THE HUMAN CAPITAL – A LONG TERM INVESTMENT

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Abstract: *Human capital reflects, on the one hand, physical and intellectual skills that characterize work and creative capacity, and on the other, the expenses incurred for optimizing and acquiring such skills. The importance granted to human capital through investment in education and research and development as well as defining the human capital concept, determining its origin and presenting its components and types, as well as the relation between education, human capital formation and economic growth, and equally the correlation between human capital and the allotment of proceeds (income) are the themes this article tackled. Correlation of the educational system supply and the structure and dynamic demand of labor market requires adaptation of workforce supply and human resources to the economic – social needs and the education and training of the same. Education plays a major part in human capital construction and in determining the opportunity of the individual from the economic point of view.*

Keywords: *human capital, investment in education, economic growth.*
JEL Classification: *E24.*

1. The origins of the human capital concept

In the economic literature of the XXIst century, capital is a multidimensional term, being comprised out of terms like: organizational capital, intellectual capital, human capital, relational capital, financial capital, social capital and innovations capital (Edvinsson and Malone, 1997).

In the French dictionary of economic sciences, human capital is defined as being «the combination of social and legal features, that institutionalizes the participation of individuals at the production of goods and services that are valued socially» (Beitone et al., 2001).

"Human capital is the term economists often use for education, health, and other human capacities that can raise productivity when increased" (Torado and Smith, 2011).

Frank and Bemanke (2007) define that human capital is "an amalgam of factors such as education, experience, training, intelligence, energy, work habits, trustworthiness, and initiative that affect the value of a worker's marginal product."

The concept of human capital was examined by William Petty in 1690, with reference to the capitalization of the human capital; after that it was mentioned again by Richard Cantillon in 1755 who stated that the natural resources (land) together with the human capital can produce up to 150 time more products, which leads to an increase in terms of profit. The same concept was analysed by Adam Smith (1776) in "The Wealth of Nations" with reference to the human being, in which he made an analogy between man and machines, that has associated not only costs, but also the possibility to produce income, but not giving a way to estimate the value of human capital.

Other authors such as Alfred Marshall (1890) who stated that all energies, faculties and habits must be included to contribute to the efficiency of individuals. Léon Walras and Irving Fisher insisted, as other economists did, at the beginning of the XXth century, upon including the abilities of the human being among the available capitals. Fisher believed that the individual work could be seen as an input and an investment in education, development and training, therefore, an investment in the human capital. The wealth of a nation consists of the human resources next to the natural ones (Fisher, 1906). Only around the 60's, the concept of human capital began to be applied in the economy by the pioneers of this field Jacob Mincer (1958), Theodore Schultz (1960) and Gary Becker (1964).

Authors, such as Malloch (2003) and Germon et. al (2011) mentions the fact that the modern theory of the human capital has developed around the group from the

University of Chicago, coordinated by Theodore W. Shultz, president of the American Association of Economy, winner of the Nobel Prize in economics. The human capital consists of gathering all previous investments in education, training at the workplace, in health, migration and in other factors that increase individual productivity and as a result the benefits. Sustaining the rationality of individuals, Schultz and his partners treated the expenses made with education and health as investments, with the purpose of increasing labour productivity, and, implicitly the economic growth.

Jacob Mincer (1974), Gary Becker (1964) and those who followed focused more on the connection between the human capital and labour income, specifically the study of income variations according to the individuals' degree of education. This is the purpose of the human capital theory, whose remarkable exposure is realised by Becker in his 1964 work, *Human capital – An theoretical and empirical analysis with special reference to education.* The essence of the theory is simple: the individual's income rise substantially, according to their degree of education. Mincer and Becker concentrated their approach on the human capital on the analysis of the educational capital, emphasizing the costs associated with the investment in training, as well as the relations between the school and after-school investments. The term human capital refers to the volume of useful knowledge gathered by people in the process of professional training and education (Samuelson and Nordhaus, 2001).

"Many workers increase their productivity by gathering new qualifications and perfecting the old ones at the workplace. Certainly, future productivity can be increased only with costs because otherwise there will be an unlimited demand for professional training "(Becker, 1962). The cost include the time and work of the individual, the cost of the one holding the training, the cost of the materials used, etc. Becker includes them in the category of costs, because by using the resources that have spent with personnel training, more goods can be produced. In other words, in order to increase future productivity, the current one is diminished. This principle applies on the short-term, because on the long term, the costs are recovered from the increased profit due to the workers training.

The incomes that will be obtained in the future are at the base of the actual investment in the human capital. Doctors, engineers, lawyers invest many years and money in their professional formation. Part of their salary should compensate for the investment made in gathering human capital.

Other human capital theories stated by Solow (1956) bring into discussion the fact that the investment in the human capital must be done at a macro level, in order to increase factor productivity and national wealth. Many authors (presented in table no. 1), believe that producing and maintaining the human capital stock must represent an investment and not a cost. At present, education-related public expenditure and health-related public expenditure paid by individuals as well as governments and are seen as costs and less as investments.

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Table no. 1 Human capital - an investment or a cost?

Author	**Year**	**About human capital**	**Investment / Cost**
Shultz, T. W.	1961	Human capital – knowledge and skills that people acquire through education and training as a form increasing individual income that yields returns.	Investment

Author	Year	About human capital	Investment / Cost
Becker, G. S.	1964	The human capital as a form of investment at the individual level up to the point where the additional income covers the costs of education.	Investment
Bowman, M. J	1969	The human capital as a form of investment. Expenditures in education, health and social services are the same as the investments made in physical capital.	Investment
Blaug, M.	1976	Human capital seen as expenditures that people make for themselves in various ways, such as, expenses acquired through education in order to obtain in time monetary and non-monetary returns. Individuals as well as governments sustain the direct and indirect costs, being a connection between investments in education and the gains of an individual during his lifetime.	Cost
Romer, P. M.	1987	Human capital determines the increase of the profit of an organization due to the investment in the human resource, through specializations.	Investment
Cohn, E. and Geske, T. E.	1990	Human capital as investment in education and training that generate gains for the individual and the society. Education and training increase productivity, the chances of obtaining a higher income and the contribution to social production.	Investment
Becker, G. S.	1993	The human capital perspective considers how the productivity of people in market and nonmarket situations is changed by investments in education, skills, and knowledge. Education increases skills, acquired skills increase productivity rewarded through higher earnings.	Investment
Rosen H. S.	1993	The human capital is an investment that people make in themselves to increase their productivity.	Investment
Ployhart, R.; Moliterno, T.	2011	Human capital represents the stock of skills, knowledge, abilities and experiences that can be leveraged for organizational and/or personal benefit.	Investment
Bae, S., Patterson, L.	2014	At a micro level, human capital refers to individual accrual, costs and gains and at a macro level, it refers to productivity, workforce market, and mobility, movement of personnel, costs, benefits and risks of the investment.	Investment

Source: resource-based literature review

On the long-term, the general tendency of developing economies, with regard to the labour market, is to pass from a repetitive and static labour, to activities that imply development, applying new ideas, increasing creativity and innovation.

Education and training (formal and informal) reflect in the increase of the individual's productivity, something that leads to increased revenue. We must consider the fact that not all individuals are as productive, because the quality of the labour depends a lot on the education, experience and knowledge gathered by each individual. In practice, measuring human capital cost is restricted to measuring only the cost of formal training (professional training). Human capital can be *"generic"* (general), that means that it can be used in several fields of activity or *"specific"*, used only in certain levels of companies (Germon et al., 2011). Generic human capital is expected to be of value and rare, and the specific one cannot be replaced or replicated (Ployhart, 2011).

Human capital reflects, on the one side the physical and intellectual abilities that define the labour and creative capability, and on the other, the expenses that are made for training and gaining these skills.

The human capital concept is quite complex (Chart no. 1) being formed out of the *native and biological capital* that integrates physical, intellectual and psychological abilities that we are born with, *educational capital* refers to the skills and competencies that we gather during the time spent in an education institution or outside the education system (Blundell et. al, 1999), *capital related to the health state*, it is known that individuals that have a good health state are productive, creative and innovative (Lutz and Samir, 2011) and *social capital* who is used to describe the resources that are at the disposals of individuals or groups through the relations that they created with one-another (Coleman, 1998).

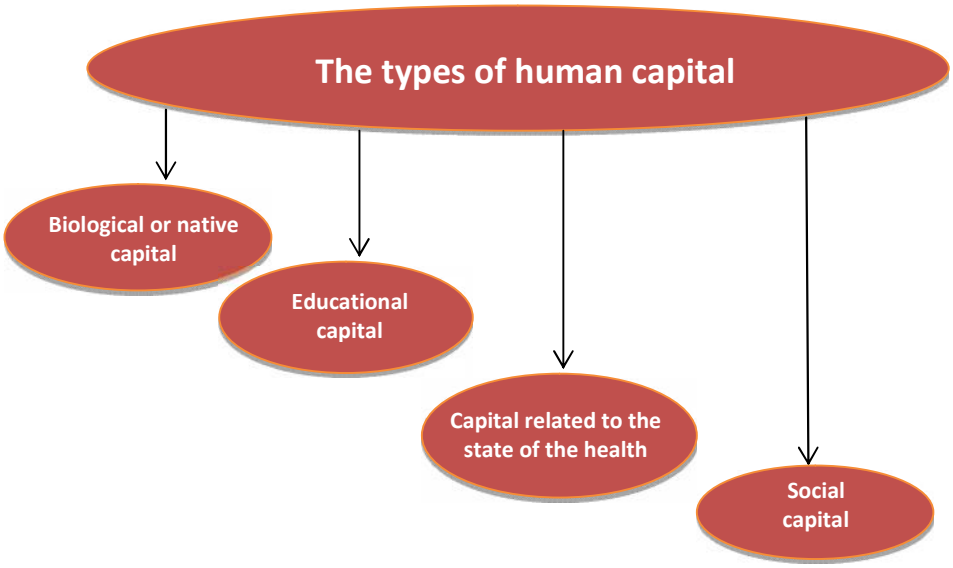

Chart no. 1. The types of human capital

Another category of human capital, considering the investment in the human resource, refers to *tangible capital*, that contains all the expenses made for growing, education and protection of persons until the working age and *intangible capital*, that results from the sum of all the physical, psychical and intellectual efforts made for training, education and social assistance (Kendrick, 1972; Minică, 2005; Nica, 2006; Marinescu, 2012).

Human capital can develop by gathering quantitative knowledge, with the help of technical progress, flexible adjusting programs, etc. Next to this, human capital ensures the

perfect combination of resources necessary to create goods and services needed for a society.

2. Investment in education

Educations plays a key role in the future of modern economies (Spieß, 2013), in forming human capital and determining the chance if a person from an economic point of view. Some researchers believe that the abilities gathered and education contributes to the measuring of human capital, but a significant number of economists reject the idea that human beings can be compared with capital from an economic point of view. Education addresses to the whole personality of the individual, having a deeper impact on a macro level (nationally) rather than on a micro level (individually) (Heckman and Klenow, 1998). Education brings an additional benefit to society because it can be associated to sustainability.

On a national level, the *aggregated human capital* was used specially for describing the level of development of a country or to explain its economic growth. Poverty can determine the degrading of human capital stock, therefore emerging the necessity to develop educational capital as a way of preventing it, by improving the learning systems, especially through investments in continuous learning of individuals (Heckman et al., 1996).

Increasing the level of education, contributes to reducing poverty by realising higher incomes from salaries. The neo-classical economic theory treated the workforce as a production factor. There is close connection between the workforce and the demand for education.

The measurement of human capital is done in several ways. Every firm can calculate the costs that it has with an employee with connection to the income, social activities, training, as well as related material and social expenses; here the education expenditures are not included. A common method in the economics literature is to use one single indicator, that is the level of education according to the average number of graduated years of school (Hamilton and Liu, 2014), but to determine the indicators that influence an efficient investment in human capital, indicators such as the difference between income and expenditure, investment pay-off period, investment value, ratio between marginal income and costs, net profit, etc., are used (Sakalas and Liepė, 2011).

The investment in human capital remains an controversial subject (Psacharopoulos and Woodhall, 1985); measuring and evaluating it at the economic entities level, represents the most difficult problem (Welpe et al., 2007). Jorgenson and Grilichres presented in 1967 the model that contains all contributions to output (Y), namely the physical capital (K), labour (L), technical progress (T) and human capital, represented by the labour quality (Q), (Bae, 2014), that is:

$$Y = f(K, L, T, Q) \quad (1)$$

Individuals will aim either to maximize at present, the value of future gains, either to maximize the profitability rate. In case the factor determined by the technical progress remains constant, human capital (Q), given by the quality of labour, represents another production factor (with secondary capital) that has a price equivalent to the marginal value of the contribution to the workforce quality. This function demonstrates that an optimal level of investment in human capital for companies or individuals' is not possible and that it is necessary to optimize human capital in order to avoid investments that are too high or too low (Bae, 2014).

From the general formula that calculates the optimal level of investment, we can determine de absolute value of human capital (Welpe et al., 2007).

$$\sum_{i=0}^{n} \frac{C_i}{(1+r)^i} = \sum_{i=0}^{n} \frac{MP_i}{(1+r)^i} \qquad (2)$$

where:

C_i – cost of investment in human capital in a period of time *i*;

MP_i – excess (obtained) following the investment in human capital in a period of time *i;*

r – reduction rate;

n – number of workplaces.

In case the value of C (cost of investment) can be determined for a single period of investment and the future gains due to this investment are known, then, the reduction rate equals the rate of return. In the last years, new international data bases appeared, that contain the variables that can draft the more sophisticated indicators such as the level of education reached, differences in the quality of knowledge obtained, differences between productivity and income based on education, the formula being (Giménez et al., 2015).

$$HCS = \Sigma i \Sigma g \frac{w_{i,g}}{w_{1,g}} l_{i,g} Q \qquad (3)$$

where:

HCS – human capital stock of a country;

$w_{i,g}$ – the medium hourly compensation received by a worker with a certain level of qualification i,

with i=, ..., N and for a group g of workers with the same characteristics related to age and gender, with g=1,...., M;

$w_{1,g}$ – the average hourly compensation received by a worker with a basic level of education in each group g of workers, with the same characteristics related to age and gender;

Lig – total number of hours realised by workers that have the same educational level i for each group g of workers, with the same with the same characteristics related to age and gender;

Q – level of knowledge obtained by workers, measured through the grades obtained at international tests.

This indicator identifies the differences related to the productivity between income levels of employees, that have different levels of education, but does not distinguish between age and gender. These differences in productivity are used to balance the total number of hours worked in each economy, based on the number of hours finalised by workers at each level of training (Giménez et al., 2015). As a result, the human capital stock is obtained in working hours, according to the level of basic education that is adjusted through the differences related to the quality of education in different countries, in order to determine if the development level of a country depends on the training level of employees.

The persons that continue their studies, with university courses, hope that the investment they and their families make, will be reflected in the future (after finishing the studies) in a more substantial income compared to the situation if they would have chosen a job after finishing high school.

Certain government policies can discourage individuals in following higher education, something that reduces the productive capacity of the national workforce. Usually, individuals invest in their education, hoping in reciving a higher income, when they are in the labour field. If the rates and taxes of individuals are higher as the income grows, they are discouraged to use their time and resources for obtaining a higher degree of education.

Investments in education have a positive effects on economic growth not only during instability or during crises, but also during stability. During crisis or instability,

qualified and better prepared individuals will find jobs faster and will adjust easier and quickly to the new demands. In the same way, during stability, people with a higher degree of training can activate successfully in any field of activity. The highly educated people have a higher creativity potential that can lead to innovation and inventions from which the whole society benefits. "A highly skilled workforce is a more employable workforce, a better-paid workforce and a more productive workforce" (European Commission, 2011).

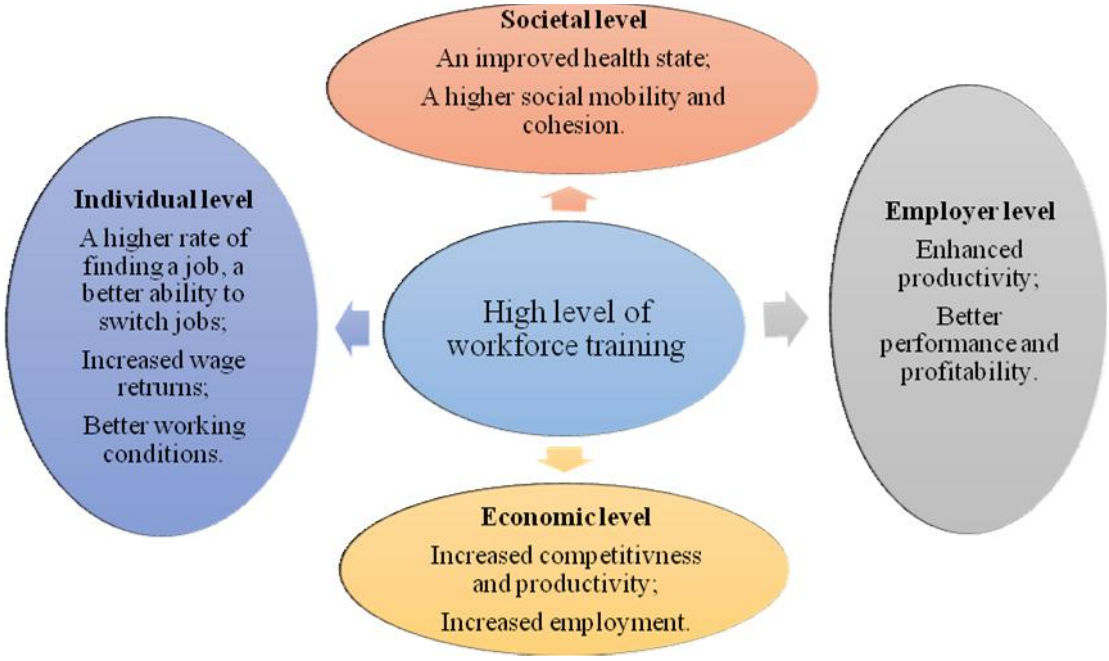

Chart no. 2. The benefits of a qualified workforce

Source: European Commission, Directorate-General for Employment, Social Affairs and Inclusion, Employment Policy Manuscript completed in July 2011.

The development impact of quality education and learning bring rewards to individuals and also to society. The persons that graduate a higher education have better chances of professional career, and the higher the level of education graduated, the higher is the average revenue. Society in general also gains through lower public expenditures with social services and also if tehnological or medical discoveries are made, the benefits are on the long term for society (Chart no. 2). For example, if a doctor discovers a cure for a disease, that pearson is not the only beneficiary, but the whole society that is protected against that specific disease.

Most work from knowledge - based economy, needs beside an education at least on a tertiary level, also a sustained improvement of competencies and why not, new ones, so that the demand for education comes from traditional students (the ones that graduated high school and want to continue their studies) as well as from less traditional students, that is from adults that want to attain new or improved skills (Wei, 2013).

A high level of education can be associated with stability. The more educated a people is, the higher the chances for them to follow current events and understand better their consequences on the family, community and on the nation.

3. Human capital, educational potential in Romania and economic growth

The sophisticated analysis of investment in education and training made by Smith, Marshall, Friedman and others were not integrated into discussions of productivity until Schlutz (1962) and his followers began to explore the implications of the investment in

human capital as economic growth (Beker, 1993). Lack of education, qualification, training, low investment in human capital leads to poverty.

The educational process must be linked to rapid changes in society starting with globalization, to increasing the dependencies between different cultures and finally reaching the information area that has an impact on the new communication and learning technologies therefore offering access to information and education to anyone, in every way and anywhere.

The most used indicator to measure economical and social development is Human Development Index (HDI) (Torado and Smith, 2011) that measures the life expectancy, degree of literacy, education level, standards and quality of life, being a regulated method for measuring wellbeing and economic policies impact on the quality of life. This indicator is used for a better comparison of the development level of a country than the GDP (Gross Domestic Product) per inhabitant that only measures material prosperity and no other social-economic factors. (Philipson and Soares, 2001). The method of calculation of this indicator has suffered changes after 2009, being calculated as the evenly balanced amount with one third from the indicators of life expectancy at birth, level of education and knowledge and the standard of life (GDP/inhabitant expressed according to the purchasing capacity) (Majerová, 2012). From 2010, this indicator is calculated as a geometrical average of three indicators, that is state of the health, level of education and life standard. The state of the health is measured through life expectancy at birth or ”living age”; the level of education is measures through the number of foreseen years of learning an number of realised years. The indicator of life standard is calculated according to the Gross National Income (GNI)/inhabitant expressed in the parity of purchasing power in comparison with the American dollar (Human Development Report, 2014). The level of human development varies on a scale from 0 to 1. The closer the value to 1, the human development index is greater in that country. Countries fit in four large categories of human development, very high, high, average and low. In Romania the HDI has registered an rising trend from 1990 until 2014, as it can be observed in Table no. 2, being situated on position number 53 out of 188, next to Ukraine, Bulgaria and the Russian Federation (UNDP, 2015).

Table no. 2. Human Development Index in Romania from 1990 and 2014

Index	**1990**	**2000**	**2010**	**2011**	**2012**	**2013**	**2014**
Development level very high	0.801	0.851	0.887	0.890	0.893	0.895	0.896
Development level high	0.592	0.642	0.723	0.730	0.737	0.741	0.744
Development level average	0.473	0.537	0.611	0.619	0.623	0.627	0.630
Development level low	0.368	0.404	0.487	0.492	0.497	0.502	0.505
Romania	0.7	0.706	0.784	0.786	0.788	0.791	0.793
Ukraine	0.705	0.668	0.732	0.738	0.743	0.746	0.747
Bulgaria	0.695	0.713	0.773	0.775	0.778	0.779	0.782
Russian Federation	0.729	0.717	0.783	0.790	0.795	0.797	0.798

Source: UNDP, Human Development Report, 2015

The human factor was and will remain the determining factor for economic growth and development. The human factor stands at the base of strategic decisions for orientation and ground rules starting from the present and future necessities.

We can see the development of macroeconomic research that focus on integrating education as an input in the production functions. Countries whose population have high levels of education and professional training are more productive from an economical point of view (Blaug, 1970). The balance must be shifted in favour of innovation in business, technology and knowledge. The development of the IT industry increased the quality of human activity due to the ability to select necessary information, as well as managing efficiently the information, which leads to economic growth. Reducing the physical stress of people is compensated by increasing activities and intellectual capabilities. Human resources capitalization is done in view of increasing labour productivity. Continuous development and training of the workforce represents the main form of self-capitalization of the human capital by using creative and innovative capabilities.

Increasing the funding in research and development leads to a rise in productivity because new technological, management solutions are identified that on a medium and long term impact on the incomes and quality of life, in the same manner in which the results from research and development increase the GNI. One of the objectives proposed by the UE2020 Strategy is that 2% from the country's GNI will be allocated to research and development investments (R-D), so that 1% is from public resources and 1% from private sources.

Romania has values below the national indicated values as seen in table no. 3, investments in research and development decreasing in 2011, when the highest percentage 0.50% from GNI was recorded. Constantly it was situated at a level of 0.49% from GNI in 2012 and at 0.39% from GNI in 2013, so that reaching the target value is far from accomplished.

Table no. 3. Investment in research and development (%GNI) from public and private sources in 2009-2014

	2009	**2010**	**2011**	**2012**	**2013**	**2014**
Total	0.47	0.46	0.50	0.49	0.39	0.38*
Public	0.28	0.28	0.32	0.30	0.27	0.38*
Private	0.19	0.18	0.18	0.19	0.12	

*estimated data from NIS, Data regarding the private expenses for R-D are not available for 2014

Source: National Reform Programme 2015, Bucharest, April 2015, p. 70.

From the OECD member states, the ones that made the most major investments in research and development as percentage from GNI are South Korea, who in 2012 invested 4.4% from GNI in R-D, Finland (3.3%), Sweden and Japan, each reaching a percentage of 3.4% from GNI for research and development (Belitz et al., 2015).

By investing in research and development, the economy of a country develops and creates new jobs. The money spent by companies in training employees are accounted for, as costs, and not as investments, even if the generated profit is significant, based on the increase in employee skills and knowledge.

4. Conclusions

The high number of persons with higher education at a global level is obvious and is due to an economy based on knowledge and emphasis made on increasing the training of the human resources. In Romania we allocate few resources for research and development

and the investment in education is low. Unfortunately we continue to face the situation that universities produce underqualified or overqualified workforce that cannot find an appropriate job on the current labour market.

The reduced interest of a career in research has determined qualitative losses at the level of human resources and has made it difficult to attract trained young people into research. The contexts of dynamic and sometimes unforeseeable changes in society determine a training of individuals that is focused on innovation, creativity and adaptability.

Knowledge is the key element in determining competitiveness. The European Union is trying to compensate in order to recover the gaps of economic growth in comparison with the United States of America, focussing on research, development and innovation. The EU needs to develop new sources for economic growth based on advanced production, sustained by a modern and dynamic business environment. By sustaining the research in future and emerging technologies, their results could be taken by industries and companies that will be able to maintain competitiveness at a global level.

There is a clear and close connection between the performance obtained from education and a degree to employment, having visible effects on reducing the risk on poverty at an old age, as well as over labour productivity and economic competitiveness.

From an economic point of view, without underappreciating the social and cultural field, reaching a high degree of competitiveness by an economic operator within the national economy, is in the responsibility of the human factor.

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