

Challenges for the University Intellectual Capital in the Knowledge Economy

Constantin BRĂȚIANU

*Faculty of Business Administration
Bucharest University of Economic Studies
6 Piața Romană, sector 1, 010374, Bucharest, Romania
constantin.bratianu@gmail.com*

Florina PÎNZARU

*Faculty of Management
National University of Political Studies and Public Administration
30A Expoziției Blvd., Sector 1, 102104, Bucharest, Romania
florina.pinzaru@facultateademangement.ro*

Abstract: *Universities have always been fundamental institutions in any society due to their enduring mission of creating new knowledge through research, of training generations of professionals, and providing service for community. They have a long life cycle and need to adapt continuously to their changing environments. In the last decades, the emergence and development of knowledge society put forward new challenges to universities and to managing their intellectual capital. The purpose of this paper is to present three main challenges for the university intellectual capital in the knowledge economy, and to discuss how these challenges can be achieved. These challenges are the following: 1) to unfold the Gordian knot of the canonical model of intellectual capital; 2) to go beyond the Newtonian logic in intellectual capital evaluation and reporting; and 3) to integrate intellectual capital in the strategic thinking of the university. All of these challenges are strongly related to the university performance.*

Keywords: *governance, intellectual capital, knowledge management, strategic thinking, university.*

Introduction

Universities are among the most resistive institutions of society. As McCaffery (2004, p.8) remarks, "Universities are both ancient and modern institutions." They are ancient in the sense that their roots can be traced back to the Bologna University established in 1088 and the famous Oxford University established in 1187. They are modern in the sense that it was only in the nineteenth century that a new generation of universities developed taken the Humboldtian University as a model. The new paradigm introduced by Wilhelm von Humboldt with the Berlin University established in 1809 is based on the integration of teaching and research,

and on a new set of values. According to Harayama (1997, p.13), in the Humboldtian University “the subjects to be taught are composed not only of already consolidated knowledge, but also of those elements that remain to be discovered. Therefore, the teaching and learning process through the activities of research”. Derek Bok (1990, p.3), a former President of Harvard University, shows that today is needed more than in any previous period of time to dispose of “three critical elements: new discoveries, highly trained personnel, and expert knowledge. In America, universities are primarily responsible for supplying two of these ingredients and are a major source for the third. That is why observers ranging from Harvard sociologist Daniel Bell to editorial writers from the *Washington Post* have described the modern university as the central institution in postindustrial society.”

That centrality of university strengthens with the emergence of knowledge economy and knowledge society. In the knowledge economy, wealth creation is increasingly based on knowledge creation, acquisition, sharing, distribution, transformation, and consumption (Andriessen, 2004; Andriessen & Tissen, 2000; Davenport & Prusak, 2000; Nonaka & Takeuchi, 1995; Stewart, 1997; Sveiby, 1997). “Knowledge is actually recognized as the driver of productivity and competitiveness and consequently its role in achieving competitive advantage is becoming an increasingly important management issue in all business and non-business sectors” (Viedma & Cabrita, 2012, p.14). In other words, knowledge becomes a strategic resource (Nonaka, Toyama & Hirata, 2008; Nonaka & Zhu, 2012; O’Dell & Hubert, 2011; Spender, 2014), and knowledge creation an essential function of the new creating class (Florida, 2002, 2007). Since all main functions of a university are related to knowledge creation, knowledge transfer, knowledge transformation, and knowledge distribution, the university became a knowledge-intensive organization with the dominance of intellectual capital over any other form of physical capital (Bratianu, 2011, 2014; De Nito, Gentile & Vesperi, 2015; Hintea, Ringsmuth & Mora, 2006; Sanchez, Elena & Castrillo, 2007; Sangiorgi & Siboni, 2014; Secundo, Perez, Martinaitis & Leitner, 2014). Thus, it is necessary to research the university intellectual capital and how the academic management is able to transform its potential into value creation for the university stakeholders and society.

The purpose of this paper is to investigate the university intellectual capital and to discuss its main challenges in the emergent knowledge society. The main challenges facing the university intellectual capital are the following: 1) to unfold the Gordian knot of the canonical model of intellectual capital; 2) to go beyond the Newtonian logic in intellectual capital evaluation and reporting; and 3) to integrate intellectual capital in the strategic thinking of the university. All of these challenges are strongly related to the university

performance. The next section is focused on the semantic dynamics of the intellectual capital concept and the evolution of research in this field. Then, each of the above mentioned challenges will be discussed in the perspective of the new paradigm of organizational knowledge dynamics (Bratianu, 2015).

The dynamics of intellectual capital research

The concept of *intellectual capital* is a semantic extension of the concept of *capital* for the new knowledge economy. In this new economy wealth is created by processing data, information and knowledge. "These value creating knowledge resources are commonly referred to as intellectual capital (IC). Value is no longer measured solely on the basis of financial outcomes; rather the value of activities that develop knowledge resources must also be considered" (Guthrie, Ricceri & Dumay, 2012, p.68). Stewart (1997, p.xi) defines synthetically the new concept: "intellectual capital is intellectual material – knowledge, information, intellectual property, experience – that can be put to use to create wealth". A more general definition is formulated by Roos, Pike and Fernström (2005, p.19): "intellectual capital (IC) can be defined as all nonmonetary and nonphysical resources that are fully or partly controlled by the organization and that contribute to the organization's value creation".

Although there were some scant works dealing with some aspects of intellectual capital, it came into full attention in 1996-1997 with the publication of the seminal books by Brooking (1996), Edvinsson and Malone (1997), Roos, Roos, Dragonetti and Edvinsson (1997), Stewart (1997), and Sveiby (1997). All of these works are considered to belong to the first stage of intellectual capital development (Chatzkel, 2004; Dumay, 2009; Guthrie et al., 2012; Petty & Guthrie, 2000). The feature of the first stage is that most of the authors focused on defining the concept of intellectual capital, constructing a framework for its research, and trying to make managers aware of the practical importance of intangibles in value creation. As Petty and Guthrie (2000, p.156) remark, "the aim of stage one was to render the invisible visible by creating a discourse that all could engage in. Mission accomplished". Thus, the first stage of research concentrated on explaining *what* intellectual capital is. Moving toward the second stage of research, the inquiry focused on *how* intellectual capital is, and *how* it can be measured. "Investigations that focus on the 'how' are second stage in nature and deal mainly with the process of measuring and managing the intellectual capital that has already been identified and situated in the context of the firm" (Petty & Guthrie, 2000, p.162). The

second stage is marked by an exponential increase in the interests in intellectual capital coming from academics and practitioners, and manifesting through a large number of publications in a variety of international journals, books, workshops, conferences and large projects performed by networks of universities and research institutions. These first stages of research contributed to a commonly accepted terminology of intellectual capital and to a structure composed of three main entities. While there are some insignificant differences in naming these entities, they obtained almost a consensus in their definition (MERITUM, 2002; Ricceri, 2008; Roos et al., 2005; Andriessen, 2004; Viedma & Cabrita, 2012). These fundamental components of the intellectual capital are the following: human capital, structural capital, and relationship capital.

Human capital is defined as “the knowledge that employees take with them when they leave the firm. It includes the knowledge, skills, experiences and abilities of people” (MERITUM, 2002, p.63). Human capital represents essentially the capacity to use and create knowledge. We refer here to both explicit and tacit forms of knowledge (Nonaka & Takeuchi, 1995). Human capital contains also all intelligences (Gardner, 2006; Goleman, 2005) which process data, information, and knowledge, as well as the way people think using mental models (Damasio, 2010; Fauconnier & Turner, 2002; Pinker, 2007; Senge, 1990). Human capital contains also people’s motivation to work, their spirituality, and their capacity for innovation. In a university, human capital contains all of these aspects belonging to the academic staff, researchers, and students. It contains the collective experience of the academic community. In the research universities the focus is on creating new knowledge and transferring it to the society. Also, many universities developed business incubators to stimulate innovation and help the entrepreneurs in launching their business ideas. It is well-known the fact that Stanford University played a major role in creating one of the most famous entrepreneurial regions called Silicon Valley. To increase their human capital, universities apply performance criteria for accepting their students and hiring professors. However, human capital is not a mathematical summation of what everybody has from intellectual point of view but an integration of all intangible resources since they are nonlinear entities (Bratianu, 2009).

Structural Capital is defined as “the knowledge that stays with the firm at the end of the working day. It comprises the organizational routines, procedures, systems, cultures, databases, etc. Examples are organizational flexibility, a documentation service, the existence of a knowledge center, the general use of Information Technologies, organizational learning capacity, etc.” (MERITUM, 2002, p.63).

Being more difficult of visualizing structural capital than human capital, some authors introduce here mistakenly aspects of organizational infrastructure and technology. While human capital reflects the stock of intangible resources, structural capital reflects their connectivity through organizational processes (Ricceri, 2008; Roos et al., 2005). For Edvinsson (2002, p.8) structural capital is a kind of multiplier: “to my mind, intellectual capital is a combination of human capital – the brains, skills, insights and potential of those in an organization – and structural capital – things like the capital wrapped up in customers, processes, databases, brands and IT systems. It is the ability to transform knowledge and intangible assets into wealth creating resources, by multiplying human capital with structural capital”. For a university, the most important components of the structural capital are its management and governance. These components contribute to the transformation of the potential intellectual capital into the operational intellectual capital, the actionable intellectual capital related to the performance of the university (Bratianu, 2014; Lee, 2010).

Relational capital is defined as “all resources linked to the external relationships of the firm, with customers, suppliers or R&D partners. Examples of this category are image, customers’ loyalty, customer satisfaction, links with suppliers, commercial power, negotiating capacity with financial entities, environmental activities, etc.” (MERITUM, 2002, p.63). Relational capital depends on the network effect which means that the more actors a network has the more relationships can be established and used in value creation. Here, we have to emphasize the fact that relational capital depends on all components of these relationships and it cannot be owned and controlled fully by the organization (Ricceri, 2008; Roos et al., 2005). As Edvinsson (2013, p.168) remarks, “the critical question became how to build a bridge between brains inside the organization, known as human capital, and brains outside, known as relational capital.” For a university the most important relationships are with its external stakeholders, especially for the state universities which depend on their financial resources on the state or federal budgets and regulations. Also, it is important to have good relationships with the major employers which usually are recruiting from their graduates. For large research projects, like those created by the European Commission, universities compete in networks and creating these networks means a high level of the relational capital. Also, in Europe, the Bologna process enhanced students exchange programs which can be done only based on collaborative relationships between universities. Thus, in a global economy and in times of rapid and unpredictable changes the relational capital help universities to find collaborative programs with excellent outcomes for students and the

faculty staff. In concordance with their mission many universities develop complex programs for the economic development of their local and regional communities. For instance, Mullin, Kotval and Cooper (2012) discuss a successful partnership between the University of Massachusetts at Amherst and the City of Springfield in Massachusetts.

In their examination of a decade of intellectual capital accounting research, Guthrie et al. (2012, p.76) identify a third stage of the research in the field of intellectual capital “which is characterized by research that takes a critical examination of intellectual capital in practice”. The third stage emerged with the special edition of *Journal of Intellectual Capital* entitled “Intellectual Capital at the crossroads – theory and research” published in 2004 (Chatzkel, 2004; Marr & Chatzkel, 2004; Dumay, 2013). Dumay and Garanina (2013, p.13) emphasize the fact that while second stage of intellectual capital research (ICR) was dealing with top-down methods and practices, the third stage can be considered a bottom-up research: “so while second stage ICR is predominantly devoted to evaluating IC’s influence on financial outcomes, third stage ICR focuses on the deeper managerial implications of managing IC in all types of organizations and can be classified as bottom-up research as opposed to top-down”. The third stage of research does not ignore previous results obtained in the first two stages, but re-evaluate them and up-grade them in concordance with the theory of the firm. Also, it is necessary to develop dynamic models of intellectual capital instead of working with static ones (Giuseppe, 2014). The author considers that the most adequate theory of the firm to deal with in researching intellectual capital is the resource-based view (RBV), which contains the contribution of Barney (1991) concerning the role of resources in getting a competitive advantage, the contribution of Prahalad and Hamel (1990) concerning core competences, and the contribution of Teece, Pisano and Shuen (1997) concerning dynamic capabilities. For knowledge intensive organizations, the resource-based view generated knowledge-based views theories (Grant, 1996, 1997; Nonaka, 1994; Spender, 1996).

Based on these theories, intellectual capital of a university should be conceived as an integration of all intangible resources, core competences, and dynamic capabilities in a holistic way. This integral view should be able to help managers in the value creation process, and not just in being in control. Intellectual capital contributes to the performance of the university but not through a direct causal relation, since the transformation of its potential into the operational intellectual capital is an entropic process and done by the organizational integrators (Bratianu, 2008, 2011; Bratianu, Dima, Vasilache & Orzea, 2012). That means that there is no universal model of intellectual capital and no general principles to be applied in any

organizations, but only a body of knowledge and ideas that can be tailored to the needs of each organization. Intellectual capital frameworks developed so far should not be used as means of control like in industrial era, but as a means of collaboration. “My current view sees IC as a skill set that can, and should, be learned by everyone who is ready for it, driven by a new view of organizations as social systems. And it is based in a very different assumption from the standard framework that seemed so attractive in the controlling phase. This socialized view of IC focuses primarily on the unique IC and approach to value creation of individual organizations” (Dumay & Adams, 2014, p.131). Thus, the third stage of intellectual capital research request new mindsets able to develop new perspectives which are not supported by the industrial management. In this view, I shall address in the next sections of this paper three main challenges for the university intellectual capital. The challenges are the following: 1) to unfold the Gordian knot of the canonical model of intellectual capital; 2) to go beyond the Newtonian logic in intellectual capital evaluation and reporting; and 3) to integrate intellectual capital in the strategic thinking of the university.

Unfolding the Gordian knot of the canonical model of intellectual capital

Viedma and Cabrita (2012) call the model of intellectual capital composed of human capital, structural capital, and relational capital *canonical* due to its general acceptance by both academics and practitioners. It is an intuitive and simple model which can be easily explained. However, it is a static model based on the theory of *stocks*, or *resource-based view* (Barney, 1991; Grant, 1991, 1996; Prahalad & Hamel, 1990; Ramezan, 2011; Teece, 2009; Teece et al., 1997). In an advanced formulation, both knowledge and intellectual capital are based on the theory of *stocks and flows* (Andriessen, 2004; Edvinsson, 2002; Nissen, 2006). “The concept of intellectual capital stocks and flows creates an interesting new perspective on organizations. We can describe organizations as a dynamic system of financial, tangible, and intangible stocks and flows” (Andriessen, 2004, p.68).

In the logic of the canonical model, the contributions of each component are summed up to yield the intellectual capital of the organization. This is a wrong hypothesis since it is based on linearity and intellectual capital is a nonlinear field (Bratianu, 2009). Instead of summation we need in this case *integration*. Starting from this requirement Bratianu (2008, 2011, 2015) introduces the concept of integrators. By definition, “an integrator is a powerful field of forces capable of combining two or more elements into a

new entity, based on interdependence and synergy. These elements may have a physical or virtual nature, and they must possess the capacity of interacting in a controlled way” (Bratianu, 2014, p.31). In any organization can be defined several integrators having complementary effects. The most important integrators are: technology and processes, management, leadership, and organizational culture. The main role of these integrators is to transform the *potential intellectual capital* into the *operational intellectual capital*, which participates actually in value creation. All the theories developed so far refer to the potential intellectual capital, and that is why they are not able to explain the differences in the business success of two companies having comparable levels of intellectual capital. By considering the two levels of intellectual capital, and a continuous transformation of the potential into operational intellectual capital we can explain the specific behavior and performance of any company. The transformation is based on the entropy law and gives a dynamic behavior to the intellectual capital. If stock and flows follows a Newtonian logic of variation, the entropic transformation is much more powerful since it is based on the logic of thermodynamics.

In the university structural capital the key role is played by the university *governance* since it defines the behavior framework and the degrees of liberty of the academic staff and management. According to Shattock (2003, p.1), “university governance is defined as the constitutional forms and processes through which universities govern their affairs”. From a very practical point of view, the governance defines the autonomy of the university and its balance between centralization and decentralization of the decision making. For instance, private universities have full autonomy since they do not depend on governmental funding. State universities depend on public money and thus they have a rather incomplete autonomy from a financial perspective. This characteristic is more evident in the Central and Eastern European universities, where the financial dimension is controlled strongly by the government. The degree of autonomy influences directly the leadership power in decision making. The more restricted the autonomy is, the more reactive the leadership will be regardless of its vision and style. Since leadership is the best integrator, and its role results from the structural capital, the university operational capital depends directly on the function of the structural capital. That is why, we call structural capital the Gordian knot of the whole intellectual capital. Unfolding the Gordian knot means *to change* the *static* view of the structural capital with the *dynamic* one based on integrators and entropic processes. In this way a university can use plenary its human capital. Let us have a look at the 2015 Academic Ranking of World Universities (ARWU) realized by the Center for World Class Universities at Jiao Tong University (ShanghaiRanking

Consultancy, 2015). The top ten universities in the world are the following: 1) Harvard University, USA; 2) Stanford University, USA; 3) MIT, USA; 4) University of California at Berkeley, USA; 5) Cambridge University, UK; 6) Princeton University, USA; 7) Caltech, USA; 8) Columbia University, USA; 9) University of Chicago, USA; 10) Oxford University, UK. All of these universities are on top of the world due to their intelligent leadership able to integrate successfully a huge intellectual capital. There are many other universities comparable with them in terms of the number of students, the number of professors, the number of research grants and so on, but not the numbers make them great. They are great institutions due to their spirituality, leadership vision and a very successful management. That means, due to their great integrators (Bratianu et al., 2012; Bratianu & Orzea, 2013a). Unfolding the Gordian knot is not an easy challenge, but only with a great vision leadership can do it to the benefit of the whole academic community and its stakeholders.

Going beyond the Newtonian logic in intellectual capital evaluation and reporting

Universities face an increase pressure from the changing economic and social environment to be more competitive on a global market. Also, they must increase their attractiveness to get the best professors, researchers and students. That means that universities must be able to evaluate and report their intellectual capital to show their capacity for performance. As Sanchez et al. (2007, p.4) remark, “the increasing cooperation between universities and firms has resulted in the demand for similar processes of evaluation for both players. Accordingly, universities and research organizations would have to implement new management and reporting systems, which necessarily incorporate intangibles”.

I would like to stress again the fact that intellectual capital is a field of intangible resources, and it is nonhomogeneous and nonlinear (Bratianu, 2009). However, all the metrics developed so far to measure and to report intellectual capital are based on linearity, which means on the Newtonian logic. Since these metrics are constructed in an arbitrarily way and they contain only linear items that can be sum up, their credibility is under a serious question mark. The original error comes from the mentality that managers can manage only entities that can be measured (Dumay, 2012; Edvinsson & Malone, 1997; Roos et al., 2005; Sanchez et al., 2007), a mentality built during the industrial management as a result of the scientific principles formulated by Frederick Taylor (1998). Housel, Baer and Mun (2015, pp.21-22) state explicitly that Newton is still relevant: “there is a

reason that the Newtonian model is still prominent in economics: It is because most of us intuitively think in Newtonian cause-effect terms. Even with the problems that arise from applying this framework to modern companies such as WhatsApp, Google and Facebook, the Newtonian model substantially simplifies the complexities of economics with many moving parts and apparently capricious human participants". Yes, but exactly that simplification eliminates the nonlinearity effect and changes the nature of the problem.

The instrument used for the intellectual capital evaluation and reporting has been generically known as *Intellectual Capital Statement* or *Report* (European Commission, 2005; Marr, 2005; MERITUM, 2002; Ordonez de Pablos & Edvinsson, 2015). Basically, this IC Reporting has a double function: internally and externally, with respect to the organization. "Internally, IC Report can facilitate management decision by improving understanding of the university's activities and goals, by identifying intangible resources and capabilities and by improving investments and capital allocation. Externally, it helps to improve transparency and to attract new employees, partners and collaborators" (Sanchez et al., 2007, p.5). IC Reporting came also as a solution to keep a controlling system on budgeting state universities when they receive more autonomy. A good example in that perspective is the higher education reform induced by the new legislation in 2002 in the Austrian university system (Habersam, Piber & Skoog, 2013; Leitner, 2002; Sanchez, Castrillo & Elena, 2006; Sanchez et al., 2007).

With the reform introduced by the new legislation - The University Act 2002 – public universities in Austria have been granted greater autonomy. That can be considered a major change in the traditional centralized higher education system. In such a centralized system most of the decisions concerning universities have been taken at the Ministry of Education level. Rectors and deans implement ministerial decisions without having enough decision power to perform a real management. The University Act 2002 granted full autonomy to universities but requested them to report on their intellectual capital by using a new accounting instrument called *Knowledge Balance Sheets (KBS)*. "The twin of autonomy is accountability. Along these lines, a mandatory KBS for all state-funded Austrian universities from 2007 onwards was implemented by law. It was that because of the growing autonomy of the individual university, the Ministry, as the supervising body responsible for the overall HEI-budget required more accurate information to legitimize the allocation of single budgets according to the strategic cornerstones of the Austrian HEI system" (Habersam et al., 2013).

The structure of the Intellectual Capital Report Act (ICRA) has been imposed by law published in the Federal Law Gazette (FLG) of the Republic of Austria, on 15 February 2006, Part II as *Regulation on Intellectual Capital Reports* (63rd Regulation). According to this Regulation, “the intellectual capital report aims at presenting, evaluating and communicating intangible assets, performance processes and their consequences and serves as a qualitative and quantitative basis for generating and entering a performance agreement” (Federal Law Gazette, p.1). ICRA includes the following sections:

- I. Scope of application, objectives and strategies.
- II. Intellectual property: 1) Human capital; 2) Structural capital; and 3) Relational capital.
- III. Core processes: 1) Education and continuing education; and 2) Research and development.
- IV. Output and impact of core processes: 1) Education and continuing education; and 2) Research and development.
- V. Summary and prospects.

The first section contains narratives about policies concerning employment and personnel development, quality assurance, students, prizes and awards, research clusters and networks, current state of implementation of the Bologna process. For sections II, III, and IV there are sets of indicators. These indicators can be expressed in quantitative financial and nonfinancial terms. There are 56 indicators, most of which have no relevance for measuring intellectual capital. That is a real problem, since they create the image of a good evaluation but their relevance is doubtful. For instance, for measuring structural capital, section II.2, ICRA uses indicators like: funding for measures promoting equal opportunities for men and women and affirmative action for women (in euro); funding for measures advancing gender specific education and research/development and promotion of the arts (in euro); number of staff active at special institutions; number of staff active in institutions for students with special needs or with chronic disorders, or both; proceeds from sponsoring (in euro); floor space (in square meters). It is really hard to understand how floor space can measure the intellectual capital of a university! The point we try to make is that although this intellectual capital measurement and reporting is enforced by law, the relevance of such a reporting system on the real intellectual capital of a university is meaningless. The temptation of the Newtonian logic of counting and summing up numbers like in a financial balance sheet, transforms KBS into a misleading instrument. In 2010, based on many critics, ICRA changed its set of indicators, using now 26 instead of 53, and increased the narrative parts. However, the Austrian experience demonstrates clearly that there is a compelling challenge for people

wanting to measure the university intellectual capital to find non-Newtonian metrics able to deal with the intangible nature of that entity. Yu and Humphreys (2013, p.39) suggest a change in the paradigm, from linear metrics and control functions to nonlinear metrics and learning functions: “the value of implementing an IC framework or model lies in the nonlinear process of learning in which the concept of IC is assessed in relation to its enabling or blocking role in activating organizational change and innovation”. The new Intellectual Capital Maturity Model (ICMM) for Universities (Elena & Leitner, 2013; Secundo et al., 2014) introduces some relaxation in defining the sets of indicators and in providing a progressive approach to implementing a reporting system, but there is no change in the Newtonian paradigm. Only by overcoming the barrier of linearity we may get out of this “current moribund status of IC reporting” (Abhayawansa, 2014, p.119).

Integrating intellectual capital in the strategic thinking of the university

This challenge has been already incorporated in the vision and mission of many universities, especially of those competing for the top positions in the world ranking of the universities. It is in concordance with the new forces of globalization and market request for new knowledge, new products and services (Bratianu, 2014; Bratianu & Bolisani, 2015; Dumay, 2013; Edvinsson, 2013; Nonaka & Takeuchi, 1995; Senge, 1990; Spender, 2014). With a history of about 1000 years, universities as knowledge intensive organizations should be aware of their increasing role in the future since knowledge has already become a strategic resource of society. As James J. Duderstadt (2000, p.328), a former President of Chicago University emphasizes, “whether one refers to our times as the information age or the age of knowledge, it is clear that educated people and the knowledge they produce and utilize have become the keys to the economic prosperity and well-being of our society”.

To substantiate this idea we would like to cite the mission statement of MIT (2015): “The mission of MIT is to advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century. The Institute is committed to generating, disseminating, and preserving knowledge, and to working with others to bring this knowledge to bear on the world's great challenges. MIT is dedicated to providing its students with an education that combines rigorous academic study and the excitement of discovery with the support and intellectual stimulation of a diverse campus community”.

Knowledge creation, acquisition, sharing and transformation are key processes in universities for generating a high level of intellectual capital potential (Bratianu, 2014; Dumay & Garanina, 2013; Ichijo, 2007). Knowledge is a strategic resource and intellectual capital a driving force for performance, but it is the role of the academic management, leadership and organizational culture to act as nonlinear integrators (Bratianu, 2008; Bratianu et al., 2012) to transform efficiently the potential of intellectual capital into a high level of operational intellectual capital. That means a deeper understanding of the intellectual capital, beyond the canonical formulation of human capital, structural capital, and spiritual capital. To grasp the essence of transforming potential intellectual capital into its operational capacity we need a new model based on entropic processes (Bratianu & Orzea, 2013b). The challenge of integrating intellectual capital into the strategic thinking of the university means to go beyond accounting logic and KBS in evaluating the past of intellectual capital, towards developing knowledge strategies for the future. Bratianu and Bolisani (2015) show that there are two approaches to this process: a) developing generic knowledge strategies, and b) developing emergent knowledge strategies. Generic knowledge strategies can be elaborated by any organization based on the level of understanding the current state of business environment and the strategic thinking of the organization. Generic strategies are the following: knowledge exploitation, knowledge exploration, knowledge acquisition and sharing, and knowledge creation. However, due to rapid and unpredictable changes in the business environment generic strategies are not enough since their effectiveness depend on the specific context in which they are formulated. From this point of view, it is necessary to develop emergent strategies and to integrate them into the framework of the university strategic thinking.

Conclusions

Universities are social institutions with long histories due to their enduring mission of knowledge creation, education and instruction at a high level, and service to community. Knowledge and intellectual capital of the university became a strategic resource and a core competence in getting a competitive advantage in the global competition. Intellectual capital reflects the hidden power of the university intangible resources and competences. In the last decades there were great efforts to identify these intangible resources and to understand the nature and complexity of the intellectual capital. The first stage of research into intellectual capital focused on that need of defining and explaining the concept of intellectual capital. The second stage of research focused on designing suitable metrics for

intellectual capital evaluation and reporting. Now we are in the third stage of research which aims at overcoming the barriers of accounting and linearity by a better understanding of the complex nature of intellectual capital and designing more adequate metrics for its evaluation.

The purpose of this paper is to present three main challenges for the university intellectual capital in the knowledge economy, and to discuss how these challenges can be achieved. These challenges are the following: 1) to unfold the Gordian knot of the canonical model of intellectual capital; 2) to go beyond the Newtonian logic in intellectual capital evaluation and reporting; and 3) to integrate intellectual capital in the strategic thinking of the university. All of these challenges are strongly related to the university performance and the third wave of research into intellectual capital. The first challenge can be achieved by understanding that canonical model of intellectual capital represents a static snapshot of the university, and we should look for a deeper level of representing intangible resources. We should consider the multifold theory of organizational knowledge dynamics which explains the interactions between the rational, emotional, and spiritual fields of knowledge, and the generation of the intellectual capital. The Gordian knot of the intellectual capital can be unfolded by changing the paradigm of its representation and the static perspective with a dynamic one. That means to adopt the entropic model of intellectual capital, based on the transformation of intellectual capital potential into its operational power with the help of organizational integrators.

The second challenge requests changing the linear metrics used so far for intellectual capital evaluation based on the Newtonian logic with nonlinear metrics. The experience of Austrian universities which must report annually their intellectual capital using a linear metric is the best example of understanding the main difference between the accounting linear metrics and the nonlinear nature of intellectual capital. Using KBS for measuring the potential of the intellectual capital leads to results that lost their significance. Their purpose of allowing Ministry of Education to exercise indirectly its control over the university budget should be changed into new goals able to stimulate learning and knowledge generation to fulfill the university mission.

Finally, the third challenge requires university leaders to look for the future benefits of intellectual capital instead of focusing on the past quantitative results requested by the accounting regulations. Knowledge and intellectual capital are strategic resources and core competencies and they should be used in concordance with the university long-term objectives and strategic thinking. Generic knowledge strategies should be integrated with the

emergent knowledge strategies to enhance the management power to deal with uncertainties and turbulent business environments.

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