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# Some Prerequisites for Electronic Commerce

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## Abstract

*We begin by examining the Internet-based electronic market of books, CD's, cattle and flowers in an attempt to understand some prerequisites of e-commerce. Books and CD's are near ideal goods to be bought via the Internet – their characteristics can be easily captured by electronic information format, they are non-perishable and they can be easily packed and transported. These features are found to be wanting in the case of cattle and flowers, but they are still being successfully traded via the electronic media. Our study suggests the notion of adequate information that is closely intertwined with other pre-requisites for e-commerce.*

*Our study argues that the following are some of the prerequisites for e-commerce: (1) ex-ante information that is perceived adequate by the prospective buyers, (2) institutions that provide reliable statement of quality, (3) transport and financial infrastructure, and technological system.*

*As a success story of on-line retailing that is often cited in trade magazines, Amazon has demonstrated its ability to integrate the use of ex-ante information, existing technology, institutions, logistics and infrastructure. However, innovation often reveals possibilities of improvement in the existing socio-technological setup. We consider the case of the payment system and argue that the credit system of payment is a relatively expensive payment medium for e-commerce. The current information technology can provide the technological base for a group of globally networked banks to provide an alternative billing and payment system.*

**Keywords:** e-commerce, information, institutions, financial and technological systems

## 1. Introduction

E-commerce seems to be the sweet dream of merchants come true: no bricks and mortar, no sales people, low inventory costs, and a global market. It is another step towards the notion of frictionless capitalism, to borrow a term from Bill Gates (1996). Because it is a relatively new phenomenon, it is still in the process of building up a body of knowledge to guide its future growth.

The aim of this paper is to examine some of the prerequisites for e-commerce. We begin by looking at the Internet-based electronic market of books, CD's, cattle and flowers and look at their similarities and differences, success and inadequacies. What comes out quite glaringly is the way information is captured and represented for the buyers. Information about books and CD's seems to render itself to easier representation on the Internet, while information about cattle and flowers appears to need the medium of direct contact. Moreover books are much more easily packed, stored and transported while cattle and flowers present many more problems. But what is the nature of these problems? After all cattle has been transported for centuries by cars, ships and more recently by planes. What about e-commerce involving

something that is not so "simple" as books but is still happening? Cattle and flowers are examples of this phenomenon. A possible explanation might be found in the previous understanding of the desirable attributes of ex-ante information<sup>1</sup>. Instead of information in the general sense, it might be more useful to consider the notion of *adequate* information. Further, buyers would want an assurance of the quality of the purchase, be it book, flower or sheep. Some kind of institutional arrangement or setup provides this assurance. It can take the form of experts who act as connoisseur giving a rating to the goods. They must be knowledgeable, independent, and consistent and integral in order to gain public confidence. To do so, they must have undergone recognized training, and their professional associations monitor their practice. It can also take the form of established business practice of publishers who subject a book to a rigorous process of peer review before bringing the book out onto the market. Even after publication, books are reviewed by critics and other readers, thereby furnishing would-be book buyers some kind of independent assessment.

After a sale is clinched, the transport of the product and payment for the purchase would depend on an efficient infrastructure of transport logistics and financial infrastructure. Finally there is the need of a sophisticated technological system; both to produce goods of reliable and consistent quality, but also to provide distant after-sales services.

Literature on e-commerce often cites the case of Amazon.com. As the first virtual bookshop, it has consistently set the standard for on-line retailing. Its success is one of turning an old fashion business into a showpiece of the technological prowess of the Internet. More importantly, it is a classic case of innovation - a clever integrated use of existing technology, ex-ante information, institutions, infrastructure, facilities and services. In the truly Schumpeterian sense, it is an exemplary case of *neue Kombination*.<sup>2</sup> However, innovation often reveals the inadequacy of existing socio-technological set-up and possibilities for improvement. We consider the case of the payment system and argue that the credit system of payment is a relatively expensive payment medium for e-commerce. Given the state of current information technology, it is realistically feasible to establish to group of globally linked banks which offer cheaper billing and payment services for E-commerce.

The paper is structured as follows. The next section examines the e-commerce dealing with books, CD's, cattle and flowers on the Internet as an "open sesame" to analyze the problem of representing information on the Web. We reflect on the inadequacy of looking at the information dimension alone. This leads us to section three to investigate the institutions that provide reliable statement of quality. Section four considers the necessary services, which follow the sales decision, namely payment and transport. For the sake of completeness we discuss the role of technological system which provides the base for production of goods of consistent quality, the operation of the transport logistics and after-sales service to distant buyers. Following this we discuss in section five the innovative character of e-commerce as embodied by Amazon.com, with reference to the idea of innovation pioneered by Schumpeter (1934). We also examine areas which need improvement in order to serve e-commerce more effectively and efficiently. Finally in the concluding section we take a broader perspective on the implication of the theme of this paper.

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<sup>1</sup> Ex-ante information refers to the information made available to the prospective buyers before the sale actually takes place. Ex-post information refers to the information made available to the buyers after the sale.

<sup>2</sup> It means new combination in English, an idea propounded by Schumpeter. He says that innovation is often the result of rearranging or combining in a new way existing technologies and practices.

## 2. Ex-Ante Information, as Perceived by Buyers

While going through the ex-ante stage of a transaction customers are searching and interpreting information before arriving at a final purchase decision. Without the right amount and quality of information it is very unlikely that a customer will decide to complete a transaction. In other words, the availability of required information can be seen as a prerequisite for successful e-commerce.

A customer wanting to buy a book online can get detailed descriptions of the book like title, author, price, number of pages, the name of the publisher, year of publishing and a summary of the content. Besides, he can see a picture of the book, read customer comments or contact the supplier for more information. Because of these possibilities the required information is present which makes direct face to face contact redundant. The online process of buying a CD has all these and more, in that many sites offer samples of music to their visitors.

The above information-related features have been treated in the marketing-oriented model of Verhagen (1999), which is based on the internet generation models of Ives and Learmonth (1984), Champy (1996) and Creemers (1997). In first instance there is the factor *information content* itself. It refers to the search for relevant product and company related information that supports the customer in making sound buying decisions. Next to this concrete source of information there are other information contributing factors. *Networking* is one of these factors. It can be described as the need of the customer to have the ability to find and talk to others who already use the product or who are considering a purchase. Another factor is *sensory experience*, which concerns the need of the customer to see, hear, or touch the product to arrive at a consumption decision. Finally we have the factor *interaction*, which refers to communication possibilities between customer and supplier. The presence of sufficient interaction options might result in improved information exchange. By reassuring that customers can use all factors while being on the suppliers Website, the information prerequisite for successful e-commerce seems to be accomplished.

When looking at the online process of buying cattle or flowers in contrast different information is required. The Web only seems capable of representing the factor information and networking sufficiently. Because of the lack of direct face-to-face contact, sensory experience and the needed interaction are far from perfect. Yet this has not prevented sales of cattle and flowers via the electronic media. The sites of Cattleweb, Farm-online, PC Flowers, Inc. and 1-800-flowers.com, show that there are no restrictions to buying these products online. Obviously, the limited representation of information does not hinder the completion of transactions.

Here we would like to make two observations. First, the represented information fulfills the information needs of the customer. The information needed varies according to the purchase type (first buy, straight rebuy, impulse purchase) and the customer profile, which, refers to psychological, demographic, intellectual, social and economical characteristics of the customer. Although transactions in the offline cattle market provide more interaction and sensory experience, the online information evidently serves cattle e-commerce pretty well. Secondly, the fact that relatively few types of information do not hamper commerce indicates that other things matter. One of these is the reliability of information. A supplier might deliver an enormous amount of adequate information on his site but if the customer does not consider the information reliable there is a big chance that there won't be a transaction.

Our observation suggests that instead of information in the general sense, it may be more interesting to consider the notion of adequate information. It refers to the minimal level of information needed by the customer in his purchase decision. This information is related to the knowledge level of the customer. It is also contingent on institutions that play a role in providing a statement of reliability, which is the subject in the next section.

### **3. Institutions to Provide Assurance of Quality**

Before the advent of the Industrial Revolution, trade was conducted in a more and less direct fashion. You knew your tailors, your butcher-store, your sausage producers and barber. Their reliability and the quality of their goods and service were something you learned from direct experience and from your social circle. The Industrial Revolution changed all this. You bought cloth from a distant producer, etc. Brand as a kind of business practice evolved to fulfil this need of the enlarged market. As a kind of social institution, brand provides a statement of the quality of a product, incorporating attributes of reliability, craftsmanship in the process of production, etc. In other words, it can be perceived as a very compact statement of information about the product. Next to product quality a brand might also inform the customer about the quality and certainty of the *transaction process*. It might be an indication for the ex-ante and ex-post care that is taken over the customer. Therefore, a brand might even be capable to decrease customer's perceived risk about sensitive topics like security of payment, delivery and privacy. It is clear that this kind of brand influence, refers to the brand of the selling company and not to the brand of the product itself. In some circumstances this might be the same but it is no matter of course.

We assume that a brand as (social) institution to assure product and transaction process quality becomes especially important in e-commerce. Due to the lack of physical contact and the absence of an organization in brick and mortar, customers have to rely on the brand and related institutional guarantees. In e-commerce this can various forms.

First, the role of social circle as we used to know it before the Industrial Revolution seems to make a comeback. In the case of books, business practice of publishers to safeguard their profit margin normally includes review of a book before publication. As it turns out, it also serves as a means for the public to assess the product quality. Readers tend to pay more attention to books published in certain series under the editorship of well-known experts, or books by authorities such as Noble laureates, or books which have been favorably reviewed by critics. Especially this last example can be seen as the renewed importance of the social circle: an electronic social circle in the form of the factor networking (please see section 2). Highly esteemed editorship and book reviews usually provide information, which is considered by general readers to be a reliable statement about the quality of the product. Customers attach value to the brand/image of the online stores, just like they do to their bricks and mortar counterpart.

Second, we focussed on online flower auction. Flowers are usually categorized into classes by independent professional rating agencies. The staff under the employ of such agencies doing the grading work are required to have undergone recognized training, and their work is continuously monitored by the community of flower sellers and buyers. The information provided by them is deemed to be adequate by the trained buyers. The term adequate information is a relative term, adequate in the sense that it conveys all information that is needed by the trained buyers as far as the sale is concerned. A layman would probably need to see, smell and feel the flowers directly to get a sense of adequate information. The

reliability of the grading work of the auction certifies the information and product quality and is closely related to customers' perception of the brand. In fact, the brand replaces to a fair extent the need for direct contact.

Another role that institutions can play is to assure the parties concerned of the credentials or credibility of the other side. According to a favorite geek joke, the great thing about the Internet is that no one knows that you are really a dog (The Economist, 27 July 1996). How could we be sure that we are not ordering jeans from a phony Website whose operator is to pull the plug at a time favorable to him? This need has given birth to agency specialized in providing credentials to individuals and Web-sites. Just like brand name, such credential has the function of reducing risk as experienced by the sellers and buyers. We may be living in a more risk conscious society or risk could well be very much an inherent part of a network society (Giddens and Pierson, 1998; Castells, 1998).

#### **4. Transport and Financial Infrastructure, and Technological Systems**

Once a customer decides to buy the product on offer on a Website, he has to pay the on-line shop. Here the payment system comes in handy. After the payment is made and a sale is clinched, the transport of the purchase would have to depend on an efficient and reliable infrastructure of transport logistics. And in the case of expensive goods, we may need to include the services of insurance companies. As to durable goods sold to distant customers, the customers must be able to obtain reliable and efficient repair and maintenance services.

In addition to transport and financial infrastructure, e-commerce relies on a well-functioning technological system (Sahal, 1981). As part of the technological system, advanced data communication system plays an important role in the pre-sale information exchange, transport management and after-sale information exchange and services. Moreover, the technological system provides the material basis for producing goods of reliable and consistent quality, enough to convince buyers that they need not feel them with their hands and see them with their eyes to trust the quality. Books are goods, which are products of a publishing technological system consisting of paper industry, printing industry, binding equipment (chemical glue, etc). The case will be even stronger in the case of buying a car on-line.

In their study of the evolution of the automobile industry, Wibbelink and Heng (2000) point out that network structure and outsourcing of production activities could emerge partly due to an excellent technological system. In our perspective, e-commerce among the carmakers and their suppliers is contingent on the fact that the know-how to produce car components is not confined within the four walls of carmakers. In other words, outsourcing has been enabled by the current state of the steel industry, the component manufacturing industries, the transport technology and communication; together they constitute the technological system supporting the car production industry.

A company that is successful in E-commerce relies on the reliability of transportation and financial infrastructure and technological system is Cisco Systems, a company in the router and digital switches industry. Customers can use the corporate website to gain immediate and direct access to Cisco's product configuration, online ordering system and technical support. The direct connection during the product configuration stage reassures that the product will be produced according to the requirements of the customer. The online ordering system provides a safe and adequate transaction. Ex-ante and ex-post technical support gives

customers as many online information as possible. Customers can get answers to all kind of questions 24 hours a day (Turban et al, 2000). If a customer still requires further assistance the technological infrastructure internally connects the customer to the right person in the company (Sterne, 1996). Furthermore, Cisco uses the services of FedEx; a company specialized in transportation, to deliver the products. FedEx is specialized in getting products just-in-time to customers, which is required in the business-to-business market of Cisco (Turban et al, 2000). Although the business-to-business market is not the focus of our paper a lot of the Cisco characteristics mentioned above could be applied to the business-to-consumer markets as well.

With the advent of the Internet and efficient transport logistics, E-commerce has become global in character. Amazon.com could well have been based in India or Singapore, and run its business worldwide. No location can have competitive advantage simply because of its geography. Countries which are keen to attract the establishing of E-commerce would have to come up with other advantages such as advanced data-communication infrastructure, efficient payment system, ample supply of competent IT professionals and innovative managers.

## **5. Discussion - Amazon.com as an innovation**

Literature on e-commerce often cites the case of Amazon.com as the showpiece of this emergent business. As the first pure virtual bookstore, it has consistently set the standard for on-line retailing (Peet, 2000). Here we would like to briefly review some of its background with the desire to understand its innovative features and to reflect on areas for improvement. Amazon was founded in 1994 by Jeffrey Bezos in Seattle. The site was chosen because of its proximity to Ingram Books, the biggest book wholesaler in the U.S. By relying heavily on Ingram, Amazon was able to offer as much as 1.1 million titles while stocking only 500 bestsellers. It has partially realized the dream of merchants to have a global market, yet with relatively little investment in buildings - 4,500 workers and some 3 million sq. ft. of warehouse space. Above all, it has embraced the idea of good services to the customers, and the result is clear. "Its 5m customers have found doing business with it simple, secure, and satisfying. Despite competition from well-financed competition, Amazon has 90% of the on-line book market and in just a few months has claimed the number one spot in music sales from CDNOW. (ibid)"

The sterling features of Amazon are: (1) it incorporates the practice of good ex-ante support (e.g. book review), (2) it integrates the use of database technology and various information technologies clustered around the Internet, (3) it makes full use of the credit card system of remote payment, (4) it makes full use of the efficient and reliable postal system and courier services. From the perspective of this paper, the sales operation of Amazon.com has fulfilled the three pre-requisites for e-commerce. It successfully provides adequate ex-ante information to its customers. Of course we can think of more information such as the letter types used in the book, paper quality and weight, and such like information for its other retail goods. But somehow, apparently its buyers do not perceive such extra information to be crucial in their purchase decision. The business practice of book publishers, book reviews and the literate culture and similar conditions for other on-line goods function as a kind of collective grading institution serving the trading transaction. Moreover the technologies used to produce books, CDs and other Amazon retail goods are of such high standard that prospective buyers do not worry about the physical quality of the goods.

Indeed, it is a classic case of innovation - a clever integrated use of existing infrastructure, technology, current business practice, institutions, facilities and services. In the truly Schumpeterian sense, it is a case of *neue Kombination*. New innovation often reveals the inadequacy of existing socio-technological setup (Rosenberg, 1976). One example of this is the credit card system of payment used by Amazon and most other on-line retailers. It is a method of payment well suited to ordinary trade, especially when buyer and seller do not know each other (*untrusted* payment). After their first buy, the customers' information is stored in a client database, and for returned sales the on-line retailer could switch to other – and cheaper – bill presentment and payment systems (*trusted* payments). In case of returned sales, online retailers would not need to pay a high premium to the credit card company for the risk incurred in first purchase; indeed they can afford to pass some of the savings to their customers. Such payment system that benefits both the seller and buyer is realistically feasible given the current developments. Seen from this perspective, E-commerce provides an opportunity for innovation for groups of banks with global reach, such as Indentrus, an E-commerce-focused group of 13 international banks in the U.S., Europe and Asia. Or we may take a leave from Drucker (1985) who argues that the opportunities that give rise to innovation lie in incongruities and discontinuities. The success of Amazon may lead some to think that Internet-based electronic selling is supposed to greatly reduce the cost of customer support by letting mouse-clicks replace phone orders. Some experiences in the USA suggest that this wish may be too optimistic. “During the Christmas rush, Shopping.com’s support lines were swamped with callers who needed a human touch. ...[It] doubled its support staff to 50, easily adding another \$1.5 million a year in costs. Yet revenue for the nine months ended Oct.31 totaled just \$4 million. (Grover, 1999: 76)”

## 6. Conclusion

This paper is a modest attempt in trying to formulate some useful concepts, which can help us understand the nature of e-commerce. We base ourselves mainly e-commerce where business sells goods to individuals, though in section 4 we discuss the role of technological system by using electronic trade between business to business. Three prerequisites for e-commerce are discussed, namely, (1) ex-ante information that is perceived adequate by the prospective buyers, (2) institutions that provide reliable statement of quality, (3) transport and financial infrastructure, and technological system. It may be interesting as part of further research to explore the application of our findings for various kinds of trading activities based on the electronic medium.

Before we end the paper, we would like to make two observations. First, e-commerce can be perceived as a business activity concerned with trading of goods and services in which the electronic medium plays a central role in the communication of information, the management of payment and the management of transport. It is an activity conducted in a society with its culture, institutions, business systems, technological systems and infrastructure. This statement may sound rather obvious when one first reads it, but it has the merit of sensitizing us to the more indirect factors, which are nonetheless very crucial in E-commerce. It has points of contact with the idea of Perez (1985) that for a society to benefit the full potential of a technology, there must be a match between the technological system and the socio-institutional setup. More than Perez, it provides us with a skeletal framework to appreciate the consequences of E-commerce for the tax department; moreover it helps to understand why two countries with more or less similar technology and socio-technological setup have different degree of E-commerce activity.



Second, institution or business practice, which we discuss in section 3, may be seen as an efficient use of knowledge dispersed among economic agents. It has broader economic implications, perceived from the position of Hayek (1945). He argues that the economic problem of society is a problem of the utilization of knowledge not given to anyone in its totality. “The peculiar character of the problem of a rational economic order is determined precisely by the fact that the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and contradictory knowledge which all the separate individuals possess. (ibid, p.519).”<sup>4</sup> Book review illustrates a situation where the readers and would-be buyers of books can be confronted with incomplete and contradictory information. After all it is too much to expect different reviewers to give the same verdict to a given writing. Institutions, which provide assurance of information quality and knowledge, are closely related in another way. Education or widespread literacy is perhaps the single best way to promote efficient use of knowledge, which is dispersed, incomplete, and at times contradictory. The user interface currently available in Internet-based E-commerce assumes a certain level of literacy. All databases assume that the user is literate, the notion of adequate information implies certain level of competence of the receiver, book reviews make sense to those who know something of the subject matter, and so forth.

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<sup>3</sup> The insights of Hayek can thus enrich the theory of transaction cost economics of Williamson (1985)

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