CHAPTER 12

RL E-COMMERCE AND ITS SCALABILITY ENHANCEMENT

12.1 Introduction

Consider a situation when there is product (status of the product is that it is used one and still consistent to be used further efficiently) and there is a crowd of people who would like to own that product. The information may about the product and the activity may be communicated through internet, mouth to mouth publicity, electronic or print media, social networking web portal or through open announcement. More publicity it receives more number of users will come forward to own the product depends upon the credibility of the product. If the ownership claim starts with the bidding methodology then it is called an auction. Highest bidder will own the product as the process allows it.

Well, we all have heard about the auction many times in our day to day progressions. We usually don’t concentrate on that because we are not concerned with this. Usually the heritage product or the product which secures some incredibility endorses the process of auction. It is also other mean to generate the revenue for the owner of the product. Though used product takes part in the auction however share market also plays with the bidding sentiments. This bidding does not result in auction because the upper limit and lower limit is well defined for the bidders hence it has lock growth for the generation of revenue unlike the auctions. Let us try to find a correlation between the general auction and the return management. It is pretty unusual but it is not illogical. The reason is both the processes deal with the used products. It is not necessary that the product which is put on auction should be incredible. Even government agencies call on auction for the machinery or the old equipments which are out of use or not in practices. Interesting part is the process through which the auction is being executed. as it is mentioned just above that there can be a correlation between auction and return management, the following example will support this concept. Suppose a user launches information about a product of which the user is owner. Now the trade is open. Few people visited the portal and consult the user. Now he can invite best prices from the people who are interested. After freezing the auction or online trading user can freeze the best price for the product and subsequently ownership would be transferred to the
winning bidder. Only difference between the traditional auction and online auction is the later auction executes physically where as the former is executed logically. With the support of ICT the caution is executed more effectively and it allows more users or customers to know the status of the product, price of the product and comparison with the existing ones. Why we try to find an analogy with the conventional auction is because it is the similar process but supported by ICT. Return management deals with the used products which have destination either of the dumping, recycling, reuse or remanufacturing. It was hard to believe the defective product can also be sold out for further use. Auction is the process which has never been thought for the used product like this. Actually it provides price information to users, limits the number of bidding opportunities and recommend auction to the users who are interested. In increases the probability of scalability in reverse logistics e-commerce. The business to business e-commerce pulls down procurement costs for buyers, reduce marketing costs for sellers and unify markets fragmentation. The question arises that why fragmented market should be unified? Actually the e-commerce system is designed in a way so that it considers following two specific goals Angelika K(2003):

- Ensure to handle traffic if participants grows on
- Ensure optimal participants in online trading.

These two goals are not so easy to meet however it can be achieved it is communicated and observed that online exchange is more profitable and feasible than the outside exchange Ryan M Sarah(2003). Let us take an instance for online auctions. Suppose I am using a PDA and some day any how my PDA secures a crack on the screen. Subsequently I rush to the manufacturer after examination of PDA the manufacturer tells me a fairly price to repair the model and to use it further. I did not hand over the PDA to manufacturer rather I started exploring another possible solution to get a PDA with reasonable price. I am having all the accessories for my old PDA hence if not PDA even then I need to have a PDA which must be compatible with all my accessories. I logged on to e-bay and put the bid on the portal. By rigorously examining the portal and several pages I come to know the bid was crossed away some time and the time where I could have been taken it is crossed and I am outbid now. Ultimately I decide to pay manufacturer the price to repair and sit back. The desired might have come a cross at some inconvenient where I could not make it possible. If I were the regular bidder then it could have been easy to me the get the right bid. I don’t need to check pages regularly as I could have notified for the bid I was looking for. This is the advantage of the online bidding. As in the
previous case I was unable to get the right bid. In the advance portion of this chapter few experiments are done. It is to test the effects of the trading opportunities and the previous price and information presented to the bidders. The market is designed for electronic products which are for return.

12.2 Experimental prototype and its description
In business to business model logical auction environment is created. Role of participants is performed by 3 demanufacturers, 3 manufacturers and 3 recyclers. Each has adequate inventory and has the goal to maximize the cash levels at the end of the auctions. Important point is at the end of the auction inventory has no worth. Auctions go for several rounds. Each round is performed by participant where it bids a price and quantity to sell and another quantity to buy. The cost and price factors are negotiable.

12.2.1 Manufacture, demanufacture and recycler
Let us understand roles of each of demanufacturer, manufacturer and recycler. Each manufacturer produces an item A and say it is to be sold at a price of 100$. Item A can be brought in any round. It is assumed that the manufacturer has a adequate inventory system to sell the item in any round. The demanufacturer buys an item B and sells the part of item out of the auction. If after bidding demanufacturer is unable to pay the cost of the product then he may face a penalty declared by the auction organizer. At last recycler can buy those items in any round and sends it to melt that instantaneously. It is assumed that initial inventory of units of product can be sold in any round.
A execution of recycler, manufacturer and demanufacturer is shown in the figure 12.1. in auction it shows the recycler can buy a shell which depends upon units of plastics. The demanufacturer buys 1 computer and fragments it to 1 CPU, 1 memory board and 1 shell. The manufacturer produces a coffee maker with the help of CPU and 1unit of plastic.

12.2.2 The auctions mechanism

It is classified into two categories ie. Short and long. The first category which is short may consists 3 rounds and the second category which is long one may consist 6 rounds. the long process has sealed bid double auction mechanism. I these two processes potential seller or buyer put a genuine bid online relevant to desired quantity of the product. So that the willing potential buyer or seller can accept the bid respectively. now let us understand how the process works. At the end of pre specified bid submission in the round the auction concludes with the creation of two tables with respect to the quantity ordered. One is Maximum acceptable buying price (MABP) and Minimum acceptable selling price (MASP). These two tables will match with each other to find out the potential buyers and sellers. MASP and MABP will maximize the total transactions carried out. If the bidding is going on then there is still scope for the settlement. This comes out to be the average of MASP and MABP. Sometimes situations come when it needs to be negotiated. For example demanded quantity with minimum MABP or higher resembles with the MASP or lower then a different negotiation technique is applied. The buyer who has higher than MABP would be given priority. Similarly the seller with lower MASP would be given priority. It is also possible that either a buyer or seller with no priority would not be able to buy or sell the product. In this case it is assumed that buyer would like to buy with less quantity and seller is willing to sell less quantity of the product. If any conflict take place as for same MASP or MABP two or more sellers or buyers are available respectively the first come first serve logic is applied Ryan M Sarah(2003). The one who bids first would be given priority. With settlement price and regulation the transaction records may reveal information about all the buyers and sellers who have won the bids.
12.3 Experiment based design

In this segment the experiment is designed to see the impact of count of trading opportunities. Two parameters are considered for this. The information level to share and the number of rounds in each auction. The information factor is described with three levels. MIN, MED and MAX levels. Each experiment is dedicated to each auction. The MIN level represents price of settlement of all participants who are winners of bids in each auction. The MED represents price of settlement to all participants in each auction. The MAX level indicates settlement price to the participants along with the price bids entered by his competitors. (for a buyer, the other buy bids and for a seller, the other sell bids). As discussed earlier the number of rounds has two levels. If it is indicated by K then K has two values as K=3 (short process) and K=6 (long process). Let us associate this with an example. The value of K is chosen as 3 for minimum number of rounds needed for computers to be sold by manufacturing unit. As it would be further transformed into plastics. It would be made available for purchased. If the manufacturing unit of computers has got the solution then what is the need of putting value of K=6. Long process (K=6) would be long enough to use inventories for long as well hence K=6.

The experiment started with making 3 groups of size nine in each. Every group participated in five experiments in all together two sessions. The significance of two sessions is as the first session was dedicated for the training and few practice rounds. As we have roles justified for
Manufacturer, demanufacturer and recycler hence any of these role can be chosen by the group. Altogether four experiments were conducted for each of the factors combinations. It comes out to be 6*MAX, 6*MIN and 3*MED. One more experiment was conducted for each of the factor combination as 6*MED, 3*MAX and 3*MIN. The factors combinations were assigned randomly to groups and sessions.

12.4 Results of experiment

Wellbeing condition of participants and health of the market is affected by the trading opportunity. As there was three market players like manufacturing, demanufacturing and recycler hence the profit which comes out from 3 rounds and 6 rounds auctions both were compared. Obviously the average profit from 6 rounds auctions was higher than 3 rounds. The reason being the substantial expansion of the set of feasible strategies. The strategy which carries out for long time is more likely to be profit oriented and so longer experiment. As it allows more materials for exchange. It was also observed that any of the players could not manage to sell items on a higher price on later round than earlier what he had paid for same items. As number of rounds have little impact on bid variation or settlement price then for K=3 the settlement price for CPU was larger than for K=6. On the other hand average bid variation around the price of settlement was greater for CPU but lesser in K=3 for shells with respect to 6 rounds.
The MED information also plays significant role in that. In auction process MED succeeds the total material which changes hands. The histogram shown in figure 12.3 reveals the total material traded by information level and loss or gain of manufacturer. The MED information also succeeds the brokering amount by all participants. Even it is applicable on least regular trader recyclers. It was an observation that alone information of settlement price discourages the trading confidence and the sentiments of traders. That is why they could not achieve success to the best of their ability.

12.5 Recommendation of auction on data analysis

The concept of knowledge discovery and data mining is used to have information about the product used in auction and its preferences. It shows our interest to find out which auctions seek users and display the information which is useful for the user to participate. Recommender is basically a system which deals with the above concept. We can see how the philosophy of the knowledge discovery may be applied in the recommendation process.
Actually a data set is created to gather knowledge about the behavior of the auction. It describes the behavior and characteristics of the auction. Before an auction the recommender system relates the class attributes with other classes which are under observation. This is the way the recommender system performs the knowledge discovery.

Let us take an instance where a recommendation can be created. As it shown in the figure 12.4 in decision tree a manufacturer wishes to buy CPUs and plastics to make coffee makers by selling computers. This way the above auction may be recommended and never any other can be. This kind of recommendation may ignore the spirit of manufacturer if he wants to act as broker for shell along with the computers. Now the machine learning concept says to utilize the data mining technique to know past record of the user and get the intelligent recommender. This concept of recommendation starts with recommendation. It enables us to know that whether an user wishes to participate in an auction or not. Accuracy is the initial performance measure of the classification model. It can be scaled too by inculcating the memory element and inducing speed.

![Decision Tree](image)

**Figure 12.4 decision tree constructed on recommendation**

The conventional approach for the classification is create a decision tree as in figure 12.4 using algorithm (as discusses below). The decision tree in figure 12.4 on top splits the participants type. Here three branches as manufacturer, demanufacturer and recyclers are created. This decision tree seeks for a bit complex recommendation as unlike simplistic model. O explain the recommendation let us concentrate on following algorithm.
a) If the manufacture has participated recently in the auction and the count is less than or equal to one then recommend the auction

b) If the stage a) is true and count is more than one and computer is brought by manufacture than also recommend the auction

c) Otherwise ignore the participation and don’t recommend.

Likewise there are many ways to recommend the auctions depend upon the nature of user’s participation.

12.6 Conclusion

Though it is challenge to sustain participations in online auction portal but considering the past records of the participants the system can be scaled robustly using knowledge discovery technique. The decision support system plays a significant role in this as its enabling strategy about the past price and recommendations about the auctions which are to come up. Thus this chapter dealt with the limited experimentation with elementary prototype auction system reveals the result with recommendation for the auctions. Follow up of this study and further research will disclose more on auctions opportunities, impact of price information and consistent auction mechanism.