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Intellectual Capital in Waiting

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Intellectual capital in waiting

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Abstract

Economic growth is connected with human capital growth - skills and knowledge of workers. On a certain level of technological development new knowledge and ideas will accelerate growth. We can observe and measure knowledge economy from the national perspective and international comparison. For the measurement of influence of knowledge to national competitiveness the concept of human capital has to be upgraded. We need to observe the intellectual capital, which consist of several components, and create a system of internationally comparable indicators. The paper proposes a model to measure intellectual capital on national level, based on a set of indicators related to human capital by gender, business environment, market capital, innovation, technology and development capital. More importantly nowadays, with the fast increasing enrolment of women to universities and prevailing number among the graduates, is to observe the intellectual potential of modern well educated women, a degree of women intellectual capital, incorporation and employment of women intellectuals in a society. Are women in the knowledge economy involved according to their professional expertise or are we intellectual capital in waiting? Is the main reason for limited impact of innovation on productivity because of the gender gap in intellectual capital - unconsidered women brains?

Keywords: smart economic growth, intellectual capital

Smart growth is target of Europe 2020 strategy

New European development strategy Europe 2020 - Smart growth and jobs - puts forward among mutually reinforcing three priorities smart growth on the first place - developing an economy based on knowledge and innovation. Three among seven flagship initiatives to catalyze progress under priority - smart growth:

1st EU flagship initiative - "Innovation Union" with aim to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs;

2nd EU flagship initiative "Youth on the move" with aim to enhance the performance of education systems, and to reinforce the international attractiveness of Europe's higher education and to facilitate the entry of young people to the labour market;

3rd EU flagship initiative "A digital agenda for Europe" - to speed up the roll-out of high-speed internet and reap the benefits of a digital single market for households and firms;

The development targets should be measurable in order to monitor the progress on EU and on national level with transformation into national targets.

However among the indicators is proposed only one corresponding to the ambitious goal: increasing the share of the population aged 30-34 having completed tertiary education from 31% to at least 40% in 2020 (US 40%, Japan 50%).

Smart growth is thus based on highly educated workers - intellectual capital.

Human capital in economic theory and some empirical evidence

Human capital is a microeconomic term referring by definition to the knowledge and skills accumulated by people in the process of their education and training. The pioneer who in early 1964 published a book “Human capital” has been professor Gary S. Becker, Nobel Laureate (1992) from the University of Chicago (Becker, 1993). By his opinion the new economy has increased the value of education and returns for investment on education. The macroeconomic aspect of education and human capital investment is contribution to the economic growth and development.

Economically we can measure human capital as ‘stock’ or ‘flow’ type of indicator, where the first one represents level of education and knowledge of people and the second one reflects the process of education. Highly educated and skilled people have an economic advantage on the labour market earning higher income that is return to their investment in education. The income level is a function of the education and experiences, higher educated people have higher price of their skills, thus earn higher income while entering the labour market and experience more rapid growth during the working life cycle (Samuelson, 1995).

Human capital is from the macroeconomic theory among the four factors of economic development beside the natural resources, capital formation and technology. The most important among the factors has nowadays become human capital as the capital goods can be bought, but can be effectively used in the economic process only by the well educated and skilled workers.

Neoclassical model of economic growth is based only on capital accumulation, while other factors such as the quality of labour force, technology and natural resources remain constant. Increase of capital per employee will increase aggregate output per worker and the economy will move up on the aggregate production function. On a long run neoclassical model leads to a steady state of economy where capital returns become constant and incomes stop growing (Samuelson, 1995).

Economic development is connected to the absorption capability that is defined by the quality of the human capital. Growth conflict is psychological process when people due to the lack of knowledge begin to oppose to the progress. Therefore investment to the machines and equipment must be necessarily accompanied by investment into human capital. Investment from economic point into human capital means education and training of employed people. Educated people are in the present time an active factor of economic development (Mankiw, 1994).

However, competitiveness of modern hi-tech post-industrial economy is closely connected to the quality of human capital. Economic development is related to the fast technological development accompanied by ICT development and flow of information around the world. Economic development is based on the technological development that needs highly qualified and innovative labour force. Technological change shifts the aggregate production function upwards, showing the advances in productivity. Simultaneously the technology development is accompanied by the human capital development that causes second shift of the production function upwards and raising output per worker - labour productivity, together with rising wages and increasing living standards (Samuelson, 1995). Research on economic growth has emphasized that human and physical capital is both important on 'explaining international differences in standards of living' (Mankiw, 1994).

The econometric studies (OECD) confirm a significant positive impact of human capital accumulation to the productivity (output per employee) and economic growth. Although the human capital theory is clearly defined, some dimensions are more difficult to quantify empirically. The human capital defined as capacity for work has five categories (UN, 1996): individual knowledge, experience, skills, capability for work (health), willingness and readiness to work (personality). Some of them can be measurable, while the others have to be estimated.

System of national accounts - SNA includes estimates of national wealth from different aspects: production, consumption, income, capital and financial accounts but no estimates of human capital or labour accounts yet. The first attempt has been taken in Australia with experimental measures of the value of human capital stock with the key notion that 'the economic value of human capital embodied in individuals can be expressed as the discounted present value of the lifetime income streams that they can earn by applying their knowledge and skills'. (OECD, 2001b).

Human capital stock is most often measured by the educational attainment of people according to the personal characteristics like age, gender etc. Another method of human capital stock measurement is observation of labour income paid in a year, assessment of the future income for each group of people according to their educational attainment, to sum the estimated aggregate value of human capital. The static model-based estimate originates from current level of education, while the dynamic model takes into account also the education in process (work-study stage and work stage). Human capital flow is measured also by the observation of people by age - youth and adult - in the process of education and training.

Intellectual capital

Intellectual capital is a broader concept than human capital and refers to other non-financial resources that determine the value and the competitiveness of an enterprise and national economy. The value of an enterprise consists of the physical assets - capital and financial assets, according to the accountancy. From SNA balance sheet measure the value of assets and liabilities; the total value of assets owned by institutional unit or sector or national economy minus the total value of its liabilities is described as its net worth. Among the intangible assets SNA mentions only patented entities.

However, the missing part in the balance sheet of enterprise and national economy is the most important intangible asset of the modern economy - Intellectual Capital (IC). Intellectual capital is source of wealth of the company and national economy and is driving force for smart economic growth.

Generally the main elements of Intellectual Capital are the following:

- Human capital - knowledge and competences of employees;
- Relational capital - relations with external subjects: suppliers, customers, partners, clients (brands), research centers, etc.;
- Organizational capital - collective know-how: information systems, databases, patents, innovations, intellectual property, etc.

Edvinsson (2004) distinguish the following components of the intellectual capital: customer capital, organizational capital and human capital.

The intangibility refers to the fact that IC is not measured in financial terms. All assets of a company/sector/nation have their value in currency. Intellectual capital consists of elements, like the quality of employees or a brand, for which there is no model for monetary expression.

In the last decade there were several attempts to measure intellectual capital and differ according to the definition of intellectual capital and available database for IC indicators. Mostly the focus was IC on enterprise level, but the scheme, data and indicators differ from micro to macro level.

The paper proposes a model to measure intellectual capital on national level, based on a general indicator and set of development indicators related to human capital by gender, business environment, market capital, innovation, technology and development capital. The main stress is on quantitative data.

In addition, we create a system of IC performance and growth oriented indicators on national level. Indicators should measure quality improvement. The ambition is also to create a model with indicators for more in depth analysis on national level. For most of them statistical data already exist, some of them need new data sources and some will need new surveys. Several indicators already exist in international institutions but they are rough and developed mostly for performance analysis and international comparison. Most of them are not growth oriented, some are calculated only qualitatively (using a scale of 1-10), and some are not relevant in the modern times anymore.

General national intellectual capital indicator in our model is calculated on investment for higher education, research and development, and software. Expenditures consist of public, business and private investment. Data on expenditures mostly exist already in the national and business statistics. The main aim of the indicator is observation in time and international comparison. General IC indicator is expressed in value and in % of GDP (PPP).

Human capital is the core component of intellectual capital and represent competences, knowledge and personality attributes embodied in the ability to perform labour so as to produce economic value. The proposed indicators are: employment with university degree, enrollment rate - higher education, graduation rate - higher education, life-long learning, all by gender and published books.

Employment by education is focused on the university degree, which has to be further described as university, masters degree and doctorate. Important is to observe employed with higher education by industries and calculate share of all employed. Data and indicators on employed by education need to be observed more in-depth by gender and 5-year age groups.

Enrollment rate and graduation rate in higher education are standard flow-type indicators but have to be observed also by gender. For matching labour market it is important to observe graduates by kind of study and professions. Life-long learning is necessary for majority of employed in the modern world. However, only having tertiary education is not enough. Intellectuals for smart growth need to be inventive, creative, innovative people, not relying on standard methods and procedures in work. Edvinsson (2002) distinguish three components of intelligence: intelligence quotient IQ, emotional intelligence EQ and synoptical - creative intelligence SQ. While IQ represents rational intelligence, SQ is above the IQ and EQ encouraging growth and development.

Indicator on published books is proposed also by Edvinsson as measure of culture. Presents also open-mindedness. Narrow-minded cannot be creative.

Business environment is on micro and macro level measured differently. On micro level represents relational capital - customers, suppliers, partners, etc. On macro level it is reasonable here to observe: enterprise births, survival rate of newly born enterprises, business structure by the size of enterprises and knowledge intensive enterprises - industries. The first two indicators are very important business indicators and are already available. Important would be also to observe indicators more in-depth: by industries, also by employment. Indicator on knowledge intensive enterprises need to be developed by survey.

Market capital is on micro level result of economic activity output and value added. On the macro level the proposed indicators are: GDP per capita, productivity, exports in GDP, exports of hi-tech products and services, business investment. GDP per capita is often used indicator, it is important, measures growth and the level of development. Productivity is indicator of effectiveness of economic activity, needs to be observed by activities. Exports in GDP is standard indicator, representing openness and competitiveness of national economy. Exports of hi-tech products and services is new indicator and is more important in modern economies. Business investment have main development role, SNA data in most cases represent total value including public investment.

Innovation is next component of intellectual capital, well measured with the indicators: value added in hi-tech industries, employment in hi-tech industries, innovative enterprises and business intelligence. Value added and employment in hi-tech industries are indicators of knowledge economy and should be as such implemented. Indicator on innovative enterprises need to be developed. Business intelligence indicator represents ICT use in enterprises. The indicators on computers per employed and access to internet are not relevant anymore. Nowadays everybody has a computer and access to internet at work. The indicator should be in modern times upgraded, only use of software is also not sufficient. There are five steps to maximize the value of information according to the information evolution model IEM (Davis, Miller, Russell, 2006):

- Operational level: characterized by individual data ownership and control,
- Consolidation level: from individual to department level perspective,
- Integration level: from department to enterprise level perspective,
- Optimization level: enterprise is closely aligned with its markets and gains market leadership by applying predictive insights about customers, suppliers and business partners,
- Innovative level: in which sustainable growth and most revenue potential is fueled by continuing creativity and renewal. Here a significant percentage of revenue is gained from projects and ideas less than three years old.

IEM model is developed on enterprise level but is useful for national level by use of already designed survey. Here we observe the information systems, databases. Intelligent enterprise is progressive and survivor in turbulent times.

Technology and development capital on micro level partially represent organizational capital (patents, intellectual property), on macro level relevant indicators would be: research and development employment, number of patents and patents per employed; all data and indicators should be more detail observed by industries.

Women are intellectual capital in waiting

More importantly nowadays, with the fast increasing enrolment of women to universities and prevailing number among the graduates, is to observe the intellectual potential of modern well educated women, a degree of women intellectual capital, incorporation and employment of women intellectuals in a society.

Two third of university graduates in the year 2009 are women (Slovenia). On the other hand data on the gender pay gap (Cesen, 2003) indicate that the biggest wage differential is between men and women with university degree, even within the same activity. According to the level of professional skills the highest and increasing female wage differential is among university degree holders: women earn one-fifth less than men, mostly because of occupational segmentation and a worse position in the work hierarchy.

Are women in the knowledge economy involved according to their professional expertise or are we intellectual capital in waiting? Women are seldom represented in the group of best-paid occupations or work positions. Among the best graduates from grammar school the substantial majority are girls, while on the other hand among the best paid people there is not even one woman, only men. Stereotypes concerning gender roles in public and private life still prevail.

Is the main reason for limited impact of innovation on productivity because of the gender gap in intellectual capital - unconsidered women brains? The picture of labour market by gender paint high employment rate of women, high educational involvement and success, but persistent pay gap due to lower positions in the work hierarchy. The concept of equal opportunities for women intellectuals is continuing divergence between conventional wisdom and reality. Available data picture women intellectuals in waiting for their career opportunity. However, importance of women intellectual capital is increasing; it is intellectual capital reserve for future smart growth and development.

Intellectual capital model – IC performance and growth indicators

Human capital	Employment with university degree (in all), by gender
	Enrollment rate - higher education, by gender
	Graduation rate - higher education, by gender
	Life-long learning, by gender
	Published books
Business environment	Enterprise births
	Survival rate of newly born enterprises
	Business structure by the size of enterprises
	Knowledge intensive enterprises
Market capital	GDP per capita
	Productivity, value added per employee
	Exports in GDP
	Exports of hi-tech products and services
	Business investment
Innovation	Value added in hi-tech industries
	Employment in hi-tech industries
	Innovative enterprises
	Business intelligence
Technology and development	Research and development employment, by gender
	Number of patents
	Patents per employed

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