

# Human Capital on the Knowledge Economy: The Role of Continuing Education

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## Abstract

In economy, driven by innovations, the society is developed by the combination of exchange process and knowledge use in the manufacturing and in other spheres as well. The creation, accumulation and effective use of knowledge play a significant role in this process. One of the most important factors that define the forming of intellectual capital, its development and rational use is professional education. The present article analyzes such categories as capital, intellectual capital, its denomination and classification. The authors highlight continuing education as the fundamental factor establishing intellectual capital and the features of the adult workers in the aspect of education. The present article provides a quick review of several strands of a literature of contemporary Russian and foreign researchers and historical examples of the end of the XIX century that provide evidence in support of the topic. Furthermore, the paper represents calculation of KPIs in education as the key factor that creates intellectual capital.

## Highlights:

One of the key factors that denominates significance and use of intellectual capital is education.

Productivity of more educated workers is higher than that one of less educated staff.

We highlighted features of continuing professional education which influence the intellectual potential of an experienced worker.

It has been proved that real monetary return on higher education considerably differs for men and for women.

Thus, continuing education is a key factor influencing the salary, a job attitude, productivity growth and also an economy's ability to develop.

**Keywords:** efficiency, intellectual capital, professional education, the knowledge education, employment, innovation, wage level and wage structure

*"We have good institutions not because we are rich. We are rich because we have good institutions"*

(Bill Clinton, 42nd president of the USA)

## 1. Introduction

Intellectual capital is the most valuable asset of any business, which operates in a post-industrial information society. The significance of this factor for a contemporary firm can be described by the following fact: in order to choose long-term partners American managers assume the intellectual capital percentage in the whole structure of assets. Only in case it exceeds 40% they consider a company to be perspective. Intellectual capital is a collection of all individual's features that can drive profit with the help of his knowledge, skills and abilities, generating ideas, creating pieces of arts or academic work. Moreover, the capital can pay not only to its owner, but also to the firm, where he or she works, to a region or to a country on the whole. Intellectual capital of an individual can also have an international significance, as the scientific progress creates not only know-how (leading to further creation of new technologies and consumption patterns), but also it contribute to the human development and consequently the intellectual development of business and of the whole society.

Nowadays serious changes have been made within the factors which traditionally determine a country's

competitiveness and its position in the global market. First of all, it concerns the relative decline of the importance of the cheap labour force and cheap raw materials in favour to education factor. In regard to this issue, in particular, early in the XIX century a number of studies came to a conclusion that “the cheapest work is not the most profitable” (Economic Evaluation of Public Education, 1896), which was proved by numerous researchers and examples. D.S. Mille in his “Political Economy” stated that “two mowers from Middlesex (*England- author’s note*) can mow the same quantity of grass that six Russian serfs. Although even taking into account the high cost of products in England and cheap expenses in Russia, mowing the same quantity of hay cost to an English farmer 0,5 kopeek and to a Russian farmer- from 3 to 4 kopeek” (Economic Evaluation of Public Education, 1896).

Today only those who lead in such fields as product quality, design, safety and availability can be competitive. Meanwhile these features require big investment in the development of professional qualification of employees (Research a development, 1993). Moreover, developing trends in the innovative economy call for high necessity of a systematic approach to innovation policy, which would be limited not only to high-tech production only, but are also aimed to transform the society due to the exchange and use of knowledge in manufacturing and other fields as well.

In our opinion, one of the most important factors determining the formation of intellectual capital development and its efficient use is education, as well as knowledge accumulation and use. One of the foremost experts of the human capital theory and education economics T. Schultz concluded that “investment in education is relatively more attractive than spending on human capital” (Schultz, 1962). According to a Japanese researcher T. Sakaia (Sakaia, 1999), is connected with the so-called “knowledge-value revolution”, i.e., a revolution based on the values represented by the knowledge. World learning standards are gradually transformed under the influence of changes in the properties of information: contact, authoritative model of schooling is being complemented by distant, interactive learning, which is also based on computer-technologies; therefore, an integral feature of modern education has been formed and turned into a permanent issue through its continuity, implemented in the model of “lifelong learning”.

Continuing professional education is a training focused on improving knowledge, skills and abilities of a person in his or her professional activities. Continuing professional education develops intellectual potential of an experienced adult worker, and therefore has the following features:

- 1) Adult learner is considered to participate voluntarily in schooling. The need for education is stimulated by personal and professional needs.
- 2) An active role of a student in planning his learning methods and models.
- 3) The education process combines both formal and informal forms of learning. (e.g., lectures-discussions, consultations, various workshops in the mode of roundtables lecture, individual interviews, etc.)
- 4) The importance of the development and approval of various forms of recognition and incentives (e.g., a cumulative assessment of a student at the end of the semester is based on his or her work during the semester and independent work).

## 2. Education Cost Efficiency

Efficiency of investing in one of the most important components of intellectual capital - education - depends on the following factors:

- 1) *The ratio of education cost to the marketing evaluation of intellectual work*, that follows training. According to the basic models of the human-capital theory, investing in education is efficient if the future income stream (R) is not less than the total cost of education (C) (or rate of return on investing in education is not less than the market rate of interest).

$$R = \sum_{t=1}^N \frac{W_1 - W_0}{(1 - i_t)^t} = \frac{W_1 - W_0}{i_t} \left[ 1 - \frac{1}{(1 + i_t)^t} \right] \xrightarrow{t \rightarrow \infty} \frac{W_1 - W_0}{i_t}, \quad (1)$$

R C, where  $W_1 > W_0$  - wage growth as a result of an education received;  $i_t$  - the market interest rate for  $t$  period.

Assume that the cost of a higher level of education (postgraduate) is  $C_1$ , and the cost of a lower level (higher education) is  $C_0$ ;  $C_1 > C_0$ . Then:

- a) a non-beneficial condition of receiving a higher level of education would be the excess of the cost of training during  $T_1$  years over future incomes:

$$T_1 C_1 > \frac{W_1 - W_0}{i}; \quad (2)$$

6) a beneficial condition of receiving a lower level of education would be the excess of future incomes over learning expenses during  $T_0$  years:

$$T_0 C_0 < \frac{W_1 - W_0}{i}, \quad (3)$$

and consequently:

$$iT_1 C_1 > W_1 - W_0 > iT_0 C_0. \quad (4)$$

This inequality explains the current trend in the developed countries of higher wages for a more educated category. Highly qualified specialists are expensive experts, the cost of their training  $C_1$  is higher than the cost for vocational education students  $C_0$  (Note 1). It is caused by higher rate of output of more educated employees than that of less educated staff.

According to various estimates, in the developed countries every academic year following the first one brings over than 10% of the annual income growth to an employee (Grigorieva, 2001). This trend has been running for more than one century. In autumn of 1895 P.M. Shestakov carried out a research on the correlation between the literacy of workers and their salaries at the print manufactory "Em. Tsindel". It turned out that a literate employee earns daily 62.3 kopeek while an illiterate only 57 kopeek, i.e. 9.3% less. This can be explained first of all by positive effect of schooling on workers' output and consequently, on their daily earning. Furthermore, the research held by Shestakov stated the influence of employee's age or, more precisely, "of the number of years that a worker has spent at the factory" (Economic Evaluation of Public Education, 1896) on the productivity and salary (see table 1).

Table 1. Comparison of daily earnings of literate and illiterate workers in the print manufactory (Em. Tsindel, 1895)

Age, years	Daily earning of a worker (kopeiki)		Difference in favor to a literate (kopeiki)	Difference in favor to a literate (%)
	For literate workers	For illiterate workers		
15-20	33.5	31.1	+2.4	+8
20-25	51.0	45.6	+5.4	+12
25-30	62.1	48.2	+13.9	+25
30-35	89.7	59.8	+29.9	+50
35-40	88.5	64.3	+23.7	+37
40-45	88.9	69.7	+19.2	+28
45-50	107.5	71.4	+36.1	+51
50-55	85.4	80.1	+5.3	+7
55-60	104.3	73.0	+31.3	+43
60 and over	63.8	88.8	-25.0	-28

Table 1 displays that in 9 out of 10 cases a literate earns more than an illiterate. The difference in favor to the first group ranges from 7% to 51%. The only exception is the age group over 60 years. Probably it was caused by a low quality of education of this category of workers. It is connected with the more amount of input of a literate worker than of an illiterate. Besides, A.V. Gorbunov reflects this difference in 20-50% at a relatively better quality of work and provides as an example a case of Dityatkov Factory where the launch of 8h working day (three shifts instead of two) let reduction within a shift from 20 up to 50% while in a department with illiterate blue collars this reduction failed to be implemented without losing work losses. Hence education is important and rewards not only a worker, but an employer as well. Today experts conducted (Klimov, 2002), that due to labour intellectualization and sharp increase of its productivity in manufacturing and agriculture in approximately 30 years 2% of working population will be able to satisfy the needs of the rest of the world

population. Nowadays the percentage of working population in the developed countries does not exceed 10%, while working in manufacturing—20%.

Moreover, education influences not only quantitative work indicators but personal (moral) features and job attitude and hence, the increasing productivity. In the end of the XIX century the research carried out by the Committee of the 2<sup>nd</sup> Congress of Russian activists in Vocational and Professional Education (Economic Evaluation of Public Education, 1896), proved the following facts, which are still actual today:

- in comparison to illiterate, educated workers are characterized as more “intelligent, more attentive, artful and dexterous and adapt faster to new job conditions and content”, hence, they are more flexible to the new working conditions or the company’s changes;
- “without any exception...literate “blue collars”... are suitable for the position where attention, intelligence and quick eye are required”;
- educated workers “were noted by a better organized workplace, hardly made any errors caused by an indifferent job attitude”, “fraud and theft among such employees are hardly possible”, so their reliability and loyalty are increasing;
- “the intention to improve the work by literate workers with the tools requiring some cleverness and ingenuity”. It presents creative job approach by educated blue-collar workers, their creativeness, wish and capability to improve and efficiency growth.

2) *On the gap between the salary of more educated employee and a less educated blue-collar worker.* This statement is based on the fact that wage rates reflect the difference in their productivity. “Financial income by education” is calculated as the difference between lifetime earnings of cohorts (Schetinina, 2001). In addition to the direct education costs it is also mentioned the so-called foregone income. It is a probable income that could an individual have obtained had worked and not studied. Namely lost earnings measure the value of time the student spent on the creation of his human capital. According to studies the foregone income rate is usually higher than the share of direct cost of education (Schetinina, 2001). In order to compare let us give the following example: in the US the annual revenue of a highqualified employee was 74,600 USD, one that of a Doctor—54,900 USD, of a graduate with a Master degree—49,400 USD, of a Bachelor’s of Science graduate—24,400 USD, of an employee with unfinished higher education—19,700 USD, of a graduate from a secondary school—18,700 USD, of an individual with unfinished secondary education—12,800 USD;

3) *On internal and external efficiency.* Internal efficiency presents the rate between the cost of education and its quality. The increasing of internal efficiency can be achieved by providing the students with study literature, visual aids, raising the level of professor staff, improving curricula and lessons plans. Money spent on schooling will not bring return if a person is not demanded in the labour market. The less unemployment is seen among high educated employees. In order to estimate the demand for specialists in the labour market such criteria as *rate of external efficiency* is introduced. At the same time a low level of external efficiency is able to devalue highest internal efficiency further to the fact that the highest internal efficiency can be socially declined by a low demand of such knowledge in a particular society.

Investment in education is extremely important not only for an employee that gains more and is more demanded, but also for an employer due to the fact that a work of more educated staff has a better quality and is more efficient. Unfortunately, our country suffers a big lack of implementation of innovation strategy, this sphere still keeps the shortage of qualified personnel who could be able to combine the intellectual and technological resources and provide commercialization of innovations in the domestic and global market (Bykova & Musatova, 2012).

### 3. Current Status of Investment in Intellectual Capital

Comparing investment in education and science in 2010, the USA spent 396 bln USD, Japan—142 bln USD, China- 141 bln USD, Russia—22 bln USD. This comparison is not in favour to Russia. In our opinion, the government investments should be the main source. It is truly that a significant increase in investment in research and education is required. According to scientific estimates, only R&D requires an investment of minimum 5% of GDP during 5 years i.e. 3.5 times more than today.

Private investment in higher education also looks very attractive. This investment normally is fully recouped and rewarded. Rate of return on private investment in education for earning a bachelor’s degree varies from 11.8 p to 13.4%, for 1-year post-graduate study—8%, for a master’s degree—7.2%, and for a PhD—6.6%. While, for example, the competition for entering one of the most prestigious world universities, Harvard university, is 200 applicants per place, the tuition is 75000 USD per year that predetermines the high earnings of the graduates,

covering the cost of tuition. The same can be revealed between the cost of higher education in Moscow universities, application competition in these institutions and the return on the accumulated intellectual capital due to the fact that graduates have more chances to gain salary which will cover the expenses on education. In regard to this French researchers Charlot O. and Malherbet F. (Charlot & Malherbet, 2013) held a study on the link between education and labor turnover. Moreover, there is a gender aspect of this issue. Some Russian scientists (Simonenko, A. M., & Baskakova, M. E.) mark that real return on higher education differs for men and for women. In fact the only points that are the same for both men and women include the tuition, payment for student's books and other direct expenses. As far as indirect costs and direct benefit from higher education are concerned, they are being created outside this sphere—i.e. in the employment sector, where the gender discrimination is clearly observed. The analysis of working Russian women let us conclude that it is much more difficult for them to return their expense on education.

#### 4. Conclusion

Therefore continuing education is the key factor that influence the employee's salary, his job attitude, output and efficiency and an economy's ability to develop as well. "We have good institutions not because we are rich. We are rich because we have good institutions"—we would like to connect the present quotation used herewith as an epigraph with the nearest future of Russian business. And just in the case of a high quality continuing education with relevant business and government investment, the economy of a modern country can switch to an innovational way.

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#### Note

Note 1. Там же.

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