



## Scientific analysis of organization intellectual capital using categorical grid method

### Análisis científico del capital intelectual de la organización utilizando el método de cuadro categórico

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#### ABSTRACT

The article proposes the author's scientific approach using the categorical grid method to determine the essence and composition of an organization's intellectual capital elements. They determined the list of elements describing the problem field of research. A categorical network has been formed that determines the scenarios for interacting intellectual capital elements. Possible connections between the tops of the triadic grid of intellectual capital phenomenon are revealed, which makes it possible to clarify the elemental composition of intellectual capital, to correlate the concepts of "consumer capital", "client capital", and "relational capital". The performed interpretation of the developed model of the triadic grid makes it possible to comprehend and describe the behavior of intellectual capital and possible scenarios for its development.

**Keywords:** Intellectual Capital; Scientific Approach; Triadic Network; Categorical Grid; Relational Capital.

#### RESUMEN

El artículo propone el enfoque científico del autor utilizando el método de grilla categórica para determinar la esencia y composición de los elementos del capital intelectual de una organización. Determinaron la lista de elementos que describen el campo del problema de investigación. Se ha formado una red categórica que determina los escenarios de interacción de los elementos del capital intelectual. Se revelan posibles conexiones entre los toques de la malla triádica del fenómeno del capital intelectual, lo que permite esclarecer la composición elemental del capital intelectual, correlacionar los conceptos de "capital de consumo", "capital cliente" y "capital relacional". La interpretación realizada del modelo desarrollado de la malla triádica permite comprender y describir el comportamiento del capital intelectual y los posibles escenarios para su desarrollo.

**Palabras clave:** Capital intelectual; Enfoque científico; Red Triádica; Cuadrícula categórica; Capital relacional.

## 1. INTRODUCTION

The modern economic situation is characterized by the strengthening of intellectual capital role both on a global scale and in the conditions of Russian reality, which makes it possible to form a unique competitive advantage of an organization at the micro level and is a factor of the knowledge economy formation and development at the macro level. In this regard, the task of assessing the amount of intellectual capital at the moment and identifying effective mechanisms for managing it in order to ensure its sustainable growth becomes urgent.

At the same time, in the context of the world economic system globalization, the role of information interaction between separate market entities is increasing, which leads to the emergence of new network forms of interaction - inter-organizational networks (Andreev et al. 2019; Krasova et al., 2018; Lazarev and Krasova, 2018; Osipov and Krasova, 2019; Kozlova et al., 2016; Petruk and Shashlo, 2019). They are based on the use of the most elusive element of intellectual capital - relational capital. Considering the fact that an organization interacts simultaneously with a large number of the external environment representatives, and also that various forms of interaction can have a mutual influence on each other, the issue of relational capital assessing and managing as the most dynamic and multicomponent element of intellectual capital acquires special relevance. At the moment, the composition and structure of intellectual capital elements is being actively studied in the works of foreign and domestic scientists (Ballestar et al., 2022).

It can be noted that the canonical structure of intellectual resources includes three components. If the first two elements in intellectual capital structure, as a rule, are similar or identical in their interpretation (the first of them is human capital, and the designations "structural capital" and "organizational capital" are most often used to denote the second element) (Tescari and Brito, 2018; Igumnov, 2019; Alexander & Morgan, 2018; Jacobs, 1961), some difficulties arise with the identification of the third element. Its existence is closely related to the development of a relational approach, in which the main value and the main source of competitive advantages are obtained by organizations through interaction with other market players and their associations (Alekseeva Natalia, 2019).

Some researchers suggest considering social capital as this element (Roos et al., 2006; Claver- Cortés et al., 2018; Li et al., 2019). The foundations of the stakeholder concept, which assumes the influence of all stakeholders in an organization management, was laid in the work by Stewart (Stewart, 1999). Other authors use the term "client capital" in relation to this element, and it can be considered in the framework of the relations with all market participants, or only with clients, but in the second case, the relations with other subjects of the external environment are not considered in any other parts of the intellectual capital (Lev, 2001).

In turn, the networks that represent a collection of interconnected market participants can be considered as a visual embodiment of relational capital (Magnani and Wasserman, 2017). Nevertheless, despite a fairly large number of works in this area, the use of the network approach is performed in a fragmentary manner to identify the elements of an organization intellectual capital, which hinders the effective management of intellectual capital development in general and relational capital development in particular. In our opinion, this problem can be solved using the methodological tools of the categorical-system methodology, in particular, the method of triadic grids.

The objective of the study is to form a structural diagram of intellectual capital elements, taking into account the specifics of their interaction and possible combinations of resources and actions leading to the creation and development of certain types of intellectual capital in accordance with the stated requirements.

## 2. METHODS

The research is based on the use of the triad grid method within the framework of the categorical-system methodology, which implies the use of "triad" concept as the basic unit of analysis. The conceptual foundations of the method were laid back in antiquity and were further developed in various fields of scientific knowledge - for example, in fundamental physics through R. Feynman's diagrams, and in linguistics via N. Chomsky's universal grammar (Kornienko, 2018). A formalized description of the method in the categorical-system methodology was proposed by V.I. Razumov (Razumov and Sizikov, 2007). The triad is the simplest categorical scheme formed from the categories of the mode of action, the subject of action and the action result. By combining separate triads of categories, it is possible to form categorical networks. The categories used in the development of networks should be homogeneous. Using categorical networks, it is possible to comprehend and interpret the existing interactions between the objects corresponding to the categories, as well as to develop possible routes through the vertices and edges of the categorical network, which makes it possible to determine the nature of the processes occurring in the triadic grid, the distribution of resources, and the interaction of elements.

## 3. RESULTS

In order to represent the phenomenon of an organization intellectual capital in the form of a triad network, it is first necessary to form a set of homogeneous concepts or categories that designate individual elements of the studied subject area. At the previous stage of the study, we identified three main elements of intellectual capital: human (employees of an organization), organizational, which corresponds to the knowledge introduced by the organization personnel, and consumer, or client, capital, which is formed during the interaction of an organization with the external environment (knowledge available for the organization from clients). However, the list of actors with whom the organization interacts is not limited to its clients. The unique competitive advantages of the organization are also determined by the specific conditions for the supply of the necessary resources, the nature of relations with controlling organizations (if any), government agencies and society as a whole. Thus, the following elements of intellectual capital can be distinguished, which can be placed in the categorical triad nodes:

- employee;
- client;
- partner;
- supplier;
- state;
- controlling organization;
- competitor;
- society (Fig. 1).

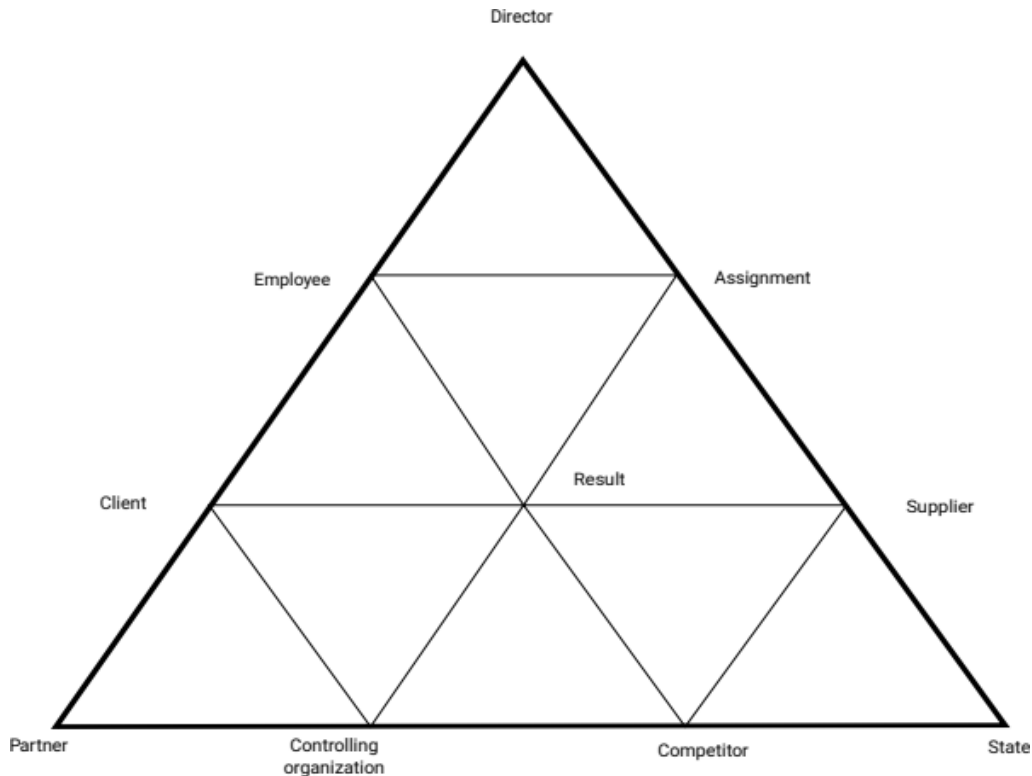


Figure 1. Triadic network in the categorical field of intellectual capital phenomenon

At the level of scientific knowledge methodology, any phenomenon can be represented using the so-called creative triad: Mode of action + Subject of action = Result of action, which takes the following form in everyday practice: Intention + Possibility = Result (Kornienko, 2018). In relation to intellectual capital phenomenon, it will look like this: Employee + Task = Result.

#### 4. DISCUSSION

An employee, faced with a task assigned to him, takes an active action to complete it, the result of which is a solved task. Further, this triad of elements can be expanded by including a manager in the scheme, who directly formulates a task for an employee. In this triad, active action is also provided by the employee's work, the possibility of its implementation is conditioned by the manager instructions, and the task being solved acts as the result, since, having received instructions from a manager, an employee formulates it for himself on the basis of the given conditions. Thus, this triad, in fact, precedes the initially designated one. A task can be formulated both by a manager and by a client directly, therefore it can also be considered as an element to be included in the categorical network.

Thus, the following triad is formed: Client - Task - Employee. In addition to an interpretation similar to the previous one, in which an employee, based on the instructions of a manager, formulates a task for himself, another interpretation can be obtained: an employee (mode of action, active origin), who is responsible for the task (the action subject, passive beginning), comes to a certain result (customer's need satisfaction). In the course of interaction with the external environment, an organization can form relationships not only with customers, but also with other interested parties - suppliers, the state, business partners, and regulatory organizations. We can consider the supplier as the next element - the top of the categorical network, which forms a triad: Supplier - Employee - Result. Here, the supplier, who provides the organization with certain resources, gives a certain opportunity (passive beginning) to the employee

performing the action (active origin), which leads to the solution of the task faced by the employee (result).

At the next level, the studied categorical network can be expanded by including the business partners of the organization (the alliance members) and the controlling organization of one party, competitors and the state of the other party. The partner forms a triad with the controlling organization and the result of the completed task. A similar triad is formed between the client, the controlling organization and the partner, in which the partner acts as a passive element, the terms of the agreement with whom are also checked for compliance with the controlling organization requirements. The controlling organization is connected by triadic relations with competitors and the result of the solved problem. In this triad, it is also responsible for the active origin, intention, action. The result of the solved problem is an object, since it is assessed in terms of the requirements of the controlling organization, and the actions of competitors and the position they occupy in relation to the organization can be considered as a result taking into account how the obtained result corresponds to the requirements of the controlling organization.

Finally, the lower right vertex of the triadic network is formed by the element “state”, which forms a following triad: state - supplier - competitor. Here the active origin is provided by the actions of competitors aimed at choosing a supplier and concluding the most profitable agreements with them. The passive beginning, the provided opportunity is determined by the supplier, and the result is the economy changes at the state level. This triadic grid is not closed and can be expanded by including intermediate elements in it. The next step is to identify possible mediated connections between the vertices of the triadic grid, as well as the interpretation of the resulting triangles (Fig. 2). If we use the results obtained at the previous stage of the study, then we can establish the correspondence of Client - Task - Result triangle with the concept of consumer capital obtained as a result of an incoming order solution from the organization customers (green triangle). The triad Employee - Task - Result characterizes the human capital of the organization (yellow triangle), and the triad Employee - Manager - Task - organizational capital (orange triangle).

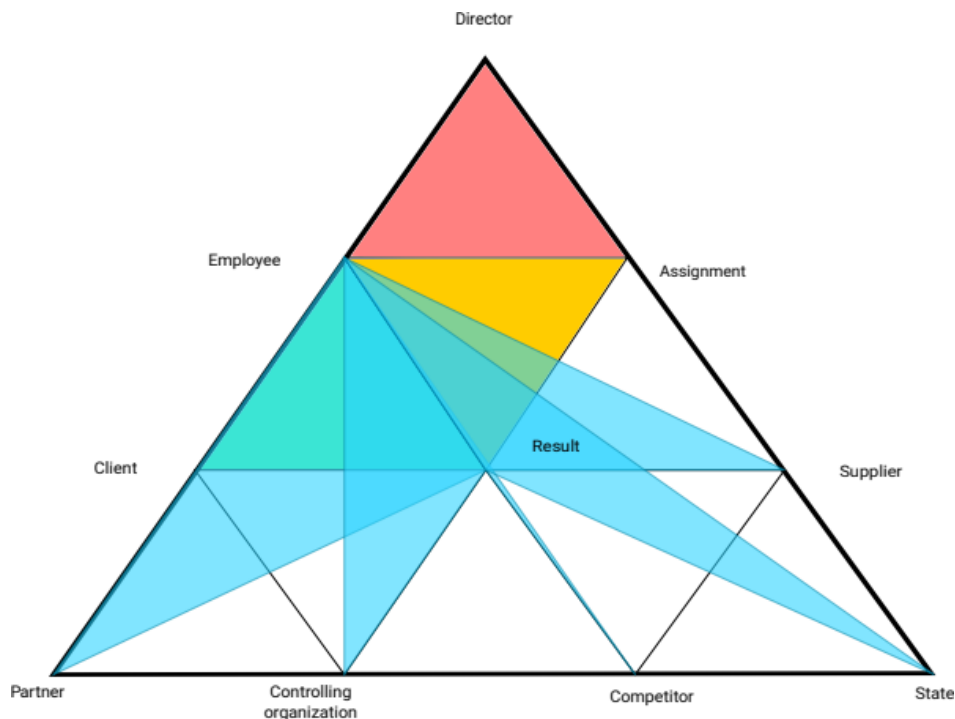


Figure 2. Correlation of intellectual capital elements

Relational capital is characterized from the standpoint of the relationships that the organization has with various representatives of the external environment regarding the solution of the problem and obtaining the desired result. In this case, the concept of relational capital turns out to be broader than the concept of consumer capital and cannot be evaluated as a simple arithmetic sum of relations with various representatives of the external environment, which is conditioned by the partial imposition of this figure on the triangles obtained during the formation of the triads Task - Result - Corresponding representative of the external environment (blue triangles).

The exception is the Competitor - Result - Client triad, where the result obtained influences the client's decision to continue relations with the organization or leave to a competing company, which is clearly shown on Fig. 2. Thus, we can state discrepancy concerning the conclusion that consumer capital in its pure form is the part of relational capital elements made in the work by Alekseeva (Alekseeva Natalia, 2019). Nevertheless, the resulting triad grid scheme confirms the conclusion formulated in the same work: it is advisable to revise the name of the element "consumer capital" in the composition of intellectual capital so that it takes into account the organization relations not only with customers, but also with all interested representatives of external environment. Also, the substantiation of the concepts "customer capital" and "consumer capital" identity is not refuted, for which the identical concept of "customer capital" is used in principle, which presupposes assessment of the organization relationship with customers exclusively.

## 5. CONCLUSION

The application of the triad grid method for the subject area of the organization intellectual capital allowed us to obtain the following results.

1. A list of homogeneous categories / concepts that describe the phenomenon of the intellectual capital of an organization has been compiled, which makes it possible to form a description of intellectual capital phenomenon with the necessary and sufficient completeness and consistency.
2. A categorical network has been developed, which forms various scenarios of interaction between the elements of intellectual capital, which makes it possible to determine the specifics of intellectual capital formation and development in various conditions.
3. Possible direct and indirect connections between the vertices of the triadic grid of intellectual capital phenomenon have been identified, which makes it possible to clarify the elemental composition of intellectual capital and, therefore, to present it in the form of categories reflecting its qualitative certainty.
4. Possible additional triads of the resulting triadic grid have been identified, which makes it possible to substantiate the transition from using the element "consumer capital" name for the broader concept of "relational capital".
5. The interpretation of the triadic grid model obtained for the subject area has been carried out, which makes it possible to comprehend and describe the intellectual capital behavior and possible scenarios for its development.

Using the results obtained in the future will allow us to characterize the aspects of intellectual capital, reflecting the progressive and regressive components of the categorical triads, contributing or hindering the formation of a knowledge-based economy; to consider the selected aspects as a single system that can be balanced by their balancing.

The practical use of the results obtained is in the field of lawmaking activities of the authorities at various levels. They can be used as a basis for program-target planning during the preparation of projects and

programs aimed at the transition to the sixth technological paradigm and knowledge-based economy development.

## REFERENCES

- Alekseeva Natalia, S. (2019). Clarification of the structure of intellectual capital based on the analysis of definitions of relational capital and consumer capital.  *$\pi$ -Economy*, 78(4), 106-114.
- Alexander, K., & Morgan, S. L. (2016). The Coleman Report at fifty: Its legacy and implications for future research on equality of opportunity. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 2(5), 1-16.
- Andreev, V. A., Varkulevich, T. V., Bedrachuk, I. A., Arnaut, M. N., & Chudaev, E. Y. (2019). Regional universities and external migration of the graduates: impact on economics sphere (example of Primorsky region). *Amazonia Investiga*, 8(23), 547-555.
- Ballestar, M. T., García-Lazaro, A., Sainz, J., & Sanz, I. (2022). Why is your company not robotic? The technology and human capital needed by firms to become robotic. *Journal of Business Research*, 142, 328-343.
- Claver-Cortés, E., Zaragoza Sáez, P. D. C., & González Illescas, M. (2018). Intellectual capital management: An approach to organizational practices in Ecuador.
- Igumnov, O. A. (2019). Socio-economic meaning of the concept “social capital”. *Vestnik Evrazijskoj nauki*. 1,18. (In Russian).
- Jacobs, J. (1961). *The Death and Life of Great American Cities*. New York, Random House.
- Kornienko, M. A. (2018). THE LINGUISTIC PHILOSOPHY OF NOAM CHOMSKY: FROM THE CARTESIAN TRADITION TO GENERATIVE GRAMMAR. *VESTNIK TOMSKOGO GOSUDARSTVENNOGOUNIVERSITETA-FILOSOFIYA-SOTSILOGIYA-POLITOLOGIYA*, 43, 88-100.
- Kozlova, O. A., Terentyeva, T. V., Makarova, M. N., & Lan, D. H. (2016). Territorial Factors of Strategic Development of the Regions of the Far East. *Ekonomika regiona*, (3), 765-775.
- Krasova, E. V., Osipov, A. V., & Hilko, E. V. (2018). Prerequisites for formation of modern management paradigms in terms of scientific knowledge evolution. *Amazonia Investiga*, 7(17), 5-11.
- Lazarev, G. I., & Krasova, E. V. (2018). Research and development in China: scope and specifics of innovation process. *Amazonia Investiga*, 7(14), 73-83.
- Lev, B. (2001). *Intangibles: Managing, Measurement and Reporting*.
- Li, Y., Song, Y., Wang, J., & Li, C. (2019). Intellectual capital, knowledge sharing, and innovation performance: Evidence from the Chinese construction industry. *Sustainability*, 11(9), 2713.
- Magnani, M., & Wasserman, S. (2017). Introduction to the special issue on multilayer networks. *Network Science*, 5(2), 141-143.

Osipov, V. A., & Krasova, E. V. (2019). Labor productivity as a source for effective development of production. *Amazonia Investiga*. 8 (19). P.547-557.

Petruk, G. V., & Shashlo, N. V. (2019). Implementation of the Science Development Strategy: New and Non-Standard Solutions. *Dilemas Contemporaneos-Educacion Politica Y Valores*. 7 (1). 57.

Razumov, V.I. & Sizikov, V.P. (2007). The informational basis of synthesis of systems: V 3 ch. Information bases of the knowledge system: monograph”, OmSU Publishing House, Omsk

Roos, G., Pike, S., & Fernstrom, L. (2006). *Intellectual Capital: Practice of Management*. Abingdon, Routledge.

Stewart, T. (1999). *Intellectual Capital: The new wealth of organization*. New York: Crown Business Group

Tescari, F. C., & Brito, L. A. (2018). The Relational View: Future challenges for a non-confirmed expectation. *Revista Brasileira de Gestão de Negócios*. 20 (3), 461-487.