working on the Offers4All service following the recent agreement between OfferNet and BT to target BT customers to become subscribers to Offers4All. Bonnie uses the BT provided SOA4All studio, which she has access to following the BT deal. She is aware of the BT communication services available through the

studio. She also sees that some other developers from OfferNet have uploaded profiling and recommendation services that she wants to use. She creates a process using the process editor, which forms the central service of Offers4All - allowing offer providers to upload offers and get them delivered to subscribers. She wants to add a billing function to the service so she uses the discovery tool of the studio to find an appropriate service and add it the process.

Charley is a sales executive at HotHotels.com, a web-based hotel broker. Following the downturn he has noticed there has been a drop-off in leisure related hotel bookings in his market segment which is luxury hotels. He needs to boost his bookings before the end of the period and thinks a 2-for-1 deal on weekend nights in the best approach. He gets the marketing department to generate some multimedia and voice content and writes a short text offer himself. He also creates a voucher code and asks the IT department to add it to the website. He recently spotted an advert for the Offers4All service in a trade magazine and decides to give it a try. He visits the OfferNet website and is guided through a process where he is able to describe the offer, upload the content and enter details about who he wants to target. HotHotels does not have an account with OfferNet yet so he uses his company credit card to pay for the service. He then gets details of how he can use the OfferNet website to track the progress of his Offer

Danielle is a BT customer. She recently received an e-mail from BT telling her about Offers4All – a service from BT and OfferNet. She's always believed that BT is a trustworthy company and has a keen eye for a bargain so she decides to sign up to the service. She provides some details about her interests, which include travel, fitness and golf. Since she's a subscriber to BT Vision, has a home phone and a mobile she says she's happy to be contacted via all these channels if offers interesting to her are made by companies. Sometime later, she gets a phone call from the Offers4All service and listens to a message from HotHotels.com. She likes the sound of a weekend away so makes a note of the voucher code and checks out the HotHotels.com website. She decides to book up a weekend at a very nice hotel with a spa and golf course.

Charley and Danielle are interacting with a service provided by the BT SOA4All platform but they do not know this since they are using web applications that are using the platform services. In Danielle's case the platform has identified her as a relevant subscriber to the offer based upon her profile and based upon her phone usage infers that she is at home but not necessarily watching BT Vision and chooses to contact her by phone.

3.2.3.1 Usage of SOA4All Technology

SOA4All components will be used to realise the scenario described above. These components include:

- Service annotation from WP3
- Service discovery from WP5
- Process creation and consumption from WP6
- Federated infrastructure from WP1
- SOA4All studio and monitoring from WP2

The potential that the aforementioned SOA4All technologies offer to Telcos is that they can be used to push forward the use of services and the reutilization of resources. Therefore, it will be easier for Telcos to expose their capabilities in a manner that many end-users will be able to mash them up in very different ways, thus promoting the implementation of new niche personalised services, embracing a Long Tail business model.

While this objective is sometimes tackled by exposing an API for programmers, making use of SOA4All technologies lowers the barriers drastically for non-technical users to participate in the creation and consumption of services.

In particular, SOA4All technologies have benefits in environments where a large number of services and users are foreseen, since the semantics involved in these technologies provide an intelligent way of dealing with this scale, and will ultimately enhance the user experience.

3.2.3.2 Value Network for Scenario

Figure 15 below summarises the relationships between the players in the scenario including service offerings and revenue flow.

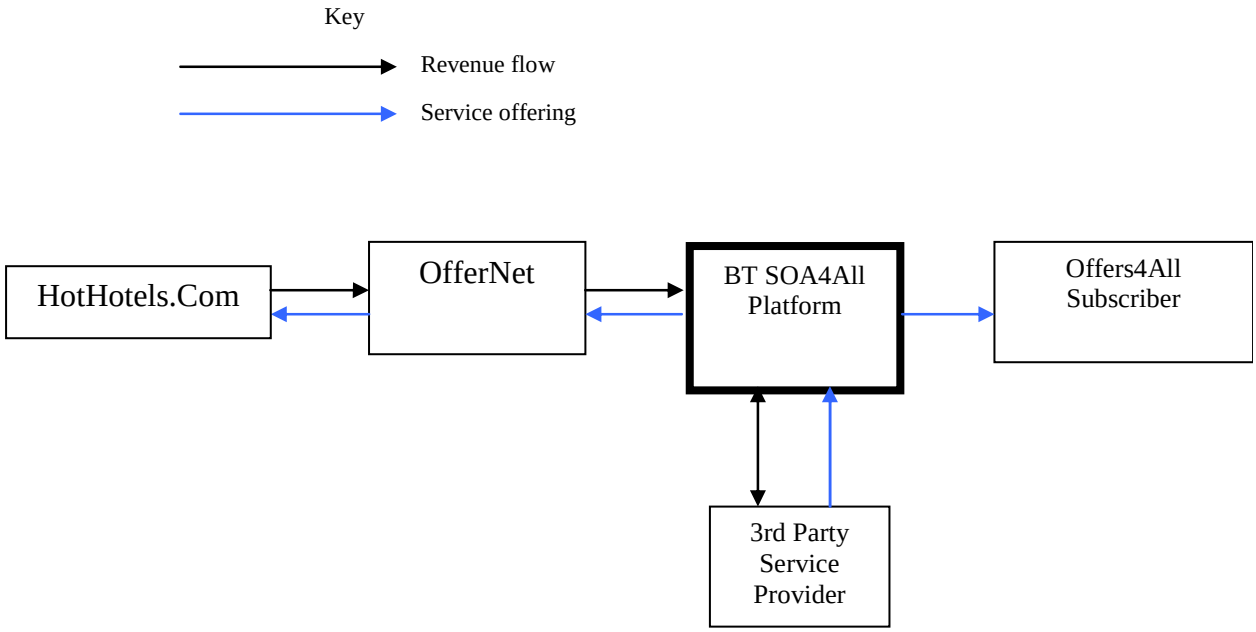

Figure 15: Scenario Value Network

3.2.4 Conclusion

This section has described Telco 2.0 and the associated platform provider business model, which is under consideration by BT and in particular in WP 8 of the SOA4All project. The background to this is that current business models within the Telco domain are proving to be unsustainable. The Telco 2.0 approach makes use of the many-sided business models that draw value from the relationship the telco has with its customers. Using this it is able to offer services to upstream customers and receive revenue as a result. An essential element of the Telco 2.0 approach is the platform that enables services to be exposed and consumed. Within the context of SOA4All this platform could be realised through the use of SOA4All infrastructure (DSB), Platform Services (including description, publishing, process editing, consumption and monitoring) and the SOA4All Studio. Consideration has also been given to the roles within the model, competitors, market size, a value network and SWOT analysis.

3.3 Web commerce

3.3.1 Market Characteristics

The WP9 use case focuses on the Web commerce area. As such, it mainly targets consumers that want to sell products to other consumers. For example, customers of an ISP can use the framework described by the use case to create a web shop allowing them to use services from third parties in order to offer e.g. credit card payments.

The use case therefore has a broad potential market size and market impact. It can bring value to almost any eCommerce user that is selling more than one product. As such, the potential market impact is broader than those of popular eCommerce platforms such as eBay or Amazon. However, it should be mentioned that the WP9 scenario will most likely be used by people that want to make their eCommerce interactions more effective and efficient and therefore the realistic target market is limited to those market participants that want to do regular and ongoing eCommerce involving regular product updates, catalogue aggregation and synchronization of multiple shops. As such, the **WP9 developments are especially interesting for people that target a so called multi-channel strategy**. Multi-channel means that they are selling products on different platforms simultaneously. For example, people might sell products in parallel via the Amazon market place, eBay and via their own webshop. Recent web 2.0 trends boost the number of users being involved in multi-channel eCommerce as it increases the number of small and socially interconnected communities that are communicating with each other via several unconnected platforms. The WP9 results can help those users to keep their eCommerce data in sync and to connect information from various data sources and various eCommerce service providers at the same time.

In terms of the precise target group, the WP9 outcomes can be used independently of the size of the user group. It can range from large ICT companies to individual eCommerce users. However, **the WP9 scenario has especially been developed for C2C eCommerce meaning that it has kept a special focus on supporting single users that want to trade with others without being capable to invest large efforts**.

The Web Commerce market, which is addressed by the WP9 use case in SOA4All, benefits from SOA4All developments in various ways. From a business perspective, those benefits will lead to **reduced time and effort** needed for maintaining eCommerce solutions, **improved income** thanks to new possibilities and better usage of context information and **reduced costs** based on higher flexibility and better usage of processes. The following subsections show the benefits in more details:

3.3.1.1 Service Providers

Service Providers can use the SOA4All Studio directly without any installation. Doing so will provide them some very important advantages:

- Preparation
  They can add their services directly to SOA4All using the SOA4All Studio and they can easily annotate them using the annotation tools of the SOA4All Studio, which can be launched with a single mouse click from the SOA4All Studio. This will provide them with an easy way to make their product catalogue semantically annotated without having to know anything about ontologies.

- Getting Business Partners
  Service Providers strongly benefit from the SOA4All discovery functionalities. Thanks to their semantic annotations, services will be found easily if someone is searching for an

eCommerce service. Moreover, they even automatically benefit from the SOA4All recommendation system where their services will be recommended to their resellers – without spending a single € to search engine marketing.

- Integration with Partners
  Of course, Service Providers can still do business in the 'old' way but with SOA4All they benefit from an additional sales possibility and from 0 integration effort as SOA4All will care about the integration. Service Providers will never have to worry again on how to integrate their product data with the system of their resellers.

3.3.1.2 Resellers (Service Consumers)

Resellers will benefit from all parts of SOA4All in her process. Some of them are even hidden and fully automatic so that they will not even know the technical details but will only benefit from the results:

- Finding Partners
  Finding suitable business partners is easy now. SOA4All provides a very simple search and unlike Google, Yahoo and Bing the search results will not point to webpages that might have nothing to do with what Resellers want: The SOA4All discovery functionality will list precisely those services that are matching their goals, thanks to the semantic annotations.

- Reliability (Social)
  Resellers can have a look at the rating and commenting facilities of SOA4All, allowing them to benefit from the SOA4All social network. This feature will allow them to easily detect services that are bad or not reliable.

- Reliability (Technical)
  Apart from the rating facilities, Resellers can also have a look at the technical reliability meaning the average response time or the availability of a service. Thanks to the SOA4All monitoring facilities, this information is only one click away and is presented to them graphically.

- Live Testing
  Resellers do not need to request example data and wait for the delivery in order to test if the product data exchange really works. They can simply launch the service (consuming functionality) in the SOA4All Studio and watch the results as soon as they come in.

- Integrating Product Data
  Integrating data from various providers into the reseller webshop or even into other platforms is an easy task now: Resellers can launch the SOA4All process composer and drag and drop the services to a process desktop. Afterwards they can simply connect the services. Thanks to the semantics, SOA4All will automatically connect many input and output parameters of the services. For others, they can use a graphical editor to connect services. No need to know any details about process modelling, no need to know anything about WSDL and no need to deal with obscure formats such as CSV, EDI, etc.

- Keeping webshop data up-to-date
  As everything is based on services, all product data will always be up-to-date. Product data is directly fed from the services of service providers into the resellers webshop and into other platforms. No need for manual updates or for manually deleting old products.

- Connecting to web 2.0 platforms
  With SOA4All it is much easier for resellers to be web 2.0-aware. They can reuse the existing SOA4All connectivity to add their data to many well-known web 2.0 communities including Facebook, Twitter, eBay and even the new Google Wave.

- Synchronization
  No need to care about synchronization of the different platforms. With SOA4All this will all happen in the background as all product data is coming from the cloud. In this sense, SOA4All essentially acts as a master data management for resellers.

- Process Changes
  Every process that has been defined can be changed and extended within minutes using the SOA4All process editor. Adding new service providers or new process steps can be done by everyone without needing training in processes modelling. Furthermore, the process is able to self-adapt by reacting to some situation that may happen at runtime.

- Monitoring
  Resellers can handle monitoring of services easily by using the SOA4All monitoring functionality.

- Sales Optimization
  Resellers do have a lot of possibilities to optimize the sales process. SOA4All gives them the right tools to do so. For example, the recommendation system gives them direct links to other interesting services such as a collaborative online advertising service.

3.3.1.3 End Users (indirect service consumers)

Although End users do not realize that SOA4All is used under the hood; they still benefit a lot from the new functionalities of SOA4All.

- Context Awareness
  End users will see products that are ‘made for them’ or more precisely are matching their profile. They will not see any winter dresses in the summer time.

- Always up-to-date
  There is nothing worse than ordering a product, paying and then getting a notification that the product is not available any more. With SOA4All, end users can be sure that all product data is up-to-date and available.

- Process Optimization
  End users indirectly benefit from the SOA4All template generator, which will optimize the order process over time to match the requirements of the users. This will shorten the time for them to buy products and will increase their shopping experience.

3.3.1.4 SWOT analysis

Within this section, a realistic view on **Strengths**, **Weaknesses**, **Opportunities** and **Threats** of the WP9 use case will be described in a brief summary. This so-called SWOT analysis can be used to estimate the success chances. At a glance:

Strengths	Weaknesses
• Flexible and scalable solution for modern eCommerce • Based on open Standards and modern, yet proven technology • Benefits from the SOA4All infrastructure (e.g. DSB, etc.) • Graphical process designer for adopting eCommerce processes to own needs • eCommerce specific UI with domain specific elements • Fully integrated solution (input, service mapping and output) • Reuse of cutting edge eCommerce ontologies like GoodRelations • Platform independent solution with build in support for Facebook and Twitter	• Performance slower than in monolithic systems • Quality depends on quality of services • Technical skills required for one-time integration • Prototype status
Opportunities	**Threats**
• Based on latest trends in eCommerce • Cutting-edge technologies (Ajax, web 2.0 elements) • Outstanding flexibility allows easy integration of future trends • Semantic aspects	• Critical Mass • Maintenance Costs • ROI time and initial investments

Figure 16: Wed commerce - SWOT Analysis for SOA4All

3.3.2 Suitability of different approaches

3.3.2.1 Value network analysis

Several actors are involved in the WP9 scenario, as illustrated by the following picture representing the value network:

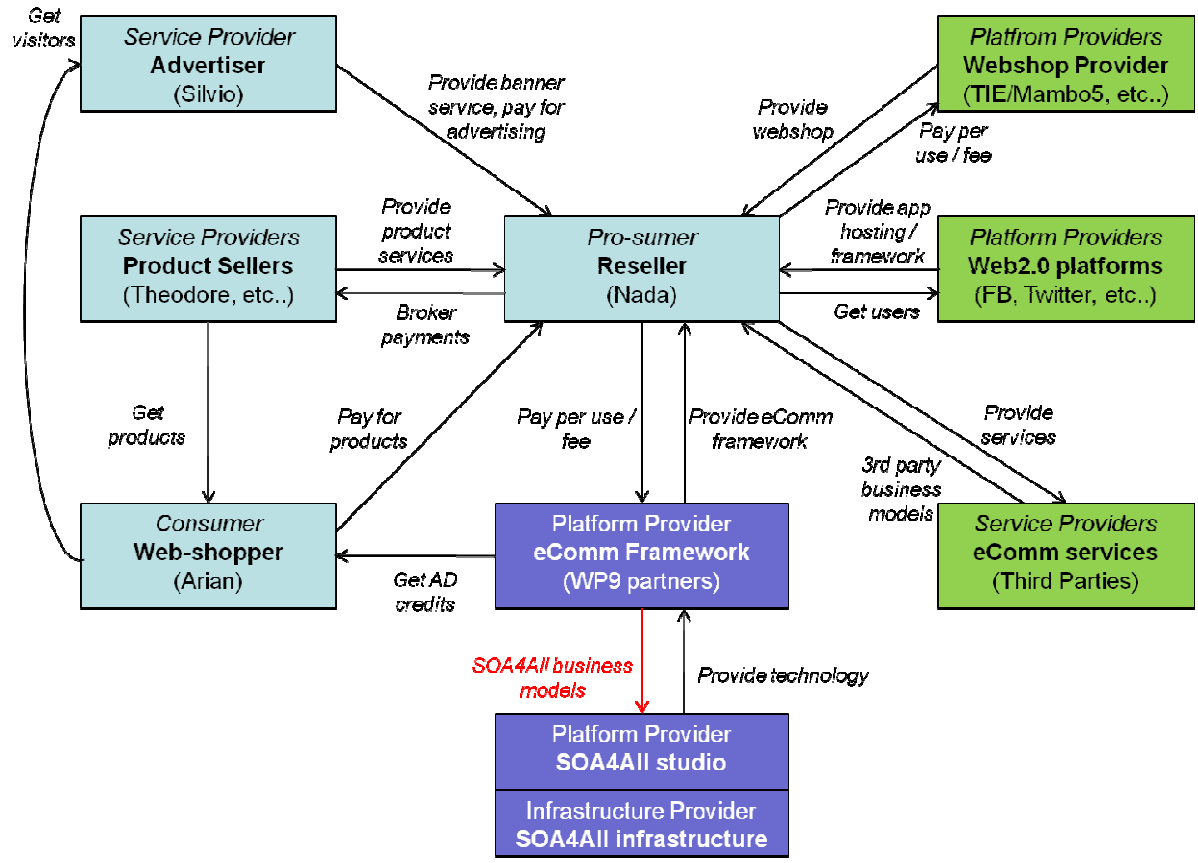

Figure 17: Value Network Analysis of WP9 scenario

The picture provides a broader view than the initial four actors described in the WP9 scenario description (section 6.1): the shopper (Arian), the re-seller (Nada), the product sellers (Theodore, Esteban and Claus) and the advertiser (Silvio). In fact, these actors are interacting in an open landscape, where additional actors need to be taken into account. We can roughly group these additional actors into SOA4All-related actors (i.e. SOA4All partners, dark grey colour boxes in the picture, in the lower side), and third parties (medium grey colour in the picture, on the right-hand side)

In order to provide a clear description of all stakeholders, it is useful to try to group them according to the following categories, based on their role:

- service consumers
- service providers, meaning either WSDL or REST services providers
- service "prosumer", meaning users creating new added-value services by mashing-up existing services or orchestrating them into processes
- Platform providers: in a broad sense, are providing complex platforms exposing both services/APIs and GUIs. Examples are Facebook, Mambo5, or the SOA4All eCommerce Framework and SOA4All studio
- Infrastructure providers, covering the SOA4All infrastructure

The following table summarises all the actors and their role:

Actor	Role	Type of actor	Function
Shopper (Arian)	Consumer	WP9-specific actor	Web shopper.
Product Seller (Esteban, Theodore, Claus)	Service Provider	WP9-specific actor	Offer web services, allowing resellers to retrieve a product list and to order a specific product.
Re-seller (Nada)	Service Prosumer	WP9-specific actor	Connect services of various partners in order to expose product information to Web2.0 platforms.
Advertiser (Silvio)	Service Provider	WP9-specific actor	Provides collaborative-enabled banners to the reseller's web-shop.
eCommerce Framework provider (SOA4All WP9 partners)	Platform Provider	SOA4All-specific actor	The SOA4All eCommerce Framework offers a set of specialised e-Commerce services, process templates and Goals, built on top of SOA4All technology, to support users to create their own eCommerce application
SOA4All studio	Platform Provider	SOA4All-specific actor	The SOA4All studio provides tools and API (services) to support service provisioning, consumption, monitoring and a process editor
SOA4All infrastructure	Infrastructure Provider	SOA4All-specific actor	The SOA4All infrastructure provides all those services and middleware required by the studio
eCommerce Service providers (i.e. paypal)	Service Provider	Third party	Providers offering eCommerce-related services, which can be found and consumed
Web2.0 platform providers (i.e. Facebook, Twitter, ...)	Platform Provider	Third party	Social-networking, Web2.0-oriented platforms which can host third party applications

WebShop Provider (i.e. Mambo5)	Platform Provider	Third party	Providing hosting environment and wizards to build web-shops

Table 4: eCommerce scenario actors

All these actors are interacting in a complex scenario. The involved flows are:

- **eCommerce Framework ←→ SOA4All studio/infrastructure**: the WP9 eCommerce framework is built on top of the SOA4All technology (studio + infrastructure), which is providing all the core functionalities.
- **eCommerce Framework ←→ Reseller:** the reseller is building her eCommerce application thanks to the WP9 eCommerce framework. In turn the framework is claiming a usage fee (i.e. monthly fee and/or pay per use models)
- **Reseller ←→ Third-party service providers:** specific eCommerce services may be included by the reseller based on actual needs. Each provider is supposed to have his own business and revenues model, based on the use of his services.
- **Reseller ←→ Web2.0 platform providers:** the eCommerce framework allows the reseller to easily export her catalogue to popular Web2.0 platforms such as Facebook or Twitter. Such platforms are usually hosting such applications for free, in turn they get more and more users, which are then exploited in order to generated revenues from advertising
- **Reseller ←→ WebShop providers:** although the reseller can directly build her own web-shop, she can also rely on third party products offering wizards and templates to quickly build and host a webshop.
- **Reseller ←→ Product Sellers:** the reseller is integrating product services thanks to the functionalities offered by the eCommerce Framework. As such, she is creating an "added-value" service, thus turning herself into a "prosumer". She is brokering payments between the shopper and the product providers, thus generating her revenues
- **Reseller ←→ Shopper:** the shopper is accessing the web-shop, browsing products catalogues, adding them to the basket and purchasing them via e-payments.
- **Product Sellers → Shopper:** once the payment has been accepted, the purchased goods are shipped to the shopper by the product sellers.
- **Advertiser → Reseller:** the advertiser is providing a collaborative banner service which is included in the web-shop by the reseller. He is supposed to pay a fee to have his banner included.
- **Web-shopper → Advertiser:** when the shopper clicks on the banner, he is redirected to the advertiser's site, so that he gets visitors to his site
- **Web-shopper → eCommerce Framework:** when the shopper clicks on the banner, he is also awarded to some "credits" by the Framework. He will be able to spend such credits later to get some kind of prize or free purchase

3.3.2.2 Revenue models

The following initial revenue models have been identified:

Actor	Revenue model
Shopper (Arian)	He is the final customer. The eCommerce framework offers collaborative advertising services to incentivate his participation, so that he can generate "credits"
Product Seller (Esteban, Theodore, Claus)	Revenues are generated by product sales. A fee is due to the web-shop owner originating customers' orders.
Re-seller (Nada)	Revenues are generated by third-party product sales. Fees are due to the eCommerce framework based on actual usage (plus subscription fee). Additional costs can be also associated with the use of third-party services. Additional revenues can be obtained from advertising
Advertiser (Silvio)	He is investing in advertising. He knows that the collaborative advertising model can incentivate users to click on his banner and visit its web-site.
eCommerce Framework (SOA4All WP9 partners)	Revenues are generated thanks to SaaS-related models: pay per use, subscription fees.
SOA4All studio	*Revenues are generated according to SOA4All general business model*
SOA4All infrastructure	
eCommerce Service providers (i.e. paypal)	Revenues are generated by the use of their services by the reseller (SaaS models)
Web2.0 platform providers (i.e. Facebook, Twitter, ...)	Revenues are generated according to their own business models, mostly based on advertising
WebShop Provider (i.e. Mambo5)	Revenues are generated according to their own business models, based on subscription + usage fee (SaaS models)

Table 5: C2C eCommerce initial revenue models

3.3.3 Reflection in SOA4ALL scenario

The market characteristics described above and the advantages that SOA4All will bring to the web commerce market are directly reflected in the SOA4All WP9 use case. They are

reflected in three angles: firstly, the WP9 scenario allows an application of the business models described in section 2, secondly, the WP9 scenario reflects the market characteristics by providing specific roles to represent service providers, consumers and end users and thirdly, the market characteristics are also reflected by applying the SOA4All technologies accordingly.

The use case consists of the following people and roles:

- Adrian (role: buyer)
- Nada (role: reseller)
- Theodore, Esteban, Claus (roles: sellers)
- Silvio (role: Advertiser)

3.3.3.1 Theodore, Esteban and Claus

Theodore, Esteban and Claus are from different companies, which are all producing products from the textile industry, reaching from footwear to T-Shirts for all seasons and covering both, male and female clothes. They are responsible for the eCommerce part of their companies.

One day they read about SOA4All and they understand that SOA4All makes it simple to provide and consume services. They then decide to make their offers available to everyone via SOA4All.

They create a small service that allows people to:

- Get a list of their products and product descriptions,
- Request the price and availability of a product,
- Place a product order.

They use the SOA4All studio to add their service to SOA4All. Two of them have used web services before and already have suitable product services they want to expose to potential resellers. The third one decides to create a RESTful service.

They use the SOA4All tools to annotate their services and to describe them graphically with some semantic information based on common eCommerce ontologies, like eCl@ss[12] for product categorization and the GoodRelations[13] for details on their product definitions and order services. They can do all of this using the graphical components of SOA4All – without any knowledge of the technologies behind this – just by using drag & drop to annotate their service elements. Afterwards they click the save button to add the service to SOA4All.

3.3.3.2 Nada

Nada wants to sell some goods to generate some side income. She has registered a business allowing her to buy and sell products. Nada is skilled in IT: she uses a lot of web 2.0 platforms including Facebook, Twitter and even an alpha version of Google Wave and she even owns a small webshop where she adds textile products manually from time to time. However, via her webshop she is only making a small number of sales and the product

[12] http://www.eclass-online.com

[13] http://purl.org/goodrelations

descriptions are usually outdated. She spends most of her time that she would like to instead invest into her webshop, updating prices and availabilities or to remove or add products. Also she has no way of automatically aligning her offered products with the Web 2.0 platforms she is using. For example, she also has created an eBay shop to sell and auction some of her products, but needs to manually synchronize the two shops.

Nada wants to change this and to do this more efficiently, thus saving time and being able to spend it making more sales opportunities. She wants to be able to automate product listings and she is convinced that adding her products to her web 2.0 sites would significantly increase her sales. However, automating things is a highly technical work and even if she develops a piece of software to connect her shop to the product data of her supplier, then she would make herself bound to this supplier and would not be as flexible, any more as things tend to be highly connected.

Nada chats with some friends about her problem and one of them recommends SOA4All identifying the following benefits to her:

- It would help her to easily discover supplier services that she can use as a product data source.
- It would allow her to stay flexible as she can model complex processes easily using a graphical process composer.
- It would allow her to do a fully automatic integration by directly connecting all services starting at the supplier's product catalogue and ending with her product presentation– leading to significant time saving since manual updating of product data is no longer required.
- It would allow her to optimize the overall quality of connected services. For instance, this can be achieved by minimizing their prices and ensuring seamless connections between services as well.
- It would allow her to 'send' her data everywhere as long as services permit this: to her webshop, to Facebook, to Twitter and to virtually any other web 2.0 platform that she already uses or will become available in the future. Unlike RSS feeds her product information would be seen as part of the platforms.
- She doesn't have to deal with storing outdated product data and worrying about the best description terms. She can simply rely on getting product descriptions from the cloud the moment she needs it. No need to store the description at her server if she does not want.
- She can consider context information for her sales items. For example, could be considered (based on the privacy settings of the visitor):
    - the profile of the site visitor (gender, education, age, country, language, …),
    - the profiles of his/her contacts/friends (e.g. birthday dates, current locations, …),
    - the device currently used by the site visitor (e.g. an iPhone, a car navigation system, a PC, a kiosk in an hotel/shop/airport),
    - the current location of the site visitor and eventually the weather and traffic conditions at the location,
    - the current activity of the user (e.g. travelling, working, shopping, …),
    - the scheduled activities of the site visitor.

Nada visits the SOA4All Studio and creates a user profile with the SOA4All Profile Editor.

Surprisingly, she notices that she can even reuse her OpenID for logging in which she uses on many other websites as well.

She then starts searching for suitable services using the SOA4All Discovery Platform and finds many services related to products. She uses the SOA4All process editor to create her own personalized process based on those services:

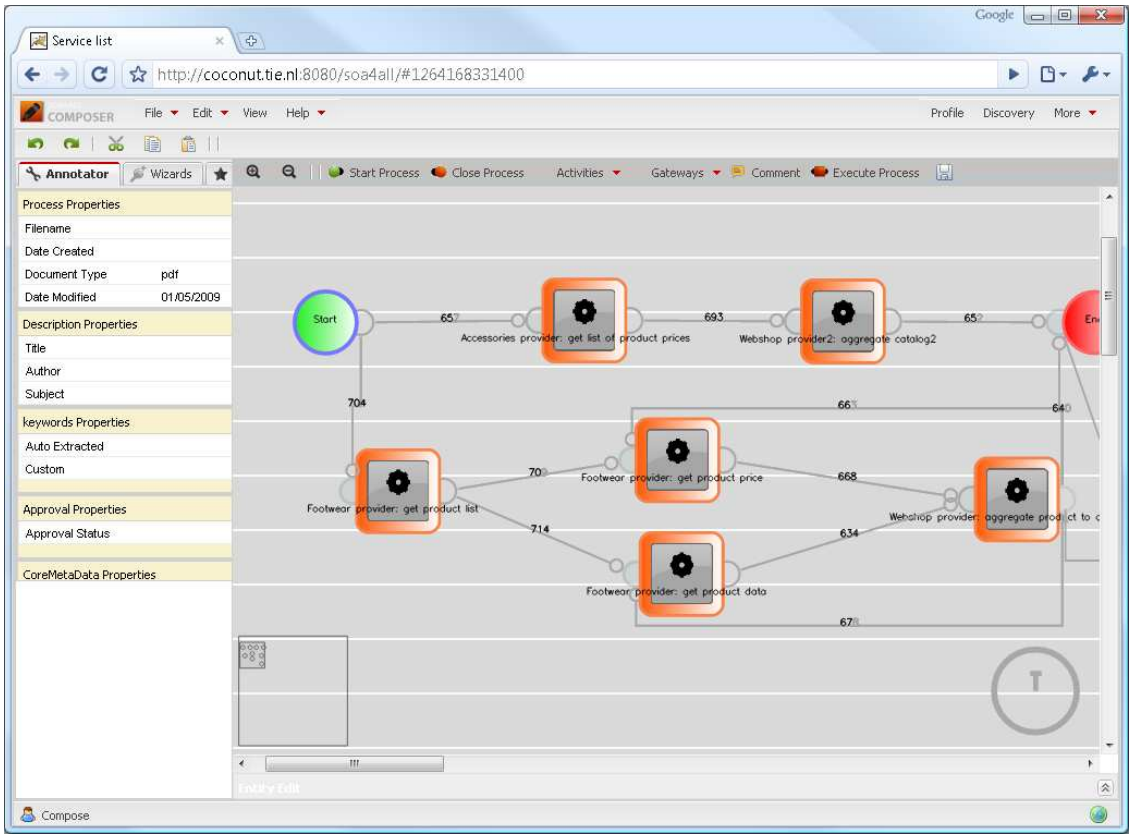

Figure 18: The D2.4.1 Dashboard showing parts of the WP9 scenario

After a while, Nada visits the SOA4All studio again and extends the process, which gathers the product definitions from external suppliers by adding additional distribution channels. For this purpose, Nada creates a new process in the process editor, which combines her webshop and the service outputs from Claus, Theodore and Esteban and feeds them into a syndication service, which acts as a mediator for her product data. From this syndication service, Nada feeds the data via SOA4All to different platforms. She starts with Facebook and decides to extend it with Twitter, eBay and the newly announced Google Wave beta.

3.3.3.3 Arian

Arian is a friend of Nada but has not seen her for 6 months, when they met at a social event and they talked about her desire to set up a webshop. He asks himself what Nada is doing at the moment and finally finds Nada's Twitter page and her Facebook profile. He sees that Nada has been pretty active and is now selling clothes via her Facebook page and surprisingly these clothes even fit to his profile and are perfect summer clothes. He decides to buy one of them. He clicks on the product, pays with his Facebook credits and happily receives the products a few days later.

Summarizing, Arian never notices that he actually deals with SOA4All. From his viewpoint everything is happening in the background but all courtesy of the project.

3.3.3.4 Silvio

Silvio represents a very large association of magazines. Such magazines have a web-presence, and want to invest into on-line advertising. Silvio wants to increase accesses to his web portal: he is currently using a banner-based strategy, but he cannot reach all the sites he would like, and moreover he has the suspect that web users tend to "avoid" clicking on banners.

Silvio knows about the eCommerce framework that is based on SOA4All technology. This framework allows to implement an innovative "collaborative advertising" paradigm, where web-users and encouraged to click on banners thanks to a credit gathering mechanism. Moreover, this functionality is community-oriented, as a user who brings a new "friend" will receive extra credits. Such credits can be spent later on by users in the web Sellers shops. Silvio understands the potentials of web-shops built thanks to the SOA4All eCommerce framework and the attractive idea of collaborative advertising, so he decides that he wants to have his banners enabled for all this.

Thanks to the WP9 eCommerce framework, he is provided with the REST services to add to his banner in order to turn it into a "collaborative advertising banner".

Moreover, he can provide his new collaborative-enabled banner as a semantically-annotated REST service, so that SOA4All users can find it from the Consumption Platform, and include it into their processes or applications.

3.3.3.5 Role of the SOA4ALL Technology

SOA4All is used in almost all parts of the scenario. The scenario itself is basically a combination of heterogeneous services and allows eCommerce users to combine various offers from different service providers. SAO4All is therefore the key-enabler of this scenario. According to D9.2.1, the following table shows the concrete involvement of SOA4All components in the WP9 scenario:

Component	Where is it involved? How will it help?
Semantic Spaces	Communication and coordination infrastructure, integral part of the SOA4All service infrastructure (e.g. used for storage by Service Registry).
Profile Editing	Used by the reseller (the profile will then be used for recommendation and discovery purposes).
Dashboard	Main entry point for the sellers (to annotate their services) and the reseller (to discover and compose).
Monitoring	For maintenance and analysis tasks (for both the sellers and the reseller roles).
Annotation (WSDL)	For adding semantics to WSDL based web services.

Annotation (REST)	For adding semantics to RESTful services.
WSML Reasoning Framework	Mainly used for discovery and composition tasks.
WSMO Data Grounding	Used by the Provisioning Platform at design time and the Execution Engine at runtime, essential for interoperability between WSML and XML.
Crawler	Finds additional services needed for eCommerce activities (payment, credit rating, fraud detection).
Service Registry	Stores and manages service descriptions, both for services provided (and annotated) by the sellers, and for additional services found by the crawler (i.e. payment and credit rating services).
Discovery	Find suitable product catalogue, ordering and payment services.
Ranking and Selection	Ranking services according to user preferences on the non functional properties of the services (e.g., for geographical context, or other user data).
Design-time Composer	Service Composer used by the reseller to define the processes described above, Service Adapter for context dependant configuration of these processes.
Template Generator	Generates process templates in order to support end-users in the selection of the most suitable one.
Composition Optimizer	Used to create an executable lightweight process of Semantic Web services.
Execution Engine	Used to execute the reseller processes.

Table 6: Component involvement

4. Conclusions

The title of this deliverable is “Business Scenarios and Models”, which is precisely what has been discussed through the three sections of the document. This has obviously been done in the context of SOA4All and therefore, it has never been the goal of D10.1.2 to cope with all possible business models in all kind of exploitation contexts we may imagine, but to provide sound explanations of the business potential of the SOA4All solution within different sectors and through different ways of using the technology.

This deliverable is a second version. While the first version focused on general analysis of business models on the web, this one has tried to address in a more detailed way the important aspects for SOA4All and be more concrete in the kind of business models that could be applied in a varied spectrum of scenarios.

For this, a conceptual exercise has been carried out in the first part of the document, while the second part has covered the instantiation of those concepts into concrete scenarios proposed by the three case studies of the project.

To understand the business context of SOA4All we have defined three main elements:

- ✓ **Roles intervening in SOA4All**: HW infrastructure provider (meaning by this a partner(s) providing physical resources such as storage and hosting capabilities, typically a cloud computing provider), SOA4All platform provider (covering the maintenance and provision of the platform elements, it is to say, all the infrastructure developed in the SOA4All project; these elements could be separated into two layers, even if this would not always be logical: the SOA4All middleware –Semantic Spaces, DSB, services- and the SOA4All Studio), service providers –having or not an economical relationship with the platform provider or the user-, prosumers and supporting roles such as consultants, system integrators and platform solution providers. Other roles may appear in the picture, but these ones reflect the most relevant ones that could be present in any SOA4All scenario
- ✓ **Value chain**: the different roles have been placed in the SOA4ll value chain showing the relationship between them
- ✓ **Value network**: as a step further, the value network goes into the details of the flows in terms of tangible and non tangible assets among all the actors, including revenue flows. The value network is different for each business model

Once the business context of SOA4All was understood, we were in the position to figure out possible business models. This work led us to discover **two different business contexts to exploit the SOA4All solution**.

First, the ***open service ecosystem***, characterized by making business on the Internet in a very open way with *a priori* unknown users and services. This ecosystem is well represented by the sentence coined by this project “A Web of billions of services” and is aligned with the concept of the Long Tail, where revenues are possible if there is a huge critical mass of customers behind. Since this ecosystem relies on attracting users on the web without a necessary previous business relationship with SOA4All, it requires being very competitive in terms of price and be able to satisfy customers’ needs in a very accurate and attractive way. For this to happen, the price issue is addressed by lowering revenues per customer (this justifies the big customer base); the issue of fitting users’ needs means that services have to be provided according to the context of the user, providing a rich user experience. SOA4All uses semantics as a way to achieve this.
With the aim of understanding current business models in this kind of open ecosystem this deliverable has made an analysis of the most successful business models used by major

players on the web such as google and facebook. In all of them advertising seems very important, if not essential. Alternative revenue sources also exist, as it has been pointed out in that section of the document.

Second, the ***Service ecosystem***, referring to the currently used concept of ***service parks***. This exploitation context refers to making business on the web (using Internet as underlying infrastructure), but within a community of providers (sometimes also users) that is under control (by platform providers or service provider). We could imagine this concept implemented in specific sectors or application domains. In some cases it is difficult to imagine that whoever user will trust any kind of service found on the Web. For business services going to a trusted community could be an asset and we expect that SOA4All also helps to increase exponentially the amount of services through the implementation of service parks around specific communities and sectors. In that context we have briefly analyze a business model based on a pure Open Source strategy and another one focused on the XaaS model. Both of them are compatible and can be combined. This classification does not mean that business models described in the open ecosystem section cannot be applied to service parks; on the contrary, our intention was to approach each context with those business models that apparently fit better to the characteristics of both environments.

The **exercise of instantiating theoretical approaches into more concrete scenarios** has been driven by the three case studies of the project. Open and Service ecosystem approaches could be applied to the three sectors represented by the use cases: Telco, Public sector and e-commerce. However, some models fit better than others. For example, the e-commerce use case led by TIE is very much focused on a very open environment on the web, as well as the one of the Telecom sector led by BT. Opposite to that, the public sector environment is suited to apply the technology in a more controlled environment. Here, services are created and provided by the Public Administration either to internal employees or to citizens. Thus, an open innovation environment with billions of prosumers is not at all conceivable.

In an attempt to exemplify the way it could work in the scenarios, as well as to justify the potential success of choices made, each of the use cases have provided the following information:

- ✓ Market characteristics
- ✓ SWOT analysis
- ✓ Suitability of the business approaches, covering roles, business models and the associated value network
- ✓ Reflection into a concrete SOA4All scenario where generic roles in the business context become in many cases people with their own names

In the case of Public Sector and the Telco domain, we have provided a generic analysis of business models that could be applied following the transformation that both sectors are currently experiencing. This is then concretized through the particular scenario that is driving the technical implementation of the use case.

In all the three case studies SOA4All technologies play an essential role to make possible the vision of realizing a web where creating and consuming services become as easy as we create and consume web pages nowadays. SOA4All offers flexibility to implement different business models and make the solution profitable in a value network where more actors come into the ground (opening opportunities to new stakeholders, like third parties and *prosumers*). What is clear is that success is only possible if not only the technology is "4All" but also benefits in one way or another (revenue flows in the value network) are "4All".

5. References

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