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IS Perspective of Research Issues in Electronic Commerce and Online Auctions
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Abstract
Online auctions represent a model for the way the Internet is shaping the new economy. In the absence of spatial, temporal and geographic constraints these mechanisms provide many benefits to both buyers and sellers. However, significant research is still needed in designing new and better mechanisms, as well as examining the efficacy of existing ones in the contexts of the markets they serve. Issues of mechanism design, secondary market creation, incentive compatibility, bidder cheating, simultaneous substitutability, and associated research methodologies are discussed in this review paper. Interestingly, one finds a new and potentially insightful research methodology standard being adopted by IS researchers delving into the area of online auctions. This involves quasi-analytical modeling that is subsequently validated by empirical investigation using data collected by automated agents which track real-world web auctions.

Introduction
Online auctions conducted on the World Wide Web represent an exciting phenomenon that encapsulates many of the interesting aspects of the new economy. In consumer oriented markets they offer a dynamic pricing alternative to the age-old posted pricing mechanism. Consumers can now experience the thrill of ‘winning’ a product, potentially at a bargain, as opposed to the typically more tedious notion of ‘buying’ it. For sellers these mechanisms bring access to newer markets, help clear aging or perishable inventory, and provide experiential and at times viral marketing capabilities.

Additionally, the creation of hugely popular consumer-to-consumer online auction sites like eBay has resulted in dramatically improving the efficiency of secondary markets that were typically associated with garage sales and flea markets. eBay’s legion of 10 million monthly visitors provides the necessary critical mass of buyers and sellers to set market prices for their goods. The more bids that come in, the more competition there is, and chances are that higher the price.

The impact is even more dramatic in business-to-business (B2B) markets where Forrester Research predicts an increase in sales from $19.3 billion last year to $52.6 billion by 2002. A full suite of dynamic pricing mechanisms is in use here including standard auctions where there is a single seller and multiple buyers, reverse auctions where a single buyer receives bids from multiple sellers and multiple buyer, multiple seller exchanges that resemble the bid-ask markets for stocks and commodities. Mollman (2000) presents an overview of the top performing B2B auctions.

Despite the enormous volume of activity on the web there are many unanswered questions pertaining to the design of such auctions.

Mechanism Design
While there exists a vast body of literature that covers much of traditional auction theory, it is becoming increasingly evident that many of the well-established results and assumptions do not hold in the online settings. Myerson (1981) and Bulow and Roberts (1989) describe the most important of these results, namely the theorem of revenue equivalence. This states that if the winner under one type of auction (say an English auction) is also the winner under a second type of auction (say a Dutch Auction), than the two auctions will yield the same expected revenue. While this result has been found to robust for auctions of single items, Bapna, Goes and Gupta (2000a) observe that a majority of B2C online auctions are multi-item auctions of identical goods. They were the first to use automated software agent technology to capture live data from real world auctions in the process adding a new methodological dimension to auction theory research.

Rothkopf and Harstad (1994) point out that single-item results do not carry over into multiple-item settings and that this has been a vastly neglected area of auction theory research. The extension of the revenue equivalence result to the online setting of multi-item auctions is an interesting area of research from the perspective of which mechanism should be adopted under what circumstance. For instance if there is a pre-dominance of risk-averse bidders who prefer a certain outcome to an uncertain one, than would a descending Dutch auction yield higher expected revenue? Of course, this analysis is not trivial even with the most simplistic of assumptions regarding the consumer type.
Incentive Compatibility

Another socially desirable property in any market mechanism is the issue of incentive compatibility. This indicates whether the mechanism provides the incentives for the truthful revelation of one’s valuations, and whether such a strategy is a dominant one. One such mechanism proposed by Vickrey (1961) is the second-price auction which is a sealed-bid equivalent of open English auctions. In the Vickrey auction the highest bidder wins but pays the price of the second-highest bid. In such auctions the bidders’ dominant strategy is to reveal her true valuation, as there is no incentive to bid higher than the true valuation since the bidder might be last person to receive the item at a price higher than her true valuations if someone else bids lower than her bid but higher than her true valuation. Examining the incentive compatibility property of the various online auction mechanisms being adopted promises to be a fruitful area of investigation.

Bapna, Goes and Gupta, 2000a emphasize the importance of the bid increment on the revenue generation in a multi-item auction. They stress on the hitherto ignored discrete and sequential nature of the equilibrium structure of these multi-item auction mechanisms. In a related paper (Bapna, Goes and Gupta, 2000b) uses online auction data to explore and refute some common assumptions about online auction behavior found in the economics literature. In particular they empirically identify three different bidding strategies employed by bidders and find a significant difference in the surplus extracted by adopters of these strategies.

Bid Taker Cheating, Trust and Feedback Ratings

Another reason a given auction mechanism may be socially preferable over another is the potential for (or lack of) opportunistic behavior amongst sellers. Kauffman and Wood (2000) present an analytical model and provide empirical evidence of ‘questionable bidding behavior’ by sellers on eBay. Pavlou and Ba (2000) recognize that trust is an essential component of online auctions, and that buyers pay a price premium to transact with reputable sellers, particularly for expensive products. Both these papers attempt to model important aspects of trust and reputation in online auctions and rely on analytical modeling backed up empirical investigation using automated agents to capture real-world auctions. This is an important area of research as it addresses many of the issues raised by the critics of online auctions and helps formalize the concept and measurement of trust and reputation of sellers.

Auctions v. Posted Price

Another promising stream of IS research in the area of dynamic pricing deals with comparing auctions with posted price mechanisms for the sale of identical goods. Seidmann and Vakrat (1999) compared online catalog prices with online auction prices. They obtained data from 473 online auctions, such as SurplusAuction (www.surplusauction.com) and OnSale.Com (www.onsale.com). They compared prices received in these auctions with prices from Internet catalog sellers, such as Egghead (www.egghead.com) and PriceScan.Com (www.pricescan.com). Their data analysis revealed that consumers expect greater discounts for more expensive items. In their studies, Seidmann and Vakrat employed Internet agents as a data collection tool. Using a similar methodological approach Lee and Mehta (1999) investigated the existence of winner’s curse using theoretical modeling and empirical validation. Their preliminary results confirm the existence of the winners’ curse in electronic auction. The amount overbid is especially pronounced for items where potential information asymmetries exist as a result of the nature of the product, and it is further augmented in cases where the product is relatively new and not much information regarding it exists in the retail channels.

A New IS Research Methodology

The above review indicates an interesting commonality in the emerging IS literature in the area of online auctions. The commonality is the utilization of an analytical modeling approach that is subsequently validated against real world data obtained using intelligent agents that scour the web. By leveraging their technological capabilities IS researchers who are interested in economic issues are adding an insightful new dimension to vast body of economics literature that deals with auctions.

In contrast to the traditional economics literature that is perhaps unconsciously constrained by the physical limitations of traditional auctions, the emerging IS perspective on online auctions has been to model these auctions in the broader context of the markets in which such auctions take place. Without the physical constraints of traditional auctions the behavior of the different economic agents in auctions is heavily influenced by the (online) context in which they take place. For instance, the presence of simultaneous substitutable online auctions - which allows an individual shopping for, say a computer, to simultaneously bid at Onsale.com or Yahoo.com - impacts the efficiency of not just the isolated auction under consideration but also the external market in which it takes place. Auction portals like www.biddersedge.com are specifically designed to make
tracking such simultaneous substitutable online auctions easy for the consumer.

I firmly believe that the emerging IS research perspective and approach has high inductive value and will lead to a significant enhancement to the body of knowledge dealing with dynamic pricing and auctions.

References