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# The impact of corruption on the sustainable development of human capital

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**Abstract.** The article explains the use of the human capital sustainable development index (HCSDI) to assess the quality of the reproduction of human capital. The paper provides the algorithm for calculating HCSDI and its components. Authors estimated cross-country differences of HCSDI and developed econometric model of the impact of corruption on HCSDI. The use of this model has allowed to reveal the mechanism and assess the impact of corruption on HCSDI and its components. The results of econometric analysis revealed a negative multiplier effect: an increase in the corruption of the socio-economic system of the state by 1% caused HCSDI reduce by more than 1%. The results and conclusions may be proxy-assessments of the socio-economic consequences of violations of the stability of reproduction of human capital in the conditions of the growth of corruption in the country.

**Keywords:** human capital, sustainable development, corruption, multiplier effect of corruption

## 1. Introduction

Nowadays the problem of increasing the efficiency of human capital in Russia is becoming particularly urgent. The possibility and pace of withdrawal from the crisis of the Russian economy depend on the correct chosen strategy of human capital sustainable development. In order to overcome the present crisis it is not enough to take measures to save the banking system, financial markets resuscitation and improve the investment climate. They should be complemented by programs of stimulation the development of country's human capital and improvement of the efficiency of its use. Unfortunately, the high level of corruption in Russia, and especially in the social sphere, has a negative impact on the reproduction of the human capital. Corruption in the social sphere in Russia has reached a level at which the country has a serious loss in the economy, governance efficiency, quality of life, trust in public institutions. According to the degree of corruption, the lead areas are education and health care that directly impairs the quality of human capital.

Corruption, as a phenomenon, is widely studied by both foreign and Russian scientists and practitioners. The effectiveness of the proposed methods of combating corruption has been investigated by Elizabeth Harrisson [9], Mushtaq Khan [12], Graham Harrison (10), Dan Hough [11],

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and others. The last tries to track progress in the fight against corruption on specific country examples. The attempt to combine the description of corrupt practices in the broadest number of sectors of the economy has been made in the work under edition of Edgardo Campos and Pradhan Sanjay [5] under the auspices of the World Bank.

However, in our opinion, the impact of corruption on the stability of the development of human capital remains hardly explored. Insufficient degree of the problem development and the presence of a large range of controversial issues have defined the purpose and objectives of this study.

## 2. Materials and methods

The analysis of approaches to the evaluation of human capital allows us to choose a number of distinctive features in the selection of evaluation criteria. The classics of the human capital theory Gary Becker, L. Thurow, T. Shultz, M. Friedman [3,7,16,17] see the assessment of human capital in the calculation of the economic effects of its use and the revenue that will be generated in the future. M. Friedman considers human capital as a form of assets, alternative to money. A feature of this method is that it takes into account the total income of the individual property. Nevertheless, it does not reflect many of the indicators used for the analysis of human capital, a number of additional costs for human capital is not considered. G. Agiomirgianakis, D. Asteriou, V. Monastiriotis, E. Dinopoulos, P. Thomson [2,5] propose an approach to the evaluation of human capital, based on the accumulated knowledge during the personnel education, S. Cabrilo, X. Zhu, J..Huang develop their research [4,18].

The advantage of these approaches is the possibility of determining the income from the use of human capital, but it does not take into account the cost of its reproduction.

The other approach is the index method. The index method is used to bring the various elements of human capital to a single coordinate system.

The most famous index that is used in the practice of evaluation of human capital is the Human Development Index (HDI).

In our opinion, the drawback of HDI, as well as of other composite indices, is that the algorithm for their calculation does not include the degree of consistency with each other private indicator included in the calculation of the index. Meanwhile, if the values of the partial indicators of the index are relatively close to each other, then this index is more stable than in the case of private index figures are significantly different from each other.

To eliminate this drawback of HDI, we propose to use the human capital sustainable development index (HCSDI).

$$HCSDI = \frac{HDI}{\sigma} / \max \left\{ \frac{HDI}{\sigma} \right\} \quad (1),$$

where HCSDI – human capital sustainable development index;

HDI – human development index;

$\sigma$  - standard deviation of private indicators included in the calculation of the HDI, from their average value;

$\max \{HDI / \sigma\}$  – the maximum value of the test indicator in the population.

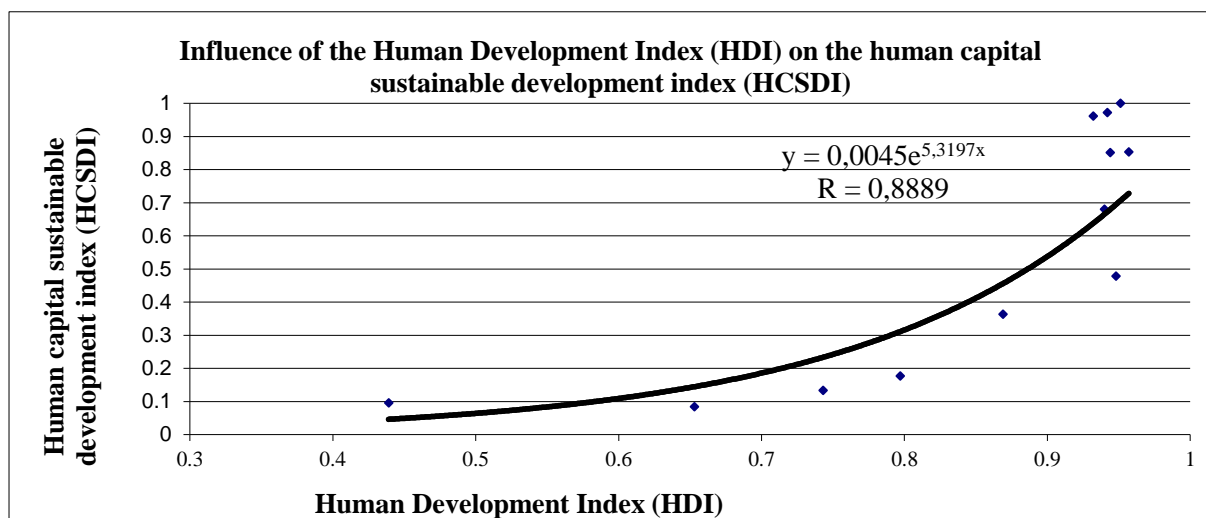
$$\sigma = \left( \frac{\sum (X_i - HDI)^2}{n} \right)^{1/2} \quad (2),$$

where  $X_i$  - the value of the i-th private indicator;

n - total number of individual parameters included in the composite index (in the case of HDI n = 3).

Division by  $\max \{HDI / \sigma\}$  in proposed formula (2) is necessary in order to bring all values of HCSDI to comparable measurements scale - from 0 to 1 (by analogy with HDI scale).

The interest question is the mutual influence of the HDI and HCSDI on each other. In order to identify the nature of the influence we have constructed the regression model (Figure 1). The study went to the analysis of modern trends in the formation of human capital, carried out with using a statistical framework and methodological tools of UNDP [20], the Federal State Statistics Service of the Russian Federation and some selected surveys.



**Figure 1.** Influence of the Human Development Index (HDI) on the human capital sustainable development index (HCSDI)

As it shown in Figure 1, there is a stable relationship between the studied indexes, and it's evidenced by the rather high, close to 1, value of the correlation coefficient (R). So, there is a direct relationship of these factors. Therefore, *ceteris paribus*, the higher the value of HDI, the higher the value of HCSDI. The smaller the spread between the proportions of the individual elements of the reproduction of human capital (i.e. the higher the HCSDI), the higher the efficiency of the system as a whole (HDI). The conclusion is that the state, society and individual businesses should strive for sustainable, coordinated development of education, health and economic development in general. In this case the additional synergy effect will be provided for sustainable development of human capital.

### 3. Investigation of the influence of corruption on the sustainable development of human capital

The efficiency of the reproduction of the human capital is closely linked to an institutional trap of corruption. Views on corruption range from perceptions of corruption as a deviation from the law to a broader concept, including corrupt behavior that violates social and moral norms [8,13].

The most complicated forms of corruption acquired in countries with economies in transition.

Thus, according to The Corruption Perceptions Index Russia in 2015, Russia ranked 119 out of 167 countries [19].

Corruption in Russia is the result of the unformed institutional system. It gradually transformed from anomalies to the social norm, the most important regulator of social and economic relations. Corruption generates destructive economic, social and political effects such as reduce the rate of economic growth, reduce the public expenditure on education and health care, social stratification of the population, informal employment development [11], etc. All the listed effects of corruption negatively affect the development of human capital, but the most destructive factor is a reduction of costs on development of education and health care as on the basic spheres of formation and development of human capital. If in the size of bribes there are such leaders as lobbying legislative initiatives, corruption in the courts and state registration authorities, then in the intensity (frequency) of bribes in Russia leading spheres are education and health. [15]

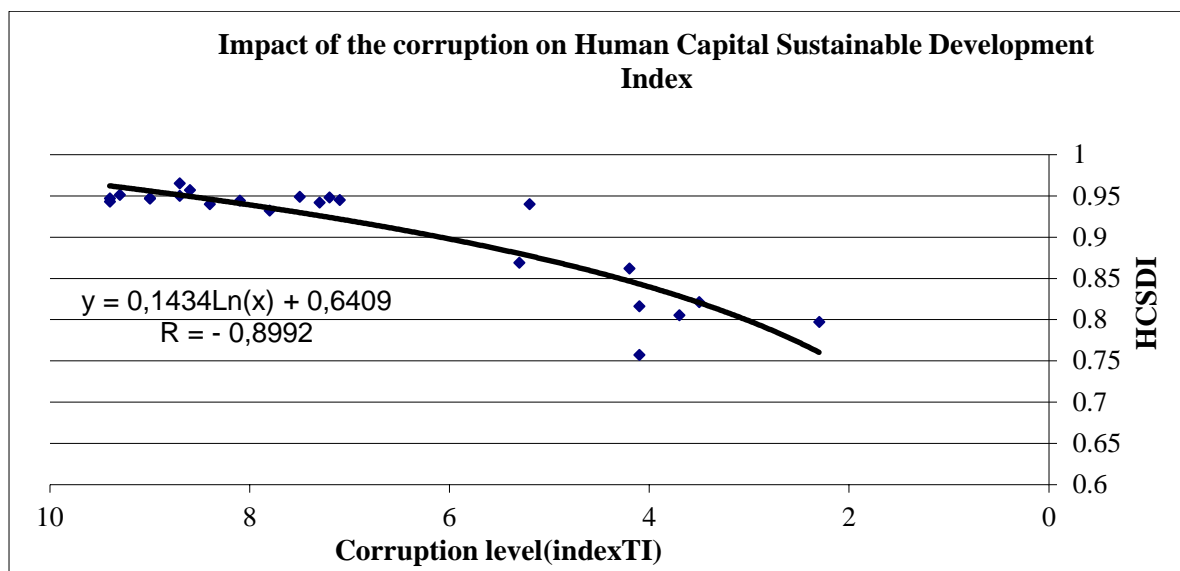
Integrated model of the impact of corruption on the sustainable development of human capital can be represented as follows:

$$\text{The impact of corruption on HCSDI} = f(\text{AQH}, \text{AQE}, \text{DI}) \quad (3),$$

where AQH -Availability and quality of health care;

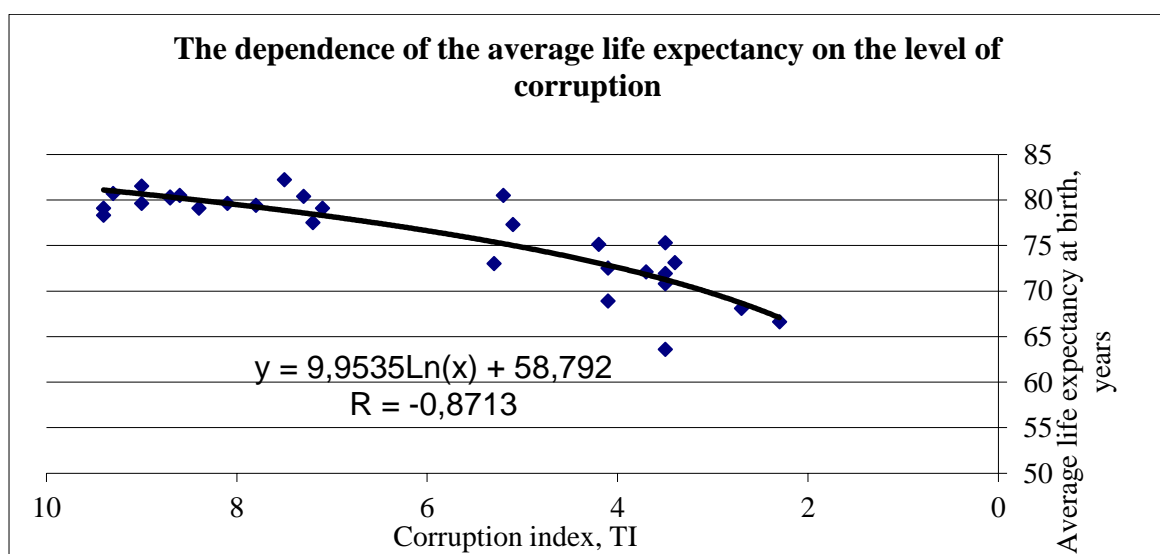
AQE - Availability and quality of education;

DI - Differentiation of incomes of the population.



**Figure 2.** Impact of the corruption on HCSDI in Russia

The study has revealed the relationship between level of corruption in the state and the HCSDI (Figure 2). The resulting function is rapidly decreasing. This suggests that an increase in the level of corruption in the state by 1% leads to HCSDI reduced by more than 1%, i.e. there is a negative multiplier effect.



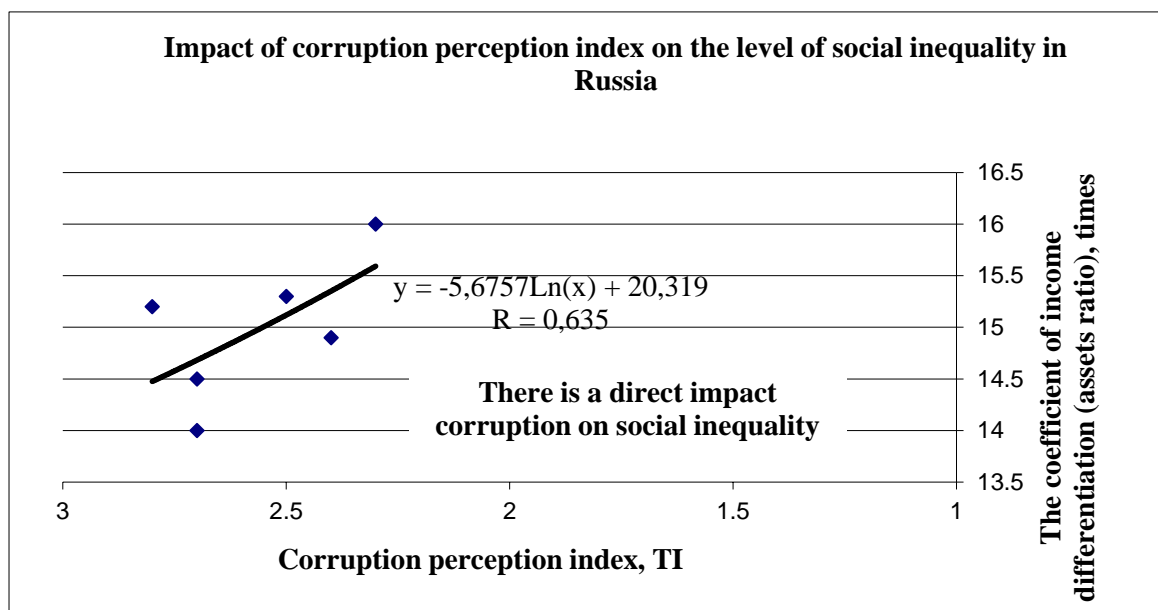
**Figure 3.** Relationship between level of corruption and the average life expectancy at birth

The negative impact of corruption on education and health is reflected in the following key trends:

- Corruption increases the costs of providing education [14] and health services, although formally the many types of services in a large part funded by the state;
- Corruption directly reduces the amount and quality of education and health services.

Effect of level of corruption in the socio-economic system of the state on the average life expectancy is shown in Figure 3.

The level of corruption has a negative effect on the differentiation of incomes of the population (Figure 4), which, in turn, undermines the stability of the reproduction of the human capital.



**Figure 4.** Effect of the level of corruption on the level of social inequality in Russia

Corruption has a greater influence on the income of the poorest segment of society, in other words it is reflected in the first place on the poor. The tax burden is being shifted on the poor, social programs funds aimed at reducing the income differentiation are being stolen.

#### 4. Conclusions

To sum up, this study suggests the following conclusions:

1. Nowadays human capital has become, both in theory and in practice, an intense leading factor in the development, the foundation of the GDP growth, combined with innovations and new technologies.
2. The study proposes to calculate the human capital sustainable development index (HCSDI) for the assessment of the degree of consistency of particular indicators that are included in the human development index. HCSDI allows not only to assess the level of human capital of the State or the company, but also the degree of balance of its individual components. The reproduction of human capital is significantly affected by the cyclical economic development.
3. In Russia, the stability of human capital development is greatly influenced by the high level of corruption, which was transformed from an anomaly in a social institution. Reducing corruption level can significantly improve the quality of human capital and reduce income differentiation, and accelerate economic growth.
4. If the high corruption level in the system of socio-economic relations in Russia stays the same, then progressive reforms in the social sectors that have the greatest impact on the sustainable development of human capital will not be sufficiently effective.

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