POSSIBILITIES FOR FUNCTIONAL IMPROVEMENT OF B2B SYSTEMS ON SERBIAN MARKET

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ABSTRACT
B2B systems are still in a state of flux. There are numerous techniques for implementation and even more approaches for theoretical debut and classification. Most of existing solutions have certain functional limitations, depending on market and industry they serve. This paper focuses on the horizontal network marketplaces, as a specific type of B2B systems. The possibilities for improving functionalities of B2B systems and removing limitation factors in development and use are discussed. It further presents existing wide spread solutions and limitations of Serbian market, as an example of environment with a low level of IT readiness. We designed and implemented B2B Web portal "Market4Net" which offers and illustrates possible improvements in the domain. This portal is intended for Serbian market and aims to overcome described difficulties. Our research mainly concentrates on development aspect of B2B, but also touches some issues related to collaboration management and trust building mechanisms.

1. INTRODUCTION

E-commerce can be described as a realization of business transaction between different enterprises over Internet [1]. Enormous growth of E-business applications in last decade caused that there is a number of different models of E-commerce implementations. Most of these types have some abbreviations, which denote their essence. For example, B2C (Business to Consumer) abbreviation denotes transactions between companies and consumers, where companies sell goods and services directly to consumers over Internet, using some of E-commerce Web applications.

Examples of this business type include Amazon.com, (the online purveyor of books and a large diversity of other items) and Travelocity (the online travel agency) businesses that sell on-line directly to consumers [2].

However, not all businesses sell directly to consumers. For example, automobile parts manufacturers commonly sell their goods to the automotive industry rather than to the car owners. Pharmaceutical companies sell directly or indirectly to pharmacies and hospitals who further sell the products to customers. As with business to consumer paradigms, the model of business-to-business (B2B) commerce has been revolutionized by advances in information technology and systems.

B2B (business-to-business) Internet platforms include all Internet-based technical solutions that aim at facilitating the establishment of new trading relationships between companies or at supporting existing relationships. [3]. This term does not include digital transactions inside enterprises' boundaries, for example the transactions between two departments of a single enterprise.

Regardless of a type of B2B implementation, this concept promises many strategic advantages to enterprises that accept it – both vendors and buyers, as well as to the complete state economy.

It is widely common that B2B can [4]:

- reduce administrative costs
- reduce costs of searching for products or services
- reduce cost of goods by improving competition between enterprises
- reduce transactional costs
- enlarge production flexibility by providing delivery "Just-in-Time"
- increase products quality by improving cooperation between enterprises
- amplify opportunities for cooperation between enterprises

Depending on a number of participants, organizational structure and relations between participants, there are two main types of B2B systems: Network marketplaces (NMP) and Private industrial networks [4]. Private industrial networks gather a limited number of strategic business partners that use a B2B system in order to improve their supply chain. These systems may be organized by some single large enterprise that involves its business partners, or it may be in possession of several companies that have same privileges in system use.

Net marketplaces (somewhere also called "Hubs") bring together a large number of suppliers and buyers, who can share information, trade and cooperate in many ways. This type of a B2B system usually means free entrance for all enterprises that belong to the market, which is supported by this system. Although it is usually organized by third party, it can be also implemented by an organization of buyers and suppliers. Using such systems, buyers have new possibilities of a supply overview, as well as a choice of new suppliers. Furthermore, suppliers have a possibility to make contact with potential buyers and see their preferences and wishes. In this way, competition between enterprises grows, transactions are automated and cheaper and prices fall down.

The value of network marketplaces is that they decrease transaction expenses by aggregating purchasers and vendors in an electronic marketplace. As opposed to business-to-consumer E-commerce portals that are one-way systems and mostly create value for suppliers, NMPs are two-way systems that mediate between purchasers and

vendors and create value for all parties. NMPs create value in many ways, including reducing search costs, standardizing systems, and improving matches for both buyers and sellers. NMPs offer more choices to buyers and give vendors more access to purchasers. NMPs find potential sellers and buyers, reducing the total time of searching for potential partners.

The rest of paper is organized as it follows:

Section 2 describes a classification on NMPs. For each NMP model, advantages and disadvantages are noted.

Section 3 denotes related work. The most important worldwide solutions are depicted, as well as techniques for NMP development and implementation.

Section 4 refers to a situation in Serbia. Besides existing solutions description, main problems and market needs are depicted.

Section 5 concentrates on the main part of this work. It proposes solutions for previously denoted problems, particularly by existing solution for Serbian market – B2B Web portal called "Market4Net". It also describes technical implementation of this portal, along with advantages which can solve problems.

2. MAIN ISSUES OF NETWORK MARKETPLACES

Net marketplaces are not easy to classify. Modality of cooperation between enterprises can be one criterion for classifying. Based on this criterion we can distinguish two types pf cooperation: spot purchasing and long-term cooperation. Spot purchasing means that suppliers and buyers create individual transactions based on current needs and possibilities. Long-term cooperation is completely opposite – participants cooperate over many different transactions that may take months or even years. Another criterion, which can be used for classifying NMP, is alternation of priority in communication. In this respect, there are two main types of Net Marketplaces: Transaction-oriented marketplaces and Collaboration-oriented marketplaces [5]. While transaction-oriented marketplaces are characterized by catalogs, auctions or exchanges, collaboration marketplaces are characterized by support for negotiated pricing, planning capabilities such as continuous planning, forecasting, and product life-cycle management.

Collaboration marketplaces have different benefits in comparison to transaction-oriented marketplaces and different adoption considerations. Factors important in understanding the adoption and impact of colaboration marketplaces include: integration benefits (that is, collaboration and coordination other than just selling and buying), preexisting and extended supply chain relationships among the participating organizations, and non-economic factors such as power. These factors might be particularly important for the adoption and impact of collaboration marketplaces.

It is essential that partners are aware of the business goals of the project, have a positive attitude and work together after extensive planning. It is crucial that both parties have the latest information and collaborative tools to make the endeavor a success [6]. Collaborative tools need to be utilized on time, effectively and efficiently by the right people, and are necessary for successful B2B collaboration. For effective collaboration,enterprises have to use the right resources in order to achieve the common goal of both parties. A secure system will allow the parties have the latest information on time helping them take informed decisions that will help guide the B2B networking towards its success.

Colaborative tools can be specific for every particular e-commerce system, but there are also some common tools and services that can be embedded into NMP, like video conferencing, desktop sharing etc.

Long term cooperation is based on trust between participants. Trust in NMPs relates to the security and confidentiality, credibility of the online market place and the credibility of market participants [7].

A technological means and a mediating party that can attest to the veracity of an action across technology platforms and clients, application types, and even international boundaries is essential. The technical solution may be difficult to address but is not insurmountable given increasing standardization. Policy and legislative issues make more difficult problems [8]. However, many theoretical and practical solutions have been developed using trust building mechanisms and "Trusted operational scenarios" for them [7]. They describe trust issues and propose trusted functionality for NMPs. For instance, trust scenarios can be created for information quality, references, reputation mechanisms, standardization etc.

In last several years, significant number of similar portals, which all have certain common features, appeared over Internet. They are all wide spread, with a huge number of members covering many different industries. This type of B2B systems is called "Horizontal marketplaces". On the other hand exist so called vertical B2B systems which are anticipated as smaller systems for individual markets or industries.

Vertical NMPs are set up to focus to an industry or other vertical market [2]. They provide domain-specific content and relationships that have a certain value to their participants. Vertical NMPs are particularly useful when there is much disintegration among the buyers and sellers, and inefficiency in the existing supply chain. Vertical NMPs that are successful tend to have a high degree of domain knowledge and industry relationships, create master catalogs and allow advanced search options. Examples of vertical hubs include Band-X for the telecommunications industry, Cattle Offerings Worldwide for the beef and dairy market, PlasticsNet.com for the plastics industry, and Ultraprise for secondary mortgage exchange [2].

Horizontal NMPs (also called "Functional NMPs" or "Functional Hubs" [2]), on the other hand, provide the same functions across different industries rather than more functions within a single industry. Functional NMPs are successful in situations where there is a greater degree of process standardization and sufficient knowledge about the processes and the ability to customize the business process to respond to differences in various industries.

Horizontal marketplaces are primarily profiled for spot purchasing, without intention for long-term cooperation. Likewise, as product catalogs are a main purpose of horizontal marketplaces, they are mostly defined as transactional-oriented.   Namely,   considering   the

development of horizontal marketplaces, main problem is how to adjust its functionality for many different enterprises, different markets or regions. The solution can be obtained by reducing the functionality to base transactional processes: catalogs, messaging and order management. Enterprises create catalogs of their goods and services, demands/offers and send messages to each other, which can be in different forms: request for quotation (RFQ), request for information (RFI), request for proposal (RFP), a query about delivery status etc. These forms of cooperation avoid all individual business processes and make a B2B system acceptable for enterprises in most of industries, markets and regions. However, still there is a problem of internationalization and localization. The localization of all business terms to any specific language is a less significant problem in comparison to the adoption of individual information of portal members in another regions and markets. Certain attributes of enterprises have different importance from country to country. That is the reason why many of B2B systems are localized for many specific countries or regions.

Ways and manners of grouping products, services, offers and demands are another problem of horizontal marketplaces. In most cases, they are grouped into hierarchical structure of goods/services. Users have to click on links that represent groups until the last element is chosen. There are two main problems in this approach:

1. A user has to click as many times as many subgroups exist in order to find desired elements. Every click mainly means a new HTTP request, so it spends additional time for navigation.

2. Users have an overview of a current group structure, but they loose an indication about the groups which are not chosen, so if they want to make a different choice, they have to move back to previously chosen groups or to the root element.

Business-to-business E-commerce is still in a state of fluctuation as enterprises learn how to force information technology in general and the Internet in particular into organizations that help them more efficiently and effectively make business. In that point of view, there are several possibilities how horizontal marketplaces as particular type of B2B systems can be improved in order to enhance business of particular enterprises, industries and economy in general, as it follows.

To make business-to-business E-commerce worthwhile, systems need to evolve to handle not only simple transactions but complex ones as well. To facilitate this need, standards will need to be developed and put into place.

One of the most usual ways for paying membership on NMPs is a transaction fee system. Members have to pay a fee for every committed transaction.

As markets become more competitive, transaction fees will most likely decrease or even disappear [2]. Apart from other implications, this means that providers will need to shift from dealing with transactions to offering more comprehensive solutions to business needs. For example, products can be bundled with related information and services in order to forge customer loyalty and long-lasting relationships. Furthermore, providers need to be able to offer separate products, in a

form of traditional catalogs, as well as group offers of products, which may include some benefits for buyers, some special offers and so on. Hence, suppliers need more flexibility in their business. In addition, suppliers need a possibility to search for buyers in the easiest possible way, and vice versa.

Overall, a conclusion is that there is a need for a development of horizontal network marketplace, which would improve functionalities that exist in current solutions. In addition, a strict separation between horizontal and vertical NMPs should be reduced. Horizontal NMPs can introduce some functionality, which has been typical for vertical NMPs, like more complex transaction processes.

3. RELATED WORK

B2B is the most important area of e-commerce regarding total realized transactions, using this concept in a whole world [4]. However, the main part of these transactions commit in countries with a high level of IT readiness. Such a situation allows a development of different forms of B2B systems, depending on wide range of facts, as described in previous chapters.

As this paper is mostly devoted to presentation of horizontal marketplaces and a possibility of its adoption to specific regional market, some widely spread solutions of horizontal NMPs will be taken into consideration.

"Alibaba" [9] is typical transactional-oriented B2B portal based on spot purchasing. This portal was founded in China and has been spread all around the world. Enterprises from the entire world share information about products and services using this portal. Any company can join and make requests about other enterprises' offers and demands for products and services. Every member can be verified by a third party in order to provide trusted identification to other portal members. Members may have various privileges on this site depending on a purchased membership version. Certain membership version include possibilities for exclusive access to buyers, real-time performance analysis, greater product visibility, trade with global big buyers or suppliers etc.

Another large B2B portal is "Kompass" [10]. This portal was founded in the USA and has also been spread all around the world. Membership is also free, but with a limited functionality. For a more serious use (a contact with another enterprises, gathering detailed information etc.), a membership fee is required. This system is also intended for spot purchasing and individual messaging. Enterprises share information about its products and services make inquiries for product/services in a form of RFI. This system also offers a public tenders dictionary.

Nowadays, the most commonly used way to develop a B2B portal is by using Content Management Systems (CMS) specialized for B2B portals [11, 12]. These products are intended for easy development of horizontal B2B systems that contain described functionalities – catalogs of goods and services sorted into offers and demands, and, on the other hand, messaging between portal members. This way of deployment is easy, fast and productive. A B2B system like this can be localized to many languages and adjusted for particular needs. The main disadvantage of such systems is the fact that

communication between members and the portal itself is much more developed than communication between members. Another disadvantage is a reduced possibility of adding new functionalities and changing and improving existing ones. As this way developed systems have its own structure, data base schema and a base algorithms, it is hard possible to change it and implement separate projects based on these systems.

The most famous B2B CMS systems are B2B "Portal Script" [12] and "Alibaba Clone" [11]. They have similar properties and make it possible for everyone to deploy a functional B2B system.

An alternative way to deploy a B2B system is by deploying a completely new project from the beginning, respecting all the standards of application deployment. [13]. Primary goal of this approach is that such applications are much more flexible and extensible for new functionalities and can be easily adjusted to needs of particular enterprises. In addition, these solutions can be more oriented to communication between users, rather then to communication between the portal and users. The most important limitations of this approach are a longer development period, a need for standardization of certain business processes and installation of these standards into an application.

Solution proposed further in this paper is oriented to development of a system optimized for Serbian market. Unlike solutions described in this chapter, proposed solution tends to promote collaboration and long-term cooperation between enterprises, rather than simple transactions and spot purchasing. The collaboration should be adapted to Serbian internal law and business rules. In addition, proposed solution is supposed to have a modular structure, so it can be changed and rebuilt easily, according to demands of entire market and separate users.

4. CURRENT SITUATION IN SERBIA

Comparing to situation in countries with the high level of e-readiness, Serbia is specific for several reasons. Serbian market is too small for developing specialized vertical marketplaces. For this reason, in initial period of network marketplaces employment, horizontal marketplaces are more suitable for this market. In addition, low level of e-readiness requires easy-to-use solutions supported with permanent education of users with little or no experience with this type of business.

Solutions in Serbia are mainly deployed by using some of B2B CMS systems and partially localized to the Serbian language. Disadvantages of these portals are related to described weaknesses of B2B systems generally deployed in this way. An example of widely used B2B portals is "Serbian Industry" [14]. This portal has been deployed using one of B2B Content Management Systems. It offers possibilities for presenting enterprises' information, publishing product information, offers, demands and messaging between enterprises. However, this portal does not include advanced possibilities related to collaboration between enterprises. For example, there is no possibility of making connections – partnerships between enterprises – portal members. It does not provide any of basic trust building mechanisms, like undoubted identification of portal members and secured connection.

In addition, it does not provide information about reputation for enterprises and feedback from other portal members.

Moreover, it does not include automated negotiate system. Functionality of this portal is mainly limited to possibilities embedded in CMS used for deployment.

On the other hand, this portal performs one of currently most important goals for Serbian market – easy usage. It has user-friendly interface, uncomplicated registration process and simple navigation. Considering choosing product categories, it is based on common navigation, as it has been already described in previous sections. Above considered circumstances, make this solution absolutely appropriate for current situation on Serbian market and proposed system currently achieves better results than other concurrent solutions.

Other B2B portals are much less used on Serbian market. However, some companies use other types of B2B systems, like private industrial networks. These companies are generally well situated and they use B2B system to improve communication with existing business partners, without a possibility for making new ones. However, small and medium-sized enterprises cannot afford such systems. For that reason, there is a need for a system, which can serve for all enterprises on Serbian market, providing a wide range of functionalities.

Communication between enterprises in Serbia is currently on very low level. Considering use of information and communication technology, more traditional ways of communication and collaboration, like e-mail messaging, are still dominant. Existing B2B solutions can cover needs for transactions, but it does not solve problems related to communication and collaboration. B2B introduction into Serbian business culture should focus on collaboration improvement.

5. POSSIBLE SOLUTION FOR SERBIAN MARKET – MARKET4NET B2B PORTAL

In the previous sections, some important disadvantages of horizontal NMP existing solutions are outlined. Most important of them which are serious obstacles in smooth adoption for Serbian business environment are:

- Difficulties in localization and adjustment for Serbian market and internal rules
- Orientation to transactions rather than to collaboration
- Limited possibilities for system extendibility
- User-interface navigation problems

Hereafter, our research has been concentrated on how all listed disadvantages can be overcome by making an independent project of a horizontal network marketplace. Concerning all the described limitations, modeled and implemented system has been intended for use within Serbian market. It means choice of suitable attributes for every object in system, related to appropriate terms for making business and harmonization with internal law and business rules.

Market4Net (www.market4net.com) [15, 16] is an independently deployed Net Marketplace solution intended for Serbian and regional markets. This solution

tends to overcome difficulties of deploying a horizontal marketplace including maximal functionality.

5.1. Market4Net System Architecture

Entire Market4Net system is built modularly. (see Fig. 1) For that purpose, J2EE components have been used. The modular structure of the system makes changeable almost any part of the system.

Data-layer is a separate system module, which is realized by a relational database implemented as data storage, and used by the rest of the system.

Entire application layer is installed on an application server. This layer includes four sub-layers: Data Model Layer, Data Access Object Layer, Business Objects Layer and Web Layer.

Data Model sub-layer relies on a logical class diagram. It includes an implementation of all previously defined classes. All other sub-layers communicate with this sub-layer.

Data Access Object sub-layer (DAO) maps those classes to data layer. In addition, it executes basic data operations – Create, Read, Update and Delete ("CRUD" operations).

Business Objects sub-layer (BO) contains complete business logic and it performs the largest part of application functionality. It is a bridge between DAO and Web sub-layers.

Web sub-layer includes all presentation elements and user interface intended for Web browser accessibility.

The last layer of the system is the Web browser. It is independent part of the rest of the system. Besides its main purpose – user interface – it also performs some operation related to business logic. This functionality is made possible by client scripting and it is an additional component for better interaction between user and the rest of the system.

Following elements have been used in development of Market4Net system:

- Application data is implemented using MySQL Data Base Management System. Tables in a database are connected using foreign keys, respecting all key concepts of relational data base methodology and constrains from database schema defined in application project.

- Application layer is implemented on JBoss application server. This layer has been deployed using key concepts of object-oriented analyzes and design. Accordingly, data layer is mapped to Java classes in application layer. For that purpose, Hibernate Object Relational Mapping (ORM) framework is used. This sub-layer is called "Data Model Layer" and all other sub-layers in the system use this sub-layer.

- Data Access Object layer is also implemented using Hibernate, with a support of Spring Application Framework. This sub-layer is used for data manipulation.

- Business Object Layer is intended for business logic and it is implemented using Spring Framework. This sub-layer accesses DAO layer, gains data and prepares it for a next level – Web layer.

- Web layer is implemented using Spring MVC (Model-View-Controller). This layer contains a part of business logic connected to Web presentation elements. This layer is accessed by some of Web browsers, which display user interface. Design for this layer is implemented by XTML, CSS and JavaScript.

This way developed system can change and improve its functionality, as well as particular development techniques in application layers. For example, for data access, Hibernate Object Relational Mapping (ORM) framework is used. However, the implementation of this layer is completely independent on other layers, so it can be changed without a need for changing other layers.
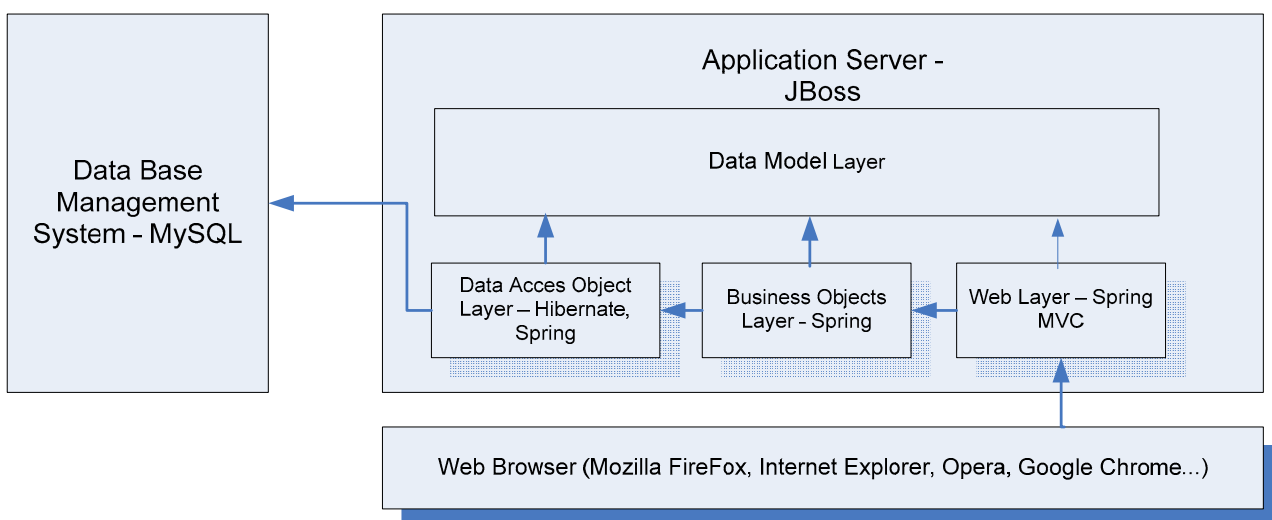

Fig. 1 Modular structure of the system

5.2. Market4Net Implementation

This system has been deployed using following methodologies and standard:

- an object-oriented methodology using the UML diagrams for system description [17].
- RosettaNet standards [18] for defining global business processes that rely on goals that have been previously defined for Market4Net project. RosettaNet represents a business protocol and a set of standards devoted to cooperation between business partners over the Internet. It tends to be a global language for e-business and help companies to overcome difficulties appeared during communication over Internet. In principle, primary goals of RosettaNet focus to supply chain and its optimization. It provides a better communication and cooperation between business partners. RosettaNet has been chosen because of its very detailed documentation and possibility for use its business processes independently of implementation approach.

  Processes described in RosettaNet are presented using "Partner Interface Processes" concepts. This way, all processes are presented visually, using one diagram for each process. In our research, these diagrams were adapted to object-oriented methodology and the UML language.
- The J2EE [19] platform is used for technical implementation, supported by Spring Framework [20], Hibernate ORM [21] and JBoss application server [22].

Usage of RosettaNet standards [18], its combination with object-oriented methodology, UML language and its adaptation with local business rules, is presented through a description of business process called "Request Shopping Cart Transfer" (see Fig. 2).

This process is presented as an activity diagram, using the process definition from RosettaNet documentation [18].

This process implies an existence of the object called "Shopping Cart". Nonetheless, this term is acceptable on markets with widely used e-payment systems, which is not the case in Serbia. Many small-sized and medium-sized enterprises in Serbia do not have that possibility. For this reason, terms in this diagram have to be adapted to the Serbian market. The term "Shopping Cart" is about to be translated into "Interest" – a term that is not connected to payment. In that case, a buyer sends only a query about some group of products. This is in accordance with one of main purposes of "Market4Net" business portal – collaboration, rather than transactions.

- **Set up structured and non-structured information for every member – enterprise.** Structured information is adapted to Serbian and regional terminology and includes general and contact information. Non-structured information includes a self-prepared description of every enterprise, without text size limits and with possibilities of text formatting, unlimited number of pictures and unlimited number of news for every enterprise.
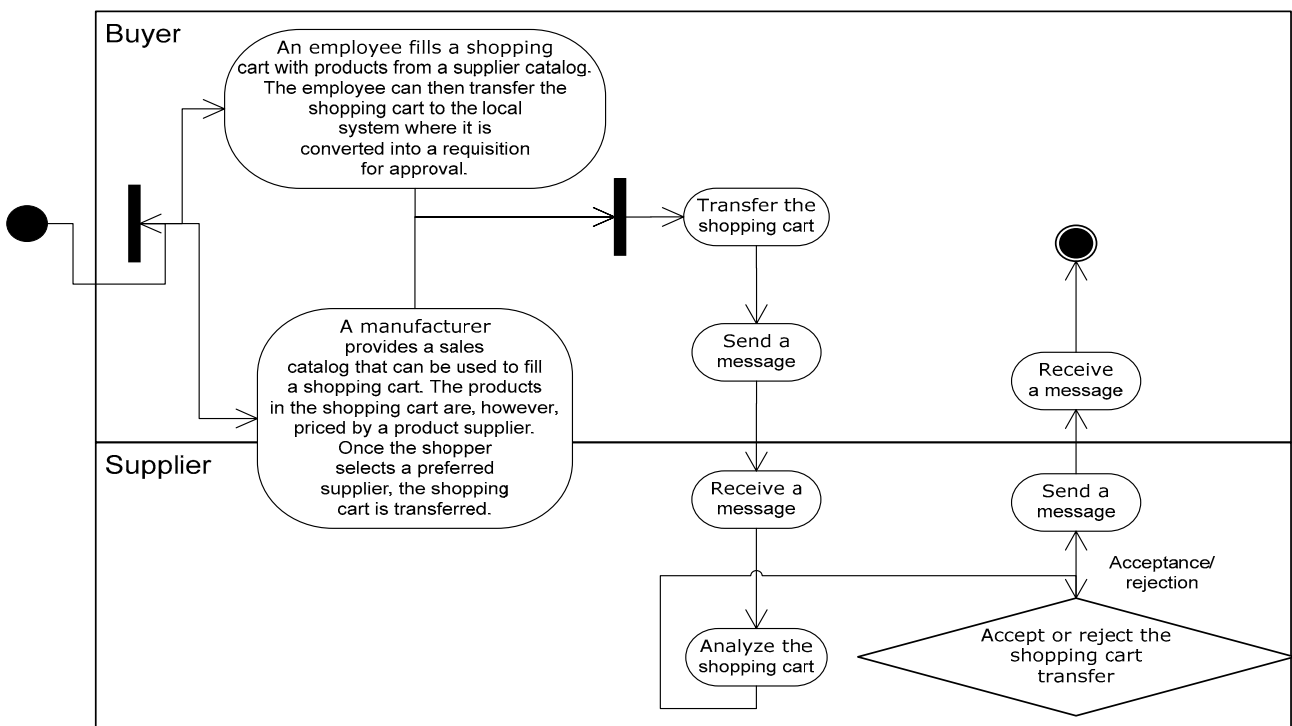

Fig. 2 RosettaNet process "Request Shopping Cart Transfer"

Fig. 3 Market4Net B2B Portal appearance – Request For Quotation

Some of main functionalities of this portal are:

- **Make on-line partnerships between enterprises.** This is one of the main advantages this system offers comparing with portals based on B2B CMS systems. Each enterprise can choose possible enterprises for cooperation. In that way, they are protected from unwanted messages ("spam") from other portal members. Each two enterprises can make partnership, with a common agreement. On the other hand, all members may decide not to limit their cooperation to their partners only. Therefore, the entire cooperation over this portal is trust based.

- **Publish product catalogs and make queries about products among enterprises.** Enterprises can show interests in products or services of their partners. Depending on information attached to the query, those interests can be treated as orders. This information can include a simple RFI for the closer explanation of a query, attachment, and delivery type. A request for quotation (see Fig. 3) can include all invoice elements: costs of every product, delivery costs, other costs, total costs, additional information and attachments, which

may include a formal invoice. The terminology for all of these elements is adapted, so it represents a communication and information exchange, without implicit transactions. Enterprises have freedom to interpret this information as they decide, depending on relationship between other collaborative enterprises.

- **Exchange information about offers and demands.** Each enterprise can publish an unlimited number of demands, offers, RFQs, RFPs, RFIs, etc. of other enterprises. A portal member can receive many different requests and choose the most appropriate ones. In addition, this functionality has installed a partnership element – an enterprise may choose to receive RFQs from partners only.

- **Simple messaging between enterprises.** This way of communication may include a range of possibilities that are not involved in other functionalities – for example query about enterprises' news and actualities, transaction cancellation, notification of invoice rejection etc.
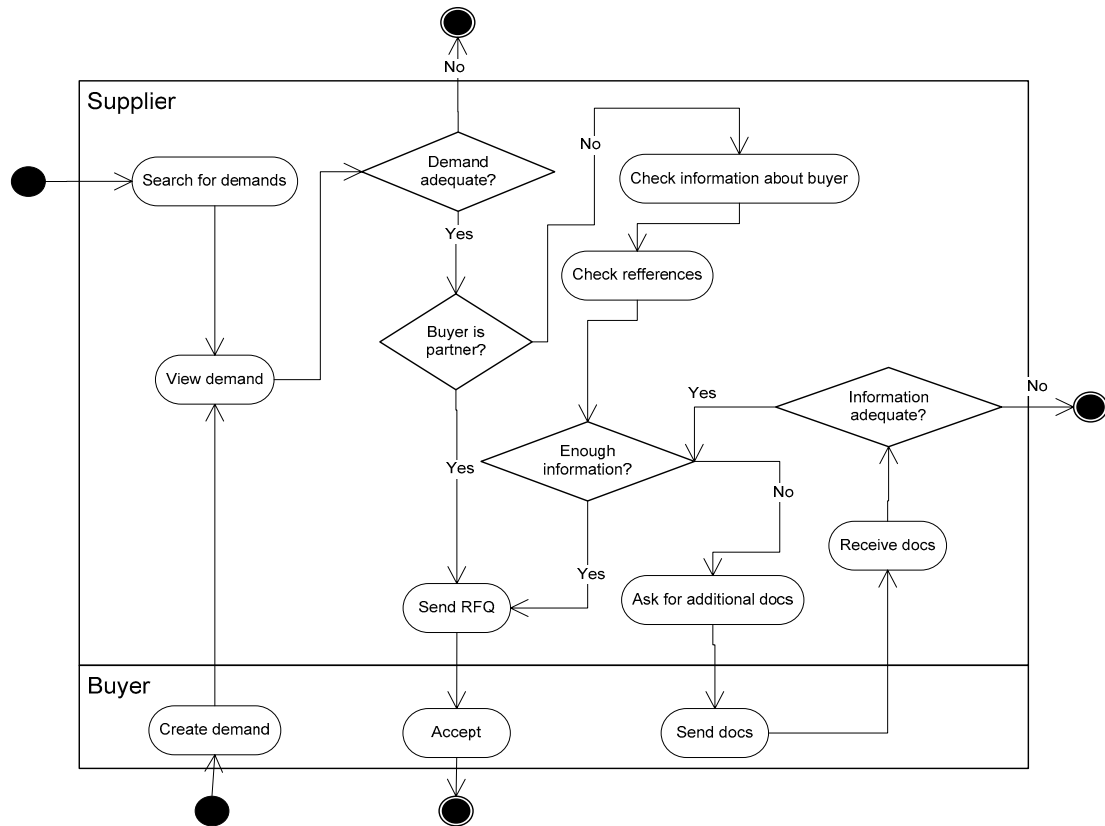
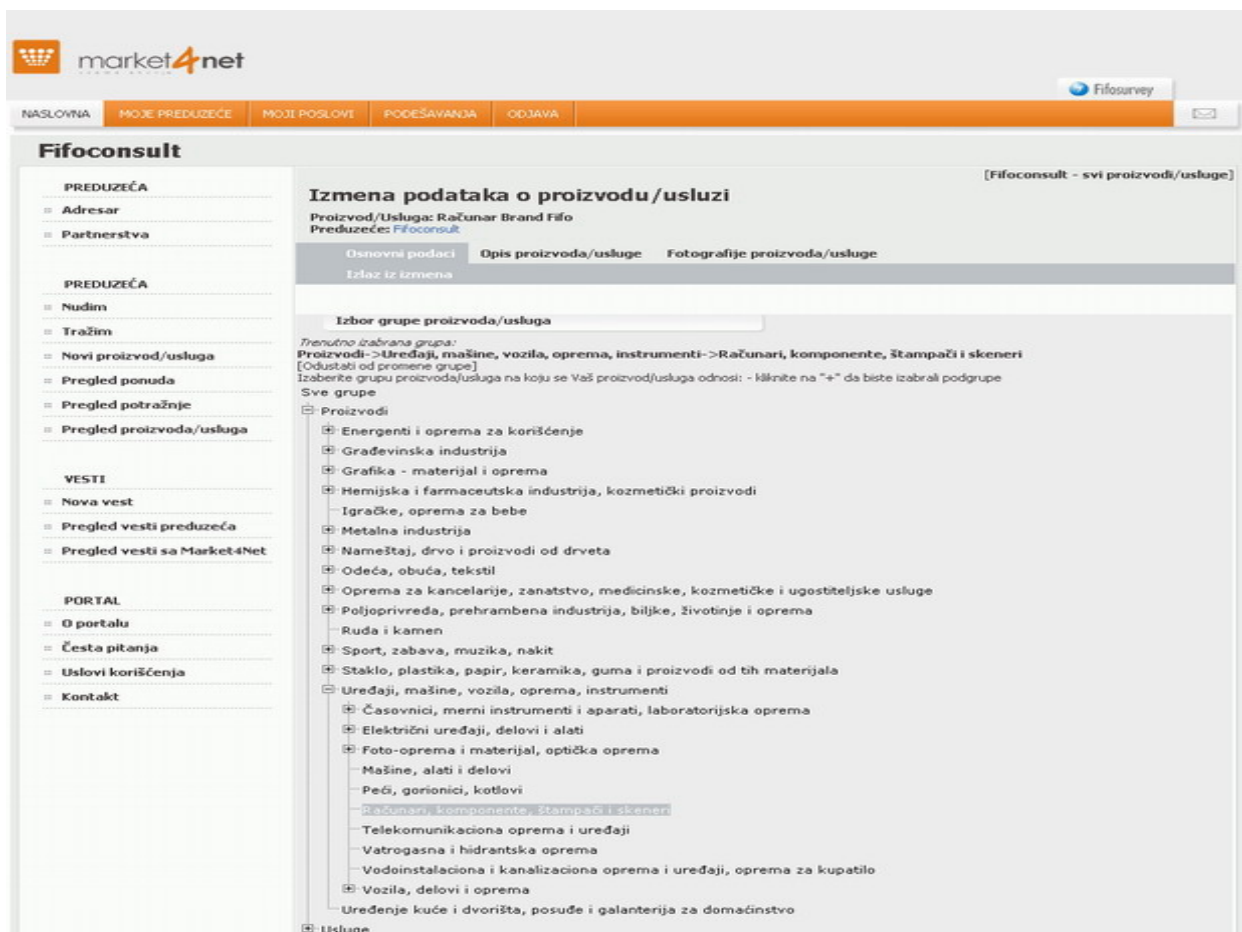**Fig. 4** Functionality extension – Demand management

Fig. 5 Market4Net B2B Groups of products and services as a tree structure

5.3. Market4Net Collaboration Management

In order to enable collaboration between portal members, Market4Net has a tendency to provide a trust building mechanisms appropriate for this market. Mechanisms that provide trust and aim to promote on-line collaboration between enterprises on Serbian market are divided into several categories [7], as it follows:

➢ **Information quality.** During a registration to portal, every enterprise has to fill in a registration form, with some mandatory fields that can be used for indubitable identification. Furthermore, contact information is also mandatory, so portal administrators can contact every portal member and check out given information.

Every portal member also has a possibility to publish miscellaneous types of information: business area, financial information, product range, images, and also self-defined information. Even though this information is not mandatory, enterprises can decide which business partners to choose, depending on information quality that potential partners present. Nevertheless, Market4Net portal offers a possibility for members to have a high quality of information, which can improve trust among enterprises.

➢ **Documents sharing.** Though every transaction, request for quote, request for information etc, portal members can send additional information to each other, as "attachments". These documents, tied with structured communication mechanisms, can contribute to confidence about business processes.

➢ **Account adjustment.** Portal contains an option for choosing a mode of communication for different portal options. For instance, portal member can choose to allow RFQ only to business partners, but RFI can be allowed for every portal member. On this way, enterprises can make contacts with potential partners using options they consider less confident. This initial communication can be an introduction for making confidence and partnership establishment.

➢ **References.** For every portal member online partnerships can be visible. This option can be disabled by portal member, in case that he has no interest to present his business partners to other portal members.

Related to this mechanism, a significant improvement can be made. It is a possibility of presenting businesses that has been made between partners.

➢ **Standardization.** Every portal member has to accept terms of use during a registration process. This is a formal agreement that contains obligations for fair conduct of business. However, this building mechanism can be fully relevant only by full enforcement of a legal regulation [23]. However, as a situation in Serbia in that field is currently on very low level, this building mechanism is yet to be improved, in common with legal regulation progress.

There are a lot of other trust building mechanisms that can be installed into Market4Net portal in future. For instance, reputation mechanism and rating exists as a prepared functionality. However, in an environment with the low level of IT readiness, this option could discourage enterprises to use portal, because of fear of abuses.

On the whole, Market4Net aims to improve its trust building mechanisms, along with its further growth and development.

Market4Net portal handles simple transactions, as well as complex communication related to order management. For instance, portal members can change information about simple offers and demands, similarly to functionality of auction sites. Furthermore, they can change complex information about a huge number of products, together with other important information like additional or transport costs and custom RFI. A query about some group of products or services can also include some generated information, like total price of ordered products and charging amount. This information is generated in a flexible way, depending on all other circumstances in a particular information exchange. For example, portal members do not have to reveal information about product price while publish product information. When some portal member makes a query about some other enterprise's products, total products' price is generated only in case that all those products contain information about the price. When the portal member answers to the request, he needs to specify the price for each product, but he can also exclude certain products and change price and an amount for every product. In this way, all additional information, like total product price and total charging, are also re-generated. This example represents a typical negotiation process between enterprises and it is a much more complex way of communication comparing to a simple messaging between enterprises, typical for most of existing network marketplaces. This complexity has been made by introducing definitions of deployment standards. These standards have been taken from RosettaNet specification and partially predefined and extended. Namely, RosettaNet standards are primarily intended for Vertical marketplaces. However, as one of purposes of this portal is adapting its functionality to more complex systems typical for vertical marketplaces, the solution is adaptation of some of these functionalities and combining them with other processes typical for vertical marketplaces.

Examples of RosettaNet functionality extension created particularly for "Market4Net" portal are "Offer management" and "Demand management". These functionalities are more specific for horizontal than for vertical marketplaces. In that reason, they do not exist in RosettaNet specification. However, as Market4Net portal needs such functionalities, so in addition to existing diagrams new structures had to be designed (see Fig. 4).

Presented demand management functionality is typical for horizontal marketplaces with reduced functionality and extended flexibility. As "Market4Net" portal tends to combine typical and extended functionalities for horizontal NMPs, this functionality, which does not exist in RosettaNet specification, had to be included into the project. This functionality combines RFQ and RFI processes and it relies on collaboration management and trust building mechanisms. While searching for adequate demands, supplier checks if demands are adequate for his needs. If yes, he checks a status of a buyer. If the supplier and buyer are already business partners, supplier sends a request for quote. If they are not partners yet, supplier has a possibility to check out information and references about

buyer. If this information is not enough, he can ask buyer for additional documentation and then decided if a transaction is possible. This part of process may be classified as request for information.

Obviously, this portal does not only support exchange of simple transactions between enterprises. Thus, it does not include transaction fees and there is no limitation for cooperation between enterprises.

Each product, service, offer and demand is related to a certain group of goods/services. Groups are arranged in a tree structure, so users can navigate it more easily (see Fig. 5).

Choosing groups does not require a new request, which makes it faster and more intuitive. Users have an overview of the tree structure in every moment, so they can easily return to any other group at any moment. This feature solves problems of navigation during search for adequate goods/services, offers and demands.

One of the most important goals of this system has been to achieve the flexibility for improving existing functionalities and extendibility for adding new ones. In that sense, non CMS or similar system, which would reduce the flexibility, has been used for deployment.

6. CONCLUSION

There is not any particular solution to address all issues about the deployment and the use of any type of B2B systems. This paper covers some of usual aspects of the problem, focusing on some specific problems. The main idea was to present these problems and propose possible solutions, particularly through a specific system called "Market4Net". During a classification of existing solutions, distinction between vertical and horizontal marketplaces was presented. In that sense, advantages and disadvantages of both models were illustrated. Moreover, one of main tasks in this paper was to demonstrate main issues related to transactional-oriented and collaboration-oriented network marketplaces.

Main attention has been paid on difficulties related to problem description and solutions intended for Serbian market. Focus is on localization, terminology and regional adjustment. In addition, Serbian market lacks communication between enterprises and needs an improvement in usage of information and communication technology for collaboration.

Existing solutions are mostly transactional oriented and do not solve collaboration and communication problems. As most of available solutions for Serbian enterprises are horizontal network marketplaces, possibilities of these systems are limited and focus on simple catalogs and messaging between enterprises.

Proposed solutions to these problems are included into Market4Net B2B portal, which is a functional and ready-to-use system for the Serbian market [13, 15]. Although it is horizontal marketplace and wide range of enterprises can use it, this portal involves functionalities which have been specific for vertical marketplaces, such as "demand management".

This solution tends to improve communication and collaboration between enterprises. It introduces new concepts for Serbian market - negotiation system and exchange information about many particular subjects like offers, demands, products and news. It also solves a user interface problem related to products and services search.

In addition, described problems and solutions can be a base for further improvements of existing horizontal network marketplaces and creating new ones, based on market demands.

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