Trust in Electronic Commerce

The Role of Trust from a Legal, an Organizational and a Technical Point of View

Edited by
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E-Commerce and Trust: a Variety in Challenges

Corien Prins and Leo van der Wees
Tilburg University, The Netherlands

1 Tune in to the Digital World

Electronic commerce, the subject of this volume of essays, has emerged as the emblem of a worldwide virtual economy. Internet access, previously said to be restricted to the technocratic and mainly young elite has increased. The potential dividends of electronic communication, digital information gathering and electronic shopping are numerous and many who, several years ago would have thought to have been excluded from the unprecedented opportunities, now embrace the dot.com world. Tune in to the digital world where Amazon.com has become a household name!

Although the direct benefits of electronic communication and, more specifically, electronic commerce for our day-to-day lives are apparent, it appears far more difficult to establish some kind of consensus on expectations of the growth of electronic commerce and the implications of future developments. One reason is that there is no such thing as a common perspective on what the virtual society is all about. Hence, the success of electronic commerce also highly depends on the way we will, at some point, be able to fully grasp the characteristics of the virtual society. The difficulties with describing and analyzing the characteristics of the virtual world have much to do with the combination of highly different trends. The digital world has become both larger and smaller: larger in terms of competition, market reach, and economic impact, and smaller in terms of time and geographical distance. Such a paradox also applies to the position of market powers. The digital world has made individuals both stronger and weaker: stronger as a result of features such as self-organization, self-help, and social interaction, and weaker in terms of threats to privacy, payment, and concerns about the inadequacy of the term 'country of origin' under the jurisdiction rules.

The difficulties facing companies, individuals, and regulators are compounded by the fact that the Internet is marked out by various unprecedented features, which these companies, individuals, and regulators, to their fascination and dismay, cannot tackle by means of the traditional paradigms. The well-known paradigms have all developed along the lines of physical and local bounds of space and time. However, these confines have lost their meaning in a society that is characterized by a 24 hour economy, has no borders, and in which virtual communication and interaction flourishes.

Hence, it is hard to fully comprehend the issues at stake. However, this does not mean we should sit and wait. It is essential to ensure that the various players in the network society are aware of the questions that have to be asked and the dilemmas that have to be faced. For the

J.E.J.Prins et al., Trust in Electronic Commerce, p. 1-9.

future choices to be made are in many respects based on the visions now to be developed. In order to play their role in shaping the future of electronic commerce, the various players need to develop an understanding of how they want to operate in the electronic market.

2 Defining Electronic Business and Electronic Commerce

The arrival of the network society has had a profound impact on commerce, more specifically on market structures, the products and services delivered, and the players that are involved. 'Electronic commerce' is the term often used to describe all kinds of commercial dealings in an electronic world. Electronic commerce thus encompasses transactions of information, data, products and services using online communication facilities. Some claim that 'electronic commerce' does not exist as a separate type of commerce: 'it is simply an additional channel of distribution that overlaps and coincides with all the other channels that a business has at its disposal'.[1] Others, among them various policy makers (such as those working with the European Union and the OECD), argue that the use of the Internet for commerce purposes has given rise to a whole new phenomenon.

Definitions of electronic commerce, or the word more often used these days, electronic business, can be found on various places in literature and on the web. According to an article available on the website of the US Census Bureau an e-business infrastructure is the share of the total economic infrastructure used to support electronic business processes and conduct electronic commerce transactions. It includes hardware, software, telecommunication networks, support services, and human capital used in electronic business and commerce.

Electronic business (e-business) on its turn is any process that a business organization conducts over a computer-mediated network. Business organizations include any for-profit, governmental, or nonprofit entity. Their processes include production-, customer-, and internal or management-focused business processes.

Electronic commerce (e-commerce) is any transaction completed over a computer-mediated network that involves the transfer of ownership or rights to use goods or services. Transactions occur within selected e-business processes (e.g., selling process) and are "completed" when agreement is reached between the buyer and seller to transfer the ownership or rights to use goods or services. Completed transactions may have a zero price (e.g., a free software download). (Mesenbourg, Thomas L., Measuring Electronic Business: Definitions, Underlying Concepts, and Measurement Plans, US Census Bureau, US Department of Commerce, <http://www.census.gov/epcd/www/ebusines.htm>, visited August 8, 2001)

In this book some topics involve electronic business, while others involve electronic commerce. And readers have to bear in mind that electronic commerce is always e-business, but not the other way around. When mentioning electronic business the definitions above on the infrastructure and the process can be kept in mind.

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[1] L. Stein, in: A. Leer, *Masters of the Wired World*, Financial Times Management, London, 1999.

In the context of this book, we refer to electronic commerce as the ability to perform business transactions involving the exchange of goods and services between two or more parties using electronic tools and techniques. It differs from traditional commerce primarily in the way that information is exchanged and processed. Traditionally, information has been exchanged through direct personal contact or through the use of phone or postal systems. In electronic commerce, information is conveyed via digital communications networks and computer systems.

Electronic commerce encompasses such diverse activities as enhancing the efficiency of business processes, conducting market research, identifying opportunities and partners, cultivating relationships with customers and suppliers, document exchange, and joint product design. Despite its name, electronic commerce is often not fully automated. Typically, online transactions require some level of human intervention. Also, with electronic commerce, the products can be ordered using online communication, whereas the actual delivery is offline.

The overall goal, however, is to integrate electronic commerce into existing business processes in such a away that a processing order moves smoothly through existing accounting, order processing, and inventory systems, no matter how or where a transaction was initiated, e.g., a sales call, an online order, or a retail outlet. This integration of online sales with back-end business process and information systems introduces a variety of challenges and opportunities that span the business, technical, and legal domains and results in what is defined above as being e-business.

3 The Opportunities of Electronic Business and Electronic Commerce

The conduct of commerce through electronic means, more specifically over the Internet, has made industries repositioning themselves to take advantage of new opportunities. When considering the advantages of electronic commerce, mention must be made of the following.

Electronic communication and transaction processes allow for the creation of entirely new service delivery channels, the development of new markets for existing products and the development of new information-based products for the online environment. The immediate effects of electronic commerce will be to enhance the dynamics of competition in the economy. With the ability to perform commercial transactions anywhere at anytime, small firms are able to enter and participate at lower cost and more effectively in new markets, and larger firms will be able to evaluate, select, and work with other companies more readily than is possible in the physical world.

Digital exchange of information, transactions, and documents is not only faster and more reliable, but also less expensive, and easier to store and handle. With electronic commerce, trading partners and customers can access the information they need and manipulate it to work for them at their end. Information collaboration also fosters the ability to examine market trends, co-develop products, and align businesses with their partners. This allows companies to become more competitive on a global scale. In addition to benefits for traditional business, new virtual enterprises are now possible and industries for which

physical infrastructures such as warehouses and retail outlets are optional.

The use of the Internet for commerce purposes enables innovative firms with good partner relationships to share data, customer buying patterns, research and development information, and future plans with their suppliers and to offer a greater selection of products and services to a larger, global customer base.

Electronic commerce, however, also faces various challenges. Concerns are present on different levels (organizational, technical, and legal) and in relation to a wide range of issues (security, acceptability, reliability, etc.). All issues have to be resolved in order to facilitate the growth of electronic commerce. Government forces, i.e. the forces that fuel the manner in which the various issues are addressed, appear of prime importance. Out of the many open questions relating to electronic commerce, one key issue should be distinguished as of major importance for a wider acceptability of the phenomenon: *trust*. Before electronic commerce becomes common practice, the development of trust between potential trading partners should be facilitated.

4 A Key Challenge: Trust

Trust deals with belief, or willingness to believe, that one can rely on the goodness, strength, and ability of somebody (the seller or the buyer) or something (for example Information technology applications). Trust is highly subjective. It is the expectation that arises within a community where regular, honest, and cooperative behaviour is the norm, based on commonly shared standards. In markets, buyers and sellers may be confronted with opportunistic behaviour. Without sufficient trust between the business partners, adequate governance of the flow of materials and services will be severely hampered. This may especially apply to electronic markets and electronic commerce in general, where the only contact between buyers and sellers may be the contact through databases and the telecommunication network.

Some of the trustworthiness that is a matter of fact in conventional trade and services no longer exists in electronic commerce. For instance: an http address (URL) is not as reliable as a physical address; verification of an identity by means of a passport or a driver's license is not possible virtually; changes in a paper document are more easily detected than in a digital document; confidentiality of information is more easily guaranteed in a physical encounter (e.g. in a dialogue with a consultant) than in a virtual encounter. These securities, however, are of essential importance for the success of electronic commerce.

In addition to the trustworthiness of the transaction channel and the electronic communication itself, attention should be given to the trustworthiness of the information that is used and the procedure that is followed. In conventional trade, partnerships are founded on the basis of previous relations and trusted middle-men. In an electronic context, the scope of finding partners becomes much wider (global) and therefore the risk of starting a transaction with an unreliable party also becomes higher.

Do we need new forms of trust in an electronic environment? How, otherwise, can parties know, whether the required quality can be delivered, whether the required amount can be delivered on time, or whether the payment will be received as agreed? Thus, the challenge lies in the perceived trustworthiness of the potential business partners. Reputation, previous experience, and the size of the company may affect perceived trustworthiness. In addition, trust between parties can be enhanced by legislation (e.g., consumer protection), and agreements (e.g., EDI interchange agreements). A formalization of the negotiation and contracting protocols could lead to more trustworthy ways of performing electronic commerce. Also, associating contracts with transaction processing will lead to negotiations and contracts that can be monitored, logged/recorded, audited and/or linked (matched and associated) with other contracts or negotiations.

On the technical side, trust can also be enhanced by using technologies such as cryptographic applications: digital certificates to ensure the authenticity of virtual shops and customers; digital signatures and time-stamps to secure the authenticity of documents; encryption to protect information. However, these new technological means for building trust do not always fit seamlessly into the legal system. Consequently, the legal system has to find a way to deal with the shifts in the basis of and instruments for trust.

The complex issue of trust thus introduces a variety of challenges and opportunities that span the business, technical, and legal domains. The interaction between electronic commerce and trust is therefore a topic worthy of a book. This book does not, indeed cannot, provide the final answer to all challenges and opportunities in relation to trust. It does, however, identify the main components and provides perspectives on how to deal with trust in an electronic environment. The remaining part of this chapter is intended to set the stage for the various chapters of this book.

5 Trust as the Subject of this Book

In taking 'trust' as the subject of this book, we have limited the number of issues related to electronic commerce. Nevertheless, the spectrum of research which can be done in the field of trust and electronic commerce remains wide. Hence, the topics discussed in this book are selected under another limiting factor. The choice of topics in this first inventory book is related to the research and researchers involved in starting up this project. They have initiated Enabling Electronic Commerce from their (research) point of view, hence have chosen subjects related to their expertise.

In addition to this, the topics are analyzed from different angles. Of course, one recognizes the three disciplines involved: technology, economics, and law. However, there is also a different approach to the topics in the sense that, in one chapter, the topic is treated theoretically, whereas it is treated from a more practical perspective in another chapter, by giving an overview of the state of the art.

The first clear distinction made was following the disciplines involved. This resulted in three main parts. The first part deals with technical affairs, the second with economic / organizational affairs, and the last one with law. This order was chosen because of the fact

that, in general, first of all a technique will be developed, tested, and introduced. A successful introduction will then lead to implementation and might, as a result, lead to re-engineering or re-organizing businesses or value chains. At the same time, the law tries to keep pace with these developments and is therefore almost always a follower, not a leader. This could be considered a disadvantage because there might always be a moment in time that there is a legal vacuum as regards to new technological developments. So far, this possible disadvantage has not given any problems, though, because of the fact that businesses and consumers do have a more than substantial freedom to make contracts for their B2B and B2C activities. More than that, it might even be better that the law is a follower because technology can make unexpected changes in development making rules obsolete. Once a development is settled, more can be said about its consequences, and a better prediction of legal omissions can be made, and, as a result, better rules. On the other hand, the law can be an important extra factor for a technique to be implemented and used. It can create trust and can give businesses and consumers confidence while acting on in casu online markets and networks. Law can be considered a servant for technology and economics. After all, there has to be a technique before a rule can be made, which is another reason to discuss the law in the last part of this book.

Within the main parts, a clear distinction can be made between the approach of the articles. As stated, some might give an overview of an electronic commerce development while others discuss in detail what kind of problems can occur in a certain field. We have chosen this approach not to make just a theoretical book or just an introductory one. The result gives the reader a bit of both and the various approaches keep the book readable.

What chapters are included in the main parts? The technical part starts with an article by the Austrian researcher, based in Eindhoven, Florian Egger. His article is entitled *Consumer Trust in E-Commerce: From Psychology to Interaction Design*. It is clear that his paper fits in the central theme of the book. It discusses the issue of trust in a business to consumer e-commerce environment, starting from psychological accounts of trust and in the end focusing on trust in electronically mediated forms of e-commerce. A model of trust for e-commerce (MoTEC) will be presented as an attempt to classify off- and online factors observed to affect consumers' feeling of trust towards an online vendor. The issue of trust will be looked at exclusively from the consumer perspective where the approach stems from the discipline of Human-Computer Interaction (HCI), given its concern for end-users and its stress on design knowledge. In the context of new media this discipline is referred to as information architecture, interaction design, or usability engineering. Its study is a necessity for system designers to build systems which are trustworthy and usable and is therefore the first chapter of the technical part of this book.

The second chapter in this part is completely different in the sense that it does not give guidelines for designers to bear in mind but describes a technique which is being used to enhance trust in an e-commerce environment: cryptology. The title speaks for itself *What Cryptology Can Mean for Electronic Commerce*. The chapter deals with topics like confidentiality and authentication and describes the role cryptographic algorithms and cryptographic protocols will play in these fields. The purpose of the paper is to give the reader an idea of what can be realized and the underlying assumptions and restrictions of the described options. The authors, professor Henk van Tilborg and researcher Berry