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New approach to analyzing the risk of intellectual capital in the structure of the market price of shares

Anton Tikhomirov ^{1*} and Svetlana Komshilova ²

¹ Peter the Great St.Petersburg Polytechnic University, Politechnicheskaya st., 29, St. Petersburg, 195251, Russia

² Digrafika LLC, 6th Verkhniy Lane, 12, St. Petersburg, 194292, Russia

* E-mail: tihomirov_af@spbstu.ru

Abstract. The paper presents an approach to the analysis of the share price as the total value of two assets: tangible, and the “market premium” associated with intangible assets (intellectual capital). It is shown that the share of intellectual capital in the market price of shares of companies that are the leaders of the information technology sector (Google, Baidu) can reach 90%, and significantly exceeds the share of the company in the extractive industry. However, the high proportion of intangible assets (intellectual capital) in the share price carries an additional risk of a significant drop in the company’s market capitalization, caused by changes in the factors forming these intangible assets. The cost of intellectual capital can take both positive and negative values. It is shown by the example of Gazprom PJSC that the market price of shares falls below their balance sheet estimates with a stable growth in the value of tangible assets, which is the result of the market’s negative assessment of the price component associated with the company’s intellectual capital.

1. Introduction

With an advent of the digital economy the companies are forced to base their operations on innovation. However, defining strategic guidelines for the development of a company, managers and owners do not always have sufficient information about the potential efficiency of each of the objects of investment. In particular, built upon the Value Based Management (VBM [1]), the company must find a compromise between investments in tangible and intangible assets. For companies, in which tangible assets make the basis of activity, the return on tangible assets is often more obvious, therefore, in most cases the decision is made to expand activities by accumulating tangible capital (equipment, real estate, stocks, etc.).

However, in the conditions of the “new economy” the companies compete precisely for the effectiveness of the use of intangible assets (intellectual capital), since these factors determine the main market advantages of almost any economic agent in modern conditions. This competition takes place in the context of globalization, which turns into the acceptance of additional risks and the need to develop new models and approaches to their assessment [2, 3].

2. Concept of intangible assets (intellectual capital)

The most popular point of view regarding the definition of intangible assets is represented in a large number of works and is reflected in the distinction between the terms “intangible assets” and “intellectual capital”, adopted both in the scientific community [4, 5] and national [6], international [7]



and accounting standards. The authors generally prefer the point of view [8], according to which intellectual capital (intangible assets) should be divided into two subgroups: recognized intangible assets and non-recognized intangible assets. In this case, the concepts of “intangible assets” and “intellectual capital” characterize the same value, but from different points of view: intangible assets – from the position of having an asset; and intellectual capital – from the perspective of the source of the formation of an asset, value creation.

The approaches of many researchers to the issue of structure of intellectual capital are based on the classification of intangible assets developed by the International Federation of Accountants [9]. It is proposed to distinguish three structural units: human, organizational (structural) and behavioral (relational) capital.

The relational capital implies the resources associated with the external relations of the company, i.e. relations with customers, suppliers, partners, creditors and other parties concerned as well as the organization’s ability to derive economic benefits from the resources related to the external relations of the company. This capital is usually attributed to: business reputation; the presence of regular customers; repeat contracts with customers; trademarks and service marks; brand names; etc. [10].

One of the most illustrative measures of evaluation that determine the role of intangible assets in the value of a company is the market value of companies, for which intangible assets are the main factors of competitiveness on the market (companies from the so-called tertiary and quaternary sectors of the economy, [11]) relative to other companies, functioning on the market. The number of companies, in which intangible assets represent the main factor of their value is currently growing steadily [12]. However, the organizations with intangible assets have features that consist in the specific mapping of intangible assets in accounting, different from the accounting of physical assets [13].

3. Methodology and data sources

The market value of the equity of companies (capitalization Cap) and its book value, E_{BV} , were compared. Capitalization was calculated as the product of the market price of shares for their quantity in circulation. In the past year, the weighted average price of the last quarter of this year was taken as the price of the P share. The book value of equity was taken at the end of the year from the financial statements presented on the websites of the studied companies. The data was obtained from the information sites of the exchange [14] and stock issuers.

4. Structure of the market price of shares

The current market price of the company’s stock (P) can be represented as the value of two assets: tangible, having a price of P_t , and a “market premium” associated with intangible assets (intellectual capital) equal to P_i :

$$P = P_t + P_i \quad (1)$$

The non-recognized intangible assets, $NrIA$ – what we call the intellectual capital – is usually entirely attributed to the company’s equity [13]. Therefore, it is possible to write the following with a sufficient degree of accuracy for the capitalization Cap (market price of equity capital E_M) of the company:

$$Cap = E_{BV} + NrIA \approx E_{BV} + V_I = E_m \quad (2)$$

where:

E_{BV} is the book value of equity;

$NrIA$ is value of non-recognized intangible assets (intellectual capital V_I);

$Cap = (\text{price of one share, } P) * (\text{number of shares, } N_A)$.

From equation (2), it follows that:

$$V_I \approx NrIA = Cap - E_{BV} \quad (3)$$

A study was conducted, the purpose of which was to compare the dynamics of changes in the market valuation of intangible assets, P_I tangible assets P_t and their impact on the market price of shares P of companies of the information technology sector – typical representatives of the so-called quaternary sector of the economy [13].

For Google and Baidu, on the basis of the data of their financial statements and information obtained from the securities market [14] and corporate sites [15, 16], the values of capitalization, market price of shares and components of market price of shares were determined. The evaluation of the “material” component of the stock price P_t was carried out according to the ratio:

$$P_t = \frac{E_{BV}}{N_A} \quad (4)$$

Thus, P_t is nothing more than the book value of net assets per share. The share price P_i , associated with the contribution of intangible assets not recognized in accounting (intellectual capital V_I) was calculated as the difference between the current market price of the share, P , and P_t :

$$P_i = P - P_t \quad (5)$$

Observations were carried out on a time interval of 10-13 years. The research results are presented in figure 1.

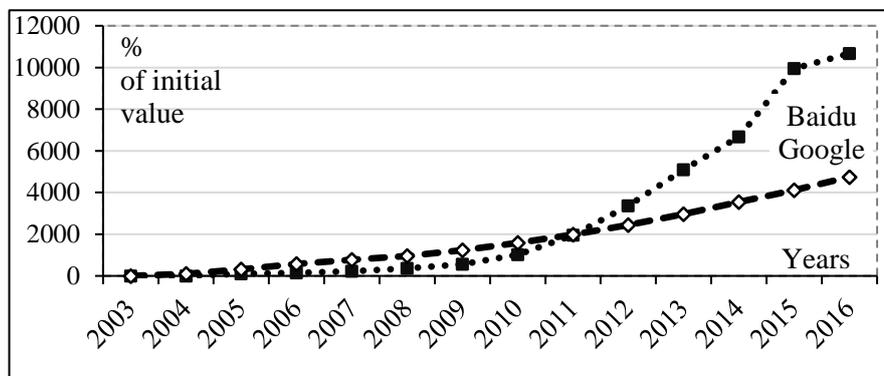


Figure 1. Relative change in the book value of equity capital of companies $\frac{E_{BV}}{E_{BV_0}}$ during the observation period. Initial value $E_{BV_0} = 100\%$.

As follows from figure 1, all the companies showed for the time period studied a multiple increase in the balance sheet valuation of the cost of equity capital E_{BV} . However, the market capitalization of companies and stock prices has undergone more complex changes over time (figure 2).

The reasons for the unstable behavior of capitalization of companies with a steady increase in the book value of equity, in our opinion, is that during different periods of time components of the market price of shares showed different dynamics. At the same time, the ratio of components changed significantly during the studied period of time. Figure 3 presents charts of changes in market prices and their components for the studied companies.

As follows from figure 3, the shares of the “tangible” and “intangible” components in the market price of shares of companies differ significantly. At Google and Baidu, it remains high throughout the entire research period.

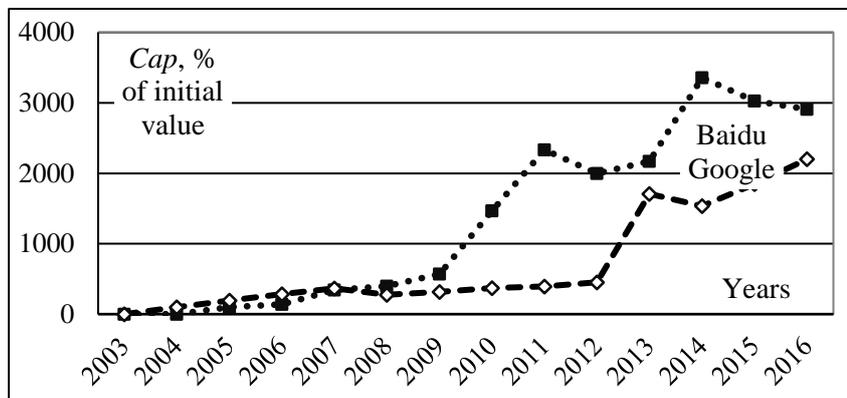


Figure 2. Relative change in capitalization $\frac{Cap}{Cap_0}$ of companies during observation period. Initial value $Cap_0 = 100\%$.

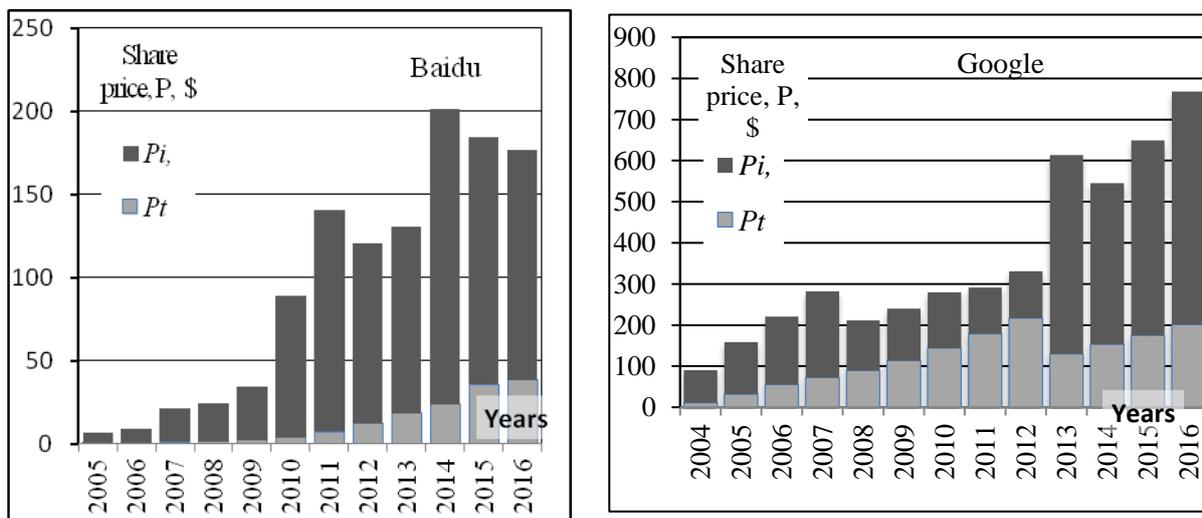


Figure 3. Charts of market prices, P , and their component P_t and P_i .

It is known that until the beginning of the 1990s the net asset value per share P_t has been the basis for the formation of the market price of shares of companies P . The difference between these values on the market was insignificant, but it increased rapidly over time, which is confirmed by the example of the companies studied. At present, the share of the “intangible” component in the share price for high-tech companies in the tertiary and quaternary sectors of the economy may exceed the net asset value several times (figure 3). Intellectual capital in the eyes of investors has become a source of economic value added optimizing the company’s capitalization [19].

5. Risk of the share of intellectual capital in the market price of shares

Investors and managers pay special attention to the fact that the market valuation of the price component associated with intellectual capital may be negative. In this case the company's capitalization is lower than the book value of equity. Not only the material damage, but also the transformation of the company into an attractive object for unfriendly takeover can be the consequence of this phenomenon for shareholders of the company.

The history of the shares of the Russian Gazprom Joint-Stock Company can serve as a convincing example of the negative impact of the depreciation of intellectual capital on the company's capitalization. The shares of Gazprom PJSC are one of the most attractive instruments of the Russian securities market. Growth of the company's capitalization from 4.6 trillion rubles in 2005 lasted until May 2008, when the figure rose to 8.11 trillion rubles. However, then the global financial crisis of 2008–2009 led to a sharp depreciation of the gas giant's shares (figure 4).

But, as follows from figure 4 (a), a full-fledged restoration of capitalization has not occurred up to the present, despite the fact that the book value of equity from 2010 to the end of 2017 increased – figure 4 (b) [17, 18].

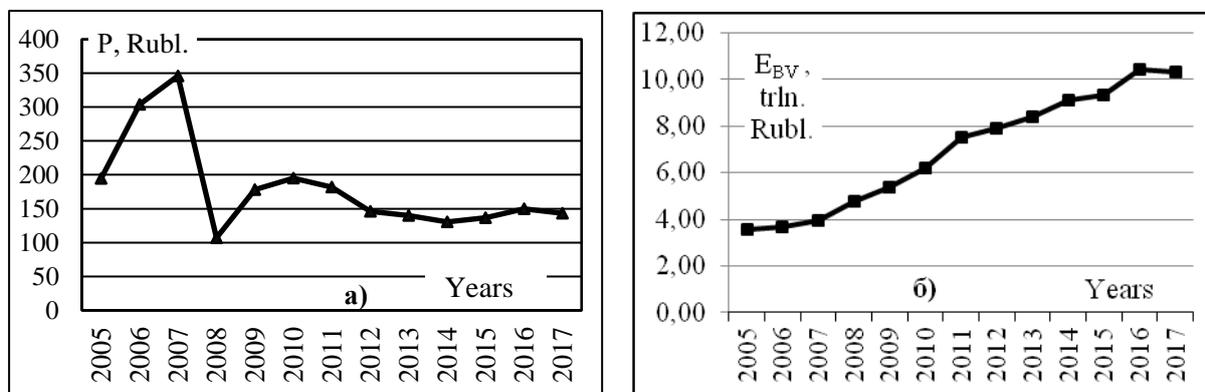


Figure 4. Share price, P (a) and equity, E_{BV} (b) of Gazprom PJSC.

The reasons for the decrease in the company's capitalization with a steady increase in the book value of equity, as was established above, are that stock prices in a given period of time were lower than their balance sheet estimates, which is explained by the transfer of the “intangible” price component P_i to the negative area – figure 5.

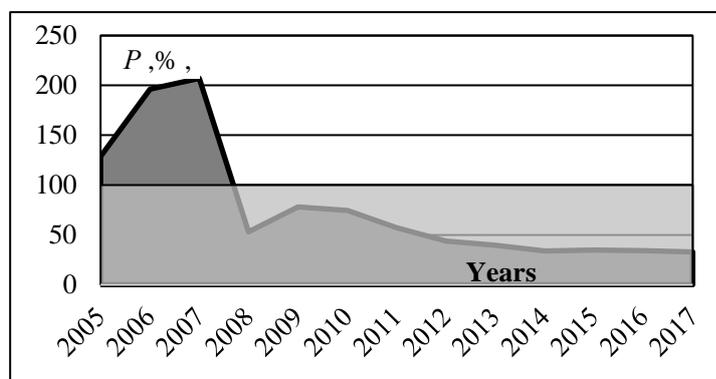


Figure 5. Market price of shares of Gazprom JSC, P , as a percentage of the book value of equity, P_t , taken as 100%.

Analysis of the capitalization of Gazprom PJSC of recent years (figure 5) shows that its substantial share is made up of the evaluation of the company's intellectual capital. In this case, we are talking about the so-called relational component of intellectual capital related to how investors on the market assess the intentions of Gazprom PJSC partners – buyers, lenders, suppliers – to maintain relations with the company in the future. At the moment, these relations are very tense and are reflected in various kinds of economic sanctions, significantly complicating the conditions for running a business. This caused a sharp drop in the market valuation of the relational component of the intellectual capital P_i and, as a result, a decrease in the price of P .

At the same time, the book value of the company's assets as it was mentioned above shows a steady growth. Under normal conditions, this would have to be accompanied by the growth of the market value of the company's shares of a similar scale, but this does not happen. Thus, in our opinion, the main reason for the drop in the capitalization of Gazprom PJSC is the “intangible” component of the share price P_i , associated with the loss of stakeholder confidence by the company.

6. Conclusions

As a result of the research, it was established that the share of intellectual capital in the market price of shares for the companies considered in the information technology sector reaches 90%, which is significantly higher than the company in the extractive industry represented by the Russian Gazprom company. However, a high proportion of intangible assets (intellectual capital) in the share price carries an additional risk, since it can cause a fall in the company's market capitalization. If the factors forming certain components of intellectual capital that are unfavorable for the firm change, the cost thereof may take negative values, as a result of which the market price of shares may fall below their book value.

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