Improving the use effectiveness of trading enterprises intellectual capital at the stages of the life cycle in the context of digitalization

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Abstract. The article discusses the directions, problems and results of the digital solutions introduction in trading enterprises. The directions of digitalization in trade are designated. It is shown that the introduction of digital solutions directly affects the reduction of costs and sales growth. The introduction of intellectual capital as another type of asset allowed us to expand the list of factors affecting the volume of sales, costs, profitability of a trading enterprise and its value. The features of the intellectual capital formation of a trading company at the stages of the life cycle are considered. Possible positive directions of digitalization impact on the elements of intellectual capital are presented, and the dynamics of the impact of digitalization decisions on the elements of intellectual capital at the stages of the enterprise life cycle is also considered. A technique for evaluating the effectiveness of investments in the intellectual capital of an enterprise is proposed, which is based on a combined assessment of the elements of intellectual capital using the CIV and MVAIC methods, as well as taking into account the stage of the life cycle of a trading enterprise. Criteria for assessing the effectiveness of investing in elements of intellectual capital are proposed.

1. Introduction

The current stage of economic development is characterized by the penetration of new digital technologies in all spheres of economic activity of society. All this leads to the formation of a completely new information environment for the interaction of economic entities based on the use of information and communication technologies, digital technologies, and big data technologies. This process is called the process of “digitalization” and has already penetrated quite deeply not only into economic, but also social processes. The Russian Federation is no exception and belongs to the group of countries in which digitalization is developing at a fairly high pace [1]. Digitalization as an objective process has a significant impact on the development of individual sectors of the economy, often leading to dramatic changes in the industry, the emergence of new types of activities of economic entities. So, the introduction of digital technologies in trade has led to the emergence of the so-called e-commerce, which has occupied a fairly large segment of the market [2,3]. At the same time, traditional forms of trade also received a new impetus for development thanks to digitalization. The prerequisites for industrial digitalization are due to the emergence of a new industry resource — a large amount of specific information about various aspects of the activities of industry entities, which
allows optimizing business processes, ensuring the reduction of industry-specific costs and the emergence of new sources of income [4].

The purpose of this study is to evaluate the effectiveness of programs and measures for the implementation of digitalization in trading enterprises. The objectives of the study include analyzing the impact of digitalization on trade and trading enterprises, analyzing the dynamics of the intellectual capital of a trading company at the stages of the life cycle, identifying aspects of the impact of digitalization on the intellectual capital of a trading company, developing a methodology for assessing the impact of digitalization on the intellectual capital of a trading company.

2. Materials and Methods
Successful development and implementation of digitalization tools is impossible without the development of technology. Currently, the development of digital technologies is focused on two main areas: the restructuring and modernization of the institutional environment (regulatory regulation of digital markets, digital production, digital retail, training of personnel with digital competencies, etc.), as well as the development of technical infrastructure (data transmission network, data centers, software services, etc.), the creation of which requires not only considerable effort, but also investment [5]. The second level of development is the direct creation, introduction and development of digital tools in the economy. At the same time, one cannot ignore the secondary effects of the introduction of digitalization - economic entities (government, consumers, enterprises), using digitalization tools, in turn change themselves - their behavior model, the organizational structure, and in addition, the mission and target settings change [6]. The speed of these changes is so great that often the basic level of development of the digitalization infrastructure does not keep pace with the changing economy. An example is the trend of updating data transmission networks, in particular the introduction of 5G, WiFi-6, etc.

2.1. The role of digitalization for trade development
Of course, digitalization has an impact on the development of trade and its main elements - trading enterprises. It should be noted that, despite the external “conservatism”, domestic retail occupies rather high places in the rating of digitalization implementation. This is due to the relatively high susceptibility of retail to innovation, especially to working with consumers, a high level of turnover and, accordingly, quick returns. Currently, there are four main areas of digitalization in trade:
- the use of digital tools to work with consumers, from the stage of interest to the moment of making a purchase, as well as maintaining this interest;
  - the use of digital tools in operational activities (work with personnel, goods, price tags, calculations, etc.);
  - logistics, control of the supply, storage and sale of goods;
  - IT infrastructure and security monitoring.
All these decisions are aimed at improving the efficiency of trading enterprises [3].

A feature of the current stage of trade development is characterized by increasing fragmentation of customers due to the accelerating pace of life. This, in turn, requires the maintenance of a fairly wide range of goods, as well as the creation of a complex logistics system from the supplier to the trading company.

Moreover, according to BCG DIGITAL, in terms of development and investment in digital infrastructure, trade in Russia occupies one of the leading places in the world. At the same time, the pace of implementation and the cost of software, data storage systems are significantly behind the world's best practices.

There are many homegrown products on the solution market that quickly lose their effectiveness and also require constant support, however, such solutions are difficult to scale.

The basic level of Internet use is at an average level, however, there is a lag in the implementation of the most advanced and progressive solutions.
The level of use of digital technology is also at an average level. At the same time, in large cities, where the level of consolidation of the retail market is close to that of developed Western countries, the tasks of the struggle for the buyer come to the fore. At the same time, the opportunities for growth due to geographical expansion and consolidation in the regions seem to be insufficient.

Despite this, there are a sufficient number of positive examples of the introduction of digitalization tools in the activities of trading enterprises. It has been established that the use of digital technologies in distribution centers can reduce costs by 5-10%, increase revenue by 1% to 2% by increasing the timeliness and completeness of deliveries to retail outlets, speed up sales, and reduce the likelihood of running out of stocks. The use of special mobile applications for retail clothing stores and luxury perfumes has allowed increasing sales growth by 6 - 11%.

Of course, when introducing digitalization tools certain problems arise, however, these problems are often not paid attention to, as evidenced by the results of relatively recent research in the field of trade. Therefore, for example, in the study [7], when evaluating the factors restricting the activity of trade, there are no digitalization factors, as can be seen in Figure 1.

![Figure 1. Assessment of factors restricting the activities of retail enterprises, % of the number of respondents [7] (Image) (Image)](image)

At the same time, other recent studies aimed at identifying the problems of digitalization in trade indicate the following problems in the implementation of digital solutions: lack of technological competence, lack of experience in implementing digitalization projects, as can be seen in Figure 2 [5].
It is noted that at present, the digital infrastructure for retail is growing at a faster pace than the introduction of digital solutions. This trend negatively affects the development of trading enterprises, as digitalization solutions are aimed at developing the intellectual potential and intellectual capital of a trading enterprise.

2.2. Intellectual capital and features of its implementation at the stages of the life cycle of trade enterprises

The concept of intellectual capital appeared and began to develop as a reaction to the limitations of the existing classical economic and financial models of the enterprise, based on a comparison of the assets structure of the enterprise and the capital structure of the enterprise, taking into account market assessments of alternative investment options. A number of models are based on this approach, such as the EVA economic value added model, as well as the CVA cash value model. At the same time, many researchers note that the main variables of the EVA model do not fully realize the potential of management and efficient use of the enterprise’s investment in capital [8, 9].

To overcome these shortcomings, the concept of intellectual capital of an enterprise is called upon. This concept is to transform the basic financial model of the enterprise. In addition to tangible assets – fixed and working capital – another asset is added – an intangible asset called intellectual capital [10]. It is the management of this asset that allows the company to form key hard copy competencies and maintain a high level of competitiveness [11].

The intellectual capital of the enterprise includes the human resources of the enterprise, experience and reputation, the system of working with customers and suppliers, established relationships with other stakeholders of the enterprise, the efficient use of material and digital infrastructure in which the enterprise is located [12].

The introduction of intellectual capital as a separate type of asset leads to a change in the entire financial mechanism of the enterprise. Thus, investments in elements of intellectual capital are considered not as costs, but as investments that are capable of making a significant contribution to the growth of the value of the enterprise in the future. However, this approach also raises multiple problems associated with the absence of generally accepted mechanisms and models for assessing intellectual capital.

Many researchers currently consider intellectual capital as an element of capital, which forms a growth in value due to the management of factors that cannot be attributed to operational or financial. Investments in intellectual capital are considered from the perspective of investments, i.e. investments with a certain level of return, but the return is not direct, but indirect [13].
An analysis of the intellectual capital of a trading company from the point of view of the concept of value chains shows that the quality of intellectual capital significantly affects the main goal - customer satisfaction, as well as the secondary goal – satisfying the interests of stakeholders in combination with solving the main economic task of the enterprise - growth its value [14]. On the one hand, a higher level of intellectual capital expands the number of counterparties and reduces costs when interacting with them, and on the other hand, it gives powerful positive information signals to the external environment, thereby affecting the quality of the enterprise’s valuation from external markets.

Currently, the most common is the model of intellectual capital, which consists of three components: human capital, structural capital, consumer capital. One of the directions of development in understanding the role of intellectual capital is an approach based on theories of the life cycle of an enterprise. In accordance with this approach, the enterprise goes through several stages in its development.

On the one hand, these stages can be represented in the form of certain stages. From the point of view of the enlarged analysis, one can distinguish the stages of emergence, rapid growth, maturity and the stage of bifurcation, when the development of the enterprise can go either in the direction of its further growth in value in the case of creating new values for customers and stakeholders, or embark on the path of decay when the quality of meeting needs customers will decline [15.16].

At the stage of origin (birth), the materialization and institutionalization of a business idea takes place and its design in the form of a working mechanism. The main component of intellectual capital at this stage is human capital, as a set of entrepreneurial abilities of the organizer, as well as his associates. Other types of intellectual capital - structural and consumer at this stage are not yet available. It is thanks to human capital that the volume of knowledge and experience of individuals who united when creating the enterprise into a team is processed into a certain structure, thanks to which real investments get the opportunity to pay off in the future. If at this stage it is not possible to form human capital, then the enterprise will fail.

At the stage of rapid growth, collegiality is manifested largely; the company develops its mission, strategy and goals. At this stage, the rules for the interaction of various members of the labor collective are formalized. Elements of the cultural environment of the enterprise are being accumulated. At this stage, organizational capital is formed. Also at this stage consumer capital begins to form, however, to a lesser extent than organizational capital. Human capital continues its development in terms of clarifying the qualifications of various employees of the enterprise.

The next stage is the maturity stage. At this stage, consumer capital is fully formed. The existing organizational structure and competencies of employees and managers of the enterprise allow the most efficient use of mechanisms of interaction with the consumer in order to increase loyalty and, as a result, increase revenue.

The next stage of development is characterized by a dual opportunity. After the maturity stage, the stage of aging or decline may occur. This is because the prevailing human and organizational capital cease to provide the previous efficiency of activity, i.e. the degradation of these elements of intellectual capital begins. In the end, this can lead to the destruction of consumer capital. However, if the enterprise management manages to find new niches, re-engineer business processes, then the enterprise can get a second wind and the stage of development of elements of intellectual capital will be repeated again [17].

3. Results
Analysis of the main directions of digitalization in trade allows us to identify the following areas of impact:

- digitalization of interaction with customers;
- digitalization in retail outlets;
- digitalization of supply chain management.

As noted above, these areas are designed to solve the following trends - differentiation, new sources of income, cost reduction.
The components of the individual components of intellectual capital, and the factors of digitalization that affect intellectual capital, are presented in Table 1.

Even a cursory analysis shows that the activities of commercial enterprises in the field of digitalization are aimed at improving the efficiency of the return of elements of intellectual capital, but using digital solutions. Possible positive effects of the digitalization directions of trade enterprises on the elements of intellectual capital are presented in Table 2.

Presented in table 2 digitalization directions show the focus of the efforts of the trading company in managing intellectual capital, it allows the correct implementation of digital tools, taking into account the complexity of the approach on the one hand (it is necessary to introduce digitalization elements in several directions at once), and on the other hand timeliness when there is no expediency of developing one or another element of intellectual capital at this stage of the life cycle of a trading company

For a more reasonable and effective investment in the elements of intellectual capital presented table 2 can be specified for various stages of the enterprise life cycle.

Options for such refinement are presented in Figure. 3.

**Table 1.** Elements of intellectual capital developed through digitalization.

| Elements                              | Digitalization Elements                                      |
|---------------------------------------|-------------------------------------------------------------|
| Human                                 | Knowledge, Skills, Experience and length of service, Creative skills, Moral values, Culture of Labor and Organizational Relations, Physical and Mental Health |
| Organizational                        | Hardware and software, Database, Patents, Trademarks, Organizational structure, Organization culture, Organizational standards, norms, regulations |
| Consumer                              | Partner Relations, Customer Relations, Customer Information, Customer Relationship History, Trademark (brand) |

**Table 2.** Possible positive effects of the digitalization directions of trade enterprises on the elements of intellectual capital.

| Differentiation | New sources of income | Cost reduction |
|-----------------|-----------------------|----------------|
| Human capital   | +                     | +              |
| Organizational  | +                     | +              |
| Consumer capital| +                     | +              |
4. Discussion

Based on the proposed models of investing in the elements of intellectual capital, a methodology can be developed to increase the efficiency of using the intellectual capital of a trading company at the stages of the life cycle.

The specified technique includes several stages:

1. Definition of the life cycle of a trading company.
2. Assessment of the level of intellectual capital of an enterprise and its constituent elements. This assessment can be carried out using both cost indicators and non-monetary indicators using a combination of CIV [18] and MVAIC [19] methods.
3. At the next stage, an assessment of the development directions of intellectual capital is made, which is based on the results of the analysis of intellectual capital on the one hand, as well as taking into account the directions of investment of intellectual capital, taking into account the stage of the life cycle of the enterprise and the proposed matching matrices (Figure 3).

To assess the value of individual elements of intellectual capital, it is proposed to use the following expression as a share of intellectual capital:

$$
HC = \frac{CIV}{HCE + SCE + RCE}\quad SC = \frac{CIV}{HCE + SCE + RCE}\quad RC = \frac{CIV}{HCE + SCE + RCE}
$$

(1)

where: $CIV$ – estimated intangible (intellectual) value of a trading enterprise as a discounted excess revenue stream; $HCE, SCE, RCE$ – indicators of the effectiveness of human capital, structural capital and consumer capital, respectively, for the $i$-th reporting period.

The estimates obtained represent the capitalized part of the excess profit of the enterprise, due to human capital, structural capital and consumer capital. In order to evaluate the effectiveness of investments in the elements of intellectual capital in the reporting period, inequalities can be used:

$$
\Delta HC_i > \Delta HC_i \geq 0; \quad \Delta SC_i > \Delta SC_i \geq 0; \quad \Delta RC_i > \Delta RC_i \geq 0
$$

(2)

where: $\Delta HC_i, \Delta SC_i, \Delta RC_i$ – change in human capital, structural capital and consumer capital of a trading enterprise, respectively, for the $i$-th reporting period, rub.; $\Delta HC_i, \Delta SC_i, \Delta RC_i$ – Investments in human capital, structural capital and consumer capital of a trading company, respectively, for the $i$-th reporting period, rub.

If the specified inequality is satisfied, then we can conclude about the effectiveness of investments in the elements of intellectual capital, due to the development of digital solutions. If this equality is not fulfilled, it is necessary to revise the approaches to managing the intellectual capital of an enterprise.
Conclusions
The introduction of intellectual capital, as another type of asset of a trading company, allowed expanding the list of factors affecting the volume of sales, costs, profitability of a trading company, as well as its value. The features of the formation of the intellectual capital of a trading company at the stages of the life cycle are considered.

The elements of intellectual capital are clarified, which have received an impetus for development due to digitalization. Possible positive directions of the impact of digitalization on the elements of intellectual capital are presented, and the dynamics of the impact of digitalization decisions on the elements of intellectual capital at the stages of the enterprise life cycle is also considered. A technique for evaluating the effectiveness of investments in the intellectual capital of an enterprise is proposed, which is based on a combined assessment of the elements of intellectual capital using the CIV and MVAIC methods, as well as taking into account the stage of the life cycle of a trading enterprise. The methodology proposes criteria for evaluating the effectiveness of investing in elements of intellectual capital, which are based on a comparison of the intensity of the growth rates of elements of intellectual capital with the amount of investment in the intellectual capital of a trading company.

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