

## Comparative analysis of e-procurement systems

Andrzej Barczak<sup>1</sup>, Marcin Stefaniuk<sup>1</sup>

<sup>1</sup>Institute of Computer Science, University of Podlasie,  
3 Maja Str. 54, 08-110 Siedlce, Poland

**Abstract.** In the abstract have been described basic kinds of information systems of e-procurement type. Have been showed capabilities of their utilization and advantages and disadvantages of adopted solutions. Author started discerning analysis of systems from revealing the capabilities that systems carry along during realization of bids. On the occasion of the theme there were showed conditionings and directions of development of those systems. In the following chapters of the article have been appeared other forms of e-procurement. In the first place it has been described as a system supporting, in the broad sense of the term, process of supplies in the firm, afterwards have been given advantages of enlargement of interactions' spectrum on whole company. In the recap there were showed aspects confirming advisability of creating B2B systems, which support activity of operators in the time of market economy. In the second part of article have been showed aspects of modeling and implementation of systems under discussion. Author, step by step, will present factors, which are essential for creation of fully functional e-procurement service. Also descriptions of programming tools, used for building those applications, will be the part of aspects under consideration. Author will use a short comparison to show the best, in his opinion, tools and to present methods of their use in order to produce correctly implemented system.

**Key words:** bid platform, electronic commerce, e-procurement, supporting logistic

### 1 Introduction

Development of electronic commerce, in the board sense of term, caused by notable increase of popularity of the Internet, was a reason of lately recorded increase of demand for applications allowing to make purchases by hand of the Internet on large scale. Internet started to perform an additional role, has become a virtual market, on which You can easily buy everything, on condition that You fulfill all the formal requirements. The first, which achieved success were auction portals, where everyone could find something for himself and participation in those transactions as a matter of fact didn't require any additional effort besides opening a private account, which allowed at the same time to purchasing and selling goods. As the years went by this kind of commerce became a way of life for many people. More advanced systems, which could satisfy more and more requirements, made by

potential users, were being created.

The purpose of this work is comparative analysis of e-procurement systems. Those systems supports business' contacts, in the broad sense of the term. Before details connected with characteristic of this systems will be described, as a introduction there will be featured basic definitions, which should allow for a proper look on the subject under discussion. The first important aspect is adequate image of transaction on the Internet. The concept of trade is closely connected with market economy, which in turn is connected with the communication between buyer and seller. One of the definitions of market says that market is a collection of mechanisms which enable contact between producers and consumers. Another definition of this term describes market as a place where buyers and sellers meet to make a transaction. In this specific case, the place of the meeting is WWW service and tools which enable contact between buyers and sellers are options – available also by hand of the Internet. We should notice that in the last years Internet was of great importance in the life of people all over the world. Communication by hand of the Internet allows to make business on a large scale without leaving office or even home. In spite of initial skepticism about perspectives of development any kinds of business contacts by hand of the Internet, from the curiosity devoid of any influence on development of areas of the economy it became the most important part of electronic industry. Development of this area was going hand in hand with prevalence of the Internet. What in turn was connected with the change of the profile of its users. In the beginning they people directly connected with informatics. When the access to the Internet became easier, it started to be of primary importance in many areas of life. During the development of trade, few types of services emerged and allowed contact between buyers and sellers. Division of those systems has been given below:

- Customer to Customer (C2C) – it's an equivalent to marketplace, where customers make transactions between themselves. There are no mediators in this process.
- Business to Customer (B2C) – it's an equivalent to traditional retail trade, with tradesmen selling goods to customers. In this type participant can't be seller and buyer at the same time.
- Business to Business (B2B) – it's an equivalent to wholesale. This is the kind of electronic commerce where producers and tradesmen sells the goods one another.

This article has been devoted the last form of sale, because e-procurement systems are part of B2B services. In the following part comparative analysis of existing applications of those type will be showed.

## **2 Bid platforms**

In the first order will featured characteristic of three biggest bid platforms available on polish market. Poland platforms tender acting in Poland Production Securities SA, Marketplanet - Open Market Electronic SA and Electronic Platform tender “e-przetarg.pl” don't have so much differences. From the point of view of

utility, those services equally fulfill their demands. Because bid procedures, its course from preparation activities till the final conclusion of an agreement, is strictly defined by law, services have to take those requirements under consideration. As a matter of fact, similar functioning is a consequence of those rules. From the point of view of technique of conduct of auction, everything is taking place on the Internet browser level. Of course it is allowed to use services after prior registration, which is closely connected with fees for a possibility of making transactions by hand of given portal. Orderers and bidders can watch prices declared by individual bidders during auction, but they don't have informations about their names. Tenders, when watching auction, in reply to starting bid or to their competition, offer lower prices till the moment of reaching earlier counted limit of the cost-effectiveness or till the end of auction. This phase of procedure has strictly defined time limit. Usually this is around 30 minutes, but exceptions also happen. When the time is over, there is a possibility to play some extra-time trading. Like before, the winner is the company which makes the most advantageous offer. This approach, specially the technique of auction in which You offer lower and lower prices, permits orderer to make sizable savings. Usually with those methods individuals which organize the tender, fetch price even up to 20% lower than with the conventional method. We could attempt to say, that despite of starting bid, gotten savings are very high. From the point of view of bidders using bid platform has also some advantages. The only bad aspect is necessity of provision of services in exchange for much lower payment, which is connected with auction in real-time and money saved by clients. Lower amounts of payment are direct reason of lower profit, however possibility of following the process of auction has a great importance. During offers preparation certain limit of the cost-effectiveness is established and suitably higher amount for which given subject is able to fulfill the trading task. The difference between those two amounts is nothing else like profit of given businessman. Often happens that the amount of profit is being currently decreased during auction. It is necessary to emphasize that it is not possible when using conventional solution, when once declared price cannot be changed.

It has been mentioned before that all three, available on polish market of trade commerce, bid platforms offers very similar packet of functionality. However in one aspect there is an appreciable difference. Costs of using particulars platforms are different, and watching amounts of them it is possible to deduce about competition for a dominant position on market. Generally speaking particular system is available after concluding an agreement between individual and service. It is also necessary to say. That there is no fixed charge for using a portal. Every client individually negotiate amount of the fee, what can have some advantages in the event of proper and competent management of those negotiations. Polska Platforma Przetargowa uses a solution, which lies in paying onetime charge in the amount of around 1% of the planned auction value. If the agreement is concluding by unit of public administration till the end of June, the annual fee for using PPP for this unit and all units dependent on it (without limits of auctions' number) comes to 6000 Euro.

Marketplanet system alike PPP carries out individual negotiations and depending on needs of particular subject proposes one of the following fees: monthly lump sum

without limit of event, monthly lump sum with limit of event, standing charges for every user of system, charge from perform transaction – amount of charge using this solution can be different every time. When choosing this option is often practiced to fix a fee for service in the amount of some percents of gotten savings.

Because Electronic Platform tender “e-przetarg.pl” is the youngest firm on the market, it has to use the most aggressive marketing policy, aiming at significant place on bid platforms market. E-przetarg.pl has the most cost-competitive offer for its clients. The same as other portals, it has prepared packet of diverse fees. In case of charity auction, there is a possibility of total exemption of fee costs.

It is necessary to add, that described portals can be used by almost everyone. It is written on the official website of PPP that any businessman or any unit of public administration can save money using their services. Certainly similar informations can be found on official websites of both other systems. As practice shows, those systems prove correct on wider and wider area. In the first place it is connected with a big development of polish economy. Becoming a member of European Union caused significant facilitation in business contacts both inside union and among the whole world. This aspect in addition to constant enlargement of teleinformation network, caused great interests in any forms of electronic commerce. Obviously, author has on mind development of polish sector of electronic commerce. Individual countries of Western Europe experienced this development much more earlier. Returning to summary, such portals as e-przetarg.pl bring savings for all the entities participant in transaction. Orderer of services, even after paying fees for possibility of using of portal, benefit significantly by savings. Bidders can currently, from any place in the world, follow the process of auction and in case of need, lower the minimal price, making their own offer even more competitive. Besides above mentioned advantages, at least two more can be found. Firstly, because whole procedure takes place in the Internet, costs associated with circulation of documents are minimized. Additional difficulty in using conventional solution is necessity of sending representative of a subject interested in trade, to a designated by customer place, in order to file proper documents. With that solution, we are losing employee's time, not to mention financial outlays for the travel. If documents are send electronically, problem doesn't exist and results of trade procedures are known right away. Important pro of using informatics system is limitation of possibility of corruption. In a situation of possibility of immediate price changing by competitive subjects and on the assumption that decisive factor, when looking for a winner of trade, is the price aspect – any form of corruptions do not make much sense. It was mentioned before, that both price changes and final price are known to those in interest in a real-time, that is promptly after the end of auction. There exist other aspects which speak for constant use of such portals as bid platforms. In the following part of article other e-procurement systems, which are put into practice, will be described.

### 3 E-procurement systems as systems dedicated to specific operator needs

In previous chapter, e-procurement systems have been described as externally expended applications, which make accessible for their clients some possibilities range, thanks to which, entities using those solutions could benefit by reduction of costs. Term “external”, in this case, means that application is out of organizational structure of given company. After more discerning familiarization with phenomenon of supporting warehouse management it is necessary to say, that we have to do with much more complicated concept. One of the definitions of this phenomenon put equal sign between “e-procurement” and “e-supply” and explains both of those terms as a “is an electronic integration and management of all activities related to the supply process on the basis of system solutions, enabling effective cooperation between the buyer and its suppliers. It is not consider as a group of separate operations carried out electronically, whether using a computer. It is a single system, which its functional scope covers the entire process, from filing requirements, through the inquiry, authorization, ordering, supplying, until after the verification and payment by the purchaser of its suppliers.” According to this terminology this is a system of all those activities which take part in purchasing. To discover full spectrum of use of e-procurement, it is necessary to add package of activities executed before and after planned purchase. Following activities are part of this package:

- compilation of analysis related to previous purchases
- access to full documentation of current and historical operations
- cataloguing suppliers by dividing contractors into the groups selected by proper criterion
- sets of functionality efficiently supplying management of contractors and allowing to evaluate them according to made transactions
- facilitation of circulation of documents both inside company and with contacts with contractors.
- possibility of constant analysis of amount of incurred costs in company
- possibility of handling many strategies of order in the same time

To fulfill all those above-mentioned aspects, which characterize effective e-procurement system in given operator, it cannot be a service with standard functionalities. Definitely, only application “made to size”, which means suitable to activity of particular entity, is able to guarantee a success. Implementation any system not fully adapted to needs of company is an unprofitable investment and in many cases may be a reason of suffer a loss or even bankruptcy. In the face of hard competition on market, where hand in hand with professionalism and high quality of produced goods has to go its low price, only reasonable expenses and their constant control – those elements are essential to survive on the market among the other companies.

Reality shows that more and more companies decide to implement the dedicated system to improve one of the fundamental departments of the company which is supply. System initiated in 2006 in one of the biggest firm working on the

insurance market allowed to minimize costs of purchasing indispensable goods, as well to speed up this process, what is an aspect of great importance in our times. Creation of better circulation of the documents has brought noticeable advantages. This is a significant facilitation, especially for employees, which are responsible for purchasing especially goods like: materials, which delivery in specific place on time is a fundamental factor in general aspiration for long-term profits of the company. Module of planned purchasing brings measurable effects. Not without importance in attaining success is possibility of easy monitoring and controlling before-mentioned circulation of documents and whole module of controlling the purchase. As you can see spectrum of this system is very wide. Most of the businessmen use solutions, which can give those types of possibilities on principle of outsourcing.

A lot of firms have already used similar solutions in their entities. On the basis of given example is visible in which areas system brings rational profits. Unfortunately, overall costs of implementation of that system are huge. This aspect can be particularly important for small and medium-sized enterprises. We should look on this problem in categories of long-term development and modernization of entity. Possibility of choosing proper contractors in business, connected with fast realization of orders and also possibility of controlled expenses are fundamental factors in aspiration for maximization of profit in every company. Influence of implemented system is so extensive, that its impact is noticeable in every cell of the company. Large scale of those systems is visible not only according to electronic commerce but also in categories of impact those services on directions of development of whole market economy. System, which carries such consequences cannot be belittled or treated in category of curiosity.

#### **4 Conclusion**

At the times of supple developing polish free market economy is easy to notice a trend of using informatics systems in a larger and larger scale. This is a process borrowed from businessmen from developed countries. Poland on the way of its evolution bases on experiences of other countries, which have already finished this path. Authors have on mind very fast development of all areas of economy, of course it is a well-known fact, that even most development countries, by proper policy, constantly reform individual branches of their system. However this is a much slower and less rapid process in comparison to one we can observe in developing countries like Poland and other East-Central Europe countries. As it was mentioned before, our state use experiences of other countries, in which different systems of type B2B have been already proved useful. Many companies specializing in providing services only by hand of the Internet have been established. Electronic stock exchanges, auctions and banks, in the era of teleinformatic technology, do not need material seats to serve clients. All business in those entities are being kept by hand of the Internet. Those solutions were proved useful in Occident countries long time ago. Now they are slowly being checked in Poland. As a conclusion, authors want to emphasize one more time, that e-procurement systems have maybe only few, but of a great importance advantages. Without any doubts, they facilitate business

contacts, in the broad sense of the term. By using modern informatics technologies in conjunction with the Internet network in commerce, the distance between buyer and seller practically does not exist. Borders of the cities, provinces or states in the major part of cases are of no importance. Transacting with the use of featured systems causes, that the employer has bigger selection of potential contractors. That fact is a direct cause of cost reduction and at the same time improvement of quality of providing services. Systems implemented in enterprises support effectively cell of supply. In a simple manner is possible to analysis and verify amount of costs bore on the purchase of goods indispensable to run a business. It is worth to add that those reports about current condition of company are almost always available in real-time. Importance of that lies on the fact that with the conventional methods of compilation of analysis we need relatively long time – firstly to collect all the required data, secondly to verify those data and in the end to write a report. In that way, time resources are being waste. It is necessary to add that this process cannot be automated or accelerated. When writing next reports, sequence of above-mentioned activities and time needed to their realization cannot be shorten. Only properly projected informatics system with properly modeled and executed scheme of data storage (for example in the form of dedicated database) causes that management of the enterprise become much more effective. Authors intentionally switch from featuring advantages of implementation of e-procurement system for cell supply to influence of that system on whole entity. Detailed description of those interactions has been given in previous chapter.

Polish market reports interest in different systems of management. Businessmen realize that they are not able to make any profit without using computerized decision support systems or application managing whole cells of enterprise. That fact let us state that there is a big demand for creating those supporting systems, and among them also e-procurement systems. Costs related to implementation of those systems are still a big impediment. Regardless of size of the organization unit and planned sphere of activity of the system amounts are substantial. Bearing a huge expenses when implementing any informatics technologies is related to a small competition on contractors' market. Creating additional units which would produce those programs or even just implement those solutions, can cause that prices of those services will rapidly decrease and become acceptable for most of the potential clients. If we look on aspect of costs through program producer's eyes - the high costs of system seems to be at least partly justified. Firstly, to create a dedicated system, it is necessary to sacrifice a lot of time and work in the whole process from analysis and modeling till tests and implementation of application. In addition we should remember that logic of that application has to comply with the legal requirements. Any bid platform can be a good example – besides requirements related to security, it has to meet a lot of other aspects, closely definite by the right of public procurement and other directly connected with the character of those transactions. Additionally, business logic, as a level responsible for databasing, has to be projected in a way that possible changes of law or other standards will not cause necessity of retreat of a portal. Eventual changes of regulations should cause (in most of the cases) necessity of performing additional configuration of the application. In exceptional and sporadic occasions,

when change in regulations would be significant and changing of the settings wouldn't give a possibility to adapt – there should be an opportunity to add to the service, in an uncomplicated way, some functionalities allowing for proper changes. This is quite difficult task, because is hard to predict changes of the law and increase of demands of participants, but it is manageable in a certain degree. Extent of realization of this task is an equivalent of satisfaction from given application and what's more of an increased requirement for those kinds of systems.

To sum up assembled informations about featured services, author states that it is impossible to evaluate those systems straightforward. There are few reasons for that situation. Firstly, taking into consideration bid platforms, as it was mentioned before, all those described services fulfill its demands at equal level. In that case, the proper approach to the issue is to estimate costs related to using the services. But even that option is not authoritative, because the prices in major part are based on negotiations with potential clients. Of course there are fixed fees for providing particular services, however in most cases, price depend on negotiation skills of both sides. When we compare supporting systems for the supply cells and also managing systems of whole units – there are also some factors, which make impossible preparing a ranking of best available systems. First and most important problem, which hinder compilation of that analysis is a fact that those systems are characterized by unrepeatability of used solutions. As it was mentioned before, to effectively fulfill its demands, those systems need to be projected and created as dedicated systems for particular enterprise. Of course there is some palette of standard sets of tools for decision support systems (in the range of - in the broad sense of the term - supply of company), however those systems loose in the competition with applications created directly for demands of concrete entity. It is not hard to guess that systems, which offer the same package of solutions for every client are much more cheaper. It is related to the fact that once modeled and made system is being repeatedly sold to different clients and its price can be lower. Price aspect it is not the best criterion for valuating those systems and author of this paper definitely does not recommend it. Despite of not small costs of implementation of dedicated system, one should decide on services precisely mapping a characteristic of conducted business of entity. There is a big risk, especially for those small and middle-sized companies, that costs of used solutions will not pay off. In extreme circumstances, this danger can carry into opposite effect to the intentional one. Instead of planned long-term profits related to implemented systems, that service will be a drag on company, taking it to the fall. This is of course extreme incident, when a system is not able to fulfill all placed on it demands.

As a result of featured factors of impossibility to conduct a comparison of services, the only possible aspect, on which base a comparison would be possible is position and experience of firms producing e-procurement systems. However results of that confrontation could be taken as an advertorial, author will abstain from putting those kinds of data. Being a businessman and deciding on an computer system it is necessary to be guided by the common good and needs of its own enterprise, otherwise is possible to just bear unwarranted costs, which can get theirs revenge in the future. On the other hand, being a producer of informatics system it is necessary to remember that it is not possible to create a perfect system, which would



fulfill requirements of all the clients. In the last words author has a good advice for both of the sides. When running a business on the market it is necessary to be guided by common sense. Creating by developers a system, which does not comply with definite conditions of particular businessman, is a fruitless work, analogical to implementation the same service to entity without finding clear reasons to do that.

## References

1. Barczak, J. Florek, T. Sydoruk T., (2006). *Projektowanie zintegrowanych systemów informatycznych zarządzania*. Wydawnictwo Akademii Podlaskiej.
2. <http://www.e-przetarg.pl/aktualnosci.php?idA=5>
3. [http://www.e-administracja.org.pl/baza\\_wiedzy/pliki/Dymek\\_Marek-publicacja.pdf](http://www.e-administracja.org.pl/baza_wiedzy/pliki/Dymek_Marek-publicacja.pdf)
4. [http://www.logistyka.net.pl/index.php?option=com\\_content&task=view&id=5523&Itemid=0](http://www.logistyka.net.pl/index.php?option=com_content&task=view&id=5523&Itemid=0)
5. <http://baan.talex.pl/iBaanE-Enterprise/E-Procurement/>
6. <http://www.ipis.pl/artukul.php?idartykul=4021&poddzial=Ubezpieczenia>