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Structural capital and its importance for the intellectual capital of an organization

Abstract

This article aims to confirm the thesis that structural capital (SC) is a framework for intellectual capital (IC) in an organization, which allows proper configuration of intangibles. Therefore, in the resource-based view, it determines its strategic character. Realizing such a goal, the author pays attention to the nature of relations and connections of individual components of IC, indicating that the SC is the key factor creating intangible assets of the organization as a source of gaining competitive advantage. The reason for taking up this issue is that, despite years of discussion in the field of IC, there are still unanswered questions concerning the management of an organization's IC, especially its planning and development. The defined knowledge gap concerns the source of strategic characteristics of IC, which, according to the resources-based view, are its rarity, originality, and the inability to be substituted or copied. The ability to shape the strategic value of intangibles makes this source itself a strategic resource and identifying it can change the way we understand IC. To achieve the paper's aim and fill the knowledge gap, the author asks whether SC can provide the characteristics of IC mentioned above and whether the strategic character of IC can be achieved independently of SC. The review and theoretical considerations are based on the analysis of the literature on IC and selected issues that are not directly related to IC, but of which the subject touches on the intangible assets commonly considered to be components of IC, such as the issue of functional stupidity, knowledge management, or resource theory. As a result of the analysis of features and characteristics of SC, the author concludes that SC is responsible for the efficient use of relational capital and human capital potential and thus is a strategic factor shaping IC as a source of achieved competitive advantage.

The topic has important practical implications because by confirming the strategic role of SC, indicates the sources of effective creation of IC and its potential. The discussion also identifies directions for further research on this issue, especially the operationalization of IC and its analysis in organizations' internal structures.

Keywords: intellectual capital, structural capital, human capital, relational capital, efficiency

Introduction

Intangible assets in the conditions of the postindustrial economy have replaced the classical factors of production (Wu, 2006). They are recognized as strategic resources that have become the primary source of competitive advantage. For more than 30 years, the attention of researchers and entrepreneurs has been focused on the issue of intellectual capital (IC), which is seen as an aggregate of intangible assets, including knowledge and its derivatives. Despite the significant role attributed to IC and the impact of this resource on business performance confirmed by numerous empirical studies, the formation mechanism of efficient IC remains largely unexplored and mysterious. Some researchers attribute a key role in building the value of IC to human capital (HC), thus placing it as a source of competitive advantage of an organization. After all, only people possess causal competencies, and in the end, the organization achieves its goals thanks to, their work. HC, being a carrier of knowledge, attitudes, and experiences as well as ideas, appears to be an important factor in creating the

mentioned value. In the context of knowledge management processes, it is both a source and recipient of processed, codified, and created knowledge. Nevertheless, it seems reasonable in this context to ask why not all organizations with outstanding HC are able to realize their goals. Where do the human decisions and actions that today we can broadly refer to as organizational stupidity come from? What factor or factors must materialize therefore for an organization to be able to make full use of its HC potential? According to the resource-based approach, strategic resources should be considered valuable, rare, have no substitutes, and difficult to copy (Barney, 1991). These characteristics in the case of IC are provided for instance by the proper and unique configuration of its components (Reed et al., 2006). Properly managed IC becomes a strategic resource, and organizations that effectively use such IC are becoming open to innovation (Altındağ et al., 2019) and are more likely to be successful and gain competitive advantages (Ginesti et al., 2018; Hejazi et al., 2016; Meles et al., 2016). Thus, a knowledge gap is revealed here, which particularly touches on the interrelationship of IC components and thus their configuration. In the context of numerous studies that pay special attention to the important role of work organization and processes in the effective use of the organization's knowledge potential, it seems that the role of SC in building the strategic character of IC is not fully recognized yet.

The subject of research undertaken in this paper is SC and its impact on the company's intangibles' proper configuration. Therefore, the article aims to confirm that SC plays an essential role in creating mutual relations of intangible resources, thus becoming an integrator of the organization's IC, responsible for its strategic character. Thus, to achieve the stated objective, the following research questions were posed:

RQ1: Can the provision of strategic resource characteristics of IC, in the sense of the resource approach, occur independently of SC?

RQ2: Does SC influence the configuration and, therefore, the interrelationship of the components of IC in an organization?

The conducted research is theoretical and based on an analysis of literature. To provide highly plausible heuristics, coherent theories in the field of management of intangible assets of the enterprise have been selected and aggregated, including the concept of an intellectual capital-based View (ICbV), the idea of functional stupidity, the concept of a Knowledge-based View of the organization (KbV), the concept of organization life cycle, and selected concepts of measurement and evaluation of IC.

The examined issues are part of the discussion conducted for several decades by researchers of the resource stream in the optimal reconfiguration of resources. The identification of IC integrators and the study of the nature of relationships occurring in the structure of IC is an essential step toward the effective and efficient operationalization of this issue.

Definitions of intellectual capital and structural capital

Even though the discussion on IC has been going on for 30 years, the world of science has not yet developed a consensus on the definition of this concept. IC, which originates from economic practice, is not anchored in theoretical considerations (Kasiewicz & Rogowski, 2006). An attempt to base this concept on modern scientific theories necessarily involves researchers from various scientific disciplines, among whom a consensus is sometimes hard to come by. An example may be the emerging criticism of the concept of IC articulated by economists, in which questions are raised as to whether such intangible assets as ideas can be considered capital at all (Dean & Kretschmer, 2003). Therefore, the ongoing discussion is multidisciplinary and, above all, conducted in the language of various scientific disciplines. The authors define IC in different ways, and we can risk a thesis that each of them tries to emphasize the correctness of their own interpretation (Ujwary-Gil, 2010). Edvinsson and Malone (2001) define IC as the sum of HC, SC, and customer capitals. HC is primarily knowledge, skills, innovation, and the ability to carry out tasks efficiently. SC encompasses IT infrastructure, organizational structure, trademarks, patents, and everything that supports employee productivity. Stewart (1997) identifies IC as the sum of everything that everyone in a company knows that gives it a competitive edge. It is the knowledge that gives value to the individual elements of the organization and is organized in HC, SC, and customer capital. According to Brooking (1996), it is a bundle of intangible resources thanks to which the organization can function. IC is about market resources, human resources, infrastructure, and intellectual property. Sveiby (1997) emphasized the human role, pointing to employee competencies and internal and external structures. IC is also defined as the source of future benefits generated by innovation, unique organizational solutions, and employee performance (Lev, 2001). Despite apparent differences, most of the concepts of IC functioning in specialized literature indicate IC as the sum of HC and other intangible resources.

The difficulty in defining IC is related to the broad scope of the discussed concept. The number of components considered and the substantive area and perspective from which the definition or description of IC is established fundamentally influence the course of the discussion. The multi-disciplinarity and interdisciplinarity of the IC concept is an important factor that hinders the development of a consensus in this regard. The view is also relevant that the number of developed concepts and interpretations of IC is so large that researchers should no longer focus on developing new ones (Marr & Chatzkel, 2004) because in each individual case, IC may be defined differently depending on specific goals or needs (Chatzkel, 2002). Paradoxically, in this approach, all definitions are correct, and the possible categorization of this con-

cept only helps organizations understand what IC is. Huang, Luther and Tayles (2007), in their research on the taxonomy of IC, and Choong (2008), Kasiewicz and Rogowski (2006), and Martín-de-Castro (2019), who conducted detailed analyses of the literature on the subject, disseminated the three-component concept of IC by dividing it into HC (i.e., knowledge, experience, competences, and creativity), Structural or organizational capital (containing assets of the organizational structure, management and information systems) and relational capital (RC, relations with stakeholders). This division can be seen as a reflection of the sources of knowledge represented by people, information systems, processes, and social ties (Reed et al., 2006).

Defining SC seems to be a particular challenge in the discussed context. Some authors refer to it as “structural capital” (Bounfour, 2003; Edvinsson & Malone, 2001; Moon & Kym, 2006; Roos et al., 1997; Stewart, 1997), but there are also terms such as “infrastructure assets” (Brooking, 1997), “internal structure” (Sveiby, 1997), “intellectual assets” (Sullivan, 1998) and “organizational capital” (Bozburu & Beskese, 2007). The taxonomy of this concept in the works of individual authors also differs. For example, Sveiby (1997), when designing an IC measurement and assessment tool known as the *monitor of intangible assets*, explicitly assigned culture and “organizational spirit” to the internal structure. The internal structure, as seen by the monitor, is not entirely identical to the SC defined by other authors, if only because it also includes elements or features attributed to the human community, such as common identity or values. The differentiation of the SC taxonomy in the works of individual authors also results from the very essence of intangible assets, which makes it difficult to assign them to a single category unambiguously. For example, internal communication systems are classified in SC as systems or in HC because communication is the domain of people, and, in practice, it is a competence of HC rather than SC (Huang et al., 2007). According to Brooking (1996), SC is a framework that strengthens the organization, and formalizes the organizational culture, relations, and relations between employees and processes.

Unlike HC, which is the wage-earning capital of the organization and remains the property of the employees (Edvinsson, 1997), SC is wholly owned by the organization (Martínez-Torres, 2006). It includes processes, methods, procedures (Khavandkar et al., 2016) and the Non-Employee State, and sources of knowledge supporting the HC of the organization (Watson & Stanworth, 2006). According to Edvinsson and Malone (2001), SC is divided into organizational capital and customer capital. “Structural capital can best be described as an embodiment, empowerment and supporting infrastructure of HC.” It consists of Innovation Capital in the form of intangible assets, Intellectual property, and other intangible assets for introducing new products and services to the market, and process capital covering all kinds of processes,

procedures, and principles supporting the efficiency of production and delivery of services. SC is “everything that gets left behind at the office when employees go home” (Edvinsson & Malone, 2001). In the concept of Saint-Ongea (1996), SC is divided into four elements: a hierarchical organization that defines the relationships and positions of members of the organization, systems that determine how the organization operates (processes) and provides services, a strategy that defines the organization’s goals and its achievements, and a culture within which it defines the values, norms and thinking of the organization. The presented approaches define SC as a diverse set of all elements shaping the environment, working conditions, and the way it is performed, as well as the knowledge contained in the organization’s information systems. A similar approach was also adopted by other researchers, such as Pietruszka Ortyl, Brooking, Bratnicki and Sveiby (Sopińska, 2010). However, some researchers emphasize that the organizational culture revealed in SC is only its codified form (Huang et al., 2007).

Mutual relations of the components of intellectual capital

In attempting to answer whether the provision of the strategic resource characteristics of IC can occur independently of SC, attention should first be paid to the issue of organizational structure. An organizational structure is a framework of relationships between employees and their groups in the work process, designed to enable the organization to achieve its goals (Minterzberg, 1992). It is also a set of methods that divide tasks into specific responsibilities and their coordination (Ahmady et al., 2016). It forms the basis of its formalized communication channels and refers to its participants’ internal relationships, and defines the source of authority, responsibility, and delegation of authority (Arnold & Feldman, 1986). According to Drucker (1954), the structure is a tool to achieve the short- and long-term goals of an organization. The organizational structure, which is a strategic resource and a part of the SC, must define the relationships between the intangible resources of the organization, becoming the source of the configuration of the IC, an important factor that gives the IC a strategic character. In the light of the cited literature and based on the results of empirical studies, SC, especially concerning work processes and organization and formal aspects of organizational culture, affects the ability of the organization to use its intellectual potential. Defining clear rules of action and expected attitudes and values defines standards of behavior and relations with all organizational stakeholders. In a study of fuzzy cognitive mapping of IC, it was shown that the relationships between HC, SC, and RC occur at the level of the individual components of these aggregates. These relationships take a unidirectional or bidirectional form and can either reinforce or weaken the other elements of IC. Based on the simulations associated with targeted development activities, it

was found that investment in SC provided the most significant return (Arvan et al., 2016).

The synergistic effect resulting from the interconnectedness of all the components was confirmed by Bontis (1998), who conducted a pilot study on a group of MBA students (representing various industries) and indicated the existence of relationships between the components of IC and their impact on company performance. Using similar research methods and applying them to a selected group of German pharmaceutical companies, Bollen et al. (2005) confirmed that the individual components of IC indeed interact, which means that the strengthening of any of them strengthens the others. In this view, the source of company value is IC as a whole, and its transformation into a value, is not possible as long as even one of its components is too weak or directed in the wrong direction (Edvinsson & Malone, 2001). The interaction of these factors generates leverage, which is consequently a source of permanent competitive advantages (Youndt & Snell, 2004). This approach is also accentuated by the concept of value platform (value platform), defining a “good” organization as one that evenly develops the components of its IC (Kuzel, 2018). The interconnectedness of intangibles is therefore much more important than their individual value (Bollen et al., 2005; Bontis, 1998; Reed, 2000), according to the principle that more is not always better (Reed et al., 2006). Pulic’s (2008) primary indicator and measure of a company’s success is the added value, and IC is an essential resource in its creation. According to the VAIC methodology of measuring IC developed by Pulic, the value of SC is determined by the difference between the value added and the value of HC. This confirms the strong relationship between the two components in the context of organizational performance. This simple formula is also confirmed in business practice. In a study conducted on a group of banks, researchers of the Reed team (2006) showed that the performance of the studied organizations became poorer the more extensive their internal regulations were. Thus, SC can generate bureaucratic and social barriers that limit the organization’s efficiency, thus leading to a deterioration in the company’s results (Reed et al., 2006). In practice, there are several examples of companies in which valuable HC in no way translates into business results. One of the reasons for this may be the systemic solutions, deeply rooted in the culture and tradition of the organization, which largely relieve employees of the burden of making their own decisions and creating solutions. Reduced need to think often results in the rigidity of action, over-reliance on plans, strict operational rules, and procedures. It is believed that a form of work organization that limits the individualism and innovative approach of employees can be the source of problems that consequently limit the ability to compete (Pech, 2001). The SC, which should have a supportive role to HC, does not fulfill this role. Without this support, HC does not represent a significant value in the context of the company’s performance (Bontis, 1998). This problem is also related to the

concept of so-called functional stupidity. Attention was drawn to this issue by Alvesson and Spicer (2016), asking the question, “Why was it that organizations which employed so many smart people could foster so much stupidity?”. Albrecht (2003) referred to this situation as successive submission to “collective stupidity.” Conformist attitudes are a natural part of the employment process and result from the individual’s need to adapt to rules and regulations established not only in the form of internal laws but also arising from the actual organizational culture. Consequently, the SC, which defines the entirety of the organization’s rules, also perpetuates solutions that support the presence of stupidity in management processes, including decision-making (Chwilkowska-Kubala et al., 2020). Improper regulation leads to erroneous managerial decisions, and this supports the thesis that illogical employee actions find their origins in functional stupidity (Alvesson & Spicer, 2016), so to speak, in SC. This problem does not only apply to commercial organizations. A prime example of institutions accumulating eminently valuable HC is universities. The problem of the so-called Gordian knot of university IC indicates that the extent to which an organization can transform the potential of its HC into efficient IC is determined by the SC, among other factors (Bratianu & Orzea, 2013). It is not difficult to illustrate this problem with the example of dynamic changes and market turbulence. Inflexible bureaucratic management and decision-making systems become a source of constraints. It forces employees to make decisions inadequate to the situation or not to make them at all. Thus, the impact of SC on IC efficiency should also be viewed through the prism of its flexibility, that is, the organization’s ability to create and use dynamic competencies within the organization (Sharabati et al., 2010), which are predominantly concentrated in HC. Research on organizational agility shows that ensuring flexibility is practically possible through the strategic use of best practices (proven patterns of operation) and appropriate tools (Sharifi & Zhang, 2001). Thus, the ability of an organization to adapt to a changing environment is the result of the right relationships between the components of IC, including SC.

Providing IC with the characteristics of a strategic resource, i.e., its value, uniqueness, being difficult to copy and replicate, should be considered through the prism of the number of components that build this capital. The idea that originality, or rather uniqueness, is related mainly to the configuration of IC components rather than to their individual characteristics seems to be correct. SC is the element that configures IC components and, at the same time, influences their basic parameters. The role of SC in shaping organizational stupidity seems particularly relevant in this context, as it clearly indicates that SC may be not only a source of value but also a source of its lacks, contributing to inefficient use of the potential of the organization’s intangible resources. Thus, shaping the strategic nature of IC is not possible in isolation from the SC of the organization.

Creation of structural capital and its impact on the configuration of an organization's intangible resources

According to Edvinsson's concept, the common source of SC creation is HC. In the four-phase idea of IC development Edvinsson defined, organizational capital results from the transformation of HC. According to this approach, SC results from the externalization of knowledge and successively develops as the knowledge processes proceed. SC is the effect of the directed actions of people. Theoretically, it could be assumed that HC is responsible for IC configuration, so valuable HC should transform into valuable SC. In the context of knowledge management and knowledge externalization processes, such an approach may seem reasonable. Nevertheless, SC is also, to a large extent, the processes, rules, and principles of functioning of the organization's members, including the limitations of this functioning. Thus, SC is a set of institutions in both formal and informal fields (organizational culture). Belief in the rationality of the formation process of IC, precisely including the transformation of HC to SC, is based on the theory of expected utility derived from economic sciences or its development in other areas of social sciences called the theory of rational choice. This neoclassical approach has been criticized by empirical researchers who emphasize that human rationality in the face of decision-making is limited by knowledge and competence but also by formal and informal institutions (Strycharz, 2013). In this context, considering the complexity of human behavior and the motivations behind it, the possibility of HC to arbitrarily shape the organizational rules and externalize knowledge seems a far-reaching simplification. Therefore, the process of changing the existing rules (SC) is difficult. It is spread out over time, which explains why more organizations fail due to internal maladjustment and not due to market competition (Albrecht, 2003).

The difficulty of changing and effectively adjusting SC by the organization is one of the sources of organizational failure but also evidence that SC is the integrator and configurator of the organization's intangible assets (Bratianu & Orzea, 2013). Unable to change existing rules, the organization must adhere to them, so regardless of the value of HC, it is SC that becomes the day-to-day cementing factor of intangible assets in the organization.

The configuration of intangible resources results primarily from the identification of the organization's needs, which are predefined in the company's strategy and translated into medium-term and short-term goals, tasks, and guidelines which are then implemented using defined tools and rules (Kopecka, 2015). SC not only defines the catalog of resources (e.g. competencies) needed for strategy realization, but also provides the tools necessary for the implementation of these needs in the form of procedures, algorithms, information systems, databases, etc. Similarly, the way these resources are used, the

principles of their mutual interaction, cooperation, information exchange, or all sorts of issues related to the delegation of authority, also find their legitimacy in the organization's knowledge codified in the form of regulations, policies, and principles (Sopińska, 2010). An excellent example of this in an organization is Human Resources Management (HRM) processes, within which the competencies of the organization are acquired, used, and evaluated. The manner of selection, as well as their subsequent placement and use, is to a large extent a derivative of SC expressed in HRM procedures and organizational structure. In the concept of human capital architecture, it is stated that the way HC is managed should depend on the type of work performed, competencies used, or objectives pursued, determining the effectiveness of this capital (Lepak & Snell, 1999). Creative work, and the creation of new knowledge, requires suitable conditions. After all, the human mind cannot be programmed to engage and work effectively only at the designated time and place. SC in the form of proper working conditions, appropriately designed to suit the needs and nature of a given position or substantive area of the organization, is an element of efficient management of knowledge workers (Morawski, 2017) and effective transfer of HC in IC (Morawski, 2009).

Similarly, knowledge management in an organization requires mechanisms that will motivate and activate HC in knowledge processes (Saito et al., 2007). A study conducted by researchers at the University of Technology in Sydney argues that knowledge codification by itself does not increase the practical value of IC and thus does not translate into corporate performance (Attar et al., 2019). Given the mercenary nature of HC and hence its transient nature (Edvinsson, 1997), the knowledge codified in SC will never represent employees' actual knowledge. Knowledge is a strategic resource, but only its active use allows organizations to obtain benefits. If this codified knowledge is not reflected in HC, its use becomes impossible. Thus, organizations must identify key resources, update them, and collect, codify, and transfer them (Gierszewska, 2006). In this sense, SC is a factor that not only strengthens HC but, above all, prevents its depreciation.

SC, as Edvinsson points out, is the result of the transformation of HC. Still, the competence to create and shape it is limited and clearly defined in the organizational structure. SC is the formal framework of decisions made in the organization and solutions applied, and through defined rules and institutions, it influences how other intangible resources are used and configured.

Taking the above into account and referring to the previously quoted concepts of organizational stupidity and the role of organizational structure in the process of IC configuration, the answer to the question posed is not unequivocal. It indicates some limitations of this discussion. In young developing organizations, where knowledge codification takes place on a limited scale, HC mainly creates the

structure of intellectual capital. The development of the organization, the progressive codification of knowledge, and the fluctuation of HC related to its mercantile nature make the way of aggregation and selection of intangible resources a derivative of SC, determining its strategic nature.

Conclusions, limitations, and directions for future research

The “passive” role of SC, resulting from the definition, identified mainly with the organization’s stock of knowledge in the form of its codified databases and other sources, limits the interest of IC researchers in this issue. Many authors emphasize the important or even leading role of HC in the process of shaping and using IC (Edvinsson & Malone, 2001). It is assumed that since knowledge is created in the minds of people and only in the process of integrating the knowledge of all employees is it possible to determine the IC of the organization (Bontis, 1999; Nonaka & Takeuchi, 1995) it is HC that constitutes the efficiency of IC. However, SC is, besides the deposits of codified knowledge, also the formal and technical aspects related to the organization’s functioning. SC, also called *organizational capital* by Edvinsson and Malone, defines how the organization should function and what internal structure it should have, divides it into activities, and tasks, and defines directions of development and goals for the future. SC formally “binds” intangible resources together and sets the rules for their use under the principle that the source of enterprise value cannot be a single component of IC. Its transformation into value will not be possible as long as at least one of its components is too weak or directed in the wrong direction (Edvinsson & Malone, 2001). Research in cognitive IC mapping confirms the unique role of SC, which contributes most clearly to IC value. At the same time, developing research on functional stupidity ensures institutions’ role in the effective use of knowledge and experience of employees. Researchers who address the topic of functional stupidity point out the numerous similarities between the mechanisms of functional stupidity and at least the mechanisms of knowledge processes (Chwilkowska-Kubala et al., 2020). This means that the same solution in different organizations may generate completely different effects. This highlights the role of SC in creating strategic features of IC in the form of hard-to-copy value resulting from the intangible resource structure of the company. Thus, SC is the backbone that reinforces IC (Brooking, 1996), constituting the structure and functioning of the organization. In this context, SC is responsible for the proper distribution and use of intangible resources possessed by the organization, and therefore for their configuration. By creating the right working conditions or adapting management to the different organizational structures following the concept of the architecture of HC, SC appears as a source of mutual relations within IC. In this context,

SC is an integrator that determines how effectively an organization uses its IC potential (Bratianu & Orzea, 2013). SC activates the organization by enabling it to materialize its potential in the form of any value. In this sense, SC is less obvious and much more specialized than the other components of IC (Moon & Kym, 2006). By answering the questions posed, the paper confirms the thesis presented at the outset that SC is a strategic resource of an organization responsible for the strategic nature of IC. This responsibility is expressed by the competence of the configuration of intangible resources in the organization, thus building relationships and activating its potential. The defined conclusions provide value for organizations wishing to effectively manage their knowledge resources and indicate that any investments and activities aimed at developing IC and RC require, first of all, the right organizational environment and the practical possibility of using the effects of these investments. At this point, it should be emphasized that these considerations concern mainly large organizations. Due to their extensive structure and scale of operations, they have defined formal rules of functioning expressed in described processes and some internal regulations. This limitation is significant because, in smaller structures, some of the principles and methods of operation result directly from the knowledge and practice of employees or even an owner (especially in micro and small companies). This knowledge is in no way codified.

The confirmed thesis and the conducted discussion open several research targets. The key issue seems to be the analysis of IC at the level of organizations’ internal structures. If SC configures the intangible resources in the structures of the company, and the appropriate configuration makes them a strategic resource, then, from the management point of view, IC should be analyzed at the level of the structure of the organization. In this context, the essential questions seem to be:

1. Is SC within the structures of the organization a cohesive resource, or is it internally divisible?
2. What is the mutual relationship of IC elements at the interface of different internal structures of the organization?
3. Which intangible resources are shared throughout the organization?
4. Does optimal IC in each place of the structure mean the same thing?
5. How to measure IC in separate structures of the organization?

Answers to these questions are sought in vain in literature. From the managerial point of view, IC, and its operationalization at the level of organizational structure, will allow it to precisely address development activities and identify barriers to its development. Further research and exploration of this issue are therefore justified both scientifically and from a utilitarian point of view.

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