Indicators for Knowledge Economy

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The Lisbon European Council conclusion was that in 2010 Europe will become 'the most competitive and dynamic knowledge-based economy in the world, capable of sustained economic growth with more and better jobs and greater social cohesion'. The knowledge economy concept is a part of modern society. This paper examines the knowledge economy concept and indicators for measuring the performance of the knowledge economy.
***Keywords**: New Society, Knowledge, Knowledge Society, Knowledge Economy, Indicators.*

Knowledge and Knowledge Society

About knowledge, **Denham Grey** said "knowledge is the full utilization of information and data, coupled with the potential of people's skills, competencies, ideas, intuitions, commitments and motivations" [3].

A basic distinction should be drawn between knowledge and information. Knowledge means that the possessors have the capacity for intellectual or physical action. So what we mean by knowledge is fundamentally a matter of cognitive capability. Information, on the other hand, takes the shape of structured and formatted data that remain passive and inert until used by those with the knowledge needed to interpret and process them. The full meaning of this distinction becomes clear when one looks into the conditions governing the reproduction of knowledge and information.

While the cost of replicating information amounts to no more than the price of making copies, reproducing knowledge is a far more expensive process because some, indeed many, cognitive capabilities are not easy to articulate explicitly or to transfer to others. [Davi01]

I have identified different kinds of knowledge which are know-what, know-why, know-how and know-who. Generally knowledge represents the answer to questions: what, why, how, who. The base of information concept is the answer to -what and why components of knowledge. Other types of knowledge – know-how and know-who –are more difficult to represent. So the information is one of the components of knowledge. The knowledge reflects in fact a deep understanding of information.

In [1] knowledge society is defined like a society that creates shares and uses knowledge for the prosperity and well-being of its people.

In the knowledge society, the fundamental resources are knowledge, product of knowledge and innovation. The knowledge society involves interconnected organization, standard protocols for transfers and communications and in the same time knowledge transfer. The new society is characterized by more knowledge incorporated in the new products and services, by more importance given to learning and innovation, globalization and sustainable development.

Peter Drucker [2] said in his article of Economist:" The next society will be a knowledge society. Knowledge will be its key resource, and knowledge workers will be the dominant group in its workforce.

Its three main characteristics will be:

- Borderlessness, because knowledge travels even more effortlessly than money.
- Upward mobility, available to everyone through easily acquired formal education.
- The potential for failure as well as success.

Anyone can acquire the *means of production*, the knowledge required for the job, but not everyone can win."

In global knowledge society the winners are represented by entity that knows to acquire, manage and distribute knowledge.

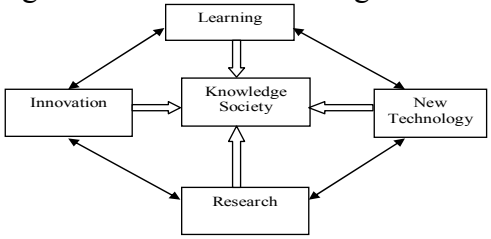

Figure 1 – Knowledge Society

In the knowledge society new technology infrastructure, research, innovation and a continue process of learning are interconnected (figure 1).

Technological progress depends on the access to more and more knowledge and information. The new society proposes to made innovation and to produce knowledge. Today evolution is based by produce of knowledge and because of this is more use in our day the knowledge economy concept.

2. Knowledge Economy

OECD (Organization for Economic Co-Operation and Development) define the knowledge economy " economy which are directly based on the production, distribution and use of knowledge and information". In knowledge economy is very important to make innovation and to investment in knowledge because this are the elements which make to grow the productivity.

In fact, in this economy, knowledge has become the key driver of economic competitiveness and success: it has added massive value to economic production through increases in productivity, and the application of new technologies and new ideas - both in the form of new inventions and also new applications of existing knowledge - has brought revolutionary change to virtually all markets and sectors.[4]

The World Bank has developed the following framework to help countries articulate strategies for their transition to a knowledge economy:

- An economic and institutional regime to provide incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship.
- An educated and skilled population to create, shares, and use knowledge well.
- A dynamic information infrastructure to facilitate the effective communication, dissemination, and processing of information.
- An efficient innovation system of firms, research centers, universities, consultants, and other organizations to tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new technology.

Knowledge economy is characterized by the rapidity of change information and knowledge in services and products fields. In this economy is important to remark that the barriers of communication and the physical distance are lowest, the value of knowledge and information depends on the situation they are used but the mode in which they are understand by the citizen is important too.

3. Knowledge measurement

It is difficult to measure the knowledge because this depends on intellectual capital.

Measurement the performance of the knowledge economy is obstruction systematical by the creation of intellectual capital.

The development of knowledge economy can be analyzed by the investments in higher education, innovation and research, and software. Measurement the performance of this economy is based on the Gross Domestic Product (GDP) indicator.

In generally GDP is the value of total production of goods and services in an economy during a particular period (normally a year). These traditional indicators guide the policy decisions of governments and those of a broad range of economic actors, including firms, consumers and workers. But to the extent that the knowledge economy works differently from traditional economic theory, current indicators may fail to capture fundamental aspects of economic performance and lead to misinformed economic policies.[5]

The traditional indicators can't measuring the performance of knowledge economy because the knowledge isn't a quantitative product.

In [5], [Anth05] GDP for measuring knowledge economy are needed for the following tasks:

- measuring knowledge inputs;
- measuring knowledge stocks and flows;
- measuring knowledge outputs;
- measuring knowledge and learning (human capital).

To **measure knowledge inputs** is similar to measure the investment in the production of scientific and technical knowledge, including research and development (R&D)

Development of knowledge flow indicators

would yield better measures of the R&D and knowledge intensity of industries and economies.

Statistical techniques could be developed to **estimate knowledge stocks** based on current R&D input and flow measures.

To **measure knowledge outputs** and evaluate the performance of knowledge-based economies, priority should be placed on developing improved indicators of the private and social rates of return to R&D and other knowledge inputs. This includes measuring returns to individuals, firms and societies in terms of employment, output, productivity and competitiveness, and could be based on both macro-level econometric analyses and firm-level surveys. One of the great challenges is to develop indicators and methodologies for analyze the impact of technology on productivity and economic growth.

Human capital indicators, particularly those relating to education and employment, are central measures for the knowledge-based economy.

The must important indicators for knowledge economy are the innovation input and output. Romania has a relatively large investment but not so good performance on outputs [6]. Indicator for innovation input is a composite index for inputs (education, investment in innovation, etc) and for innovation output is a composite index for outputs (firm turnover coming from new products, employment in high tech sectors, patents, etc).

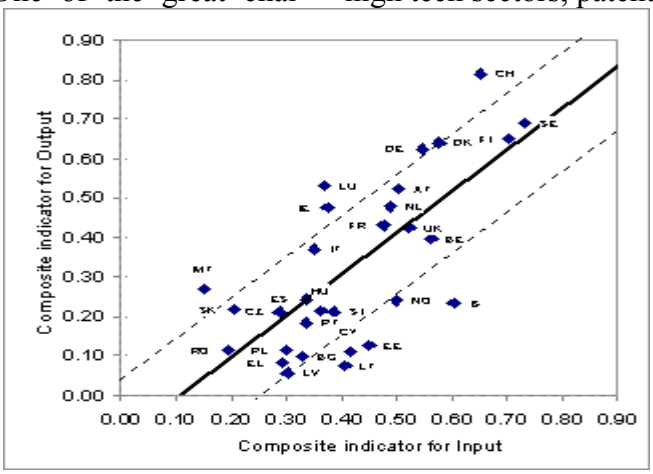

Figure 2. Input and Output [6]

Figure 2 graphs the composite index scores for Inputs against the scores for Outputs. The solid line shows the trend line between both indices. The results give an indication of the efficiency with which a country transforms its innovation inputs (education, investment in innovation) into innovation outputs (turnover coming from new products, employment in high-tech sectors, and patents). Countries above the diagonal line perform better on outputs than on inputs, suggesting that they are more efficient at transforming inputs into outputs than countries below the diagonal line. The innovation is a long-term process and the evolution of the output performance of these countries will likely improve in the years to come, based on current investment in inputs.

4. Conclusions

The base element for knowledge economy is knowledge. Information, research and development, innovation are the important support for knowledge. The research and development can't be done without technology. So technology is the begin of knowledge economy and the ends are trust which are the result of R&D knowledge. So, I conclusion this paper: It is difficult to quantify knowledge economy because knowledge is difficult to measure.

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