

Literature Review of electronic commerce security and its regulation.
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Abstract.

This paper focuses on a literature review of e-commerce, its evolution and future prospects, the comparative study of e-commerce types, the e-commerce security and its threats for users, e-commerce strategy and regulation ways of e-commerce in the business area.

The principles of this study are to investigate the research questions and find appropriate solutions and state the conclusions.

The study is based on the analysis of a large number of publications linked to e-commerce.

Keywords: Internet, literature review, e-commerce, e-commerce types, the e-commerce security, e-commerce strategy, e-commerce regulation.

Introduction.

Daily life without the Internet has become incredible. Globally, Internet technology and information technology represent a leading role. E-commerce is based on Internet technologies. E-commerce would hardly exist without the Internet.

The basis of the information highway and e-commerce is the Internet. The Internet is a combination of millions of computers and network systems of all sizes. You can simply point to the Internet as a “network of networks”. The information superhighway is also known as the Internet. No one really owns or controls the Internet. Each network is managed and funded locally. It is assumed that more than 200 countries are directly or indirectly connected to the Internet.²

Currently, all types of businesses, non-profit organizations and government agencies use the Internet and its information technology. As a fundamental basis of technology, most transactions are conducted over the Internet. Thus, the sale through the Internet through internal borders and access to international markets, as well as the search for new international consumers. Consumers can get huge benefits from modern information technologies because they can easily explore the Internet to get economic goods and services.³ It is obvious to observe that e-commerce is an important area for research and needs further investigation.

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² H. Bidgoli, *Electronic Commerce: Principles and practice*, San Diego, Academic Press. 2002, p.6

³ J. K. Shim, et al., *The International Handbook of Electronic Commerce*, New York, The Glenlake Publishing Company Ltd, 2000, p.xi

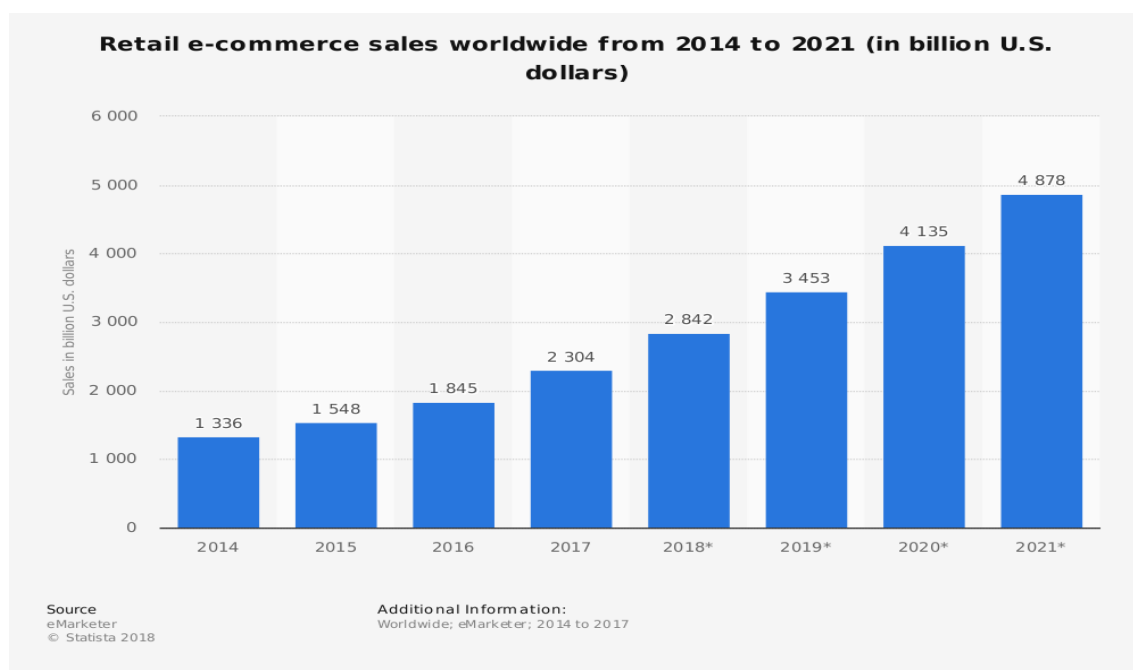
1. E-commerce definitions and categories.

Over the past few centuries, people have experienced two major revolutions: the industrial revolution and the electronic revolution. The first transformed our society from agricultural to industrial, while the second transformed our society from mechanical to electronic.⁴

It is noteworthy that the world at the beginning of the XXI century is completely different from what it was at the end of the last century, especially for commercial enterprises associated with their business activities. In the commercial world, there are regular changes, but the latter was abrupt, complex and unpredictable. The Internet dominates over this new uncertainty.⁵

The Internet has definite benefits over other communication tools. Daily mail needs a long time, the telephone limits users to verbal connection and the fax machine displace vocal speech. Neither the telephone nor the fax promotes mass communication and while radio and television are well intended for mass communication, unfortunately, there is no dialogue between individual persons. The Internet, however, combines sounds, text, interpersonal contact and mass advertising.⁶

Currently, the Internet provides access to the global market for various vendors. If someone has goods or services that sell on the network, it is estimated that about 150 million people will be able to access the website. Many companies, in order to increase their efficiency, promote supplier-customer relationships using e-commerce technology. Under the leadership of automakers from Detroit, a number of industries are creating procurement sites to reduce the cost of working with suppliers. Companies are trying to provide their supplier with the easiest ways to produce production plans and join their supply chains.⁷



These data gives information on retail e-commerce sales worldwide from 2014 to 2021. In 2017, retail e-commerce sales worldwide amounted to 2.3 trillion US dollars and e-retail

⁴ H. Chan, E-commerce. Fundamentals and Applications, Chichester, John Wiley&Sons, Inc., 2001, p.7

⁵ P. Carey, The Internet and E-commerce, London, Thorogood, 2001, p.5-6

⁶ Y. Zhao, Dispute Resolution in Electronic Commerce, Leiden, Martinus Nijhoff Publishers, 2005, p.15

⁷ H.C. Lucas Jr., Strategies for Electronic Commerce and the Internet, Cambridge, Mass, The MIT Press, 2002, p.7

revenues are projected to grow to 4.88 trillion US dollars in 2021. The top 3 online stores' revenue amounted to almost 100 billion US dollars in 2017. Online shopping is one of the most popular online activities worldwide, but usage varies by region. In 2016, an estimated 19 percent of all retail sales in China occurred via the internet, but in Japan, the share was only 6.7 percent. Desktop PCs are still the most popular device for placing online shopping orders, but mobile devices, especially smartphones are catching up. These numbers show that e-commerce continues its actual growth and has sustained the shake-up of dot-com companies. There was an estimate of 3.5 billion internet users worldwide in 2016. This means that about 45 percent of the global population accessed the internet that year. The majority of global internet users are located in East and South Asia, while China is the largest online market in the world. In 2016, China had over 721 million internet users, more than double of the third-ranked U.S. with nearly 290 million internet users. India ranked second in the number of users; Brazil and Japan complete the top 5. English is the most common language of Internet users followed by Chinese and Spanish. South Korea has the world's fastest average internet connection speed – 27 Mbps as of 2016. The global average internet speed stood at 6.1 Mbps.⁸

The Internet and electronic commerce are growing so fast that forecasters regularly underestimate how many users will be online and how much revenue will be generated by electronic commerce.⁹

Here is the definition of e-commerce by various authors and organizations.

Definition	Reference
Electronic commerce is sharing business electronic commerce information, maintaining business relationships and conducting business transactions by means of telecommunications networks	Vladimir Zwass ¹⁰
E-commerce –is an increasing number of transactions in international trade are carried out by means of electronic data interchange and other means of communication	United Nations Commission on International Trade Law ¹¹
An electronic transaction(commerce) is the sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organisations, conducted over computer-mediated networks	Organization for Economic Co-operation and Development (OECD) ¹²
E-commerce encompasses the entire world of electronically based organizational activities that support a firm's market exchanges—including a firm's entire information system's infrastructure	Rayport and Jaworski ¹³

⁸ <https://www.statista.com>

⁹ C.L. Mann, et al, Global Electronic Commerce: policy primer, Washington DC, Institute for international economics, 2000, pp.5-6

¹⁰ V.Zwass, Electronic Commerce: Structures and Issues, International Journal of Electronic Commerce, volume 1, number 1, 1996, p.3.

¹¹ United Nations Commission on International Trade Law, UNCITRAL Model Law on electronic commerce with Guide to enactment 1996 with additional article 5 bis as adopted in 1998, United Nations Publication, New York, 1999, p.17

¹² Organization for Economic Co-operation and Development (OECD), Measuring the Information Economy, United Nations Publication, Paris, 2002, p.59

¹³ J.F. Rayport and B.J. Jaworski, e-Commerce, New York, McGraw-Hill Companies, Inc, 2001, p.13.

Electronic commerce (e-commerce) is the buying and selling, marketing and servicing of products and services via computer networks.	C. Combe ¹⁴
Electronic commerce involves the use of information technology to enhance communications and transactions with all of an organization's stakeholders	R. T. Watson ¹⁵
E-commerce enables business integration together with a company's personnel, alliances, suppliers, customers, or a community.	W. Rodgers ¹⁶
E-commerce—is the use of the Internet, the World Wide Web (Web), and mobile apps to transact business	K.C. Lauden and C.G.Traver ¹⁷
Electronic commerce (EC) refers to using the Internet and intranets to purchase, sell, transport, or trade data, goods, or services.	E. Turban ¹⁸

According to H. Bidgoli e-commerce establishes on traditional commerce due to the flexible computer networks and the available Internet. For his opinion e-commerce also generates new possibilities for carrying commercial activities online and for creating and distributing appropriate and proper information through computer channels.¹⁹ There are many types of e-commerce, but depending on who acts as a consumer in Internet transactions, e-commerce is divided into the following categories:

Business-to-Business (B2B): Business-to-business (B2B) points to transactions between and among organizations. Today, the volume of B2B is about 85% of the whole EC.²⁰

Business-to-consumer (B2C): Business-to-consumer (B2C) is e-commerce, in which online business companies try to contact individual consumers.²¹ Amazon.com is the typical shopper for this type. As the sellers are regularly retailers, sometimes it is called e-tailing.

Consumer-to-consumer (C2C): In this position both the seller and the buyer are consumers. Online auctions implement an efficient means for supporting C2C e-commerce. For example, eBay (www.eBay.com) provides the world's largest online trading service for consumers due to online auctions.²²

Consumer-to-Business (C2B): In consumer-to-business (C2B), consumers use the Internet to sell goods or services to companies and organizations. People use C2B in order to bid on products or services. As the leading organizer of C2B travel service businesses, we can name Priceline.com.²³

E-commerce is an interesting area for research, because of its relative originality and exploding increase. However, there are some barriers to the growth of e-commerce.

¹⁴ C.Combe, 2006, p.13

¹⁵ R. T. Watson, et al., *Electronic Commerce: The Strategic Perspective*, Zurich, Jacobs Foundation, 2008, p.8

¹⁶ W. Rodgers, *E-commerce issues addressed in a Throughput model*, New York, Nova Science Publishers. Inc., 2010, p. 7.

¹⁷ K.C. Lauden and C.G. Traver, *E-commerce. Business, technology, society*, New Jersey, Pearson Education, Inc., 2014, p. 12

¹⁸ E. Turban, et al., *Electronic Commerce: A Managerial and Social Networks Perspective.*, Springer International Publishing, Switzerland, 2015, p.8

¹⁹ H. Bidgoli, 2002, p.7

²⁰ E. Turban et al, 2015, p.8

²¹ K.C. Lauden and C.G. Traver, *E-commerce. Business, technology, society*, New Jersey, Pearson Education, Inc., 2014, p. 12

²² H. Chan, 2001, p.7

²³ E. Turban, et al., 2015, p.8

1. There must be a demand for online products, but this demand must be well-equipped with technology in order to ease the customers' online requests.
2. Participants must be aware of the approximate costs and possible revenues associated with the technologies if they want to launch electronic commerce.

This study shows a review and classification of the papers related to EC dated from 1996 until now. By highlighting the sub-categories and application areas in these papers, the contemporary and succeeding trends are distinguished. We intend to broaden the boundaries and contribute content of improvements to organisations, academics and managers in the field of e-commerce.

2. E-Commerce Security.

The World Wide Web is the dynamic growing part of the Internet. Increasingly, it is also the part of the Internet that is most vulnerable to attack. Web servers are an attractive target for attackers to damage data protection.²⁴

E-commerce merchants and consumers suffer from similar risks as participants in traditional trade, although all it happens in the digital environment. Whether it is digital theft or traditional theft, theft is theft.²⁵

More than 90% of all cyber thefts are targeted at proprietary information, including manufacturing processes, sales information, research and construction, customer schedules, and pricing lists. Loss of data integrity, privacy, service and control are key security concerns in the e-commerce world.²⁶

According to E. Turban, et al computer security involves providing protection of data, internet networks, computer programs, computer power, and other elements of computerized systems. He classified computer security into 2 categories:

1. Generic topics, relating to any information system (e.g., encryption), and
2. E-commerce-related issues, such as buyers' protection.²⁷

Any illegal entrance to information technologies system with any telecommunication tool shall be treated as an offence. The results are unpredictable because it can be the transfer of funds or removal and utilisation of any personal confidential information. As the Web server's channels are free and unlimited it does not confuse anyone when individuals can send an email with a virus, even it is assumed as unlawful. Nowadays society concerns about all rapid changing issues. However, with the assistance of computers, it is secure to determine many crimes even these are not specially related to computers. If persons get illegal access to computers for their purposes, they can be referred to as crackers, especially hackers with malicious intent. Electronic commerce crimes occur with the use of computers and telecommunication tools and this kind of crime is treated to as cybercrimes.²⁸

The early cyber-conflicts related to computer-mediated environments started from 1994, namely however with the Estonian cyber-conflict to be as the first cyber-conflict. The reason the Estonian case has been stamped the 'first cyber-conflict or cyberwar' is that during this conflict

²⁴ S. Garfinkel and G. Spafford, *Web Security & Commerce*-O'Reilly, New York, O'Reilly, 1997. p.11

²⁵ K.C. Laudon and C.G. Traver, 2014, p. 15

²⁶ H. Bidgoli, 2002, p.7

²⁷ E. Turban, 2015, p.13

²⁸ A. Davidson, *The Law of Electronic Commerce*, New York, Cambridge University Press, 2009. p.4

the main target was the nation's infrastructure and this occurred in an organised, unprecedented and sustained manner. The attackers used a giant network of bots, as many as one million computers, in places as far away as the United States, Peru, China and Vietnam to amplify the impact of their assault.²⁹

Joachim Biskup suggested 3 security mechanisms that might aim at:

- preventing security infringements;
- limiting the damage effected by violations while they are happening;
- and compensating their consequences.³⁰

G. Schneider considered that in order to prevent unauthorized disclosure, destruction, or modification of assets security standards must be created to work together. A good security policy should direct the following:

- *Authentication*: Who is trying to access the site?
- *Access control*: Who is allowed to log on to and access the site?
- *Secrecy*: Who is permitted to view selected information?
- *Data integrity*: Who is allowed to change data?
- *Audit*: Who or what causes specific events to occur, and when?³¹

Data security and privacy guarantees are vital in electronic commerce as they boost users' confidence in making electronic commercial transactions. The United Nations Commission on International Trade Law (UNCITRAL) tried to enhance these two extended issues – data and privacy protection. In its report 'Promoting confidence in electronic commerce: legal issues on international use of electronic authentication and signature methods', released in February 2009, UNCITRAL addressed the privacy and confidentiality requirements of internet service providers in order to increase the legal certainty in protecting personally identifiable information as well as trade and competitive data.³²

There are several ways how internet users' information might be collected and stored:

1. **Clickstream**: It happens most time when visitors click the link on the website. By visiting a website, all information about the visitor, its IP address, geographical location and all activities will be captured by the website.
2. **Computer Series Number and Software Product Key Code Registration**: For example, Microsoft has a 'Windows Product Activation' tool, collecting the users' CPU serial number and CPU model number/type. During activation, users may also provide personal information if users want to register their product with Microsoft.
3. **Cookies, Web bugs and Spyware**: Cookies are data or text file sent to users in order to track users personal information. However, Web bugs are graphic images, but doing the same thing. Spyware is software installed to subscribers' computers superstitiously.
4. **Online Shopping**: For example when you decide to do online shopping on eBay you have to open an account with your personal information.
5. **Social Networking or Online Dating Sites**: Social networking websites, such as Facebook, LinkedIn and mySpace etc, contain a variety of personal information, including personal profile, contact information, the social circle of friends, comments

²⁹ A. Karatzogianni (ed), *Cyber Conflict and Global Politics*, New York, Routledge, 2009, p.6

³⁰ J. Biskup, *Security in Computing Systems. Challenges, Approaches and Solutions*, Berlin, Springer, 2009, p.27

³¹ G.P. Schneider *Electronic commerce*, Stamford, Cengage Learning, Stanford, 2015, p.438

³² F.F. Wang. *Law of Electronic Commercial Transactions Contemporary issues in the EU, US and China*, Taylor & Francis e-Library, London, 2010.p.297

from and to friends, personal interests, photos, joined groups or professional information.

6. Governments, Banks or Other Organisations: There is usually a large profile of sensitive personal information stored in the databases of governments, banks and other private or public organisations.

In the future, society must be creative in using the legislation and enforcement to control problems while ensuring that the legal, acceptable use of the Internet wouldn't be restricted.³³ The law enforcement authorities would have to find people who are sufficiently skilled with computer use to detect a cyber-attack, stop the attack and eventually find the attacker.

3. The E-commerce strategy.

Today, a strategy formulation process must include the Internet, which is more important than ever before. According to Michael Porter, "Many have argued that the Internet renders strategy obsolete. In reality, the opposite is true. Because the Internet tends to weaken industry profitability without providing proprietary operational advantages, it is more important than ever for companies to distinguish themselves through strategy. The winners will be those that view the Internet as a complement to, not a cannibal of, traditional ways of competing."³⁴

It has often been argued that the increasing importance of technology reduces the need for clear strategies. Firms should instead focus on getting their technology to work. This is especially true for the technology underlying e-business and electronic commerce. Yet technology is not, and cannot be, a substitute for strategy. Overlooking strategy and how a firm can create a sustainable competitive advantage is a likely recipe for failure. Just because certain activities are feasible from a technological perspective does not mean that they are sensible from a strategic perspective. Ultimately, information technology (IT) and the Internet should be used not for the sake of using them but instead to create benefit for customers in a cost-efficient way.³⁵

The starting point for developing a strategy is to identify the resources that may give a firm a competitive advantage. In order to confer such an advantage, a resource has to be rare, valuable, inimitable, and non-substitutable. A competitive resource has to be valuable as well as rare; a resource is valuable to the extent that it provides value to its owner. A valuable resource is one that enables a firm to implement strategies that increase its efficiency or effectiveness. A strategic resource also has to be inimitable; otherwise, a competitor can create a copy or near copy of it. A strategic resource is non-substitutable; that is, a competitor cannot easily find a similar resource to use in its place.³⁶

Within organisations, T. Jelassi et al typically recognised the following three different levels of strategy. They are followings:

1. Corporate-level strategy: The highest strategy level, i.e. the corporate-level strategy, is concerned with the overall purpose and scope of the firm. It typically involves the chief executive officer (CEO) and top-level managers.

³³ A Mitra, *Digital Security: Cyber Terror and Cyber Security*, New York, Infobase Publishing, 2010, p.92

³⁴ P. Carey, 2001, p.15-16

³⁵ T. Jelassi, et al, *Strategies for e-business: Creating value through electronic and mobile commerce*, Pearson education limited, Edinburgh, 2014, p. 7

³⁶ H.C. Lucas, 2002. p. 7-13

2. **Business unit strategy:** Business unit strategy is concerned primarily with how to compete within individual markets. At a more detailed level, a business unit strategy deals with issues such as industry analysis, market positioning and value creation for customers.

3. **Operational strategy:** Operational strategy, also known as functional-level strategy, deals with how to implement the business unit strategy with regard to resources, processes and people. In the context of e-business, this includes issues such as optimal website design, hardware and software requirements and the management of the logistics process.³⁷

The dominant force in corporate strategy was introduced by Michael Porter in 1985. M. Porter coined the term value chain into the vocabulary of managers. The value chain divides activities into two types—primary and support. Primary activities are associated with the mission of the firm; it consists of Inbound Logistics, Operations, Outbound logistics, Marketing Sales and Service Support activities are represented by the firm's infrastructure. They are the processes that create products and services: it composes of firm infrastructure, Human resources management, Technology development and Procurement.

What is the contribution of the value chain? It offers one way of analyzing the impact of the Internet and electronic commerce on a traditional firm and of thinking about ways to build new business models.³⁸

The power of the Internet in the value chain, however, must be kept in perspective. While Internet applications have an important influence on the cost and quality of activities, they are neither the only nor the dominant influence. Conventional factors such as scale, the skills of personnel, product and process technology, and investments in physical assets also play prominent roles.³⁹

4. The E-commerce implementation.

The execution of the strategic plan takes place during the strategy implementation phase, where e-commerce systems are deployed. Decision makers evaluate options, establish specific milestones, allocate resources, and manage the projects. There are several e-strategy implementation issues, depending on the circumstances.⁴⁰

Build, Buy, or Rent EC Elements: Implementation of an EC application requires access to the construction of the company's website and integration of the site with the existing corporate information systems. At this point, a number of decisions of whether to build, buy, or outsource various components or an entire project need to be made.

Outsource: What? When? To Whom?: Outsourcing can deliver strategic advantages for firms in that it provides access to highly skilled or low-cost labour, and provides potential market opportunities. Outsourcing is the process of contracting (farming out) the company's products, services, or work to another organization that is willing and able to do the job.

Software-as-a-Service: In considering outsourcing, a company should look at both software-as-a-service and cloud computing as outsourcing options.

Redesigning Business Processes: BPR and BPM. During the implementation stage, many firms face the need to change business processes to accommodate the changes an EC strategy

³⁷ T. Jelassi, et al, 2014, p. 7-8

³⁸ H.C. Lucas, 2002, p.12

³⁹ P. Carey, 2001, p.15-16

⁴⁰ E. Turban, et al., 2015, p.602

brings. Business process reengineering (BPR) is a methodology for conducting a one-time comprehensive redesign of an enterprise's processes. The term business process management (BPM) refers to activities performed by businesses to improve their processes.

Change Management: Implementing large-scale EC or social commerce projects may require change management approaches, especially if the processes of the business have changed.

Competitive strategies are the courses of action that firms choose to implement in order to achieve stated objectives and gain a competitive advantage. Porter in 1985 developed a generic strategies model designed to help firms overcome the constraints evident in the five forces and to achieve better performance than rivals in their industry sector. The generic strategies are cost leadership, differentiation and a focus strategy. Porter recommends that firms choose either differentiation or cost leadership and stay consistent with that choice or be 'stuck in the middle'. However, there are some firms who operate both generic strategies simultaneously. Once a strategy has been formulated, the next stage is implementation. Strategic implementation is the practical measures taken to execute a strategic choice. However, in order to implement a strategy successfully, firms need to put in place effective strategic controls that link strategy with performance.⁴¹

5. The E-commerce regulation.

In the process of e-commerce development, the legislation is especially important. The core of e-commerce legislation focuses on the electronic signature, electronic contract and legal effect of electronic records. Since the State of Utah, USA, promulgated its "Utah Digital Signature Act" in 1995, dozens of countries and regions promulgated relevant legislation, such as:

- In Russia - "Federal Act No. 24-FZ of the Russian Federation on Information, Informatization and Protection of Information" in 1995,
- In European Union - "The United Nations Commission on International Trade Law Model Law on Electronic Commerce" in 1996,
- In Germany - "Information and Communications Services Act" in 1997,
- In Singapore - the "Singapore Electronic Transactions Act" in 1998,
- In European Union - "Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community Framework for Electronic Signatures",
- In European Union - the "Uniform Rule on Electronic Signature" in 2000,
- In the USA - "The Electronic Signatures in Global and National Commerce Act", in 2000, etc.
- In European Union - the EU's "Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 Concerning Common Rules for the Internal Market in Electricity and Repealing Directive 96/92/EC."⁴²

These laws have greatly promoted the development of e-commerce. For example, global e-commerce before and after 2000 was largely attributed to two laws. One was "The United Nations Commission on International Trade Law Model Law on Electronic Commerce" released in 1996 which laid the foundation of global e-commerce. The other was the "Framework for

⁴¹ C. Combe, 2006, p.234

⁴² Z. Qin., et al, E-commerce strategy, Zhejiang University Press, Hangzhou, 2014. p.13-14.

Global Commerce” released in 1997, which was directly related to key problems of e-commerce development such as the customs, electronic payment, security, privacy, infrastructure and intellectual property protection, thus creating a good legal and policy environment for e-commerce in the US.⁴³

The announced “European Digital Plan” is a significant part of “European Strategy 2020” to achieve stable, sustained and overall economic growth. Differing from the statement of the U.S. e-commerce strategy, the statement from the EU includes much more pragmatic components rather than the domineering components of the U.S. strategy. The statement of the EU e-commerce strategy is to vigorously develop the competitive information industry, and strive to surpass the U.S. in mobile communications. By implementing the e-commerce strategy in the EU and speeding up the construction of the European information highway, the European Union will be the most competitive economy in the world before 2020 and will promote the rapid development of the European economy for a long time. The EU is looking forward to gaining the dominant position in aspects of e-commerce law, standards and technology, as the largest economy.⁴⁴

Conclusion

The advent of information technology introduces distinct models and advanced strategies among business enterprises, organizations and individuals. Buying and selling online has become a common practice due to the advantage of not using physical connections and geographical locations.

However, this dynamic growth of new technology challenges current legal theories and regulation. Some national and international legislative organizations made a great step in formulating of systematic approaches and main aspects of e-commerce. For the future legal improvements, I suggest take a look at promoting trust and confidence in online as the main aim for both consumers and businessmen.

⁴³ Ibid, p.14.

⁴⁴ Ibid, p. 53

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