

University of Pardubice

Faculty of Economics and Administration

New Economy and its Economic and Regional Aspects

Ing. Tomáš Lelek

Dissertation Thesis



Pardubice 2010

UNIVERSITY OF PARDUBICE
FACULTY OF ECONOMICS AND ADMINISTRATIONS
INSTITUTE OF ECONOMICS

NEW ECONOMY AND ITS ECONOMIC AND REGIONAL ASPECTS

DISSERTATION THESIS

AUTHOR: Ing. Tomáš Lelek
SUPERVISOR: doc. Ing. Jolana Volejníková, Ph.D.

2010

CONTENTS

INTRODUCTION.....	4
1 ANALYSIS OF THE CURRENT STATE OF THE ISSUE.....	6
1.1 DEFINITION OF NEW ECONOMY	6
1.2 THE SHIFT IN THE UNDERSTANDING OF THE WORD "NEW" IN NEW ECONOMY	8
2 OBJECTIVES OF THE DISSERTATION AND RESEARCH HYPOTHESIS	10
3 APPLIED METHODS OF THE DISSERTATION WORK.....	11
3.1 STATISTICAL ANALYSIS OF ECONOMIC DATA	12
3.2 N-GON OF ICT SECTOR INFLUENCE (NUVICT).....	12
3.3 SYSTEM DYNAMICS AND DYNAMIC MODELLING	13
4 MAIN REACHED RESULTS OF THE DISSERTATION WITH EMPHASIS ON THE AUTHOR'S OWN CONTRIBUTION	14
4.1 ASSUMPTIONS OF THE NEW ECONOMY MODEL.....	14
4.2 DESCRIPTION OF THE NEW ECONOMY MODEL	14
4.2.1 <i>Interaction of the Essential Elements of the Model</i>	15
4.3 NUVICT	17
4.3.1 <i>NUVICT-CR</i>	17
4.3.2 <i>NUVICT – Regions of the Czech Republic</i>	18
5 CONCLUSION.....	20
6 REFERENCES	26
7 LIST OF SELECTED PUBLICATIONS BY AUTHOR.....	40

Introduction

A series of changes occurred in the industrial economy in the last quarter of the 20th century. These changes can be seen mainly in moving economic activity from the secondary sector (manufacturing) to the tertiary sector (services). Throughout the 1980's and 1990's there were other significant changes, especially technological nature. The most important changes include information and communication technologies (ICTs), which due to their penetration and connectivity (the Internet) have changed the way we communicate and have a significant impact on the performance of individual economic entities and the economy as a whole. Moreover, each particular increase of computing power also brings the possibility of new research and development (R&D) that was up to this point technically impossible. Implementation of R&D produces practical (commercial) technological processes, materials and products that lead to innovation.

These changes are commonly included in the so-called "New Economy". New Economy can be viewed as, with a certain simplification, a newly formed structure of the economy, which was created from traditional industrial economy under the influence of transformational impact of modern information and communication technologies (ICT) (SVATOŠ, 2006).

The term "New Economy" is known since the early 1990's. Today it doesn't only belong to journalist or scientific jargon, but due to significant changes in many areas, it has become true to its name. Theorists place the emergence of New Economy around the early 1970's and the period between 1970 and 1990 is regarded as laying the foundation for this new phenomenon. The major part of the New Economy phenomenon is tied to the rise of the information society (information technology) and is linked to the transformation of the contemporary economy. It shows that this is a dynamic process, whose intensity and attributes changed over time.

According to professor Valenta, ICT is part of micro-technologies, which are mass-distributed and represent the highest level of innovation; very similar to the innovation that started the great Industrial Revolution (VALENTA, 2000). The use of ICTs could radically change or even modify the execution of all human activities. This entails their penetration into economic processes and their influence on how the global economy functions, especially cross-border trade and the division of labour, which has undoubtedly a significant regional impact. ICTs have an impact on the global economy as a communication tool, but also are one of the engines of globalization. ICT itself can directly be one of the key factors of regional

development. Their development and mass penetration may suppress or eliminate the importance of spatial allocation of the region.

Another reason for focusing on the impact ICT has on the economy is the potential which it brings. These include a promise to increase productivity, reduce costs and improve and accelerate research and development, whose output in the form of applied innovation will strengthen the position of certain economic subjects.

The thesis is divided into three main parts. The first part is a theoretical introduction of the New Economy phenomenon. Basic terms are defined in this section, especially terms pertaining to New Economy and its instruments. In this chapter a differentiation of the New Economy since the previous economic structure (industrial economy) and characteristics of its developmental stages is also made.

The second and third parts of the thesis work are the so-called research (application) part of the dissertation. The second part deals with the economic aspects of the New Economy, including mainly the productivity of labour or total factors. The hypothesis of the dissertation, which examines the influence of ICT on economic growth, will also be tested in this section.

The second part is also devoted to the theoretical New Economy model. It is comprised of the individual elements of the New Economy, which are mainly analyzed in previous chapters. The creation of this model is one of the main objectives of the dissertation.

The third part is devoted to the regional aspects of New Economy. For the analysis of the ICT sector and its impact on economic magnitudes, the Czech Republic and its regions were selected. This influence is quantified by n-gon of ICT sector influence on the region (NUVICT). Categories were created using the quantifications. The regions of the Czech Republic were divided into these categories according to their average NUVICT-Region value. The indicator NUVICT serves not just as a theoretical tool for classifying regions under the influence of ICT, it also has its practical uses, such as being an indicator for investors and policy makers. The result of the hypothesis, from the first section, with the following aggregate indicator, reflect the impact of ICT on the current economy of the Czech Republic fulfilling one of the main objectives of the dissertation.

1 Analysis of the Current State of the Issue

This chapter describes currently known findings pertaining to New Economy, which serve as a platform for further research.

1.1 Definition of New Economy

Many Czech and foreign economists have attempted to define New Economy. Each one has emphasized different aspects of New Economy. A common ground for all of them is emphasizing the importance of new technologies and knowledge in the development of today's economy. An integrated and universal definition of New Economy does not yet exist. As an example of individual approaches, there are some definitions included in this thesis which are classified according to the focus of the author.

In these definitions, the authors focus on the technical aspects of New Economy:

New Economy means - technological revolution associated with the impact of explosive growth in the World Wide Web (JANSEN, 2006, p. 11).

New Economy is emerging from the simultaneous sharp changes in technology and in the international economic environment. Technologies have become digital and international economy is transformed into global economy. This is accompanied by an increase in the pace of economic and social changes of structural links (EUROPEAN COMMISSION, 2005). New Economy can be described as the new emerging structure of knowledge-based economy, which was mainly influenced by the effect of the transformation of modern information and communication technologies and the globalization process (Czech Statistical Office, 2005).

Other authors have focused on the impact of New Economy Macroeconomic indicators and economic entities:

At the theoretical level this term usually refers to the so-called non-inflationary economic growth accompanied by low unemployment rates (PICK, 2000a, p. 7).

In practical terms this is called "booming new industries using information technology, and pushing or suppressing traditional economic disciplines" (PICK, 2000b, p. 11).

New Economy has become an expression of extraordinary and historically unprecedented gain value creation. It has become not only possible, but in the circumstances of global competition, a necessary result of a crossing of the so-called "high technology" (such as

programmable automation, biological, chemical and environmental technologies, integrated logistics, direct sales, etc.) with a qualitatively new level of informatics (JIRÁSEK, 2000, p. 24).

Potential in New Economy is created by information technology which changes the direction of the way trade functions and causes an upward shift in productivity (KELLY, 1999, p. 15).

Finally, the authors address the increasing importance of knowledge and innovation: New Economy is an economy of knowledge and ideas, a key to job creation; growth of living standards are innovative ideas and technologies in fully integrated products and services (BALÁŽ, VERČEK, 2002, p. 156).

New Economy is defined as an economy in which technological progress has high growth, so much in fact that the economy is critically dependent on knowledge, while globalization occurs through the integration of national economies into world economy and taking into account long-term sustainable growth (JÍLEK, 2000, p. 198).

From the given definitions it is perceptible that despite all the differences in viewpoints, they all have one thing in common, emphasizing the importance of new technologies and knowledge in the development of today's economy.

Based on the analysis of the different definitions reflecting aspects and dimensions of New Economy and economic reality, I have come to my own definition of "New Economy". I personally think that New Economy is the practical use of modern information and communication technology (ICT), which gradually penetrates into all sectors of today's global economy. It leads to significant changes in economic processes and social institutions. ICT is an entirely new way of using knowledge which generates a great deal on innovation. It enables higher efficiency in the production (with simultaneous cost reduction) of existing goods and services, but also the emergence of entirely new products and sectors, which together form the potential for an increase in productivity and economic growth.

1.2 The Shift in the Understanding of the Word "New" in the Title New Economy

The word "new" itself has different meanings when the epithet "new" is associated with time. When this unknown phenomena was discovered it was impossible to accurately determine its nature, so the adjective "new" was used.

New Economy was used to highlight an increase in productivity brought by various technological innovations, or also the long expansion in the business cycle from 1991 to 2000 or even the prolonged boom in the stock market from 1987 to 2000.

The next meaning of the adjective "new" is its content. In most cases it is a "marketing" trick used in order to raise interest in the given subject or phenomenon. This abuse has occurred even in the case of New Economy. An example of this is the rapid growth rate of stocks called "dot.com", which was achieved through the mass investment of U.S. shareholders. These "fictitious" companies only lured money from greedy investors and subsequently collapsed.

Despite the excesses associated with the collapse of the price bubble with regards to the dot.com corporations in the NASDAQ, and the subsequent drop in production and investment in ICT between 2001 and 2003, many respected scientists and academics still view New Economy is something new.

The concept of New Economy can be understood in a narrow and wide sense. In a narrow sense, it is only the anomalies that have arisen in connection with certain macro-economic indicators and it can accurately characterize the paradigm, which arose after 1995 in connection with an unusual growth in the U.S. economy. New Economy and its theories are derived from observations of peculiarities of the business cycle and its remarkably long growth phase (at a relatively low inflation) (Czech Statistical Office, 2005). This paradigm, however, was based on the observation of economic development and has been gradually undermined.

In a wider context it is important to realize that the economy cannot exist and work by itself. Those who give life to the economy and are submitted to its rules and institutions are entities that make up the society. New Economy should be constructed in a broader (social) context, because only by projecting the consequences of the behaviour of its tools on society, can it

prove how significantly it can change the way we conduct day to day task (in addition to economic).

It is necessary to monitor the impact of New Economy instruments, which are ICT in the global process of globalization, which is open to interaction from economic actors around the world. The world is changing the balance of economic forces through international cooperation.

With the fast way of gradual transformation of the industrial economy to a new structure the adjective “new” in the name New Economy represents real changes in economy. These changes are so substantial, that it is necessary to replace or at least to modify current economic paradigm and think over economic laws describing principles of how current economy works.

2 Objectives of the Dissertation and Research Hypothesis

The starting point of this dissertation work is the issues, objectives and research hypothesis.

The main objective of the dissertation work is to create a theoretical model of New Economy functions, which serves for was the analysis of the relationship between New Economy elements and the assignment of its key elements.

Moreover, the thesis aims to assess the impact of New Economy instruments, which are ICT, on economic development in the Czech Republic and its individual regions.

This basic objective is divided into the following sub-objectives:

- to explore the facts of the scientific literature dealing with New Economy and information and communication technologies
- to define the basic terms that relate to the theme of the work (New Economy, innovation, ICT sector, knowledge worker, region, etc.)
- to do a critical evaluation of the development of New Economy based on the data of economic magnitudes
- to analyze the influence of New Economy's main tool
- to build a theoretical model of New Economy with its assumptions and mechanisms of functioning
- to define the importance of individual elements of New Economy Model and provide critical components for its operation
- to asses the impact of the ICT sector in the development of macroeconomic magnitudes at the national and regional level
- to quantify the size of ICT sector impact and classify it
- to propose recommendations for policy-makers in terms of focusing on the various areas, which are key and provide a relatively greater positive effect (e.g. investment - capital, in education, etc.)

In addition to the above mentioned main objectives, the dissertation work should help verify the basic hypothesis, which is determined as follows:

Expenditure and investment in ICT in the Czech Republic have a relatively significant impact on real GDP growth in the long run.

3 Applied Methods of the Dissertation Work

The following methods of scientific work are used in this work.

In the introductory chapter, which provides an overview of the issue, a literature search that relates to the phenomenon of the New Economy, is made.

The method of description was used in introducing features of the New Economy and its ad hoc definitions. The synthesis method was used during the creation of a general and whole definition of New Economy.

In the introductory chapter a comparison method for demonstrating dissimilarities between the New Economy and former industrial economy in terms of whole economy and its subjects is used (e.g. knowledge workers). In the work statistical reported anomalies in the development of certain economic magnitudes are also analyzed. These anomalies are analyzed in terms of ICT impact.

The next chapter contains an analysis of labour productivity from a microeconomic point of view, in enterprises (there's a comparison of ICT sectors for economically advanced countries). Economically advanced countries are compared within the ICT sector. A comparison of productivity is also made in various sectors of the ICT sector in the Czech Republic, where the largest increase for the period refers to telecommunications.

The analysis method is also used at the macro level, where the decomposition of productivity gains of OECD countries is carried. This illustrates gains in capital deepening and gains in multi-factor productivity (MFP). An analysis of the MFP in the U.S. showed that its growth has the largest share of computers and electronics.

Based on the analysis and evaluation of this work, the abstraction method is also applied. By means of this method, the author of this work created his personal New Economy model. Within the constitution of this model a method of observation was also used. Due to this method some types of links among elements of the New Economy model were recognized.

This method is also used for categorizing the regions of the Czech Republic based on the influence the ICT sector has on them. These categories were established according to the values in the indicator the author created. In the Czech language it has the abbreviation NUVICT (n-gon of ICT sector influence).

3.1 Statistical Analysis of Economic Data

The thesis' hypothesis was tested on data from the Czech Statistical Office (CSO).

The following statistical methods were used: extrapolation of data time series, regression analysis and residue analysis, which examine the time series of the chosen economic magnitudes.

Data pertaining to the ICT sector at a regional level was obtained from the Czech Statistical Office (CSO). Unfortunately only four years worth of data was available, due to this it was impossible to use some sophisticated statistical analysis. In order to use this data the indicator NUVICT was created to combine the data.

3.2 N-gon of ICT Sector Influence (NUVICT)

It is based on the idea of magic n-gon used in macroeconomics. Its area shows how successful the economic policy of a given state is. In this work it is applied to the Czech Republic and its regions. It is a composite indicator made of five (at the state level) and four (at the regional level) ratio indicators. The layout indicators of ICT sector influence were chosen according to the economic studies conducted on the impact ICT has on a given area (BUČEK, PÁSTOR, 2008) and (BARRIOS, S. MAS, M. A KOL., 2007).

At the national level (NUVICT–CR) the following five indicators are used:

- the ratio of investment in the ICT sector to investment in other sectors
- the ratio of R & D expenditures in the ICT sector to R & D expenditures in other sectors
- the ratio of gross value added of the ICT sector to the value added of other sectors
- the ratio of total employment in the ICT sector to the number of employed in other sectors
- the ratio of ICT sector enterprises to other enterprises

At the regional level four indicators were used, according to existing regional data, in order to create NUVICT–Region. The four indicators used are the same indicator used at the state level except for ratio of gross value added of the ICT sector to value added of other sectors.

For the purpose of calculating the aggregate indicator NUVICT, values of individual indicators were plotted on the axis and then the surface area of this shape was calculated. The larger the area of the polygon is, the more successful economic policy is

(RUSMICOVÁ, 1997, p. 78). It is necessary to distinguish whether the values of the desired indicators are away from the centre and values of non-desired indicators are closer to the centre (KRAFT, 2008, p. 111). It is not necessary for the aggregate indicator NUVICT to distinguish these qualities because all the sub-indicators have a positive impact on the economy of the territory.

3.3 System Dynamics and Dynamic Modelling

The discipline of system dynamics was developed during the late 1950's by J.W. Forrester of the Sloan School of Management at the Massachusetts Institute of Technology. Currently, it is a method that deals with the construction of a mathematical model of the system's dynamics.

The design of this model consists of three steps:

- construction of causal diagrams describing the system
- construction of stock and flow diagrams
- creation of differentiation equations

Dynamic modelling instruments were used during the creation of the New Economy model. According to the running process in the simulation of this model it was clear, which are the key elements. These elements are critical for the proper function of the New Economy model.

4 Main Reached Results of the Dissertation with Emphasis on the Author's Own Contribution

The main objective of the dissertation is to create a theoretical model of New Economy.

4.1 Assumptions of the New Economy Model

Assumptions for the New Economy model come from the techno-economic paradigm.

ICTs, which are represented by microchips, fulfil all three assumptions of the techno-economic paradigm, they are:

- (1) the cost of electronic chips is continuously falling
- (2) the supply of chips is still available at an increasing amount; chips are used in all types of production processes
- (3) the miniaturization process gives chips increasing memory and computing power. Microchips are embedded in almost all products. The production system of microchips, microelectronics and related technology is very different from assembly lines in factories with mass production (e.g. computer chips are printed). In terms of falling prices, the easier the usage of the chip is and having a plentiful stock of the, the greater their advantage will be compared to older/former technologies. Moreover these advantages give ICT the potential for quantum leaps in productivity during shifts to the techno-economic paradigm in the industry (KUDYBA, DIWAN, 2002, p. 7).

4.2 Description of the New Economy Model

Due to the basis of a former existing scheme for New Economy it was possible to analyze its elements and the links between the elements. Then it was also possible to switch to more complex methods of display and add more links and values, which resulted in the creation of the New Economy model. For further work, the model is graphically captured by a dynamic map which was created in the programme Vensim PLE.

This software can, after putting the mathematical equations describing the relationship between elements, dynamically model the behaviour of the system. In the case of the New Economy model, these equations and their parameters are determined on the basis of qualified estimates.

4.2.1 Interaction of the Essential Elements of the Model

Knowledge workers and ICT are considered to be resources to New Economy, whose interaction intensifies R & D, and hence enables a large number of innovations. Due to innovations in technology and organization of production labour productivity in enterprises is increasing. This is reflected especially in the ICT sector, which according to the statistics has a major share in the increasing productivity of all sectors of the economy. It is obvious especially in the part of the work dealing with the production of ICT. The remaining sectors of the economy are included in the element named “other sectors”. These sectors can not be excluded from the New Economy model because their production is necessary for the function of the economy. These sectors also benefiting from ICT goods and other changes, that support their productivity. An increase in productivity at the micro-level should be reflected in the various sectors of the economy and should lead to an increase in macroeconomic performance of the whole economy (GDP).

Increasing productivity in the ICT sector leads to mass production and massive dissemination of the ICT and simultaneously their performance is increasing and prices are falling.

Social changes reinforce the second component of New Economy resources, which are knowledge workers. One of their characteristics is the ability to autonomously think creatively, creating and using knowledge. For securing these actions it is necessary to have the ability to work with ICT. This motivates people to acquire the ability to work with ICT in order to perform their daily personal or professional tasks. Due to the massive penetration of ICT and the possibility of using ICT in every day life there is non-direct motivation for people to work with ICT, which can lead to an improvement in the personal lives. This is strongly associated with positive externalities, which can be very difficult to quantify and in the model itself are not explicitly included.

The elements described above cause social changes and economic growth. Social changes and economic growth strengthens the model’s sources (input) of the New Economy (ICT and knowledge workers).

From the perspective of dynamic modelling, it would seem that these essential elements and their relationship made a self-reinforced loop. This is not entirely so, because there are few restrictions undermining self-reinforced effect or even anticipated growth.

Obstacles to the Adoption of Innovations

A majority of people have in their character a certain degree of resistance to changes, which blocks the implementation of innovation. It is generally known that people who have obtained a higher level of education are more willing to adopt new innovations than people with lower levels of education. This is very closely linked to knowledge workers, where the vast majority of them assumed that the basis of their knowledge and skills are gained in some area of tertiary education.

Other obstacles in adopting innovation are the necessary costs associated with radical innovations, such as the transition to an electronic method of providing activities (eg. public administration).

Number of Knowledge Workers

This element is one of the sources and has a major impact on the whole model. A small increase in the number of knowledge workers, which occurs after several cycles as economic growth slows down, can in the long term cause the New Economy model to stop working. Likewise, this should occur according to the logical reasoning that technology alone can not have a benefit unless there is somebody who would use it to generate innovation.

The number of knowledge workers, although strongly stimulated by social change, is limited. Social changes do not have a strong enough effect to overcome the natural distribution of mental and intellectual abilities in society. It unfortunately this implies that all economically active workers cannot be transferred to tasks that are carried out by knowledge workers. This is one of the main barriers limiting the growth parameters of the New Economy and it corresponds to the state of resource exhaustion.

If you have enough resources the system grows exponentially, but at some stage after the completion of a few cycles your resources become scarce, which causes the system to collapse (MILDEOVÁ, 2007). In the case of knowledge workers, it is almost impossible to find an alternative. In the distant future, an alternative may be in the form of artificial intelligence.

New Value

This element (New Value) should reflect the shift in the understanding of the economic worth the New Economy era. It is the accentuation of certain aspects of goods, services and skills

that are, in terms of individual economic actors, perceived as useful, yielding a higher return or are important for the development of society. This is especially connected with the transformation of society to information society, which is followed by knowledge society.

New Value can be seen from a consumer perspective, as an added value to a product or service (the greater use of monetary unit of goods or services). Thanks to better feedback, made possible by electronic communication, the product can be better adapted to the requirements of consumer needs or requests. Thanks to innovation even the slightest needs, previously considered irrelevant, can be fulfilled. Next are newly emerged needs (based on the development of new products from new areas).

From the business point of view the “new” value can be primarily considered as the creativity of employees. This creativity reflects innovation which can be commercially exploited.

The next point of view is a new way of creating value through digital networks. For example the proliferation of basic, or trial versions, of the software for free. Further it is necessary to pay for other related services or full version of the product. Higher gains can be achieved by having more members of the network use this software. Thanks to such a network that increases the value of the product, the cost for each additional digital copy converges to zero in comparison with the production of natural (physical) products (KELLY, 1999).

4.3 NUVICT

The ICT sector is significant because its contribution to productivity growth, or its products, is associated with technical progress. Its economic impact has not yet been quantified. The Author of this work contributed to solving this problem by creating his own indicator of ICT sector impact for a given area, which was given the acronym NUVICT. This indicator has been compiled first theoretically. Next the values of NUVICT-CR and NUVICT-Region were calculated. This was accomplished by using data that was available in the ICT sector from the Czech Statistical Office.

4.3.1 NUVICT-CR

Based on the available statistical data the value NUVICT-CR was calculated for the time period 2003-2006.

The analysis of NUVICT-CR values listed in the work showed that the greatest change was caused due to the rapid change in the amount spent on R & D and invested in ICT.

For the period being research NUVICT-CR recorded an annual growth rate of 9%. During the research period NUVICT-CR increased its value by about a third of the baseline in 2003.

Based on the values of NUVICT-CR for the period 2003-2006 it is possible to predict future values. For this purpose, regression analysis was used. The selected linear regression model accounted for 90% of the variability of the data. On this basis, a small error in the prediction data can be assumed. Values obtained for 2009, resulting from the predictions, were compared to the baseline year (2003) twice. It can be inferred that the influence the ICT sector has on the Czech economy is growing very rapidly.

4.3.2 NUVICT – Regions of the Czech Republic

As with previous NUVICT-CR, the larger the value of the area of the imaginary polygon is, the larger is the impact of the ICT sector on the economy of the given region.

The value of the aggregate indicator NUVICT-CR and NUVICT-Region were calculated for each region in each year of the research period. Based on these values, an analysis of the impact of the ICT sector on the regions of the Czech Republic was performed. Also, the situation in the region was analyzed based on institutions and their possible support for R & D with regards to the ICT sector. This area was chosen due to possible innovations, which are considered as a source of economic growth.

In order to compare the impact of the ICT sector on the regions of the Czech Republic an average value using the values for the whole period was calculated. These values showed that the impact of the ICT sector across the region varies considerably.

The Prague Region, where the ICT has the greatest impact on, has an average value of 110, while the Karlovy Vary Region only has an average value of 2.77. This created a relatively large and heterogeneous interval. This interval was divided into three equally sized subintervals according to estimated similar number of regions among them. Due to these intervals, the classification of regions into categories according to the size of the impact of the ICT sector on their economy was performed.

The first category includes the regions which experience the greatest impact from the ICT sector. There are three regions which have the necessary NUVICT values to belong to this category.

The second category contains two regions. The third category contains nine regions whose average value of NUVICT differs substantially amongst them. Therefore, this category was divided into three subgroups for greater diversification.

On the basis of this classification it can be concluded that in areas where the impact of the ICT sector is the largest expenditures will have the greatest effect on the economic situation of the region. Presently the ICT sector is very important for some regions because it can create many employment opportunities for its inhabitants. And it can be important also for the future, due to R & D, which is considered a prerequisite in increasing the competitiveness of regions. From the perspective of future development, high value-added created especially in the service sector of the ICT sector is expected. This can be a source of relatively higher incomes for workers in the ICT sector.

The benefit of this classification is not only a regional breakdown of counties based on the size of the impact of the ICT sector, but also the creation of the value of individual indicators NUVICT-Region that are representative of each category. Based on the values NUVICT-Region, that are representative of the category, a specific Czech Republic region can be chosen, which has the closest average value of NUVICT, and further observations and research can be performed using the selected value.

5 Conclusion

Name of described phenomenon contains adjective "new". Attribute new is usually used for the entities or phenomena, which are still poorly explored. The "New Economy" is defined as a very broad concept at the beginning of this work, due to ad hoc attitude by different authors to this issue. According this New Economy comprises using of ICT, knowledge, innovation, information society and even sustainable development. The New Economy is defined more precisely for the purpose of this work, in order to avoid other interpretation and misunderstanding¹.

From this definition implies the New Economy is based on three main elements. The most important element is the ICT, which massively expanded during the 90's of the 20th century. Other element is knowledge, which is devoted huge emphasis by many authors. They argue that, knowledge effective use within the business process is associated with economic success. The third equally important element is innovation. J.A. Schumpeter described innovation as a "promoting new combinations". Nowadays innovation is associated with the strengthening of competitiveness. From the perspective of the New Economy, innovation is perceived primarily as means for increasing productivity. For example productivity increasing is evidenced on statistical data of multi-factor productivity in the U.S. Production of computers and electronic appliances have the biggest share on multi-factor productivity increasing.

Dissertation objectives

One of the main objective of the work was to create a theoretical model of the New Economy. Platform for this model is a techno-economic paradigm with three default conditions. ICT key element of the New Economy fulfil al these conditions. ICT is a subset of ubiquitous micro-technologies. Another two defaults are fulfilled due to falling price of ICT and its effects on increasing productivity.

¹ Currently is generally used name the New Economy. Over time, if there is proved by scientific methods or empirically, which of the "engines" in nowadays eaconomy has the greatest impact (whether knowledge or ICT or their combination), then phenomenon examined in this work can be renamed. The common name used for expressing a high degree of uncertainty will change in order to better articulates the essence of permanent changes in the economy.

This model was created with use of software Vensim PLE. The relationships between elements were examined in order to find out, which elements are critical for its function, in order to provide sustainable output of the New Economy model. Element represents knowledge workers has shown as a crucial.

The second main objective was to assess the impact of the New Economy, respectively its tools ICT to economic development and regional development.

In the context of economic aspects of the New Economy the hypothesis was tested at work. "The expenses and investments in ICT² in the Czech Republic have a relatively significant impact on real GDP growth in the long run." Hypothesis confirmed significant impact of ICT on GDP of the Czech Republic.

In order to examine the ICT impact on the economy of the given territory, data on the ICT sector were used. Data of ICT sector magnitudes reported for the Czech Republic and its region have become essential for the analysis of the ICT sector impact in a given territory. This analysis is done both for the whole Czech Republic as well as for its regions (NUTS3) for the period 2003 - 2006. Examined economic magnitudes gave rise to n-gon of the ICT sector influence (NUVICT). The impact of the ICT sector on the region was assessed on the values of this n-gon surface area.

Part of the analysis is also profiles of the ICT sector on the region with regard to the preferred R & D, which is perceived as a source of innovation and in terms of the New Economy has cardinal importance. Assessment of ICT sector impact corresponds to the industrial structure for the vast majority of regions. Impact of ICT sector is determined also by a sufficient amount of skilled labour, which arises in the region, or already existed on the basis of business interests in last decades.

The classification of region according to the average value of NUVICT-region during the reporting period is done. There are three categories.

² Expenditures for ICT equipment and services include: intermediate consumption (P.2) Investment - Gross fixed capital formation (P.51 + P.53) and final consumption expenditure by households, government and nonprofit institutions (P.2). Investment (GFCF) in ICT equipment and software includes acquisitions and disposals of tangible (P.511) and intangible fixed assets (P.512) and increase the value of non-produced non-financial assets (P.513). See more CZECH STATISTICAL OFFICE, 2009.

In the first category with the highest average NUVICT value in the interval 110-74 belong these regions: Praha, Plzeň and Pardubice. ICT sector prospers from previously existing electronics enterprises (factories and production facilities) and a sufficient quantity of skilled labour. It is attractive for foreign investors, who invest there their capital (eg. Foxconn, Panasonic).

In the second category with an average NUVICT value in the interval 1973-1937 is Jihomoravský and Zlínský region. These regions have had worse starting conditions and therefore conditions for ICT sector have depend more on their ability to adapt their enterprises and to acquire necessary skills and have a sufficient number of suitably qualified labour force. In these regions it can be expected to gradually move to the first category.

To the third category with an average NUVICT value in interval 36-0 belong majority of the Czech Republic regions. Level of the ICT sector impact varies between them very much. These are regions: Středočeský, Jihočeský, Karlovarský, Ústecký, Liberecký, Královehradecký, Vysočina, Olomoucký and Moravskoslezský. These large categories were divided into three subintervals with the same scale, in order to take into account the large differences between regions with the largest and smallest impact of ICT sector.

Into subinterval of average NUVICT value in scale 36-25 Královehradecký region belongs. It has started to implement a project of IT cluster since the end of the reported period in its territory. This is a good prerequisite for getting in Category 2 in the future.

Into subinterval of average NUVICT value in scale 24-13 belong Olomoucký and Ústecký region.

Into last subinterval of average NUVICT value in scale 12-0 belong these regions: Karlovarský, Moravskoslezský, Vysočina, Středočeský, Jihočeský, Liberecký. These are, despite their awareness of good technological level and assumptions in its structure aimed at a completely different industry than the ICT sector.

According to the NUVICT indicator and sector focus of the examined region can be seen the following stages in transition of its industry to another more perspective industry (eg. ICT sector or nanotechnology, etc.):

1) Predisposition

NUVICT values for the region arise mainly from the historical focus of enterprises in given region. This was evident for the reported period 2003-2006.

2) Adaptation

Another stage of economy specialization of given region is linked with a move way to promote the ICT sector by economic subjects and institutions (local government, specialized agencies). In practice this happens for example in the Královehradecký region, where since 2007 started to emerge the ICT cluster. Furthermore, required education should be adjusted to the new focus of region enterprises (according to the required skills and profession). Investment activities of local government can support this stage of adaptation and should be followed by actions of private investors. This is basically the accentuation of new areas of regions development.

3) Reorientation

At this stage, the region is leaving its historical economy orientation and its economy is built on other sectors than in past. These are within the economic development perspective, such as ICT, nanotechnology, etc. This stage in any of the examined region does not occur. It can be assumed that transition may take more than one decade.

The Main benefits of the dissertation work

The benefits for development of science consists of:

- the determination of the New Economy dissimilarities from the previous economic structure is important for specification of the changes that occurred in the economy and further specification of focus in the research field;
- the general and whole definition of the New Economy includes all its major elements and their anticipated effects and interactions too. This general definition replaces existing ad hoc definitions, which only accentuate certain aspects of the New Economy;
- the confirmation of the significance of ICT for economic growth linked to the volume of investments (expenditures) in ICT, which was lead heavily discussed to in the begging of the 21th century;

- the creation of theoretical model of the New Economy, in order to understand the its mechanisms. It is an important starting point for further research. This model represents the core of the New Economy with added relationships between its key elements, which can serve as a basic module. This can be incorporated into existing macroeconomic models programmed on the same or compatible software. This will enabled simulations effect of other economic entities and financial and material flows associated with their working. Due to it will be enable to get in modelling closer to projecting reality.
- the identification of key elements of the theoretical model of the New economy for its function is necessary for the timely support of entities represent these elements. This entity is knowledge workers, whose number is required to maintain at least equal increments over a given period. Their number and quality can be addressed through education (values) and the way education should be lifetime.

The benefits for practise can be as follows:

- the construction of the aggregate indicator, which is graphically represented by n-gon influence of the ICT sector on given territory. This indicator has abbreviation NUVICT.
- NUVICT was calculated on real data sets for the Czech Republic and its regions. Regions of the Czech republic of the Czech Republic were classified into categories according to average NUVICT value in reported period;
- the category, which includes the given region, reflects the size of the impact of the ICT sector in the region;
- each category has its "representative", to which refer real region with similar average value of NUVICT and this region further examine and analyse effect of regional policy instruments on ICT sector and its transfer to economic indicators;
- due to the NUVICT values for individual regions of the Czech Republic can be chosen region where the monetary expenses would have greater effect in increasing economic magnitudes. It may be used as a guide for investment projects;

- Indicator NUVICT partly reflects socio-economic situation of the region with regard to the scope and nature of R & D and thus innovation in the ICT field.
- Based on NUVICT indicators for the region it is possible to make time series and carry out a comparison of development of ICT sector in different regions over time.

In conclusion, the New Economy is a very broad phenomenon, therefore, by reason of scale and specialization, which provides work and also facilitate the documentation of the effects of New Economy instruments was explored its most significant element – ICT, which as well as pervaded the economy and society, pervades the whole this work. Significant impact of these technologies has been using scientific methods also proved.

Regarding the future development of the economy, in which represents the New Economy fast growing structure is not possible to clearly identify which sectors are drivers of the next, the sixth, Kondratieff wave. Undoubtedly to the development of these sectors contributes micro-technologies and its subgroup ICT. As stated in the work the knowledge workers are important for the development of the New Economy. With the request of their continuous increase raise many questions related to training, education to social issues (population unable to use ICT, equitable distribution of income) as well as power (the concentration of economic and political power of those who own developed and for maintaing the living standards of mankind necessary technology).

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ANNOTATION

The work is devoted to the phenomenon of New Economy, and it is more closely focused on the effects of information and communication technologies and their mass penetration during the mid 1990's to the 21st century, transforming the economy. This newly formed structure is called "New Economy".

The work primarily defines New Economy and new concepts associated with it. It then focuses on the impact ICT has on economic magnitudes and provides a theoretical model of how New Economy functions.

In the section devoted to regional aspects of the New Economy the impact of the ICT sector in the Czech Republic and its regions is analyzed. This influence is quantified on the basis of n-gon of ICT sector influence (NUVICT). Due to the empirically derived values of the parameters fixed categories, into which individual regions of the Czech Republic are classified, were created. This indicator has a wide range of usage in theory and practice.

ISBN 978 - 80 - 7395 - 292 - 1