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Digital Chain Policy of Contemporary Global Economy: E-commerce Evolution through E-banking and E-signature

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ABSTRACT

Rapid technological development significantly changes our everyday life. The fairy tale's magic world of magic mirrors, flying carpets, mysterious powers, moving pictures, and est. becomes reality in the 21st century due to the limitless opportunities offered by digital technologies. Despite the fact that traditional business models are prevailing in contemporary Global Economy, new digital structure of economic performance is gaining speed. Against tough international and domestic competition more and more business translate into practice digital technologies to suggest new products to customers via modern channels of interaction. Electronic commerce is becoming increasingly popular in business operations and among customers. Development of e-commerce entails e-banking progress. Transforming of business and banking model into digital ones requires new changes in the fields of regulation, economic environment, physical infrastructure, customers' awareness and skills, technology and est. Among these factors one can differentiate the one, which is the most important to support all these things to happen smoothly – the development of electronic signature, making reliable and operable business and banking models. Thus, the new digital chain – e-commerce through e-banking and e-signature is one of the most characteristic features of contemporary global economy. The paper discusses the clear correlation between these variables and concludes that simultaneously development of these variables inevitably leads to better positioning of national economies in international competition. National economies have to adjust its policies in the fields of regulations, infrastructure, education and so on to meet the modern requirements raised due to the rapid development and spread of information and communication systems.

Il rapido sviluppo tecnologico cambia in modo significativo la nostra vita quotidiana. Il magico mondo delle fiabe fatto di specchi magici, tappeti volanti, poteri misteriosi, immagini in movimento e così via. diventa realtà nel 21 ° secolo grazie alle infinite opportunità offerte dalle tecnologie digitali. Nonostante il fatto che i modelli di business tradizionali siano prevalenti nell'economia globale contemporanea, la nuova struttura digitale della performance economica sta guadagnando velocità. Contro la dura concorrenza internazionale e nazionale sempre più imprese traducono in pratica tecnologie digitali per suggerire nuovi prodotti ai clienti attraverso moderni canali di interazione. Il commercio elettronico sta diventando sempre più popolare nelle operazioni aziendali e tra i clienti e tale sviluppo implica il progresso dell'e-banking. La trasformazione del modello di business e bancario in forma digitale richiede nuovi cambiamenti nei settori della regolamentazione, dell'ambiente economico, delle infrastrutture fisiche, della consapevolezza e delle competenze dei clienti, della tecnologia e così via. Tra questi fattori si può differenziare quello che è il più importante per garantire che tutti questi elementi avvengono senza intoppi: lo sviluppo della firma elettronica, che rende funzionanti e affidabili i modelli di business e bancari. Pertanto, la nuova catena digitale – il commercio elettronico tramite e-banking e firma elettronica – è una delle caratteristiche più peculiari dell'economia globale contemporanea. L'articolo discute la chiara correlazione tra queste variabili e conclude che il loro sviluppo

simultaneo porta inevitabilmente a un migliore posizionamento delle economie nazionali nella concorrenza internazionale. Le economie nazionali devono adeguare le proprie politiche nei settori della regolamentazione, delle infrastrutture, dell'istruzione e così via, per soddisfare i requisiti moderni sollevati a causa del rapido sviluppo e diffusione dei sistemi di informazione e comunicazione.

Keywords: Global Economy, International Competition, E-commerce, E-banking, E-signature.

1 – Introduction

The beginning of the 21st century is characterized by the unprecedented spread of digital technologies. We are living in the era of the Fourth Industrial Revolution that is smoothly growing into the fifth one. This process is distinguished by a combination of digital, physical and biological technologies changing our everyday lives (Francesconi, 2009). The contemporary global economy is rather moving towards the new system based on digital infrastructure and devices than the emerging the new technologies. The ways and means of production, consumption, communication, transportation and movement, energy creation and communication are fundamentally changing as new technologies becoming more and more available. The fundamental and global nature of these changes presents new threats and challenges and relates to the labor market, income inequality, geopolitical security, the system of social values, and so on.

In such a new reality, the main purpose of business - to increase profits - is directly linked to promoting the development of a science-based economy. Increasing profits implies increasing the efficiency of resources, labor and capital. Under the current conditions of science and technology development, resource efficiency is increased at the expense of innovations and new technological solutions. The accomplishment of this task takes into account many interrelated factors.

The significant reduction of production expenditures caused by the digitalization results unprecedented spread of digital enterprises, where new practice of social, mobile, analytics and cloud (SMAC) technologies are widely used to achieve greater productivity (Sepashvili, 2020). At the same time, unprecedented growth of digital consumers, in its turn, boosts even wider usage of SMAC technologies and thus, leads to a new era of digital economy and digital world (Mermanisvili, 2019). In contemporary global development digital technologies force business to adapt novelties to survival in the transformed global industrial aria against the tough international competition (Sepashvili, 2019).

2 – Research Methodology

The paper discusses new phenomena of the 21th century Global Economy, namely the Digital Chain that was developed due to the rapid and widespread expansion of digital technologies, which are entering business process and are changing everyday life and behavior of millions of customers over the globe. The main pillar which entails of all these changes can be formulated as digital chain: e-commerce through e-banking and e-signature. Though this chain refers to many factors and aspects but the given paper analysis just these three variables in terms their development. The literature review highlights the origin of the term and provides various position on the topic. Importance of the technological development to resource efficiency is studied to evaluate the importance of introduction of digital technologies for business efficiency and the need of rising the questions of creation of appropriate environment of regulatory and physical infrastructure high on economic policy agenda.

3 – Purpose

The rapid development of digital firms is main characteristics of current global economy Obviously, there is a variety of range of the digital firms, and they vary according the extent they use these technologies in their business operations. Though, against the continuous development, progressively more business processes, products, goods, and services are impacted by digital innovations. The purpose of the given paper is to portray the main sequence of modern business – digital chain of conducting e-commerce through e-banking and e-signature via appropriate physical infrastructure.

4 – Literature Review

Fourth Industrial Revolution is the key issue on modern development agenda in academic, political and economic circles (Schwab, 2016). Success of the country in science and research significantly defines the level of national welfare that is achieved through various business activities (Sepashvili, 2016). However, increasing of resources, labour and capital, efficiency depends rather on usage of knowledge and technology than on simple existing of well-equipped higher educational institutions and/or highly skilled workers (Sepashvili, 2018b). New business models set new tasks to the existing policy at countless levels: science development competition policy, human rights and consumer protection, personal data protection, taxation, intellectual property rights and so on. Without balancing developments, such as appropriate regulation and the improved skills and institutions to meet these new challenges, the accelerated growth opportunities that the digital technology may offer could be replaced by unexpected risks (Gazzola et al., 2017). Production processes are determined by the combination of technology and devices along the whole value chain. In that way, digital technologies significantly improve the efficiency of economy through dramatically reduction of the cost of business relations and transactions. Computer-driven systems are becoming more and more common to monitor and conduct physical processes.

At the beginning of 20th century, the famous Economist Schumpeter saw innovation as a key driver of socio-economic progress. As he noted, "the main function of the entrepreneur is to combine resources when new benefits can be obtained, or new effects are used, or innovations". Innovation not only helps to establish new firms and sectors, but also renews traditional firms and sectors, thereby accelerating economic growth. Due to the Digital technologies new products and services were invented as well as old products and services gained new, digital dimension and thus, acquired additional quality and cost advantages (Mella 2019).

The given paper discusses just one side of digital business: e-commerce - Buy and Sell of Goods and Services by using internet or other types of IT technologies. Since its invention and development electronic commerce has received many definitions and much attention by researchers, official and private users, business and customers. There are no limitations to the definition of e-commerce. And they vary. Some early-bird researcher defined e-commerce as the conducting business transactions by means of telecommunication networks, sharing business and other types information, implementing business relationships (Vladimir 1996). Little bit later e-commerce was defined as making of commerce with the support of telecommunication-based tools (Clarke 1999). E-Commerce has also been named as doing business through the internet, buying and selling goods and services which are delivered offline as well as products which are “digitized” and can be delivered online, such as computer software, consulting services and est. (Coppel, 2002). Allison regard e-commerce as the electronic conducting the exchange of value by means of computing and communication technology (Alilson, 2013).

The definition for the e-commerce that is adopted in the EU for official use, states that it is "the sale or purchase of goods or services, whether between businesses, households, individuals or private organizations, through electronic transactions conducted via the internet or other computer-mediated (online communication) networks". (Eurostat, 2019). The term also undermines ordering the goods and goods and services which are sent over computer networks, and where the payment and the final delivery of the goods or service is conducted either on- or off-line. According EU definition, electronic commerce also includes the purchase of shares, making financial investments, buying via online auctions, paying for information services from the internet, confirming reservations for accommodation and travel participating in lotteries and betting and ets. Under the term of "digital firm" we undermine a company that uses IT technology in its everyday operations on both internal and external markets (Ackermann and Imoniana, 2019).

E-commerce is implemented via websites offering online shopping carts, booking, ordering or reservation as well as an exchange of electronic messages The digital technologies make easier both entering the markets and market integration through significant reducing communication costs and increasing matching efficiency, which in its turn increases competitive advantage of those who use these novelties (Panova et al., 2020). They support to decrease entry barriers by offering online services, like globally accessible cloud computing and online marketing platforms to small- and medium-sized enterprises and start-ups due to a significant reduction of the fixed costs of running a business both in internal markets and foreign markets. The new type of business operation – Electronic Data Interchange type e-commerce – represents the structured transmission of data or/and documents between enterprises by electronic means allowing automatic processing. Big data equip firms with the opportunity to target products, so they more closely align with consumer preferences grounded on more accurate information about the latter's.

One of the important aspects that support the development of digital business operations, is e-banking providing solutions to deal with new digital environment in the economy via connecting technology and business operations and financial transactions. Milan et al. (Milan, 2011) notes, that banks are required to introduce new philosophy, new strategies, new structures, and new banking models based on new technologies to ensure sustainability to banking system. Therefore, modern banking tends to dynamically develop, adapt its operation to modern changes occurring globally. To achieve this ultimate goal, banks have adjusted its business models and strategies with the latest technologies, to compete both in national and international markets, maintain positions and satisfy customers' new requirement.

As researchers (Oyewole et al., 1998, 2013) note, e-banking is the remote delivery method to perform banking services. Angelakopoulos and Mihiotis (Angelakopoulos and Mihiotis, 2011)) indicate that e-banking covers a wide spectrum of banking transactions, which the can be performed electronically without the need to visit in-personal the bank office. According to this views that has been developing over the past several decades, many services and operations performed by use of IT technologies create the system that is knows as Electronic Banking. Widely spread the Internet and new achievements in IT development are used to support and implement many traditional banking services, such as managing an account and transferring funds among different accounts even among international ones (Rusu and Shen, 2012).

Milan (Milan, 2011) notes emergency of a new banks model, called virtual banks that have a business model enabling to provide online services with a lower operating costs. New digital technologies also enable banks to offer customers some new services, such as electronic bill payments and online investment. Devi (Devi, 2010) list following services provided by the e-banking: internet banking, electronic clearing services (ECS), electronic transfer fund (ETF), mobile banking, telebanking, electronic data interchange (EDI), automated teller machine (ATM) and so on.

Another important aspect that support the development of e-commerce, is the electronic signature. The electronic signature is the online verification of contracts or important documents necessary to prove the validity of online transactions. To say in other words, possibility to offer an approval or agreement online when digital trade and exchange is happening, is key to develop e-commerce. In this context, the electronic signature is an excellent tool to affirm the legal value and validation of online business operations.

The first legislative normative act which recognized Electronic signatures in the EU was the Directive on a Community framework for electronic signature (eSignature Directive) adopted in 1999. Recently, the EU established a new legal framework for electronic identification, signatures, seals and documents by issuing the Electronic Identification and Trust Services Regulation (EU regulation 910/2014/EC - also known as eIDAS Regulation) in 2014. The eIDAS Regulation replaced an EU e-signature directive. Since 1 July, 2016, eIDAS Regulation is in force. The Regulation offers the terms of using for three levels of signatures: basic, advanced and qualified e-signatures. These are also the only types of signatures mutually recognized by all EU member states. While all types of signature are legal, acceptable and valid, only qualified e-signatures are legally identical to handwritten signatures. Qualified electronic certificates are based on qualified certificates which are issued by a Certificate Authorities accredited and supervised as designed by eIDAS Regulation (EU Commission, 2016). At the same time, The EU is adopting strong and sound security requirements for digital signature to ensure its reliability.

E-signatures represent modern means to accelerate online business processes and thus, make accounts receivable and accounts payable, as well as close deals faster by removing transaction barriers and invoicing issues (Sepashvili, 2020). Signatures can be gathered in a matter of minutes, increasing operational efficiency. Moreover, the use of electronic signatures provides greater quality of viability as it provides more transparency: well-designed digital processes and e-signatures can show every detail and changes of the transaction (Adobe, 2017).

5 – Results of the Research

5.1 – *Electronic Commerce*

Alongside with the e-banking and e-signature development, electronic transactions have been considerably expanded during the past decades. In 2017 20% of enterprises in the EU made e-sales (Eurostat 2019). In 2018, 1.8 billion people purchased goods online. During the same year, global e-retail sales reached the 2.8 trillion U.S. dollars. Forecast predicts these number to increase up to 4.8 trillion U.S. dollars by 2021. (Clement 2019). According the United Nations Conference on Trade and Development (UNCTAD), in 2013 the value of business-to-business e-commerce exceeded $15 trillion and with business-to-consumer e-commerce reached the $1.2 trillion. Meanwhile in 2015, the gross value of the cross-border e-commerce reached 300 billion US dollars. Estimates foresees the growth rate, roughly, 25% annually through 2020. (DHL Express, 2016). As UNCTAD (29 March, 2019) number shows, in 2017 e-commerce sales grew by 13% globally and reached 29 trillion US Dollars.

Rank	Economy	Total ($ Billion)	As a share of GDP (%)	B2B ($ billion)	Share of all e-commerce (%)	B2C ($ billion)	Annual average spent per online shopper ($)
1	United States	8 883	8 883	8 129	90	759	3 851

2	Japan	2 975	2 975	2 828	95	147	3 248
3	China	1 931	1 931	869	49	1 062	2 574
4	Germany	1 503	1 503	1 414	92	88	1 668
5	Korea (Rep)	1 290	1 290	1 220	95	69	2 983
6	United Kingdom	755	755	548	74	206	4 658
7	France	734	734	642	87	92	2 577
8	Canada	512	512	452	90	60	3 130
9	India	400	400	369	91	31	1 130
10	Italy	333	333	310	93	23	1 493
	Top 10 Total	**19 315**	**19 315**	**16 782**	**87**	**2 533**	**2 904**
	World	**29 367**	**29 367**	**25 516**		**3 851**	

Table 1 – Top Ten Counties by E-Commerce Sales (Source: UNCDAT 2018.)

Data in the table above shows that the United States, Japan and China are leading in terms e-commerce volumes, which is not surprising given the size of these economies. The more interesting picture is given by the share of e-commerce in the GDP, which indicates the intensity of its use. According to this indicator, Korea is the leader with 84%. It is followed by Japan at 61% and of course, the United States with 46%. Korea and Japan are still among the leaders in terms of the ratio of e-commerce and traditional commerce in Business– to–Business relationship comprising for both as high as 95%, but Italy is in the top three with 93% share. It should be noted that any figure calculated worldwide is much more modest than in the case of the leader countries in terms of using e-commerce. This situation indicates that all countries on a global scale are not actively participating in these types of transactions. Given this fact, we can assume that the volume of e-commerce will grow at an even more impressive pace over the next decade.

New technologies provide good opportunities to small and medium businesses to act at global level and easily access the foreign markets. WTO and OECD numbers on trade shows that, due to the electronic means of communication and by using e-banking and e-signature, relatively small business had access to more customers via cross-border activities. Study presented that off-line sellers mainly exported to one market meanwhile in case of 60% of online purchasing, such kind of firms were selling to more than one market. Furthermore, new internet platforms, such as Upwork and Freelancer, make possible to businesses and entrepreneurs to widely suggest services online. (OECD and WTO 2017). UNCTAD data demonstrates, the share of those buying from abroad encrease from 15% in 2015 to 21% in 2017 (UNCTAD, 29 March 2019). Consequently, cross-border business-to-consumer sales reached $412 billion in 2019, consisting approximately 11% of total B2C e-commerce. This is a 4% growth to previous year numbers (UNCTAD, 2019). Worth to note, that yet most internet buyers yet prefer to purchase goods and services from domestic firms, though cross-border purchase has the growing tendency.

In the EU e-commerce sales comprise one fifth of all firms in 2017, which represents 7% growth in comparison with 2008. These number accounted for 17 % of the total turnover generated by global business in 2017 (Eurostat 2019). In the period of 2008-2017 the share of e-commerce in total turnover in the EU increased by 5% meanwhile the share had been 12% in

2008 and had fluctuate, but steadily grew by 2017 and reached 20% in 2016 and 2017 (see figure 1 and table 2).

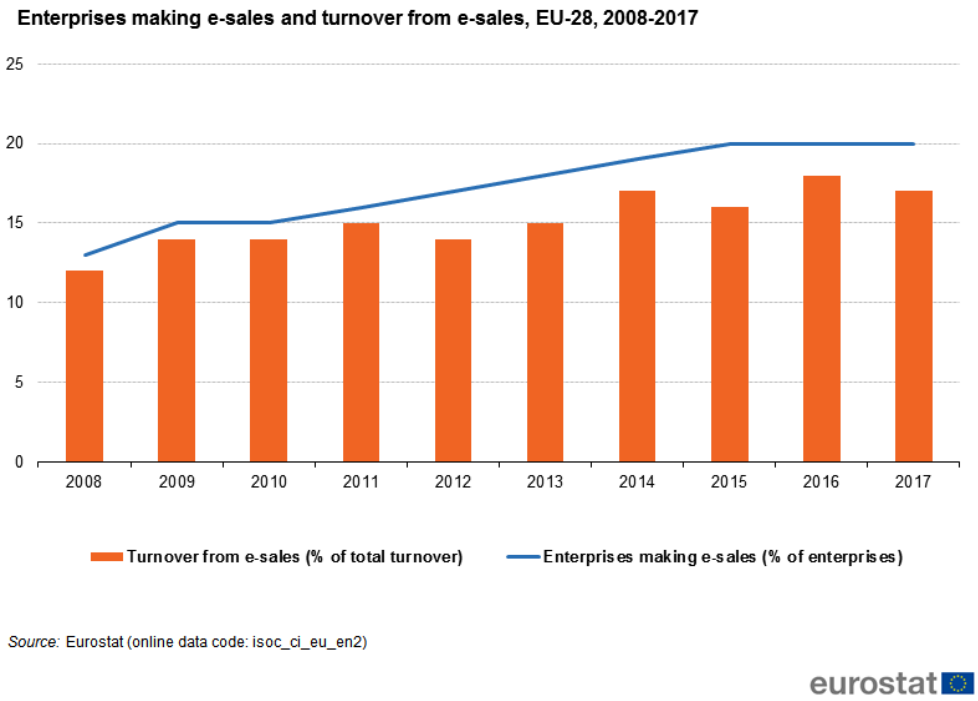

Figure 1 – Enterprises making e-sales and turnover from e-sales, EU-28, 2008-2017

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Enterprises making e-sales (% of enterprises)	13	15	15	16	17	18	19	20	20	20
Turnover from e-sales (% of total turnover)	12	14	14	15	14	15	17	16	18	17

Table 2 – Enterprises es making e-sales and turnover from e-sales, EU-28, 2008-2017

5.2 – *Electronic Banking*

No wonder, increased e-commerce is accompanied by increased e-banking implication. Recent statistical data demonstrates that the e-banking operations and online banking rapidly grows up. According numbers (Statista, 2015), 28.7% of the internet user audience accessed online banking sites in 2012, comprising 423.5 million people. Among them, 45% were visiting online banking sites form the North America, 27,8% from Europe, 25.1% from Latin America, 22% from Asia, and 8.8% from the Middle East and Africa. These figures rapidly raise. Already in 2013, 61% of internet users accessed online banking in the US. These figure reached 43% for Europe (Eurostat 2015), 46% in Asia Pacific region, 45 % in the countries of Africa and middles East and 35% in Latin America (Factbrowser, 2015). In 2018, 51% of adult Europeans used internet banking (Table3). As Eurostat reports (Eurostat, 2018) this share doubled since 2007, when it

stood at 25%.. The usage of internet banking is highly correlated with the educational level. 77% of users with high education and just 24% of users with low education are practicing the e-banking services in Europe (Eurostat, 2018). E-banking is especially popular among youth, 68% of young users, aged 25-34 years old, are using the internet banking. Generally, Study results (Papagiannis et al. 2020) demonstrates that the age of the consumer is an impactful participating factor of sharing economy and surprisingly, on the contrary, gender and annual income are unimportant determinants. Moreover, researchers note, the sample is unbalanced: the majority of the answers were provided by young people.

European commission reports that in 2017 from usage point of internet banking, the leading country was Denmark, where 90% of population aged 16-74 years old, said they were using e-banking. Nordic countries are following Denmark, by 87% in Finland and 86% in Sweden, and slightly ahead is Netherlands by 89% of population performing the e-banking operations. This showing for Estonia was 80%, for Latvia 61% and for Lithuania 56%. Less than 30% use internet banking in Greece (25%) and Cyprus (28%). The lowest shares are registered in Bulgaria (5%) and Romania (7%) (European Banking Authority, 2019).

The European Banking Authority (EBA) Consumer Trends Report for 2018 and 2019, analyzed consumer behavior trends related to financial retail products in the European banking sector and presented comprehensive view of issues related to the financial products and services that most impact bank consumers.

The report concludes that mortgages are the retail product that most impact consumers' finances, where more than half of the European population already uses online banking. The report points 2017 as an important milestone due to the fact that already at that time more than half of EU population was already using online banking. Moreover, it is noted that payments with electronic money is consistently growing annually, alongside with continues decreasing of the paper-based transactions. One of the most important topics is financial education of consumers, who are unprepared to face new solutions based on innovative technologies to use e-banking services.

	Adult Europeans used internet banking (%)	Individuals with high formal education (%)	Individuals with low formal education (%)
2013	42	68	19
2014	44	70	20
2015	46	71	20
2016	49	74	22
2017	51	77	24

Table 3 – Percentage of adult EU citizens who used internet banking in 2013-2017 (Source: Consumer Trends Report for 2018-2019, The European Banking Authority, 20 February, 2019).

This trend revealed by these statistical number presents that consumers are gradually becoming more familiar with new and innovative ways of making payments, in particular the use of internet banking.

Internet banking is particularly popular among 25- to 34-year-olds, with 68% using this facility, confirming that the new generations of consumers are those most willing to interact with their banks and payment institutions through new technologies. Moreover, the use of internet banking tends to increase in line with the education level of the user. While only 24% of those with no education or less than high school level used internet banking in 2017, 77% of those with high school education used this channel in the same year.

5.3 – *Electronic Signature*

Except for e-banking, e-signature is another key tool to accelerate e-commerce over the globe, that supports its development granting security and trust for such type of business activities. Electronic signatures have been supporting business to improve and speed up their operations for more than three decades now. Nowadays e-signature offers provides wider value of benefits. It is more than simply the convenience of electronic signing. E-Signatures delivers substantial efficiency to businesses. So no wonder, that they are widely acceptable and usable for contemporary business operations. The practice of s-signature tends to increase more and more alongside with technological development and rising the awareness and knowledge of its customers.

The online verification of contracts or important documents necessary to prove the validity of online transactions is key for both e-commerce and e-banking. To say in other words, possibility to provide an approval or consent online when digital trade and financial exchange is occurring, is crucial to advance e-commerce. In this context, the electronic signature is an excellent and important tool to affirm the legal value and validation of online business and banking operations. Signatures can be gathered in a matter of minutes, increasing operational efficiency.

The usage of e-signature has been growing and the relevant software market is one of the fastest-growing markets across the globe. In past decade, the growth of e-signature was caused by the gaining spread of e-commerce and a-banking requiring more and more widely online documentation processes, which is valuable and reliable though having e-signature. This process is supported by the development of relevant laws for the e-Signature implication both on national and international level. Another important factor boosting e-signature implication, is growing demand for labour force efficiency, production and supply chain improvements, and for better security. The literacy level and appropriate knowledge of knowing how to use the new digital technology is significantly facilitate the usage of it (Cismaru et al. 2018).

Finance Online Review for Business (2020), published some important development trends proving the rapid development of e-signature implication and growing number of its users. As some estimates demonstrates in the period of 2014-2019, e-signature transactions have increased from 89 million US dollars to 754 million US dollars. According estimates, by 2020 global e-signature market growth will reach 39% and by 2023 e-signature global market will consist 9.07 billion US dollars.

6 – Conclusion

Thus, the new digital structure of economic performance gaining speed in contemporary stage of global economy creates new models of business operation and consumer behavior. Of course it refers to many factors and aspects but the main pillar which entails of all these changes can be formulated in the following way: it is the digital chain of contemporary global economy. Or to say in other world, it is e-commerce gaining the speed and conducting through e-banking and e-signature. This new digital chain is gaining importance and impact on national economies. The data presented in the tables above clearly demonstrates the vivid correlation among e-commerce growth, e-banking progress and e-signature development. These three factors are influencing on each other and the development of one of them entails and requires the development of others. However, to support further development and improvement of these factors, national economic policies should take certain measures in the fields of appropriate and supporting legislative regulation and education, economic environment, physical infrastructure, customers' awareness and skills, technology and est. Despite the difficulties of taking comprehensive and overwhelming measures, the national economic

growth and rise of welfare is inevitably linked to the proper and rapid development of this new digital chain ensuring sound positions of the national economies in international markets and securing stable places of national firms in international competition. The data analysis indicates that all countries on a global scale are not actively participating in these types of transactions. Given this fact, we can assume that the volume of e-commerce will grow at an even more impressive pace over the next decade.

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