Service Innovation in Business Value Networks

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Business value networks offer new opportunities and chances for innovation-related cooperation. This paper introduces a new innovation process and framework which has been developed in the Texo use case[1] of the Theseus project[2] and which provides a comprehensive yet flexible approach to support multi-stakeholder innovation projects in business ecosystems. One major aim of the proposed framework is to involve communities into innovation projects as has been proposed within the idea of "open innovation".

Les réseaux business value offrent de nouvelles possibilités pour la coopération liée à l'innovation. Cet article présente un nouveau processus d'innovation ainsi qu'un cadre, développés pour le cas d'utilisation Texo[1] du projet Theseus[2], qui fournissent une approche complète et néanmoins flexible permettant de gérer les projets innovants à acteurs multiples dans les écosystèmes économiques. Un des objectifs principaux du cadre proposé est d'impliquer des communautés dans les projets innovants, comme cela a été suggéré par l'idée d' «innovation ouverte».

1. Introduction

Globalisation and the rise of information and communication technologies support and require increasing customer centricity and shorter time-to-market. The web 2.0 evolution brings more power to the customer, thereby forcing companies to increase awareness of users' needs. Business value networks offer new opportunities for innovation-related cooperation. Tapscott and Williams state that "[...] the pace of change and the evolving demands are such that firms can no longer depend only on internal capabilities to meet external needs […]. Instead, firms must engage and co-create in a dynamic fashion with everyone – partners, competitors, educators, government, and, most of all, customers" (Tapscott; Williams, 2007). They conclude that "organizing loosely coupled innovation webs to capture the serendipity and diversity of innovations and scientific progress is where the real value is" (Tapscott; Williams, 2007).

[1] http://www.theseus-programm.de/scenarios/de/texo

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As “inter-organisational networks have many links with the idea of Open Innovation" (Van Haverbeke; Cloodt, 2006), we suggest that the open innovation paradigm provides a theoretical basis that can be further utilised within the context of Business Webs, which are a also understandable as a Service ecosystem (Janiesch; Ruggaber; Sure, 2008, Barros; Dumas, 2006): Idea and service innovation is different and much more complex in loosely coupled networks. Traditionally, the research and development departments are the main driver of a company’s innovations. Now, the tendency to open-up to other resources of innovations (e.g., employees, suppliers or universities) becomes more and more important (Surowiecki, 2005). In networks of companies it is even more important to use the aggregated information available in the network efficiently. As a result, the closed innovation paradigm became more and more outdated since the 1990s due to four erosion factors (Chesbrough, 2006):

- the increased availability and mobility of skilled technology workers,
- the expansion of the venture capital market,
- external options for unused technologies (sitting on the development shelf), and
- the increased supply of highly capable external suppliers.

The term “Open Innovation” was introduced by Chesbrough denoting an ecosystem in which customers, partners, freelancers and even competitors may participate in a collaborative innovation process (Chesbrough, 2006).

The main approaches of open innovation are called “outside-in” and “inside-out” process (Gassmann, 2006):

1. The outside-in approach to innovation means that knowledge and innovations generated inside the company but merely “sitting on the shelf” for whatever reason can be “imported” by other companies and organisations because the company does not plan to use the innovation themselves.
2. In the inside-out approach companies, which do not have the capabilities to generate (enough) innovative concepts or ideas within their organisation acquire innovations from outside the company, e.g., they can buy services, licences, and patents from other companies.

Of course, both approaches can be combined, leading to companies that externalise their own knowledge while taking in external know-how. Ideas may move “outside-in” where companies import ideas generated by other companies. This may result in ideas being delivered to new markets from the viewpoint of the originating company. Moreover, a company may acquire ideas from outside the company and deliver them in products to the currently served market.

Service ideas that seem unrelated to one company may be valuable for another. The key success factor of a business value network is to have a system or platform where participants come together to share knowledge and services for the benefit of all partners. Only if actors of the platform are able to constantly innovate and offer creative new services can they survive the global competition. Through the open innovation approach our proposed innovation framework supports the development of new services through integrating customers, suppliers, complementors, and competitors into the innovation process.

Open concepts in Business Networks represent a great opportunity for idea and innovation management. The innovation cycle we propose in the next section is designed to integrate all participants. If participants (community) in business networks are aware of the opportunities, they may participate in innovation processes which are interesting for them following James Surowiecki's "Wisdom of Crowds" (Surowiecki, 2005). Thus, a goal of the innovation lifecycle in this approach is to integrate the community as early as possible. This is achieved in the first phases of the process where the community is involved in generating ideas, which can evolve into innovations. The next step (idea evaluation) invites the community to assess ideas as well as innovations with a market-based system. If opinions and refinements of the communities are collected early, this feedback can be integrated in further steps and implementations: "The premise is that under the right circumstances, the collective judgment of a large group of people will generally provide a better picture of what the future might look like than anything one expert or even a small group of experts will come up with" (Surowiecki, 2005). Even after a service is implemented, the community can give feedback in order to improve services. These steps of the innovation process are described in sections 2.1-2.5 in detail.

The factors that drive the trend towards business value networks of course have consequences with regard to a company's innovation process. In Section 3, we look into the challenges that have to be overcome due to current development in business and society, especially when it comes to services as the object of innovation. In Section 3, we discuss several challenges which we will address for innovation management in business value networks. A short summary (Section 4) concludes the paper.

2. Framework of Innovation Process

Process models are an important aspect of innovation management, both in practice and academic research. Process models serve different means in these regards. In practice, process models are mainly used to standardise processes as they are executed in a company. In academic research, innovation processes are empirically analysed and process models derived to gain insights into the workings of organisations. Depending on the aims of the process model, different aspects may be emphasised, elaborated in more detail or combined. Hence, there is no single "right" process model.

In this paper, we introduce a process model that groups innovation activities into five main functions that are required to develop new innovative services. The process model is based on the generic model proposed by (Herstatt, 1999).However, to reflect the specific aspects of service ecosystems, the challenges that arise in innovation networks, the challenges specific to services, as well as the unique structure of service ecosystems this generic model has been adapted. Although the process model is depicted in a sequential process the focus within our work lies on systematic and continuous innovation management. This is illustrated by the feedback loops that connect every process step with each other. Thus, a highly dynamic innovation process emerges that allows flexible and continuous innovation management but is still a systematic process.

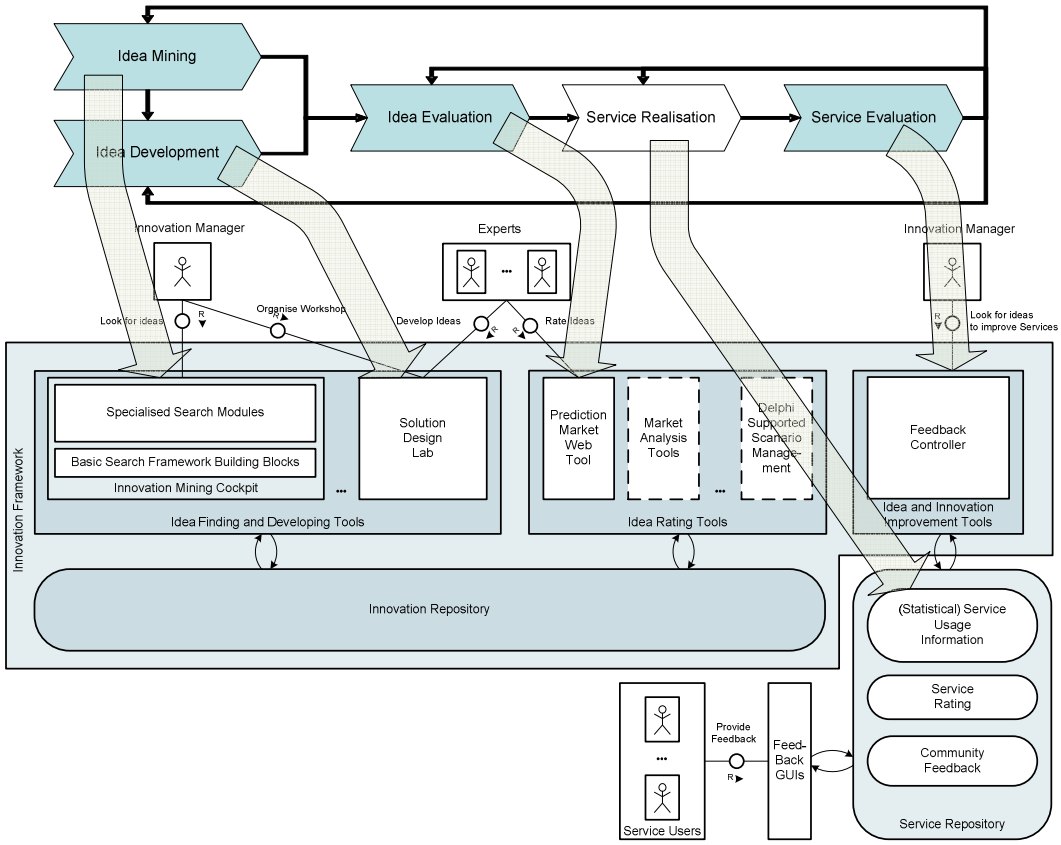

Fig. 1: Innovation Framework – System Architecture.

Our innovation framework methodologically and technically connects different tools and methods for systematic idea development. Fig. 1 illustrates the innovation framework by aligning the innovation system architecture with the innovation process. After an idea has been created and developed using tools like the Innovation Mining Cockpit, the Innovation Community, or workshops using the Solution Design Lab, it is evaluated using Information Market-based approaches. If the evaluation result is positive, the idea is implemented and used. Service usage information in different shapes will influence change and improvement of existing services using the Service Usage Feedback Controller. A central component within the framework is the Innovation Repository which provides means to store and retrieve ideas and systematically enhance them with additional information. All tools are supported by this repository in the back-end, which thus acts as a uniform idea data warehouse and aggregates the data generated in the respective components.

In the following paragraphs we will describe each of the components of the innovation framework in detail.

2.1. Idea Mining

The Internet, and especially the Web, is the world's largest source of information. Consequently, it is being highly frequented as knowledge source by innovating firms and a lot of an innovation manager's daily work today is somehow related to searching the web for information. A recent survey among industrial innovation actors and experts states that web search engines clearly dominate the Internet-based technologies used by innovation actors, followed by online editions of professional jour-

nals (Novanet, 2006). We consider the following use cases important for innovation managers seeking web based innovation information:

- *finding topic definitions* to learn about a topic or technique,
- *identifying experts* to overview the important players concerning a topic,
- *mining relevant scientific papers* to gain background as well as state of the art knowledge,
- *browsing patent data bases* to see what has already been invented and protected - and what's not,
- *finding and analysing user discussions* to learn about problems and new ideas that might be uttered, and
- *evaluating press releases* of competitors and potential business partners to prevent falling behind and missing business opportunities.

General search engines today offer more (e.g. browse patent data bases) or less (e.g. identifying experts, finding definitions) elaborated support concerning these tasks and are complemented by specialised search engines and mining tools. Few tools, however, have been exclusively designed for the needs of innovation managers, though the need for such tools clearly exists (which we know from several discussions with industrial partners).

We consider search needs of innovation officers to be of long-term concern. The system thus, after being configured appropriately, is planned to work widely automatically and notify the user about any new findings it has come across and rated as relevant. It will therefore utilise search agents that continuously observe the user-defined search space. The final outcome will be a search portal targeted towards innovation managers that allows searching the internet far more target-oriented than it is possible today using general purpose search engines. It will form a single point of entry for all of the innovation manager's web search related activities.

Regarding the development of new search approaches we will pay special research attention to the field of competitive intelligence by focusing on

- identification and processing of relevant user discussions in blogs and message boards, and
- identification and presentation of news items and press releases related to the user's area of interest.

We consider these tasks especially important within the context of service innovation. Most of the innovations in services are improvements and adaptations to existing services to satisfy changing needs (Hipp; Grupp, 2005). Quick reaction to altered customer requirements is a key driver for business success not only but especially within service industry. The rise of customer-centricity brought forward with the Web 2.0 movement broadens opportunities to find out what customers want and what they do not want. Information expressed in blogs and message boards can be utilised to track satisfaction of a firm's own customers, but might even point to aspects that users find fault with a competitor's service. On the other hand, service innovations can

easily be copied. Hence, it is crucial to any service provider to know his competitor's offerings in time to avoid dropping behind.

The Innovation Mining Cockpit will interface the Innovation Repository. Thus the user will be able to directly annotate existing ideas with findings that he comes across using the Innovation Mining Cockpit or enter new ideas she just developed.

2.2. Idea Management

This section describes the idea management aspect of the global innovation process. The idea management will consist of a main component: the Innovation Repository.

Integration of customers is one of the biggest resources for external innovations. Furthermore, service ecosystems are open and flexible systems with a great number of actors that participate on the platform. As argued in the introductory section, business value networks are inherently network driven and various actors engage in them for joint service provisioning and development. Consequently, there is a need for collaboration and an open system to foster innovation in service ecosystems. To facilitate the integration of the various actors and customers a tool is required that supports this integration.

To support this joint innovation development a core prerequisite is a consistent knowledge base throughout all phases of the innovation project. Moreover, to support a coherent innovation process along all phases of the process and across the various specialised tools (e.g., innovation mining, workshops, evaluation, or usage feedback) a shared data base is necessary. Consequently, the Innovation Repository plays a central role in our work, as it links specialised tools as well as the actors of the innovation process.

The Innovation Repository is a tool that facilitates access to information relevant to the early stages of designing innovative solutions in service ecosystems. Particular emphasis is put on trust-supporting components of the repository that help to establish trust in the capabilities of services offered on the platform. We envision the repository to provide the following information:

- Guidance for solution design: Service ideas possibly extended by best practice applications, business models, or service patterns.
- Service idea evaluations: Service ideas can be evaluated according to different measures (e.g., business cases, customer ratings, and market potential).
- Resulting service products: Once a service idea gets implemented it has to be linked back to the idea it originated from to analyse the effectiveness of the innovation process.

For the Innovation Repository we envision supporting a core idea representation. This core idea representation would be consistent across all tools and allow referring to general service ideas. The repository will be equipped with a REST Web-service interface that allows easy access to the database by other tools.

The core idea representation is then extended by each tool with specialised attributes. For example, the prediction market-based idea evaluation (see section below)

will extend the data schema to reflect this special type of service idea evaluation. Thus, we achieve a flexible yet integrated and coherent repository that allows access to all the information generated during an innovation project.

In addition to the integrative back-end functionality described above, the Innovation Repository will also provide a web-based front-end. The front-end allows building a virtual community around the platform and will serve as a single-point-of-contact for all innovation activities. It could in particular provide access to the other tools employed along the innovation process and allow easy access to service ideas already stored in the repository.

2.3. Idea Evaluation

In this section, we introduce how innovative ideas can be evaluated using a prediction market-based approach. Companies have tried to forecast, e.g., product sales or inventory replenishment strategies for years. Traditionally, companies used two strategies for forecasting. The first method is to use historical data to extrapolate trends in order to align their business strategy to the requirements of the market. The second method is to use surveys of customers, employees or experts. These groups are asked about their individual estimations of future market situations. Thus, Conjoint Analyses[3] or Delphi Studies[4] are used. One problem of this is to identify a representative group for the survey. Moreover, it is difficult for consumers to formulate their preferences/intentions for e.g. products or services. Even experts for a certain domain are difficult to identify. The problem of how to aggregate and weight their opinions is still not solved satisfactorily. Furthermore, interviews and surveys are costly in terms of time and access to subjects. Thus, real time information will not take effect in forecasts contemporarily. Information markets excel these problems by providing a real time information aggregation and weighting mechanism using a market-based approach. The efficient market hypothesis introduced by Fama states that publicly available as well as privately held information is efficiently aggregated in market prices (Fama, 1970). Unlike financial markets, information markets are virtual markets available over the inter- or intranet where traders may buy and sell virtual stocks according to their information about the stock. Stocks in virtual markets are descriptions of events (or technologies, ideas, etc) in the near future, where traders form their portfolio following their probability estimation about the events. For example, virtual soccer or political markets are very popular. In a soccer market, traders arrange their portfolio in order to represent how they think the tournament will end. Similarly, in political markets traders compose their portfolio according to their beliefs of how they think which percentages the candidates will receive in the election. Once the market is closed, participants will receive a payment of their portfolio according on how many shares they hold from the “winning” stock. In our proposed innovation framework, the main focus is not on predicting soccer tournaments or political elections but evaluating promising ideas and innovation alternatives. Innovation alterna-

[3]Conjoint analyses are surveys where participants have to weight attributes on goods following their personal perception. The weighted attribute values can be aggregated to a single value.
[4] Delphi studies are multi staged surveys where participants get feedback after each stage to improve the results.

tives differ from those of soccer matches as there is no real world event traders may trade at. Furthermore, payout rules cannot be defined in advance. In soccer matches one can define in advance that the winning stock will pay off (virtual) 80$, the second 50$ and so on. Differently from such real world events, innovation alternatives not winning the market and not getting a high valuation from traders will not be implemented – so the payoff rule cannot be determined in advance. Therefore the market mechanism must have appropriate payoff rules to let traders know how to arrange their portfolio in order to get paid out. Spann proposes to run several markets where the result of one market determines the payoff function of the other to solve the payoff problem (Span, 2002).

Descriptions of ideas and innovations may be specified on an abstract level, so that it will be difficult to identify appropriate experts having expertise for certain topics. Thus, it is advantageous to invite large groups of people in order to aggregate information held by them as described in Section 1. Ideas and innovations are rarely of a broad public interest in contrast to soccer tournaments or political elections. E.g., for the 2008 US presidential nominee election, several thousand traders participate every day[5]. We expect that only a few traders will participate in innovation markets compared to events of huge public interest which will lead to illiquid markets. In essence, illiquid markets with few traders are undesirable and not suitable to derive appropriate information from the market result. Therefore, incentive mechanisms to increase the trading activity and to improve market accuracy are required. In financial stock markets, illiquid markets are equipped with market makers providing enough liquidity so that the market works out. A market maker is an active market participant trading on his own risk with his own money. The main task is to provide a permanent trading possibility for other market participants and to equalise fluctuations in market prices. Thus, our approach to overcome the illiquid market problem is to establish automated market makers (AMM) in virtual information markets. There are a lot of approaches and models in the literature about automated market making in financial markets (Glosten; Milgrom, 1985, Das, 2005, Boer; Kaymak; Spiering, 2007). We analysed and adapted them in order to develop an automated market maker suited for information markets. Several simulations showed that the core functionality was appropriate and the market making mechanism can be evaluated in a field experiment.

In June 2008, we conducted a field experiment that showed that thin markets equipped with an appropriate automated market maker mechanism leads to better market results. The strategies the automated market maker used were simple in that experiment and we like to improve them and develop more sophisticated strategies in further steps. This experiment as well as additional simulations with different scenarios were very promising. In general, information markets are an appropriate and promising tool for service innovation assessment, when the main focus is on aggregating asymmetric information being held across the community.

[5] https://www.intrade.com/jsp/intrade/trading/t_index.jsp?selConID=177134

2.4. Service Realisation

In our innovation framework, an idea becomes an innovation when it is realised. The process of selecting ideas to be realised was described in the previous subsections, i.e., ideas are identified, documented, and evaluated. All information created in these activities is collected in the Innovation Repository. Convincing ideas that are evaluated positively are the best candidates for a realisation and will be implemented as services.

Since service innovation deals with rather unstructured information an informal description of an innovation is stored in the repository initially. It is the task of the service engineer to formalise this information during the service engineering process. Nevertheless, this information should be valuable in documenting the requirements for the service to realise. In particular, the approaches discussed in the previous sections may be helpful to, e.g.

- detect related innovations that can be used to implement a service,
- detect relevant user groups, or
- estimate the market potential of a service.

However, to make the mapping of information collected in the Innovation Repository accessible to service engineering, we consider to explicitly annotate comments or supporting material with tags for an easier mapping into service engineering tools, e.g., we may tag a patent search explicitly as an indicator of novelty.

Following the service engineering phase a service is deployed to be used by service consumers. In particular, service usage refers to all activities related to the service while it is available to execute including:

- Service Discovery,
- Service Selection,
- Service Orchestration,
- Service Execution,
- Monitoring of the execution of a service, and
- Feedback provided implicitly or explicitly by a service consumer.

Our main interest is in the information generated in these activities because they might be sources for new ideas, or they might be valuable in detecting the need for innovation.

2.5. Service Evaluation

Service evaluation closes the loop of our service innovation lifecycle by evaluating services which might relate to ideas in the Innovation Repository. It accumulates both static and dynamic information about the demand for services and usage of services. Based on this information it generates feedback for service engineers and for the

early stages of a new service innovation lifecycle. As a result, this feedback may lead to a different set of available services which may lead to an increased customer satisfaction.

In order to provide valuable feedback, we require feedback information to be annotated with static information related to the used services, i.e., a unique service identification, a description of non-functional properties that are used for contracting and also monitored at execution time, and usage information including a usage counter associated with the time of execution. Furthermore, the static information related to service consumers includes a unique user identification, user profiles, and user preferences.

The dynamic information collected for services relates to the in-bound messages that are created in the service usage phase and the out-bound messages that trigger changes to the current service offering. As our work is embedded into a larger research context on a service delivery platform, in-bound messages will be emitted by one of the components related to the service usage we mentioned in the previous section.

Information assembled during the search for a service produces many insights on the needs of service users. For example the distribution of keywords used for the discovery of services may indicate evolving hot topics, and thus the need for innovation. Unsuccessful search requests may indicate missing service offers. The selection of services among the search results is another indicator for improving service offers, e.g. one might improve the service descriptions to make them easier to comprehend. The actual execution of services may point out the business value of a service: Does the service terminate successfully? Does the service meet its promised service level? Does the service consumer abort the execution of the service before it terminates? How often is a service invoked in a given period? How are these invocations distributed over time? Monitoring at execution time of the service provides all these types of implicit feedback. Advantages of implicit feedback are that (1) service consumers have no additional effort for giving feedback, and (2) the collected information does not suffer from errors introduced by explicit feedback in questionnaires (see e.g. (Sampson, 1996) for a detailed discussion).

It is the task of the service evaluation component to analyse all these in-bound messages and create out-bound messages as appropriate. From a business perspective, it is desirable to adjust the service offers in such a way that the customer satisfaction of the service delivery platform is optimised. Thus, the service evaluation component may provide the following types of reports: top-k list of most/least used services, top-k-list of most/least desired features, services frequently used together, clusters of user profiles, or statistics on service usage over time (day, week, month). These summaries may either be provided on request, or they may be triggered by the service evaluation component automatically. The ranking of services in these reports should be configurable. In particular, it should be possible to configure the relevance of quantitative (e.g. usage counts) and qualitative (e.g. failures of services) aspects.

Notice that in-bound and out-bound message types completely define the interface of the service feedback component. All computation performed by the component is hidden from its users. Thereby we maximise the flexibility in choosing an implementation of the service evaluation component - we will discuss this issue below. Notice also that both the sources of the in-bound messages as well as the receivers of the

out-bound messages mentioned above are often unknown or might change dynamically. Resulting from both observations, we propose to decouple the service evaluation component as much as possible from the senders of in-bound messages and receivers of out-bound messages.

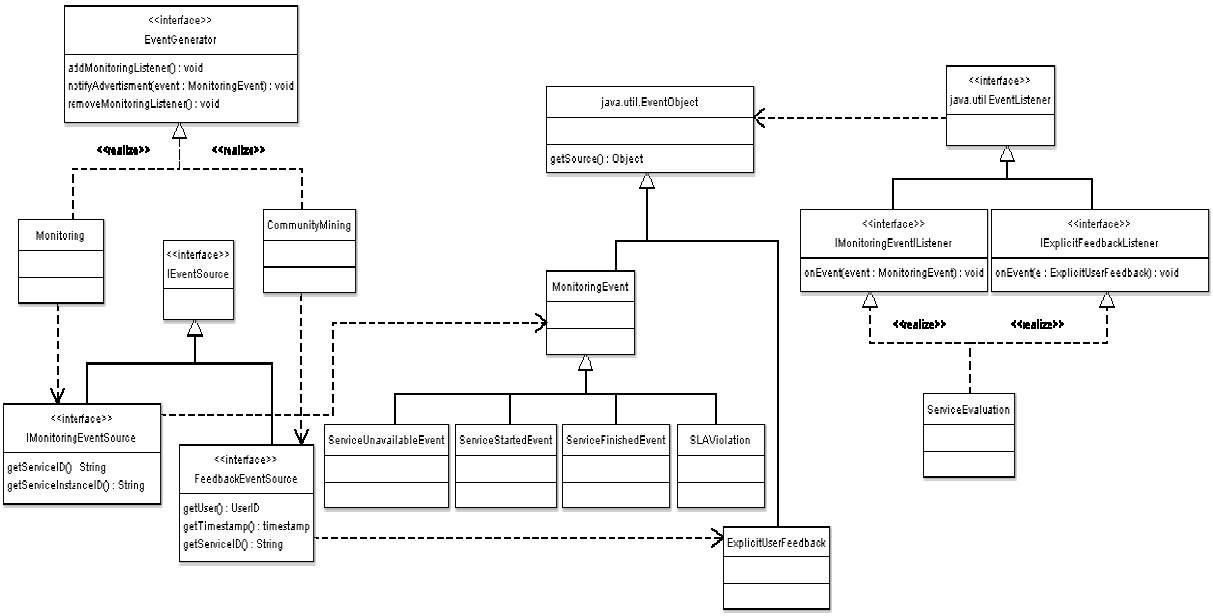

Fig. 2: Messaging interface for service evaluation.

The basic idea for decoupling the senders and receivers of the messages described in this section is based on the observer pattern (Gamma; Helm; Johnson; Vlissides, 1995) as shown in Fig. 2. In our architecture we apply the observer pattern twice: (1) we assume that certain message sources, e.g. the monitoring component or the community mining component, observe a concrete service, and (2) certain message receivers – in particular the service evaluation component – observe the higher-level events generated by the components mentioned in (1).

Message sources and message consumers communicate via events - shown in the center of Fig. 2. From the figure it is evident that observers of services generate different types of events. So far, we have identified the following types of messages (i.e. events):

- ExplicitUserFeedback – this is feedback explicitly stated by service consumers, e.g. in blogs or communities.
- MonitoringEvent – this is information collected from the execution of services.
- ServiceUsageEvent – these events (not shown in the figure) are generated in the process of service discovery and service selection.

With this set of events, it is possible to support all required types of in-bound messages discussed earlier in this section. To support other types of in-bound messages or out-bound messages we may either extend the class hierarchy of events, or we may add them as methods in the service evaluation component. This also underlines the flexibility and extensibility of the proposed architecture. Notice also that all required static information identified earlier is transported by every single message as it is captured in the attributes of the base class of all events sources.

We have already implemented the architecture presented in this section based on the observer pattern available in Java AWT. In a next step, these event types will be implemented as messages. Then, message brokers and tools for complex event processing, e.g. Apache ServiceMix or ESPER[6], can be used to lift the architecture presented here to a service-oriented architecture.

3. Challenges

The shift towards business value networks and the adoption of appropriate innovation management processes of course go along with a number of challenges that have to be overcome, especially when it comes to services as the object of innovation. In the following section we will discuss the most important challenges.

3.1. Network Management

As a business network by definition involves a multitude of partners, innovation processes naturally become more complex and demands on management increase - and innovation networks do not make an exception. Van Haverbeke and Cloodt argue that the higher the number of actors, “the more difficult it becomes to distribute the value created and to manage the value constellation” (Van Haverbeke; Cloodt, 2006). The orchestration of innovation activities thus must be managed in a well-defined way “by means of mergers and acquisitions, strategic alliances, licensing agreements, contracting and other types of relations that go beyond arm’s-length contracts“ (Van Haverbeke; Cloodt, 2006). We plan to address this challenge by offering well-defined processes for installing, maintaining and managing the network and providing advice based on best-practices regarding choice of partners and number of participants. Though the actual formation of the network naturally depends on the innovation object in question, Nieto and Santamaria observe that “the greatest positive impact on the degree of innovation novelty comes from collaborative networks comprising different types of partners" (Nieto; Santamaria, 2007). This is due to the fact that ”being integrated in a heterogeneous network promotes access to diverse sources of information and enables firms to transfer and apply that knowledge.“ (Nieto; Santamaria, 2007). Concerning the alignment of the partners’ activities, we find it necessary to either give power to the key playing company within the network or install a well-defined management board, depending on the innovation in question. As companies of course will behave opportunistically, one consequently has to install win-win situations for each participant within the network. To provide network stability and flexibility at the same time, all partners have to agree on the aims of the innovation project in advance and clarify where and when partnership starts and ends.

[6] See http://servicemix.apache.org/ and http://esper.codehaus.org/

3.2. Intangibility of Services

Services are largely “intangle” which means that they are far more difficult to explain and display than products, "hence, their qualities are not easily explained to the customer" (Hipp; Grupp, 2005). This issue becomes even more severe, if it comes to actively engaging customers into the innovation process and it makes community driven service idea development quite a difficult task and points to the need for elaborated methods and tools for customer integration. Howells and Tether claim, that “the lack of demanding and novelty seeking customers, who are willing and able to pay for upgraded, improved or novel services, seems to be a major and highly important barrier in service innovation which enterprises find difficult to overcome” (Howells; Tether, 2004). Innovation within business value networks, on the other hand, offers a chance to concentrate different companies’ customer integration efforts. As innovation in the service sector is often less systematically organised and companies are rather small, the framework should support them by providing standard-processes and best-practice examples as well as pre-built frameworks and sophisticated tools to keep infrastructure costs as low as possible.

3.3. Intellectual Property Issues

The intangibility of services goes hand in hand with the problem of insufficient protectablilty, as “there is no way of creating a temporary monopoly with the help of some sort of patent protection to redeem the innovation annuities" (Hipp; Grupp, 2005). This claim is approved by the findings of Arundel et al. who state that "a lower percentage of service sector firms use IP than industrial firms, with the exception of copyright where use rates are slightly higher in the service sector” (Arundel; Kanerva; van Cruysen; Hollanders, 2007). This points to the importance of well-managed IP issues within a service innovation network. Service innovations can easily be copied and therefore necessitate a continuous innovation process. Company’s services must always be up-to-date with the customers’ requirements and be prevented from falling behind a competitor’s offering. This is reflected in the findings of Hipp and Grupp that state that “three quarters of service innovators imitated already existing services" (Hipp; Grupp, 2005). Again, we see a key driver to success in the provision of standards and guidelines for IP management. For example, companies could be supported by offering standardised agreements.

4. Conclusion

In this paper we proposed an innovation framework that covers all phases of a service innovation process, starting with the idea generation and ending with incorporating usage feedback to improve already implemented services. Based on the open innovation paradigm as theoretical background we suggested an open framework that makes heavy use of community involvement. For each phase of the innovation process we develop and provide specific software tools that aim at supporting the innovating companies at their innovation activities:

- an integrated web search cockpit to help gathering relevant information (like press releases, message board and web logs, scientific content),

- a central data repository for storing, annotating, and retrieving of ideas that allows flexible data exchange,
- a new information market based mechanism to rate and rank innovative ideas, and
- a feedback controller offering well-defined mechanisms to feed back usage information into the service innovation process.

The innovation process and framework constitutes a holistic approach to innovation management within business value networks. Nevertheless the shift towards collaborative innovation within business value networks brings with it some severe challenges that have to be faced in order to successfully apply the innovation process among a multitude of partners.

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