

# Intellectual capital of a knowledge-intensive organization: strategy and principles of management



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*Given the refined concept of «intellectual capital management», basic strategies for intellectual capital management are defined based on the formation, use and exchange of knowledge. Differences in the characteristics of physical and intellectual capital of a knowledge-intensive enterprise are shown. General principles of intellectual capital management are formulated.*

**Keywords:** intellectual capital, intellectual capital management, strategies for intellectual capital management, principles of intellectual capital management.

### **Introduction**

Intellectual capital is considered in the economic theory as a factor that adds value in the same way as physical and financial capital. It increases through the accumulation of human, structural and customer capital. It is obvious that an understanding of the essence and patterns of management of this valuable asset is indispensable for choosing the right strategy to implement a knowledge-intensive production, appropriate innovation process planning and regulating labor relations, where human resources can be used to the maximum extent possible.

It is evident that intellectual capital management is a subfield of knowledge management, while knowledge management is related to a specific category – organizational knowledge, i. e. knowledge managed by the organization. The most important distinguishing feature of intellectual capital as a body of knowledge is that it includes both explicit and tacit knowledge. Explicit knowledge allows employees to communicate freely using words or other means of communication (images, sounds, texts), i. e. they represent information. Tacit knowledge cannot be clearly expressed by an individual and therefore cannot be converted into information. Although knowledge management theory and concepts

are well known, there is scant literature on knowledge management methods within a particular knowledge-intensive organization. As Thomas Stewart said openly at his time [1]: «No one knows how to write a cookbook with recipes for intelligent resource management». One has to agree with this point of view, as intellectual capital management appears at the intersection of other disciplines – human resource management, information technology, performance measurement and assessment.

Understanding of challenges facing an innovative company evolves as it gets a new experience in the course of innovation processes, training, discarding erroneous hypotheses and confirming true ones, adapting to new conditions and moving forward. The above-mentioned considerations give grounds for the following definition:

Intellectual capital management is a process aimed at getting added value by the company from the body of explicit and tacit knowledge contained in intangible assets of human, structural and customer capital.

### **Basic strategies for intellectual capital management**

The founders of the human capital theory (Becker G., Schultz T. et al. [1, 2]) were the first to note the «productive nature» of investments in people, having a significant and long-term effect. Further research has shown that in terms

of macroeconomics the formation of intellectual capital should be considered as investments in innovation and education, which are transformed into an employee's knowledge and skills «required for production». In the context of such understanding of intellectual capital, socio-economic stratification is seen as a consequence of the turnover of intellectual capital. According to economic theory, intellectual capital is not just a body of an individual's knowledge, skills and abilities, but an accumulated (codified) storage of skills, knowledge and abilities that provides optimal management of this important resource. Price of labor which is formed on the market is an economic assessment of all the components of intellectual capital. This indicates a need to identify the main factors influencing the decision-making process of managers of a knowledge-intensive enterprise with respect to the rationale for investing in intellectual capital: the level of payment for intellectual work, training and professional development costs, and investments related to launching innovative projects, etc.

Often, however, methods for managing intellectual capital and its components (human, structural and customer capital) come down to methods of emergency response to changes. Instead of accepting the concept of system management, local subsystems are created, in most cases, with no chance to fulfill the strategic task of an innovative production.

Poor refinement and elaboration of the strategic goal of a knowledge-intensive business can lead to the so-called «goal bias» [2]. Many managers who just wanted to write a computer program to codify tacit knowledge for improving structural capital, after a while became good IT experts. However, they could hardly realize that their strategic goal had been lost long ago and they were fully occupied with solving secondary tasks. This is an example of a «goal bias». There are many other forms of «goal bias» in the process of management: fanatics of card files who spend unreasonable amount of time for hardware (equipment) and methodologists, etc. It is these «goal biases» which occur when leaders «worship specifics: they are interested in watchwork wheels, not the time that the watch shows. Everybody becomes a specialist in mechanics. In theory, they give all their love to what can be regarded as certain, wishing to protect themselves with that they see everything as absolutely certain and precluded from any objections. They fall in love with means, methods, techniques, and forget or give a painfully low assessment of what they have lost faith in and the knowledge that each of them once devoted himself to» (Horkheimer) [2].

Some hypotheses can be suggested to explain the occurrence of such «goal biases»: the pursuance of safety and the lack of confidence in their own abilities.

Fig. 1 presents a set of phenomena that can be attributed to the underdevelopment of mechanisms to manage the strategic goal or even an obscure wording and rationale for such goal. Incomplete decomposition of the strategic goal by default results in the lack of confidence of managers and misunderstanding of the possible consequences of their decisions. Thus, in these situations, problems are searched for on the criteria of obviousness and competence. Problems with already known solution methods are only selected.

This strategy leads almost inevitably to solving false problems, ignoring future problems, and ignoring «implicit» problems. This creates more disconfidence, encapsulation by a specific task, and fixation on insignificant issues.

It can be concluded that poor elaboration of the strategic goal is caused by incomplete knowledge about reality. A clear representation of an accurate and detailed model of reality supposes knowledge of possible relations within a certain market sector and the availability of variables that are crucial at a given moment or may be important in the future.

Methods for managing physical capital are not acceptable for such a complex construct as intellectual capital, because of fundamental differences between their characteristics, as presented in Fig. 2.

The differences between physical and intellectual capital determine a number of basic strategies for managing the latter based on both the formation and use of new knowledge, and knowledge exchange among the components of intellectual capital.

A number of papers [3] identify the following basic strategies for intellectual capital management:

1. The strategy which is based on the formation and use of knowledge in human capital and answers the following questions: how is knowledge exchanged among employees of the organization (enterprise), how is their competence improved and how is it used to

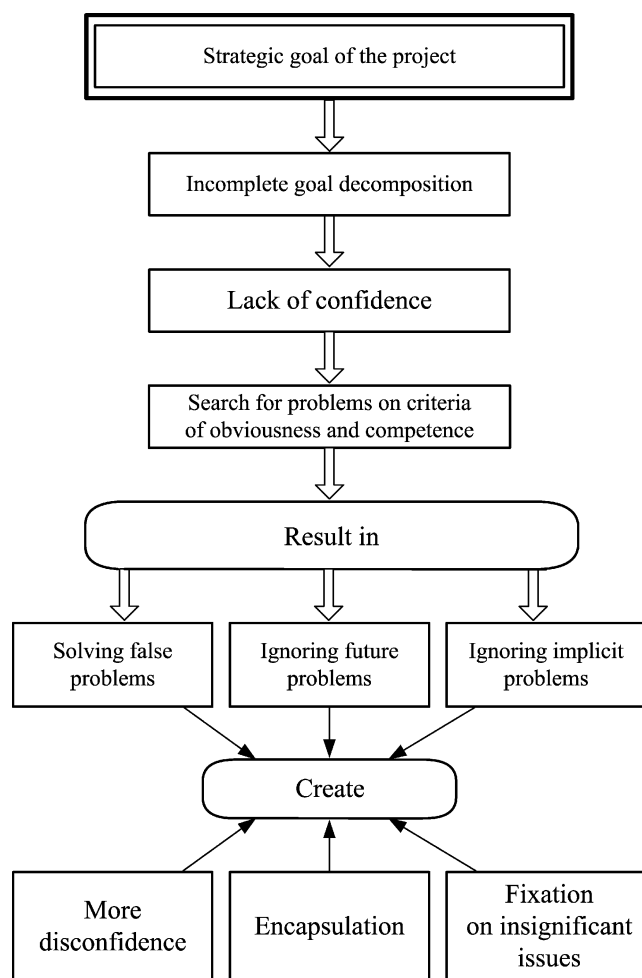


Fig. 1. Consequences of poorly specified goal of an innovative business model

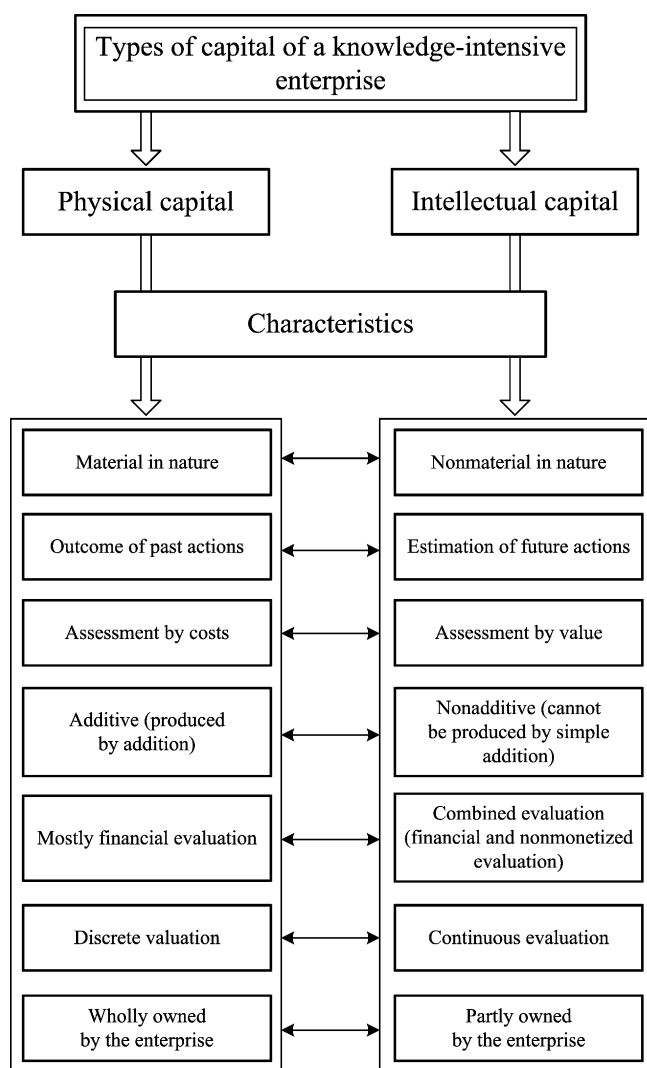


Fig. 2. Differences between characteristics of physical and intellectual capital of a knowledge-intensive enterprise

enhance the competitiveness of the organization. This strategy is focused on the development, above all, of individual knowledge, skills and abilities of employees through their education and training, dialoguing and building a corporate culture of innovation.

2. The strategy which is based on the formation and use of knowledge in structural capital and answers the following questions: how is knowledge exchange organized among knowledge operators in the organization, which technical and organizational elements are necessary for that purpose, how information systems should be created and developed, what data and information should be entered in them, which technologies and methods should be used to codify tacit knowledge of human capital.
3. The strategy which is based on the formation and use of knowledge in customer capital and answers the following questions: how is knowledge exchanged between the organization and its customers, which marketing techniques would be more effective to attract and retain consumers of products (services) the enterprise sells, which methods should be used to enhance the attractiveness of the organization (enterprise) and improve its image.

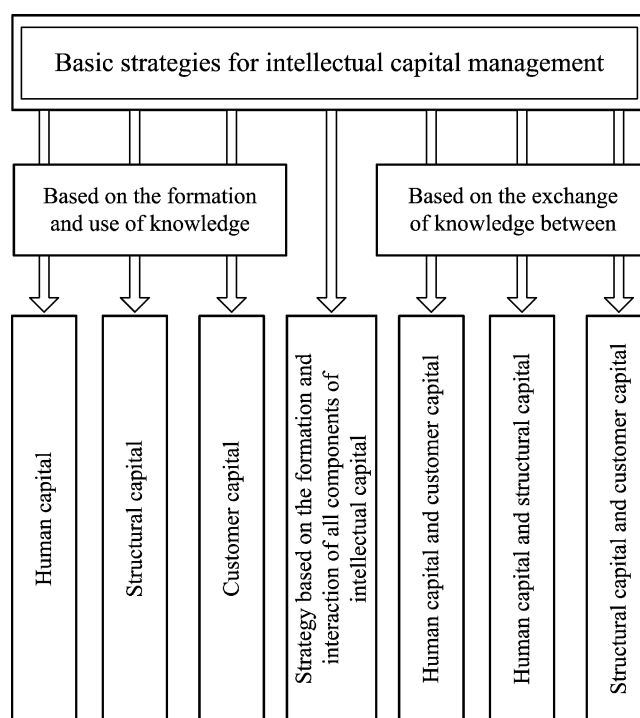


Fig. 3. Basic strategies for intellectual capital management to gain a competitive advantage

4. The strategy which is based on the exchange of knowledge between the human capital and customer capital and answers the following questions: how to improve interaction between the organization and its customers, which methods and techniques are required to help employees of the organization better understand customer requirements to the quality and price of products that are being produced or planned for production.
5. The strategy which is based on the exchange of knowledge between human and structural capital and answers the following questions: how to ensure the retention of knowledge generated by human capital in the organization, how to ensure an easy access to and high transmission rates of codified information to knowledge operators, how to select and record the amount of information that is relevant when implementing the innovation process.
6. The strategy which is based on the exchange of knowledge between structural capital and customer capital and answers the following questions: how to get a flow of information about the market condition, the demand for products and the attractiveness of its quality, how to take into account the needs of individual customers.

The above strategies are aimed at the implementation of individual capabilities to increase the total intellectual capital, and therefore can be ineffective or even useless as they may give rise to the phenomenon of «goal bias» discussed above. Efficient intellectual capital management is only possible on the basis of the system account for interaction of all its components, while the appropriateness of any control actions should be assessed in line with the strategic goal of the enterprise. Decision-making and the

formulation of the strategic goal of the project taking into account the interaction of human, structural and customer capital is the main basic strategy for intellectual capital management (Fig. 3).

**Principles of intellectual capital management**

The essence of intellectual capital gives grounds for the formulation of a number of intellectual capital management principles.

The principle of equal ownership of human capital by the enterprise and its employees. This follows from the understanding of the nature of human capital. The enterprise is a co-owner of this capital together with its employees. The enterprise can make the most of these intangible assets only by adopting the principle of equal ownership. Any attempt to save on employees would lead to the loss of an important source of future revenues in the long view.

The principle of equal ownership of customer capital. Similar to the previous principle, the point of the formation of customer capital is to ensure closer cooperation with customers (consumers) and suppliers, their closer involvement in joint activities with the enterprise. This clearly indicates that cooperation to the maximum extent possible and «tying» of the customer to the enterprise imply their mutual possession of customer capital.

The principle of the priority of strategic goals. An increase in human capital and efficient management are provided subject to pursuing the strategic goal to create added value. The implementation of this principle means making priority investments only in those employees whose skills and talents help to achieve the strategic goal. The rest of the staff, no matter how smart and talented they are, cannot be a part of intellectual capital of the enterprise, they are an expenditure item that should be cut down to the maximum extent possible.

The principle of teamwork. In order to create useful human capital, the company should encourage teamwork and support informal practical study groups. Nothing but teamwork allows capitalizing on the talent of an individual worker and making him/her a collective property, in this case it will rely less on a particular individual, who may leave the company at any moment.

The principle of the creation of a favorable environment for the interaction between employees and customers. This principle follows from the fact that structural capital is owned by the enterprise and can be easily controlled. However, it should be formed so that favorable conditions are created for the interaction between a customer and employees, and a customer enjoys cooperation with employees of the company. In this respect structural capital must be transparent for both interacting parties.

The principle of the minimization of information movement time. Entrepreneurs have long understood that on-time delivery of materials and components is more effective than storing all things for possible future use. The same holds true for the accumulation of knowledge, which is implemented by structural capital: the amount of codified knowledge is not important, what is important is knowledge relevant for the implementation of the project. It is important to deliver information to knowledge

operators on time and provide a high rate of its circulation within the organization.

The principle of the substitution of tangible assets for intangible assets. This principle involves substitution of expensive physical assets, continuous monitoring of costs of their maintenance and continuous search for opportunities to substitute them for intangible assets.

The principle of the identification of strategically important information. This principle means continuous monitoring of the entire value chain from raw materials to the finished and market-ready product. This activity aims to identify information which is critical to the creation of added value. This information is especially important at the lower consumer-related end of the chain.

The principle of the transition from mass production to custom manufacturing taking into account customer's requirements. In recent years, the strategy of mass production no longer brings any significant profit. Even in those sectors of production where mass production has prevailed for a long time, an individual demand can be taken into account, for example, by providing a wide range of services.

The principle of the optimization of costs for human, structural and customer capital. A contribution to employees, infrastructure and customers alone is not enough. Non-optimal investments in these components of intellectual capital can either strengthen or weaken them, because they work closely with each other.

The principles of intellectual capital management stated above are presented in Fig. 4.

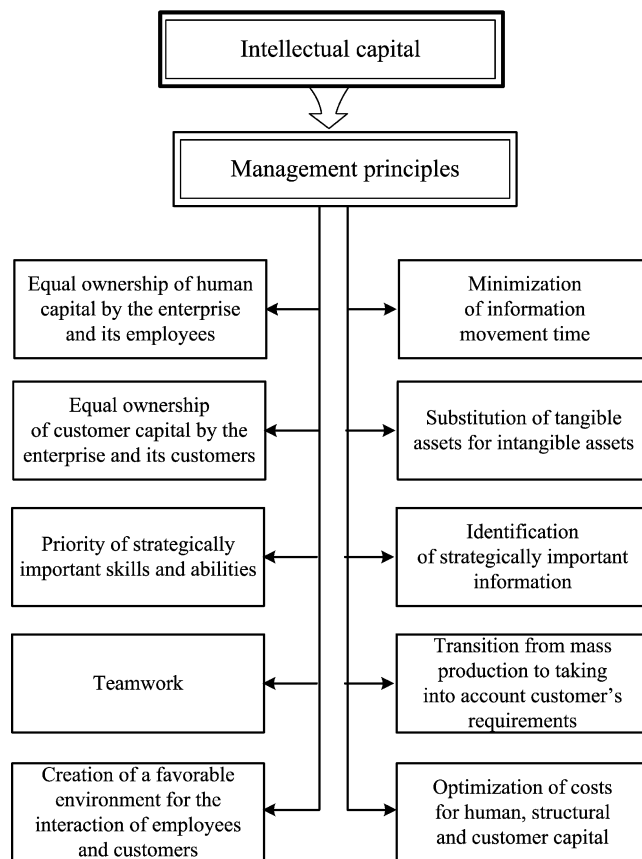


Fig. 4. Principles of intellectual capital management of a knowledge-intensive enterprise

The implementation of these principles of intellectual capital management is complicated by the fact that managers mostly follow old approaches, within the old paradigm of the so-called «inertial approach based on the theories and schemes of the last century, which is usually associated with the concept of an industrial society» [4-6]. The inertial approach to management is based on a number of weakly connected principles, the mechanical sum of which does not allow the creation of a holistic approach to intellectual capital management. This conclusion follows from the fact that management on the principles of «inertial policy»:

first, uses a technocratic approach where the main discussed issue is R&D commercialization on the principle: «ideas – innovative market product – money»; this «linear» scheme of innovation cultivation is adopted by most managers and entrepreneurs;

- second, the strength of the technocratic approach, which is based on its adaptability to manufacture, if applied to the required production, shows its inadequacy, or may even be destructive if it is not connected to the strategic goals of the enterprise. This is due to the fact that intellectual capital as an object of management is so undetermined, active, has its own goals and an infinite number of degrees of freedom, that even a well-trained manager-technocrat is not able to efficiently manage such an object;
- third, according to current views of researchers on issues of the theory of national innovation systems, such systems are not considered as an object continuously changing in time and space, which indicates the unacceptability of 10-30 years-old experience (including foreign experience) for current Russian realities;
- fourth, a management system that uses a linear scheme of intellectual capital growth does not take into account the processes of globalization, in the belief that this growth is possible when all the elements of the chain serving innovation are arranged evenly.

These features of outdated management principles which are based on the paradigm of «inertial approach» does not consider the fundamental purpose of innovation-driven growth involving a fundamental change in the socio-cultural environment in the country; the formation, in the first place, a class of managers with strategic and innovative thinking; the implementation of an integrated innovation infrastructure, one of the main functions of which is to form a demand for innovation and high innovation culture in the relevant entities.

At present, the innovation process and, consequently, intellectual capital are managed in an unsystematic and fragmented way. Intellectual capital as an object of management can be defined as a complex system of legal, material, financial, economic, and spiritual conditions of the existence of interacting individuals and social groups which ensure the development of innovations and their subsequent transformation into novelties.

Studies of innovative activities of an organization pay much attention to intellectual capital, considering its individual components and often «ignoring the problem of the development of organizational management mechanisms.» [7]

At the same time, foreign researchers pay a lot of attention to this component of the intellectual capital. For example, this is evidenced by the study conducted by Massachusetts Institute of Technology on the basis of the research and development laboratory of Global East, which employs more than a hundred thousand people from thirty countries of the world [8, 9]. The purpose of this study was to find an organizational design that would facilitate the voluntary exchange of knowledge within the team (human capital formation), since the traditional hierarchical structure prevented the rapid spread of knowledge.

The problem under study was based on the analysis of «social networks».

1. «Instrumental networks» related to the established formal relationships between employees of the company. In the context of instrumental networks, an effect of hierarchical relationships between people on addressing issues related to the content of work and its results was studied, as well as relationships developing on the basis of social support and friendship, not influenced by formal, hierarchical relationships due to the fact that they were not directly associated with work behavior within their duties. This type of network groups people according to the principle of complementarity. Such networks included those with whom it was pleasant to discuss common problems to be solved by the organization
2. Networks of the «technical council» originating from technically competent colleagues who have necessary skills and can give advice on specific technical (professional) issues, i. e. that part of the company's employees, which is, when considering the above-mentioned value of employees in terms of their possible contribution to human capital, classified as a group of «true masters of their craft, irreplaceable specialists and almost independent persons» [10].
3. Networks of the «organizational council», which include colleagues with great organizational and managerial competencies, forecasting and predicting skills, as a consequence of the implementation of the adopted model of strategic development of the company

### Conclusion

Based on the above peculiarities of the formation of a strategic business model, fundamental distinctions between physical and intellectual capital of the organization, basic strategies and principles of intellectual capital management, it follows that the system intellectual capital management would be much more efficient if the organization focuses on the following closely related issues:

- management of choice of direction and assessment of the prospects of a strategic business model;
- management, analysis and adjustment, if necessary, of the innovative process, which implements a strategic plan to achieve a competitive advantage of the enterprise;
- management of the process of the formation and structuring of the company as a «learning organization», which comprises the following

necessary components: systems thinking, intelligent models, personal improvement, shared vision, team teaching and dialoguing.

Taken together, these management activities in their organic unity based on the achievement of the strategic goal of the organization, will be the foundation to ensure the growth and effective role of intellectual capital in gaining added value of knowledge-intensive products.

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**Интеллектуальный капитал наукоемкой организации: стратегия и принципы управления**

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С учетом уточненного понятия «управление интеллектуальным капиталом» определены базовые стратегии управления интеллектуальным капиталом на основе формирования, использования и обмена знаниями. Показаны отличия характерных признаков физического и интеллектуального капитала наукоемкого предприятия. Сформулированы общие принципы управления интеллектуальным капиталом.

**Ключевые слова:** интеллектуальный капитал, управление интеллектуальным капиталом, стратегии управления интеллектуальным капиталом, принципы управления интеллектуальным капиталом.

*Конференция молодых ученых «Менделеев-2017»*

4-7 апреля 2017 года в Санкт-Петербургском государственном университете пройдет конференция молодых ученых «Менделеев-2017». Тезисы принимаются до 17 февраля 2017 года. Участвовать в конференции могут студенты, аспиранты и молодые ученые (не старше 35 лет) российских и зарубежных университетов и научных организаций.

Работа конференции пройдет по шести секциям: химия и физика наноструктур и наноматериалов; полимерные материалы: методы получения и переработки; биоорганическая и медицинская химия; компьютерное моделирование; современные методы в аналитической химии; радиохимия и радиэкология.

В рамках конференции состоятся следующие мероприятия. Школа-конференция «Направленный дизайн веществ и материалов с заданными свойствами» совместно с Институтом органической и физической химии им. А. Е. Арбузова КазНЦ РАН при поддержке РНФ. Основная цель школы – обучение молодых ученых и специалистов рациональным подходам к созданию и исследованию новых веществ и материалов, обладающих заданными каталитическими, люминесцентными, магнитными, биологическими и другими практически значимыми свойствами. Турнир инновационных проектов. Мастер-классы на базе ресурсных центров Санкт-Петербургского государственного университета с участием производителей ведущего исследовательского оборудования. Конкурс на лучшие устные и стендовые доклады в каждой из секций.

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