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Designing a Multilingual Auction Website for Selling Agricultural Products

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***Abstract*—**The study aimed to identify the logical structure of data and particularities of developing and testing a website designed for selling farm products through online auctions.

The research is based on a short literature review in the field and exploratory trials of some successful models from other industries, in order to identify the advantages of using such tool, as well as the optimal structure and functionality of an auction portal. In the last part, the study focuses on the results of testing the website by the potential beneficiaries.

Conclusions of the study underlines that the particularities of some agricultural products could raise difficulties in the process of selling them through online auctions, but the use of such system it is perceived to bring significant improvements in the supply chain.

The results of scientific investigations require a more detailed study regarding the importance of using quality standards for agricultural products sold via online auction, the impact that implementation of an online payment system could have on trade with agricultural products and problems which could arise in using the website in different countries.

***Keywords*—**E-commerce, online auctions, marketing.

I. Introduction

THE importance of using information technology in marketing of agricultural products was increasingly highlighted in the last decade and the theory is well backed up by statistics.

In Europe e-commerce turnover was estimated to reach over € 305 billion in 2012, compared with around €15 billion in 2005. The expected growth figures in 2013 range between 10% to 30% in some European countries (for example Poland and Czech Republic 25-30%, France 20%, Germany 25%, Belgium 20%, Italy 19%, Spain 19% and the Netherlands 10%) [4].

For the same period The United States turnover is estimated to around €280 billion, and Asia-Pacific turnover to €216 billion, with a growth expected to reach 35%. In Africa the growth has been slow mainly to limited communication infrastructure but the rate of grow is strong [1].

In Scandinavian countries and United Kingdom, where Internet penetration is 90% or higher, over 70% of Internet users are e-shoppers [4].

This phenomenon has an enormous impact on agriculture industry too [2], [7], [9], both in business to business or business to customer transactions, from which the most relevant consequences were identified as:

- E-commerce facilitates the exchange of information about products, before or during ecommerce transactions, hence improves the post-transaction satisfaction.
- Improves the access to the market, irrespective of geographic location, both for buyer and suppliers. This is seen as a positive effect for the society but also raising new challenges for producers who must shift and be more active in order to find the best sales channels [5].
- Increases the market and price transparency. Online access to product and price information allows comparison of products and boosts price transparency reducing price differentials resulting from geographic location [3].
- Reduces the transaction costs. The traditional trade of agricultural products is hampered by high transaction costs, low transaction efficiency, too many links in the circulation of products, disadvantages diminished considerably in e-commerce activity [10],[12].
- Minimizes the need for re-entry similar information for multiple parties involved in transactions, reduces errors and increases the efficiency of trade [11].

Despite these facts, the online searches shown us that the auctions sites specialised in agricultural products are very rare. In some countries (Romania, Bulgaria,) we couldn't identify any, although exist numerous auction websites for other type of products.

Considering these realities the study focuses on describing the principles of designing, and the functionality of an auction portal for agricultural products, as well as some results obtained from testing the website, under real working conditions.

II. Materials and Methods

The research was conducted in six stages:

a) a short review of literature was made in the first step in order to define the relevant concepts
b) experimental trials of eight websites were conducted in order to conclude about commune structure and functions in an auction website
c) designing the database structure and graphical user interface
d) implementation of the model,
e) software module testing by users
f) improvement of the model based on lessons learned from tests.

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Open Science Index, Economics and Management Engineering Vol:7, No:4, 2013 publications.waset.org/14662/pdf

Implementation of the model was done by one programmer paid under a service contract using PHP, Java and an SQL database.

Testing was done by 26 persons living in six counties, of which 21 farmers and five representing companies conducting wholesale trade in agricultural products.

The methods used to conduct the research were mainly: review of scientific literature, analysis, synthesis, data collection, data modelling, computer programming, software testing, interview and observation. The research was completed within a period of approximately three months.

III. Results and Discussions

From the Internet research conducted by authors and literature review it was found that the most used online auctions are: the English auctions and the reverse auctions.

In the English (or ascending-bid auctions) the seller adverts the goods for sale and invites the potential buyers to bid, from a set relatively low initial price. This price is increased with every bid and the bidders withdraw progressively from the auction, when price exceeds their willingness to pay. The auction ends when only one active bidder remains, who is the winner.

In the online environment usually the seller establishes a fixed date as time limit for every auction and the software automatically decide the winner at the finish date, based on the highest bid. Alternatively, the seller can establish a fixed (expected) priced and the auction automatically ends when there is at least one bid equal or greater with the expected price.

In the reverse auction the potential buyers advertise their need to buy a certain good or service and invite suppliers to send their bids in an established timeframe. The suppliers are allowed to send more than one bid in order to decrease the asking price. The buyer decides the winner based on the best offer, in term of price and quality. Reverse auctions have the advantages of allowing buyers to react quickly to price fluctuations and also to reduce the time involved in identifying and negotiating with individual suppliers [3].

In both type of auctions the real identity of the bidders during the bidding process can be either hidden or public.

These two types of auctions are well suited for online transactions both to their simplicity, attractiveness from a financial perspective for seller and buyer, but moreover because they do not require the simultaneous interaction between the agents.

Thus it was decided to follow the two types of auctions in designing the website for agricultural products.

From the exploratory trials of other similar websites it was concluded that the optimal structure should comprise the following modules:

- Visitor module
- Registration/login module
- Seller module
- Buyer module
- Rating module
- Administrator module

A. Visitor Module

First category, the visitors, can access all sections with general information, such as: terms and conditions for using the website, number of registered users, ongoing and finished auctions and their details, statistics on prices by product, bids made etc. Access to this information allows them to inform themselves about the benefits and rules for using the website and awake the interest in the advertised products.

Sections available to visitors are shown in the table below, according to the structure of the implemented website:

TABLE II
Website Structure – Visitor's View

Section	Subsection
Home	
Advantages of online auctions	
Rules	• Terms and conditions concerning the use of the website • Rules governing the selling process through the website
Opened auctions	• Classic auctions • Reverse auctions
Statistics	• Prices • Products sold (quantities) • Regional statistics
Contact form	
Subscription page	
Login page	
Useful external links	• Agricultural news • Discussion forums • Agencies and organisations

The transaction agreed between persons covered by anonymity involves risks that some people could act fraudulently [8]. There is also a possibility that some of the users not to carry out the transactions completed online (delivery of the product, payment, etc).

Therefore the true identity of each person participating in transactions should be known at least by the administrators of the website.

B. Registration/Login Module

Any person interested in using the auction system must first register by filling out a registration form, providing the real name, postal address, contact details and desired password to access his account latter. At the time of registration the user must provide also the contact details of a public employee (of the municipality or other state authority) who can confirm his identity (acting like a reference). The activation of the account is made manually by the administrator, based on a telephone recommendation received from the referee, usually in next 48 hours after the registration.

Although there are some systems requiring financial guaranties or credit card details at the time of registration we consider that these conditions arise suspicion among users representing barriers for those not familiar with online transactions, so we chose not to ask for.

Open Science Index, Economics and Management Engineering Vol:7, No:4, 2013 publications.waset.org/14662/pdf

After validation, every user can access his account through the login page using his email and password. Successfully logged, the user can access the seller or buyer module, depending on his intentions.

C. Seller Module

The seller has access to the following sections:

- Current auctions
- History of closed auctions

To start a new auction the seller must first choose between the classic or reverse type and to fill in the data according to every type of auctions (Table II). We chose to use a highly structured content in order to help user to describe better their products but also for making possible well structured queries about the products available in live auctions.

TABLE II
INFORMATION NEEDED TO CREATE AN AUCTION

Classic auctions – information needed	**Details**
Category of product	*mandatory*
Name of the product	*mandatory*
Type/breed/variety	
Destination/Use	
Quantity	*mandatory*
Measure unit	*mandatory*
Starting price	*mandatory*
Currency	*mandatory*
Reserved price	
Location of the products	*mandatory*
Information about delivery	*mandatory*
Payment term	*mandatory*
Other details	
Relevant pictures (max. 5)	
Total value (without VAT)	*auto calculated*
Total value (including VAT)	*auto calculated*
Closing to: (either established date or expected price)	*mandatory*
Reverse auctions – information needed	**Details**
Category of desired product	*mandatory*
Name of the product	*mandatory*
Type/breed/variety	
Destination/Use	*mandatory*
Quantity	*mandatory*
Measure unit	*mandatory*
Maximum expected price	*mandatory*
Currency	*mandatory*
Delivery place	*mandatory*
Payment terms	*mandatory*
Other details	
Documents including a detailed description of the products (max. 5)	
Closing date:	*mandatory*

After creating the auction, it remains hidden for buyers until the seller decide to open it. All unfinished auctions will appear in the *Current auctions* section.

During the auctioning process the seller and buyers can exchange information via website during the bidding process, through a message box. These messages are visible for everyone but the users have no right to divulge their real identity. Sellers can check the bids received all the time, but without finding the real identity of bidders.

The terms of an auction cannot be changed after opening it, but the seller has the right to cancel it any time before closing time, without justification. The bids cannot be cancelled.

In English auctions the winner is declared automatically by the system, based on the highest bid. In reverse auctions the person who created the auction must check all bids received and to choose the winner. If the last bid is received in the last hour of the opening time, the expiry date of the auction is postponed automatically with one hour.

If there are no bids or these do not meet the minimum expected price or reserved price, the auction will close without a winner.

In the *History of closed auctions* the seller can access all his or her auctions created over time and check their full details (how many bids were received, the winners, etc). He can also see a report for each category of product with quantities sold, price, etc. and to compare them with data available at local or national level.

D. Buyer Module

The buyer has access to the following sections:

- Live auctions
- Currents bids
- Bidding history

In the *Live auctions* any member logged into the auction system is allowed to browse the list of opened auctions in order to find the required products. The potential buyers can use multiple search criteria feature in order to find products which are close to his expectations in terms of location, price (if known) date of delivery, payments terms etc.

To bid in an auction, the buyer simply has to enter the amount of the bid in the bid cell. Bidding is always referring to the price per unit measure and not to the total value of an auction.

A valid bid must fulfil the following requirements in order to be accepted by the system:

- The user placing the bid is not the same user who started the auction.
- In classic auctions, the first bid must be at least as high as the starting price and the next bids must be at least 1% higher than the previous one.

At any time the buyer can check the status of his bids for the live auctions accessing the section *Currents bids*, together with the total value of all auctions where his bids are the highest.

In *Bidding history* section, the buyer can see a list of all won and lost auctions where he or she made a bid.

E. Rating Module

In this section every user can give a score to the other users who have sold to him products or bought from him. This module allows also excluding from the bidding process undesirable users, based on their real identity, if past experience requires this. The rating system helps also the administrators to identify the untrustworthy users.

Open Science Index, Economics and Management Engineering Vol:7, No:4, 2013 publications.waset.org/14662/pdf

The rating is based on a 1 to 5 stars scale, awarded to three criterions for seller and only one (last one) for buyer:

- quality of the product comparing with buyer expectations
- the description made in the auction details matches with the delivered product quality
- the user interest and efforts to complete the transaction

F. Administrator Module

The administrators of the website can validate or ban the users. They can also see a history of the all activity in the website and to receive and respond to messages received from users.

If the auction is closing with a winner the seller and buyer receive the identification details of each other. According to the terms and conditions of the website, the seller and buyer became part of a selling contract being held by law to execute the transaction. In order to avoid any interpretation every transactions is governed by a *Framework Contract* which stipulate what rights and obligations has each parties.

However the delivery of the goods and price payment are done without any intervention from website administrators and the seller and buyer can choose to sign a different contract for regulating the transaction.

Depending on circumstances, the users which don't complete his obligations can be sued in court by the party who has suffered a financial loose and/or can be banned definitively to use the website, by administrators.

Implementing an online payment system was not feasible for the moment due to three major reasons:

-The payments of agricultural products, unlike other industrial goods with a well standardized quality, require often an inspection before reception. From this perspective the online payment usually can't be done at the moment of closing the auctions and allows users to pay through their own systems, on a later date.

- Being designed to be used in more than one language the administrative process of making online payments requires the involvement of an international company specialised in this field, action which couldn't be budgeted.

- The website was created with the intention to be used at the beginning mainly by users located in East of Europe where online banking systems are not highly used. For example only four percent of the people having a bank account use this facility in Romania [6]. However this facility can be added on a later stage if will be considered useful by users.

The translation of all terms present on the website was implemented through an algorithm that can pick up the translated words from a table dictionary, according to the language selected by every user. After translating all the 147 terms used, the website can be used in any language with Latin or Cyrillic alphabet. Supplementary, the website detect the location of the user based on his internet provider details, and load from the beginning the menu in local language and only the auctions from his country.

However the content of discussions and descriptions of products is not automatically translated without the help of an online translating machine.

After implementing the model, the website was tested in online environment. Testing was done by 26 persons living in six counties, of which 21 farmers and five representing companies conducting wholesale trade with agricultural products.

The age of the users was between 28 and 63 years old, four were women and 22 men.

The results of tests were registered through a questionnaire comprising twelve closed and one opened questions with answers consisting in scores from 1 to 10, where 10 is maximum possible. The final results are presented in this article as average of scores given by all testers.

Before filling in the questionnaire, the testers had to accomplish four tasks:

1. to browse the website trying to understand the structure and the content of the website;
2. to create and open two auctions each;
3. to bid in three auctions, specially created by administrators for testing purposes;
4. to score a fictitious user;

No training or any manual was given to testers prior the trial session.

According to the answers, the website has a logical structure (9.4 score) and the content is easy to understand by any person (8.9). The design was found to be very attractive (10).

The reaction time of the webpage after every action is fast (9.8) and functions can be easy found (9.2) on the menu.

When creating a new auction, the user has the possibility to fill in all details needed (8.4). When bidding, the user can see all necessary (if provided) information in order to make a good decision (8.8).

The scoring system is easy to understand and reflects the real needs in this process (8.9).

The website represents a useful tool to sell and buy agricultural products according to testers, who strongly agreed that, both buyers and sellers will have benefits from using the system (9.5).

The probability to use a similar system in the future for selling or buying agricultural products or inputs and to recommend the website to other was found to be very high according to testers (9.7).

In the last question, the testers were asked to tell their opinion regarding the website, whatever would be the idea.

From the answers we found that 18 of them were concerned about bidding in auctions without not enough information or descriptions about the goods to be sold. The concern relates mostly to livestock (14 testers highlighted the problem), where a truly assessment is difficult to be done without physically seeing the animals. Another observation was about the description of the products using non standardized words, which leave space for subjectivity and make difficult to sell or buy agricultural products. There were four suggestions to implement an organized structure for describing each category of product.

There were also noticed six concerns about the impossibility of finishing the transactions due to some

Open Science Index, Economics and Management Engineering Vol:7, No:4, 2013 publications.waset.org/14662/pdf

circumstances which cannot be known at the time of ending an auction and these doesn't mean necessary maliciously intentions from any parties.

Two testers suggested that anonymity of the seller it is not acceptable in some circumstances where the seller has a strong brand. The last suggestion was implemented after the evaluation process, as option for the sellers to make public their real identity at the moment of opening the auction, if they want to.

IV. Conclusions

The information technology has an increasing impact in way of conducting business all over the world. E-commerce turnover is expected to grow globally with double figures percents. In some countries where Internet penetration is high, over 70% of people already buy various products using the Internet.

Auction websites for agricultural products are a particular application of e-commerce and their benefits are well demonstrated by the literature, but the online commerce with agricultural products it is not developed in comparison with other categories of products, which was the motivation of conducting this study, i.e. implementing a website for agricultural products, with the aim to bring benefits for all parties involved in agricultural transactions.

According to the website structure, visitors have the option to browse all information on each page, but it doesn't give them the right to create auctions or to bid.

Any person interested to sell or buy through the website must register first, providing the real identity, and being manually validated by administrators.

The auction process can be conducted through a classical auction or a reverse auction. The users can exchange messages during auctions in order to reveal more details about the products, but their real identity it is usually hidden. As exception, the sellers can disclose their real identity if their name help them in terms of branding.

In classical auctions the winner is declared automatically by the system, based on the highest bid. In reverse auctions the buyers must choose the winner manually, based on the best offer. According to the terms and conditions of the website, the seller and buyer became part of a selling contract being held by law to perform their obligations. The transactions are governed by a *Framework Contract* which stipulates what rights and obligations has each party in order to avoid disputes.

Any party can be sued in court to execute the obligations or can be excluded from using the website by the administrators if their behaviour is abusive.

The users can provide feedback by rating other users through the Rating module or even exclude reciprocally from the future transactions.

The website can be used in any language based on Latin or Cyrillic alphabet, due to the translation algorithm.

According to initial tests the website was found to have a logical structure and the content was found easy to be understood. The design was found to be very attractive and the reaction time of the website to be fast.

However there were questions raised about insufficient details describing some items for sale, especially live animals, or about improper terms to describe products, which bring real difficulties to close online transaction for some types of agricultural products.

Testers strongly agreed that, both buyers and sellers will gain a competitive advantage by using the portal. They also stated that it is highly probably to use a similar system in the future to sell their own products and recommend others to use it.

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