

**INFORMATION TECHNOLOGY, GLOBAL ECONOMY AND PARADIGM TRANSFORMATION**

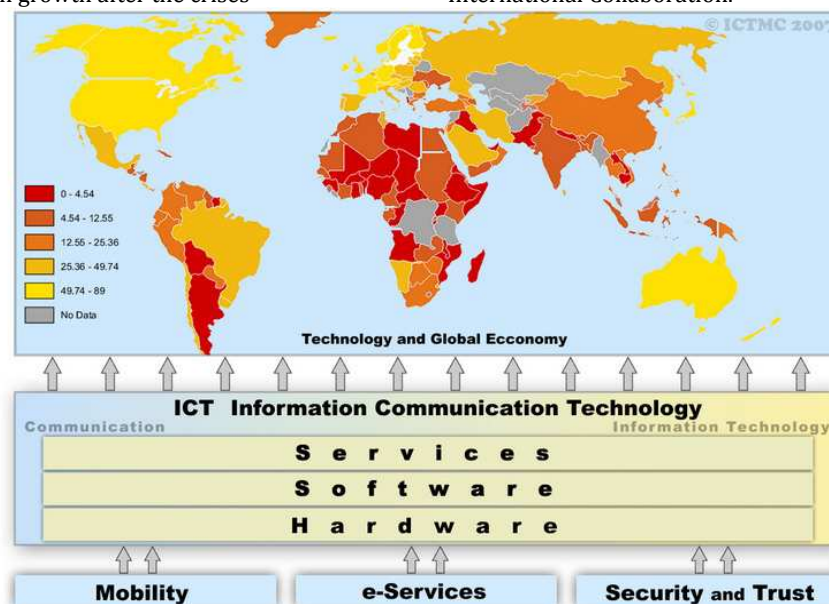
The transformation paradigm for international cooperation in the post-crisis period has been analyzed in the article. The global market of computer and telecommunications technologies was taken as an example. The influence of technological penetration on the economy as a whole was discovered, the comparative analysis of the technological penetration in different countries was carried out. All that has allowed to come to the conclusion that the global economic crisis has created a new paradigm for international cooperation and international strategic alliances, not only in the industry of computer technology, but also in other industries.

**Key words:** paradigm transformation of international cooperation, technological penetration, gross domestic product, the forms of international cooperation, international strategic alliances.

Throughout the world, the Global Economical Disaster forced a paradigm change in the industry sector. The goal of individual industrial entities and international enterprises was to achieve a sustainable competitive advantage, affected by the factors:

1. Growing power of the international marketing channels
2. The need to reduce distribution costs
3. The Increased role and Power of Technology
4. The New stress on growth after the crises

This created a new collaboration processes, governed by achieving the maximum own advantage, independent of whether the collaboration is legal or illegal. It predicted also a paradigm transformation in the international cooperation. In order to analyze this development process and to predict a future optimized collaboration model, the Global ICT Market is analyzed. The analysis process focused on the mutual intertwining between Economy, Technology and International Collaboration.



**Fig.1. Information Communication Technology and the Global Economy**

The development and growth of the sector Information Communication Technology (ICT) market over the recent few years has been exceptional, perhaps even unique in the history of economics. As the ICT market continues to rapidly

grow and expand the direct impact on e-Business and different Web-applications is taking more and more powerful significance. According to the previous section, the parameter Technological Penetration (TP) is used to

measure the technological status and progress for a certain country. It is defined as the number of Personal Computers per 100 inhabitants.

In Fig.1, the upper frame, illustrates the Technology Penetration all over the world. Maximum Technology Penetration (50%-89%) is achieved at North America and some countries in Western Europe. Followed by Asia and some country in South America and East West Africa (25%-50%). Rest of the world shows a penetration less than 25%. This distribution of Technology Penetration indicates also, which countries are potential market for Strategic Alliance and International industrial cooperation, e-Commerce and online services.

The second frame illustrates the Information Communication Technology (ICT) market, where the two components Communication and Information Technology are currently converged, so that it is really difficult to predict only one of the two industries.

The sector ICT, with its three supporting pillars: software, hardware and services, is playing the enabler for all types of online services. Mobility as well as Security and Trust are expected to be the success factors for every future business.

Furthermore, this Figure represents the "Big Picture" for on-line services, its dependency, activating potentials and

geographic distribution worldwide. Subsequently, it presents the role of on-line services as driving factors on the Global Economy.

The comparison of the Gross Domestic Product (GDP) per Capita, within the Commonwealth of Independent Countries (CIS), reveals the fact that Belarus, with a PPP (Purchasing Power Parity) value of almost 15.000 \$ in 2011, is in a good position with respect to the world mean value of 11.000 \$. Moreover, from this diagram we can see that Belarus has a rather high rate of GDP per capita, but still it's smaller than the average value on the World. That's why we may say that Belarus now is in the process of developing its economy and we can expect GDP gross in the nearest future. GDP per capita is higher in Russia than in Belarus, but we should take into account the great difference in area and energy resources that each country possesses.

While comparing Belarus to other countries in the Russian room we see that even the Ukraine, Mongolia that are larger in area have less rate of GDP per capita. It means that territory is not very important and we can expect the growth of GDP per capita in Belarus due to developing technologies and services. The main sources of developing the Belarusian economy are tourism and high technologies.

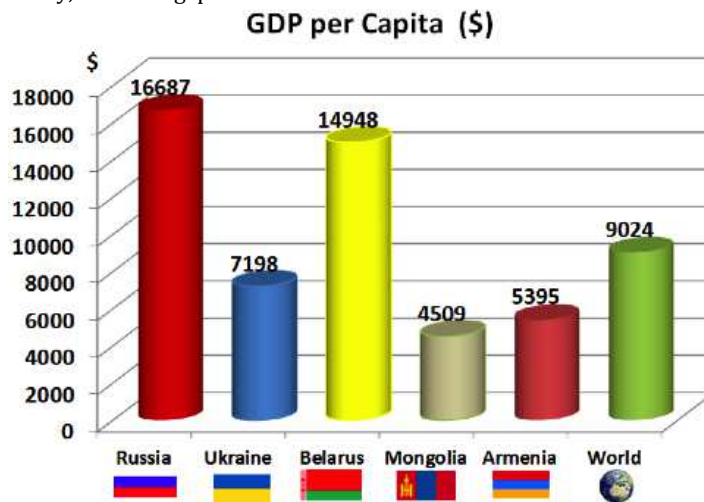


Fig. 2. GDP per Capita in the Russian Region

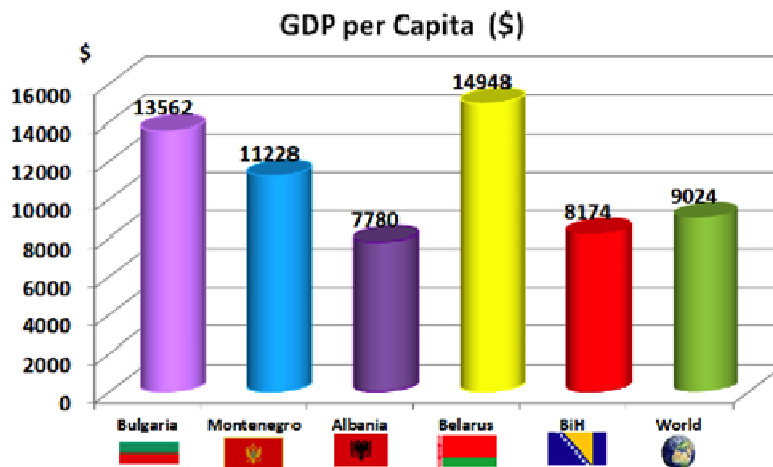


Fig. 3. GDP per Capita, comparison with some European Countries

In comparison with developing countries in Europe, GDP per Capita of Belarus is much higher than that of many European countries, and even higher than that of some

countries within the EU as Bulgaria, Montenegro, Bosnia and Herzegovina, and Albania. Many of those countries have a developed infrastructure of tourism, nevertheless the level

of their GDP per Capita is lower than in Belarus. This gives right way. even more motivation to believe that Belarus is going the

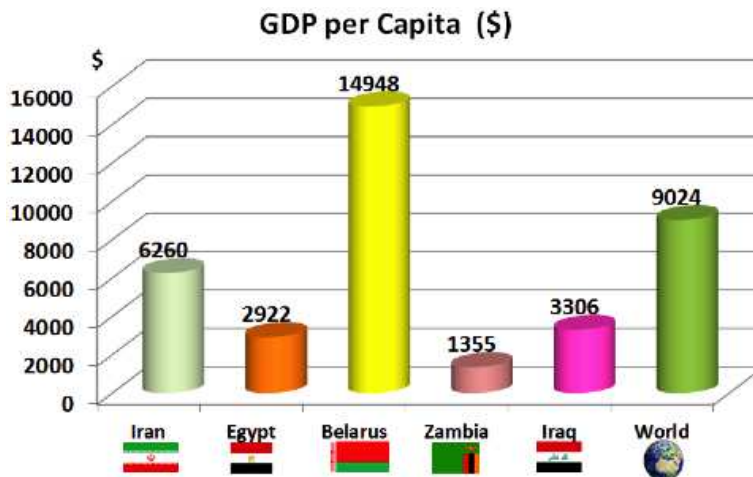


Fig. 4. GDP per Capita in Selected Developing Countries, together with Belarus

We can see the great difference in GDP per capita rates of Belarus and some developing countries. In some countries this rate is smaller, for example in Egypt some political crises has happened that caused economic difficulties. Leaders in this chart are Belarus and Iran. We see a slight difference in the values of GDP per capita of these countries in favor of Iran. But Iran has better rate because of having a large amount of energy resources, especially oil and gas. On the other hand,

Belarus doesn't possess a large amount of resources, so we can say that our economy in the sphere of different services is at the good level, and to improve the rate of GDP per capita we should develop our economy in this direction.

Technology Penetration "TP" in a certain country is defined as the number of persons per 100 inhabitants having online PC's in a certain year. This parameter is considered as the technology progress measure. The following section

presents the TP of Belarus in 2011, in comparison with selected countries, in order to highlight the importance of the Belarus progress.

Undoubtedly, the technology penetration influences the economy of each country. This factor is intertwined with the progress of the Information Communication Industry ICT, which in turns is intertwined with the economical progress. We can see that usually the country with better rate of technology penetration has better economy results. But still we should remember about energy resources and minerals that each country possesses. At the same time Belarus has the better rate of IT penetration even than Russia, so we should keep our leading positions in this sphere. Also Belarus has the perceptibly higher rate of IT penetration than the average value in the World that sounds very optimistic.

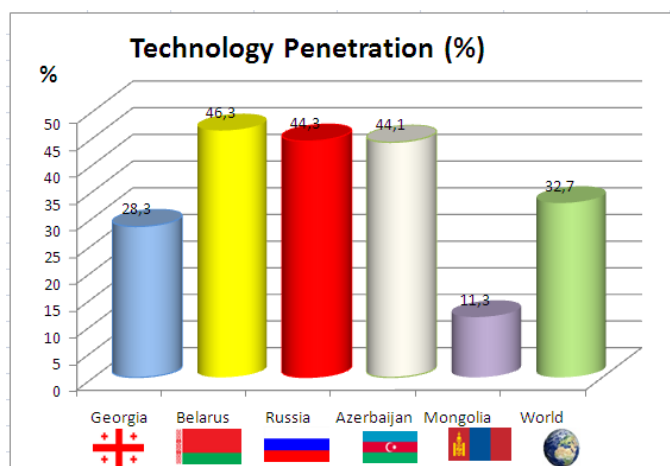


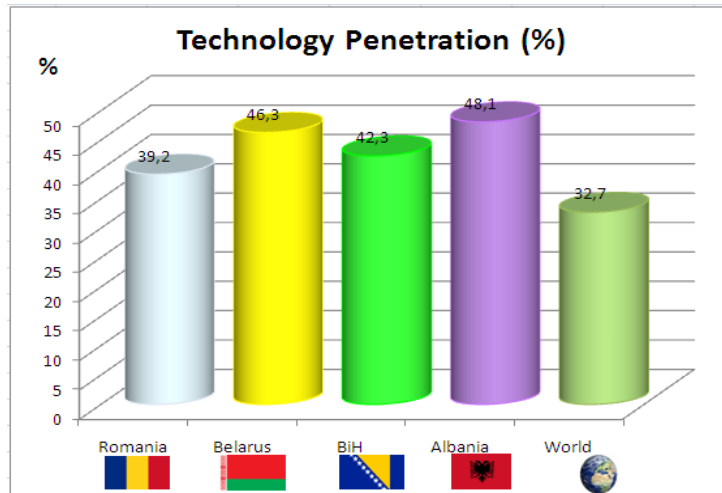
Fig. 5. Technology Penetration in the Russian Region

In October 2003, the two largest Belarusian enterprises, IBA Group and EPAM Systems, were the first in Europe to achieve the SEI CMMI (Software Engineering Institute's Capability Maturity Model Integration) Level 4 Rating. CMMI is a business model that is used to monitor the organization's ability to manage project activities towards success. A CMMI rating provides for organization's

worldwide recognition as a quality provider of systems engineering, software engineering, and IT services. So we can say that Belarus successfully develops its technology.

In comparison with developing countries of Europe, Belarus has an attractive rate of technology penetration. The comparison was held with such countries as Romania, Bosnia and Herzegovina and Albania.

These countries have many similarities in social systems and educational systems as well as a comparative technology penetration.



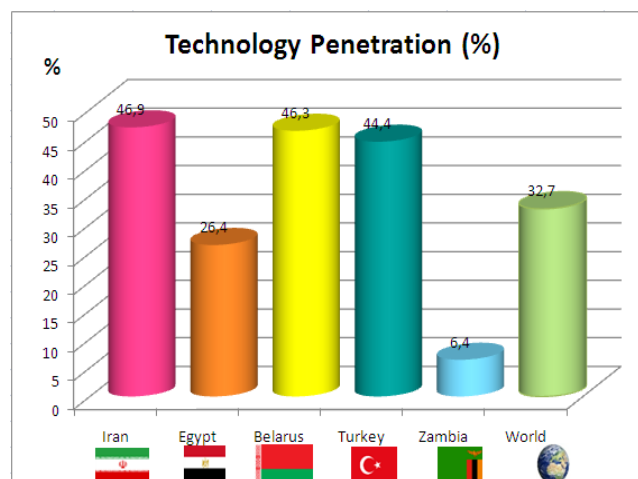
**Fig. 6. Technology Penetration, comparison with some European countries**  
However

Belarus is expected to surpass many countries, according to the announced and on-going Belarusian program to promote innovation and support technology evolution. With a technology penetration of over 46,3 % in 2011, Belarus showed an advance with respect to the corresponding value of the World, which is usually taken as the mean value.

Observing GDP per Capita and technology penetration of those countries, it is easy to come to the conclusion that economic parameters such as GDP per Capita and parameters of development of technology (technology penetration) are strongly correlated. This is supported by the fact that, developed technologies helps to produce and generate more GDP, which in turns, acts as the driving potential to develop more advanced technologies.

Comparing the technology penetration of 2011 in Belarus and these developing countries, see Figure 6, it is

clear to see that the difference in the technology penetration with countries as Iran and Turkey is not very large, in spite of the technological progress achieved in Iran with respect to Atomic Energy. It is a good result for our country because we do not have much energy resources as Iran and the tourism industry is not so popular as in Turkey. We can see also the rather perceptible difference in the technology penetration rate. Technology penetration is one of the important parameters that make the economy successful and prosperous. So each country should use all the possibilities to improve its technology and to develop its economy. With such level of technology penetration we may expect the enhancement of GDP per capita as well as continuous technological progress in Belarus during the next years.



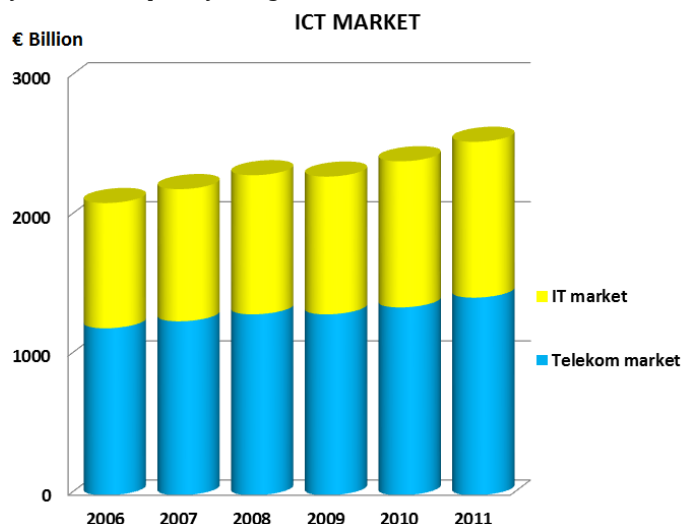
**Fig. 7. Technology Penetration, in selected Developing Countries, together with Belarus**

The world entered the 21st century on a wave of technological optimism, far from bringing the world to a halt. During the economic difficulties. Information and Communication Technologies (ICT) and especially the Communication part, showed to be capable of even generating a new level of global prosperity. The progress of the world ICT Market during the last 6 years (status July

2012) is illustrated in Figure 8, all values are measured. 4

With the US as its epicenter, in late 2006 the subprime crisis triggered a global liquidity crunch putting downward pressure on economic growth. As the International Monetary Fund stated, the worldwide losses stemming from the US subprime mortgage crisis could hit 945 billion dollars as the impact spreads in the global economy.

Today, the large-scale impact of this crisis spread out to cover every national economy, and subsequently the global economy.



**Fig. 8. Development of the Worldwide ICT Market During the Last 6 Years (All are Measured Data)**

In 2006, the global Information Communication Technology market started to exceed the magic mark of 2.000 Billion €, with a steady increase rate. In 2009, the global market in every sector, showed the effect of the recession after the Global disaster. The ICT sector showed a confined effect of the recession, however, this effect was confined only to the fiscal year 2009, after which, the ICT market started immediately to recover, and showed even a resuming to the used progress rate. Thus presenting the proof that ICT market is the main enabler of the Global Economy and subsequently to the Global sustaining development.

Figure 8 reveals also the fact that Communication Market (the blue region) resembles more than 60% of the ICT market

The ratio R :

$$R = \text{CommunicationMarket} / \text{ICTMarket}$$

is continuously increasing, which indicates that in the near future, the R will converge towards the value 1. This means that there will be no pure Information Technology as an island, un-connected to the whole network.

The global communication market reached a record of over 1500 Billion € (see Fig.8). It showed the following break down according to the main global economic domains 5.

**Table 1. The main global economic domains**

Economic Domain	Billion €	%
Europe	346	30,7
US	243	21,6
Japan	164	14,7
BRIC	97	9
4 Tigers	11	1
RoW	264	23

With:

BRIC: Brazil, Russia, India and China

4 Tigers: Hong Kong, Singapore, S. Korea and Taiwan

RoW: Rest of the World

From the growth rate point of view, BRIC are sustaining an amazing growth rate of 7,4 % p.a., whereas the 4 Tigers are moving into the future with speed and skill, showing a remarkable growth rate of more than 6%.2

International Collaboration was traditionally confined in six types:

*Subcontract/Supplier Relationship:* It is usually valid for a short term, with the advantages of reducing risks and reducing costs, however, with the disadvantage of transaction costs.

*Licensing:* Confined to a fixed term, aiming to the advantage of technology acquisition, taking into account the contract costs and the constraints.

*Consortia:* Confined within a medium term. It makes an

advantage of expertise, standards and share funding. However, this is subject to knowledge leakage and subsequent differentiation.

*Strategic Alliance:* which is the most flexible form of collaboration, with market wide access and low commitment and with the main disadvantages: potential lock-in and knowledge leakage.

*Joint Venture:* With long term characteristics. Providing complimentary know-how for both sides, with a dedicated management, but with possible disadvantages as strategic drift and cultural mismatching.

*Collaboration Network:* which is long-term based, providing a dynamic collaboration and big learning potential, however, with a static inefficiencies resulting from

the inertia for the other partners and difficulties to take decisions.

The Global Economic Disaster and the subsequent short recession and recovery phases, created a new paradigm for the International cooperation and alliances. Enterprises are looking for competitive advantages, irrespective of the international regulations or the laws. Just for example, it appears the rational cooperation strategy, Inspired by

military experience in different mighty regimes, which begins with analysing and understanding the environment and circumstances of all partners, then to determine the course of action, then to act immediately. This strategy faces usually two main problems: underestimates the complexity of the internal-external environment and focuses on "hidden monopoly".

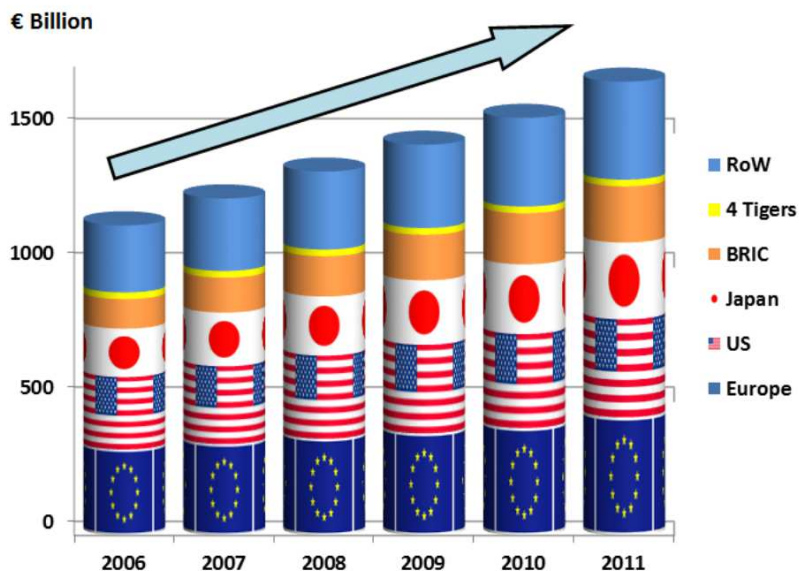


Fig. 9. Global Communication Market by Region

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## РЕЗЮМЕ

**Шаврук Юлия, Реда Реда, Бернат Владимир**

**Информационные технологии, глобальная экономика и парадигма трансформации**

В статье исследована парадигма трансформации международного сотрудничества в посткризисный период на примере глобального рынка компьютерных и телекоммуникационных технологий. Выявлено влияние технологического проникновения на экономику страны в целом, проведен сравнительный анализ технологического проникновения в разных странах. Это позволило прийти к выводу о том, что глобальный экономический кризис создал новую парадигму для международного сотрудничества и создания международных стратегических альянсов не только в отрасли компьютерных технологий, но и в других отраслях.

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## РЕЗЮМЕ

*Шаврук Юлія, Реда Реда, Бернат Володимир*

### **Інформаційні технології, глобальна економіка і парадигма трансформації**

У статті досліджено парадигма трансформації міжнародного співробітництва в посткризовий період на прикладі глобального ринку комп'ютерних і телекомунікаційних технологій. Виявлено вплив технологічного проникнення на економіку країни в цілому, проведений порівняльний аналіз технологічного проникнення в різних країнах. Це дозволило прийти до висновку про те, що глобальна економічна криза створила нову парадигму для міжнародного співробітництва та створення міжнародних стратегічних альянсів не тільки в галузі комп'ютерних технологій, але і в інших галузях.

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