



# The Potential of Web Services for Electronic Business-to-Business Marketplaces in Europe

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## ABSTRACT

In order to provide substantial value to their members marketplaces have to offer a comprehensive service offering that aims to support all phases of the transaction process. Building up such a service offering is not a one-time effort, but electronic B2B marketplaces will have to continuously evolve their service offerings and to adapt it to ever-changing needs of the companies they serve. Therefore, instead of trying to create such an extensive service offering on their own, we argue that B2B marketplaces have to make use of partnerships with specialized service providers. Only by partnering they can make use of speed and scale of such a collaboration of specialists (Ernst et al. 2001). This view of B2B marketplaces as integrators of services from multiple parties puts some new demands on architectural issues of the marketplaces. A service-oriented architecture may help to cope with these new demands. To test this view a survey among European B2B marketplaces has been carried out in order to match their service development and their needs with the characteristics of a service-oriented architecture.

## INTRODUCTION

Currently B2B marketplaces are expanding the scope of their services. While the core matching services that were at the center of attention in the beginning of the evolution of B2B marketplaces are still relevant, they have to be supplemented with services from such diverse areas as logistics, finance, collaborative design, or quality assurance. A technological infrastructure that enables the necessary alignment of business needs and technological requirements will be critical for the success of B2B marketplaces (Alt and Fleisch 1999). From this we derive two main hypotheses:

First, B2B marketplaces will rely heavily on specialized service providers in order to be able to provide this wide array of services. To examine this hypothesis we surveyed a large number of European B2B marketplaces in mid 2001 and have been asking them about their use of service providers in key service areas.

Second, a service-based architecture that is built upon standards as envisioned by the web services concept is required for marketplaces in order to coordinate and integrate services from multiple service providers into a flexible and extensive service offering. This hypotheses has been tested by analyzing the current body of literature on service-based architectures and by examining its applicability for B2B marketplaces.

## THEORETICAL FOUNDATIONS

Following the transaction process Schmid distinguishes information, intention, contracting and settlement phase and their respective services. These services have to be subsumed under the umbrella of a shared context or "logical space" outlining the roles and protocols of the interacting parties (Schmid 1999). In a similar way, Bakos discerns three main functions of a market: Matching buyers and suppliers, facilitation of transactions and the institutional infrastructure, which contains the context-related services that have been mentioned above (Bakos 1998).

Marketplace providers also have to coordinate and integrate service providers in order to cover this wide scope of services (Nenninger and Lawrenz 2001). However, by using specialized service providers the ability to deliver diverse high-quality services is traded in for demanding integration tasks. Or to put it differently: "interconnecting is the new competency" (Temkin 1999).

## THE USE OF SERVICE PARTNERS – EVIDENCE FROM EUROPE

507 electronic B2B marketplaces have been identified in March 2001. Due to the fact that this is still a manageable number it was

decided to survey the complete population instead of a random sample. The survey was taking place from April to May with mostly high-ranking members of the management team from 248 marketplaces participating.

One major area of interest in this survey was the service offering strategy of the management with regards to the current status and planned evolution as well as the use of specialized service providers in this strategy. Following Schmid and Bakos, we distinguished between thirteen services in three major service areas.

Figure 1: Current and planned service offering (percentage of marketplaces that offer (left beam)/plan to offer (right beam) a service, n = 233 to 244



The results of the survey show that currently the service offering mainly consists of basic information services and core transaction services. However, the planned development of the surveyed marketplaces indicates that all services but especially value-added services such as logistics, financial, backend integration and trust services are being adopted widely by marketplaces in the near future.

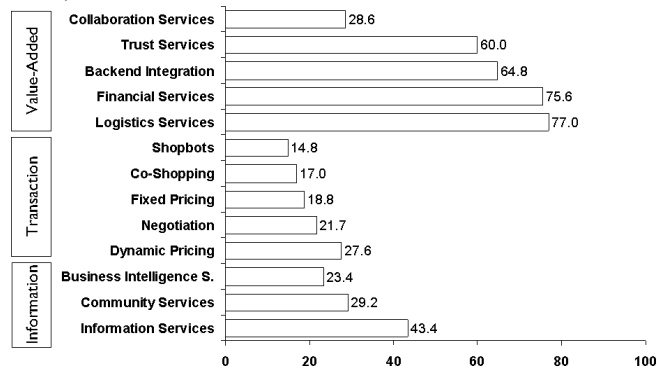
From this evolution we can conclude two things:

1. Marketplaces will expand their services to a far more comprehensive service offering, thereby increasing the complexity of the overall marketplace coordination task – with respect to architecture as well as processes.
2. This increase in overall complexity is reinforced by the more complex nature of the services that are added now in the later phases of the initial set-up process. Logistics, financial, backend integration and business intelligence services are intrinsically more complex than basic information or transaction services.

We already suggested above that a suitable strategy for the providers of B2B marketplaces to cope with this increasing complexity is to make use of specialized service providers and to focus on the role of the service aggregator and coordinator.

The results from the survey support this view. The use of specialized service providers, especially in the more complex value-added services is high among European B2B marketplaces.

Figure 2: Use of service providers as partners (in percent,  $n = 49$  to 175)



The resulting rise in the significance of partnering and thereby in the organizational structure of B2B marketplaces will also have profound effects on the technological architecture. Today, simple point-to-point integration dominates the landscape supported by EDI and VANs. With proprietary point-to-point integration based on EDI it is difficult to manage more than 25 partners (Durchslag et al., 2001) and even harder to change partners. Therefore, according to our second hypothesis we test the ability of the service-based architecture concept to align with such an organizational model.

## SERVICE-BASED ARCHITECTURES AND THEIR IMPLICATIONS FOR MARKETPLACES

According to Gisolfi (2001) a service-based architecture distinguishes five business roles a company can play. For a B2B marketplace all five roles qualify and offer potential added value to the customers and partners.

**Service requestor:** Since the business activity of the marketplace includes the interaction with the partners in order to offer composite services it can be seen as an intermediary providing service aggregation. Hence, the marketplace adds value by solving a number of problems that customers would otherwise be left to deal with. Intermediaries provide context support missing from current standards. This context can be provided by the marketplace offering a common interface to access the partners' services to the buyers and sellers (Truelove, 2001).

**Service provider:** A marketplace may directly provide services to its customers by offering a standardized way of interacting with the required services. Interfaces are therefore more stable and minimize the customers' need for frequent and expensive adaptation. Therefore, the marketplace hides the heterogeneity of interacting with different service providers. Furthermore, the marketplace may flexibly choose the most suitable provider. Services from multiple parties can be compounded to comprehensive service bundles.

**Registry:** Instead of directly providing services aggregated from partners the marketplace may also collect data about the partners' services in a catalog related to a particular industry the marketplace is serving. The registry is hosted by the marketplace and accessible to its customers only, providing contact information to directly interact

with the service providing partners. The partner in turn is offered access to the customers of the marketplace and the registry listing indicates trust and industry focus guaranteed by the marketplace.

**Broker:** Service description and metadata are central for maintaining a loose coupling between service requestors and service providers. The role of the broker extends the registry by offering additional metadata about the partners' services and based on this metadata the functionality for searching and service classification. In addition, industry specific taxonomy data helps to find service providers and enables the precise description of service offerings.

**Aggregator/Gateway:** Extends the capabilities of the broker by providing actual policy, business processes and binding descriptions that form the standard way of operation on the marketplace fulfilled by service providing partners, e.g. standard interface definitions. Services implementing the standard definitions are either offered directly by the marketplace (i.e. intermediating between customers and heterogeneous partner interfaces) or by the partners who use the standard definitions for service implementation. Standard interfaces also allow a marketplace to provide value-adds like quality of service monitoring. (Graham, 2001)

A marketplace can provide support for customers and partners in playing each of these five roles. Therefore, adopting a service-based architecture will be essential for B2B marketplaces in coordinating the multitude of contributions from service partners.

The technological foundations for the implementation of service-based architectures are currently available as specifications only as in the case of ebXML (Eisenberg and Nickull, 2001) or as specific implementations, i.e. the SOAP messaging protocol, the UDDI registry service, the WSDL service description language, etc. In any case the technological framework used needs to provide a common messaging protocol, a registry which administers the common knowledge available on the marketplace with agreed upon syntax and semantics and preferably a set of standardized components and services widely used by the participants. Which specific technology will evolve as the dominant solution is hard to predict, however, due to its association with OASIS and UN/CEFACT and due to the wide support in the B2B community – e.g. Covisint the automotive B2B marketplace chose ebXML as a cornerstone of its architecture (Covisint 2001) – ebXML is widely perceived as an important element in the evolution towards a service-oriented architecture (Fitzgerald 2001).

## CONCLUSION

Partnering with specialized service providers is critical for the success of B2B marketplaces in order to create a comprehensive service offering for their members. However, the complexity of the task to integrate not only buyers and sellers but also service providers dynamically into the marketplace platform requires new architectures. The introduction of service-oriented architectures has the potential to provide such flexible architectures.

Further research should be directed at how marketplaces and their members that require service providers find and bind those partners on technical as well as on a business and relationship level. Do they forge special and close relationships in order to create unique offers on their marketplace or do they use market mechanisms to let the members decide which of a broad choice of service offerings they prefer? Also, questions further on might be: How do they evaluate the performance of their service providing partners and how do marketplace providers and service providers generate value and accordingly split revenues?

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