



Towards an Open eBusiness Collaboration Community

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Abstract. Internet access is no longer an issue for European organizations. However, the integration of these organizations in regional business networks still is a challenge for most enterprises, especially in the SME sector. The current eMarketplace model, which was one of the faces of the eBusiness revolution at the beginning of the XXI century, did not fulfill the expectations to include organizations of all sizes and sectors in an unified electronic market. This paper deals with this issue and suggests a new eBusiness model to foster a broader open participation of companies in B2B world, allowing them to overcome some of the current obstacles e.g. high investment costs, partner collaboration mechanisms, standards, interoperability, to take part in a virtual collaborative network.

1 Introduction

The introduction of the Internet in the business environment has allowed companies to realize their selling and buying activities as well as their cross company communication through the World Wide Web. This possibility has dramatically impacted business performances and delivered a number of benefits to company's activities e.g. process improvement, cost reductions and increase of revenues.

The Internet access in the European Union has achieved its mature stage with more than 90% of the European firms in all size-bands and sectors (except food and beverages) connected to the Internet. On the other side, less than 30% of these firms realize online purchase in a volume greater than 5% of their total procurement, and less than 20% realize some kind of marketing and sells activities online [1].

Along the years, a number of information systems have been developed to support companies in their transition from traditional processes to the digital economy e.g. eCatalog (Electronic Catalog), eProcurement, SRM (Supply Relationship Management), CRM (Customer Relationship Management). However, more important than the deployment of these systems to realize online collaboration is to identify the right eBusiness strategy to participate in virtual networks.

eMarketplaces were regarded as one of most prominent eBusiness models of the Internet era. Nonetheless, most of the eMarketplaces have been failing to achieve their business goals and to attract companies, especially SMEs, to their business concept.

Therefore, this paper analyses the development of eBusiness along the years and suggests a new framework for companies to overcome some of the current obstacles to succeed in their eBusiness initiatives, while creating a more democratic electronic market.

2 eMarket Background

At the beginning of the eBusiness revolution companies used to communicate with their business partners to establish business transactions in a one-to-one approach, at that time the main focus of the systems was on the acquisition of direct goods i.e. intermediate goods which are incorporated to the end product.

The technology that supported this business relationship was based on the integration of an ERP system, which was primarily designed to organize company's internal processes, with an EDI system (Electronic Data Interchange), which transferred agreed business documents in a standard format between information systems of two different business partners [2].

EDI was still not based on the Internet and it was a system relative expensive to manage and it did not deliver the flexibility and the scalability desired by companies.

The advent of the Internet has provided a more flexible and sensitive protocol for companies to communicate with their business partners, reducing the costs to realize business processes across organization's borders.

The World Wide Web has allowed the evolution towards a collaborative environment, where one company could communicate with multiple suppliers in a virtual market by applying WEB-EDI, which supported EDI systems through a web-browser in a one-to-many approach.

The Internet has opened a new frontier, where companies theoretically could negotiate with a great number of customers and suppliers in a transparent network, which would lead to a perfect market. This was the embryo of the virtual marketplaces, enterprises that bring together buyers and sellers in particular industry, geographic region, or affinity group, for the purpose of commerce [3].

Marketplaces could be either public i.e. a virtual market, where companies would find each other to buy and sell products in a many-to-many approach, or private i.e. sponsored by a company or group of companies, normally a large enterprise, who connected their suppliers within their extranet with the goal to reduce their process costs, while keeping control of all processes (see figure 1).

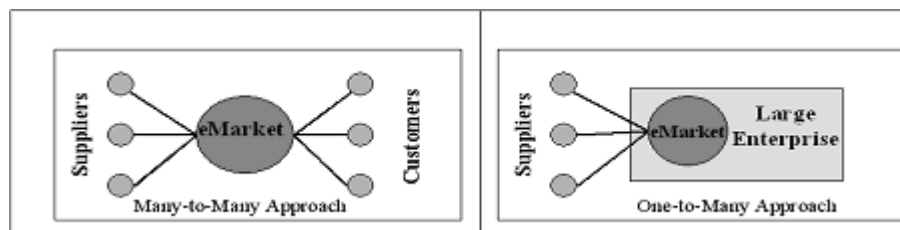


Fig. 1. eBusiness Relationship

eMarketplaces have been around since 1998 with the launch of BT Trading Place in England and since then the number of marketplaces has increased dramatically, especially during the Internet boom, when on average one eMarketplace was being opened in every eight hours interval in year 2000 [4].

Currently, according to eMarketplace services, a portal specialized on eMarketplace issues, there are around 1000 active marketplaces in different sectors and regions. It can be said that eMarketplace is in a period of consolidation, when most of them are realizing some kind of merger and acquisition activities to profit in a broader scale the benefits of their network.

The main obstacles that have limited eMarketplace's success are the lack of capital, inefficiency to acquire new customers, difficulty to achieve a critical mass, besides a number of technical issues.

In order to overcome these obstacles, eMarketplaces have started to cooperate and integrate with each other e.g. vertical eMarketplaces with horizontal marketplaces, sell-side driven marketplaces with buy-side driven ones.

Nonetheless, the realization of this strategy requires a great effort to overcome the technological obstacles to materialize these alliances e.g. system integration, multilingualism, lack of global accepted standards.

Therefore, a new concept is required to achieve the vision to create a collaborative network and accelerate the transition process from a central hub model to a broader unified network, where companies can cultivate their business relationships, while doing commerce.

The next part of this work describes a scenario, in which the authors believe would contribute to overcome some limitations of the actual eMarketplace model, and thus facilitating the transition towards a broader virtual eBusiness ecosystem.

3 Unified Virtual Framework

3.1 The framework architecture

The virtual collaborative framework described here suggests a new approach to overcome the limitations of current eBusiness networks. The idea is to use a web-based infrastructure to allow companies to access a range of eServices of crucial importance to their virtual activities, while using their current corporate infrastructure.

Therefore, a peer-to-peer (P2P) network is required to enable companies to do business online directly with their business partners, instead of the current eMarketplace central hub approach. eMarketplaces would no longer work as a central hub of the network, instead they would participate as a member of a broader ecosystem.

Another advantage of P2P networks is the enhancement of collaborative environments, thus increasing the scope of the ecosystem, permitting service enterprises to participate in virtual markets, both providing their services and cultivating their relations with their business partners.

At the eCommerce level, electronic catalog was chosen to be the basic technology of the network to support business relationships, because of its appropriateness to manage electronic product information, facilitate interoperability with diverse back and front-end systems and provide a powerful search engine to discover products, services as well as potential customers and suppliers.

In this paper, the architecture is divided in several layers to facilitate the understanding of the framework suggested. The infrastructure consists of a technology layer, an eServices layer, an eCollaboration layer, which is sub-divided into two sub-layers, eCommerce and virtual enterprise layers, and an eTrust layer (see figure 2).

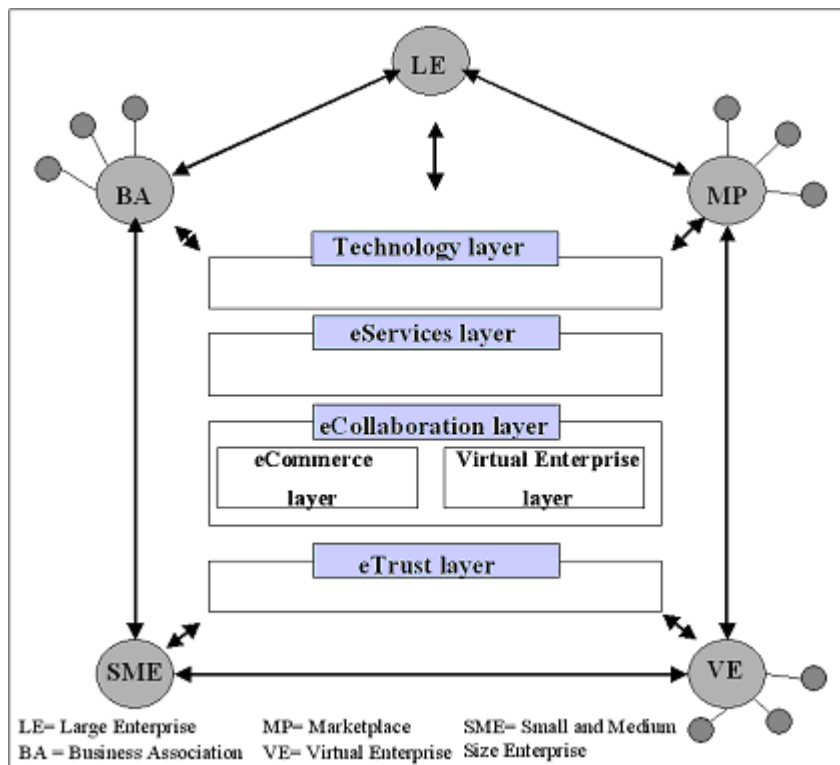


Fig. 2. Unified Virtual Framework

The following sections treat each layer and its functionalities in detail.

3.2 Technology Layer

The first layer consists of information technology components to support the activities of the network, these components should be based on current standards e.g. eXtensible Markup Language (XML) to facilitate the electronic communication between different organizations. This includes components such as:

- Broadband networks to allow enterprises to have access to the internet and communicate with their business partners;
- Web applications to support the members of the network to access information and services anywhere, anytime;
- Messaging services to support the exchange of messages across company's boundaries;
- Workflow applications to support business processes;
- Standard eCatalog management systems to facilitate the exchange of product information across different companies and sectors;
- Collaboration mechanisms e.g. LDAP services, dynamic databases to the formation of virtual enterprises and collaborative business relationships;
- Advanced search engine i.e. lexicon, taxonomy, ontology to discover products, services and partners in the network;
- Security mechanisms to guarantee information and company's privacy e.g. encryption, authentication, digital signature.

3.3 eServices Layer

The eServices layer together with the eCollaboration layer is the center of the network, at this layer companies can find components and services from various information technology and business services providers to manage and improve their eBusiness activities.

This layer allows that companies from all sizes, regions and sectors have access to a range of products and services in order to facilitate their virtual presence at an affordable price.

The layer is based on a repository that works as an eLibrary that provides a pool of mapping tools between the most important format and classification standards, building data integration applications e.g. unix open source [5].

In order to maximize the return of investment for companies and boost the application of the current major eBusiness standards, the eLibrary should provide, at its first level, mapping tools for a restrict number of current relevant standards e.g. eCl@ss, UNSPSC, BMEcat and their respective versions.

Other services that would be available at the eServices layer are:

System integration adapters to facilitate the interface between major systems;

- Central company and product databases i.e. a kind of advanced yellow page to reduce the search effort of new products and partners e.g. CatPilot in Germany [1];
- eLibrary with a pool of common lexicons and ontologies based on limited number of terms to facilitate the mapping between different languages, for companies to communicate with their business partners from different regions;
- Customization services to integrate more complex and personalized components into company's business processes.

3.4 eCollaboration Layer

One of the main objectives for companies to join a virtual network is to collaborate with their business partners in order to improve their business processes and gain competitive advantage. Therefore, collaboration tools are of vital importance to cultivate a successful eBusiness network.

The collaboration infrastructure as it happens at the eServices layer should be based on existing eBusiness standards to allow the interoperability of systems and the formation of virtual enterprises.

The eCollaboration layer is divided in two sub-layers, the eCommerce and Virtual Enterprise layer.

3.5 eCommerce Layer

The eCommerce layer supports the commerce functions of the network, providing functions such as:

- Electronic catalog management to exchange product and services information between business partners;
- eCatalog generation based on current business standards e.g. BMEcat, EPC (GS1), eCl@ss, UNSPSC [7];
- Negotiation tools, which can be either based on auctions that after the price agreement could be automatically transformed into a catalog format, or in catalog schema, where bids would be established in domains where multi-attribute analyses could be done on a multilateral negotiation approach [8];
- Search mechanisms to find products and services from company's suppliers, and in case that company's current suppliers do not have the desired product, a request would be sent to the eLibrary repository located at the eServices layer to find candidate suppliers, based on free text or classification codes search e.g. eCl@ss;

- Invoicing and payment services to facilitate business transactions;
- Business process workflow based on standard processes e.g. ebXML [9].

3.6 Virtual Enterprise Layer

In a virtual network, team-building functions have to be provided to incentive member's cooperation. These functions let companies, especially SMEs, work together in the acquisition and execution of projects e.g. consulting, construction projects, at the same time that they could join industry and buying associations to overcome their resource limitations.

The components of this layer of the network provide the tools for companies to cooperate. The advantages of this layer are: first, it allows companies to find candidate organizations to join forces in procurement and selling activities, enabling SMEs clustering. Second, create an infrastructure for companies to communicate, share knowledge and work together in projects. The major functions of these layers are:

- A repository where companies can search for candidate partners and business association profile, ranked on services quality and other parameters specified in the network to facilitate the search;
- An alliance database, where market opportunities are listed together with their respective alliance partners and their desired partner profile;
- A collaborative infrastructure to support co-work environments e.g. document sharing, capacity planning, simultaneous engineering;
- Interaction management to define cooperation structure, rules and privileges of its members as well as an access management tools;
- Collaborative procurement and sales tools for companies to participate in alliances, profiting from a better negotiation position.

3.7 eTrust Layer

Trust is considered the most important challenge to virtual networks success, besides the technological framework and its interoperability. Therefore trust-building mechanisms should be developed to enhance trust between network members and to cultivate a reliable atmosphere to balance simultaneous competing and collaborating behavior.

The first step to achieve this goal is to create a registration center, where companies can describe their profiles and offers, which can be accessed and administrated by a user password. This information is then available for all members of the network, who during their business relations with these companies can publish their comments on companies performances based on parameters especially designed to cultivate member's reciprocal trust.

Other important mechanisms that should be made available in the network are:

- Data privacy e.g. encryption, authentication, virus protection;
- Secure access of information e.g. access control, privileges, domain model to ensure company's strategic information security;
- Related trust-enhancement services e.g. independent financial classification agencies, eSignature, member ranking scorecards;
- Legal issues repository, where companies can find contract models/law, country's legal information, etc;
- Common rules and laws to be accepted by all members of the network.

4 The Network Business Case

The access to the network would be provided in two levels. At the first level, a number of standard products and services would be made available to all members of the network for a considerable low maintenance fee e.g. cost for internet access.

The membership affiliation program would work as other virtual community networks e.g. open-BC, in which the members are divided into different hierarchical levels to access the network services.

This degree model has the advantage to allow users to have access and pay just for the services that they judge relevant for their activities, participating in the network as for example a silver or gold member, in which the simplest membership profile could be or not charged for companies to participate in the network.

At the second level, complementary and more complex products and services would be offered for companies who are willing to realize more complex and not standard electronic business processes.

This dual business model allows the participation of SMEs in the network, together with large organizations, increasing the network effect of the ecosystem and reducing one of the main problems of the actual eMarketplace model, the inefficiency to acquire new players and as a consequence achieve a critical mass.

The capital originated from the membership program would be used to finance the network and invest in new features that would be made available to network members.

More complex and customized solutions could be acquired from IT providers, who would offer their products and services in the network. In return, these IT providers would deliver in some extend, at no charge, IT services to maintain and enhance the capabilities of the network.

The biggest challenges foreseen for the implementation of such an eBusiness ecosystem is the attraction of current eMarket players e.g. eMarketplaces, Global IT companies and the selection and implementation of neutral standards that would be deployed within the network.

Therefore, the involvement of Government Organizations e.g. European Union, to promote such an initiative would be of crucial importance to create a truly democratic and neutral virtual environment.

5 Summary

The research envisages a business environment in which companies can share a single B2B marketplace in a regional basis beyond the actual eMarketplace model based on isolated central hubs. This eBusiness network would allow the development of a virtual ecosystem based on eBusiness Standards, which would increase the return on investment and the chance of eBusiness projects to succeed.

The main focus of the framework is on the development of a broad eBusiness network for companies to communicate with their business partners, while promoting electronic commerce and co-working initiatives.

The proposed network is underpinned by a web-based infrastructure consisting of Technology, eServices, eCollaboration and eTrust layers. Through these layers, the infrastructure provides support for trading functions, data and system integration, network building and trust development between the participants.

The ecosystem suggests an innovative business model that fosters the inclusion of SMEs in electronic markets. However, in order to this network model to succeed, the support of current eBusiness players, government organizations and associations is of vital importance to the implementation and management of this eBusiness collaboration community.

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