Harnessing network-based intellectual capital in online academic networks. From the organizational policies and practices towards competitiveness

Elena-Mădălina Vătămănescu, Andreia Gabriela Andrei, Diana-Luiza Dumitriu and Cristina Leovaridis

Elena-Mădălina Vătămănescu is Lecturer at the Faculty of Management, National University of Political Studies and Public Administration (SNSPA), Bucharest, Romania and Bucharest University of Economic Studies, Bucharest, Romania. Andreia Gabriela Andrei is based at Alexandru Ioan Cuza University, Iasi, Romania. Diana-Luiza Dumitriu and Cristina Leovaridis are based at Faculty of Communication and Public Relations, National University of Political Studies and Public Administration (SNSPA), Bucharest, Romania.

Received 31 May 2015
Revised 27 October 2015
Accepted 3 November 2015

Andreia Gabriela Andrei was supported for this work by the strategic grant POSDRU/159/1.5/S/133652, co-financed by the European Social Fund within the Sectoral Operational Program Human Resources Development 2007-2013.

Abstract

Purpose – *The paper aims to investigate the standpoints and practices of university members from European developing countries regarding the harnessing of the intellectual capital (IC) within online academic social networks.*

Design/methodology/approach – *A questionnaire-based survey with 210 university members was conducted, with the indicators adopting prior measurement scales which were further adapted to a network framework.*

Findings – *The organizational policies and practices relate positively and highly significantly with the valuation of the network-based IC components. Moreover, 63 per cent of the professional and organizational competitiveness of higher education institutions is determined by the exploitation of the IC embedded in online academic networks.*

Research limitations/implications – *All survey respondents were from the European developing countries, which may limit the general applicability of the findings. Also, the emphasis is laid solely on online academic networks.*

Practical implications – *This paper brings to the fore both the potential and the state-of-the-art in leveraging the IC of online specialized networks which are indicative of the academic field. When acknowledged as such, the network-based IC is liable to generate substantial competitive advantages at the professional and organizational levels at the same time.*

Originality/value – *This research adds to the extant literature in two main ways. First, it advances a new construct – network-based IC – in the context of the online academic social networks. Second, it proposes a research model for addressing the network-based IC from a competitive advantage perspective.*

Keywords *Organizational policy, Intellectual capital, Competitive advantage, Online networks*

Paper type *Research paper*

1. Introduction

Intellectual capital (IC) is perceived as a driving force for harnessing the organization's latent values and often acts as a catalyst of the overall performance and competitiveness (Sharkie, 2003; Isaac *et al.*, 2009; Kianto *et al.*, 2013; Ling, 2013; Tseng *et al.*, 2015). "Virtually all of what has been written on the subject to date focuses on the strategic issue of how to better create knowledge and intellectual capital in order for the firm to achieve its strategic objectives (Sullivan, 1999, p. 132). This situation is indicative especially of the knowledge organizations that achieve the competitive edge by "converting knowledge into value".

"Progressively, the dynamic, complex and highly competitive environment has placed the postulate 'knowledge is power' in a key position."

Progressively, the dynamic, complex and highly competitive environment has placed the postulate "knowledge is power" in a key position. The main trend is laying emphasis on what an organization knows than to what an organization owns (Grimaldi and Hanandi, 2013). The focus on the organizational intangible assets entails the significance of the IC in sustaining the organization's performance and effectiveness in response to the environmental opportunities and pressures. In this front, knowledge and intelligent workforce set themselves up as paramount tiers of value creation for the organization and its members (Sumedrea, 2013), innovation, experience, good practices and new ideas becoming value drivers with a view to achieve high organizational competitiveness (Bohlander and Snell, 2007; Bogner and Bansal, 2007; Kianto *et al.*, 2013; Tzortzaki and Mihiotis, 2014; Tseng *et al.*, 2015).

In this respect, the knowledge organization acts on two different levels. The first one refers to the IC function to create value, while the second one points to its role of value extraction. The former involves a wide range of activities meant to generate new knowledge through consistent learning and with the support of the organization's institutionalized systems for knowledge acquisition. The latter includes leveraging the value acquired with a view to attain a competitive advantage (Sullivan, 1999; Marr *et al.*, 2003; Sharkie, 2003; Wang *et al.*, 2014; García-Merino *et al.*, 2014; Goebel, 2015).

Referring to IC as a knowledge-based capital (KBC), OECD (2013) emphasizes that compared to physical capital, KBC can foster growth because the initial cost incurred in developing certain types of knowledge is not re-incurred when that knowledge is used again; moreover, investments in many forms of KBC – such as R&D, design and new organizational processes – also create knowledge that spills over into other parts of the economy, again spurring growth. It is in this particular line that Kok (2007, p. 184) argues the need for the developing countries to target national investment in education "since this offers the highest social returns".

Herein, although the IC and knowledge management conceptualizations were initially placed within the framework of for-profit organizations, over the past years, a paradigm shift occurred, and the concept was extended to the public and academic sectors, too, as proved by the works of Mouritsen *et al.* (2004), Leitner and Warden (2004), Kok (2007), Kong and Prior (2008), Sánchez *et al.* (2009), Ramírez (2010), Brătianu (2009), Brătianu and Orzea (2013), Wu *et al.* (2012), Ramírez and Gordillo (2014), Veltri and Silvestri (2015), etc. In this regard, Ramírez Córcoles *et al.* (2011) deem that IC covers "all the institution's non-tangible or non-physical assets, including processes, capacity for innovation, patents, the tacit knowledge of its members and their capacities, talents and skills, the recognition of society, its network of collaborators and contacts, etc".

Even Carneiro (2000, p. 87) pointed out that "the knowledge and the information technology (IT) are critical success factors for strategic formulation". The exploration and use of IT novelties facilitate the emergence of a competitive advantage and, which is more, the organization's IC and the innovation architecture stand for overarching factors of long-term competitiveness and performance (Adams and Lamont, 2003; Gokmen, 2009; Gunsel *et al.*, 2011; Martín and Delgado, 2012). "New management philosophies are aware that information is the result of knowledge evolution and that a solid network between intellectual effort and technological innovations is enlarging" (Carneiro, 2000, p. 92). Similarly, Kok (2007, p. 183) deems that "bringing IC, knowledge management and

enabling technologies together is an exciting challenge to leaders wishing to create an information age institution".

Against this backdrop, the present work aims to investigate the approaches of university members from European developing countries (classified by the International Monetary Fund, 2014: Romania, Bulgaria, Hungary, Poland, Serbia, Croatia, Lithuania and Turkey) on leveraging the IC embedded in online academic social networks. The enterprise is meant to set itself up as a basis for recommendations to universities' management to support and capitalize on knowledge sharing through the online academic networks. As Leon and Vătămănescu (2015, p. 460) explicitly argued, "in order for the strategic approach to be successful, it is necessary for the decision makers to define the objective (what type of knowledge they want to share and why), to define the message [. . .] then to evaluate the effects. Unfortunately, previous researches neglected the first and the last stage". In other words, the managerial approach toward the appropriate capitalization of the intangible assets stands for a focal point to be discussed.

Although social networks emerge both offline and online, the focus is on the online social networks, pursuant to Ordóñez de Pablos' (2013) approach on the knowledge economy, and implicitly, on the IC:

- it is focused on intangible resources rather that tangibles resources (Edvinsson and Malone, 1997);
- it has a hyper-competitive business environment;
- it is digital;
- it is virtual; and
- it is networked.

In line with this overview, we advance a new construct – the *network-based* IC – which we define as an intricate configuration and consistent interaction among people, knowledge, information, expertise, competences, know-how within complex and dynamic online social networks. The network-based IC construct implies a dyadic purpose: the individual's goal to learn, to have access to the network's resources for self-improvement and organizational competitiveness through cross-organizational networking.

To this end, the paper was organized in several main sections. The first part addressed a manifold perspective on IC, from a general outlook (Section 2.1) toward more specific issues, as: the IC, organizational policies and competitive advantage achievement (Section 2.2), the advancement of a new construct – *network-based intellectual capital* – in the context of online social networks (Section 2.3) and IC within the higher education institutions framework (Section 2.4); subsequently, six hypotheses were formulated. Next, the methodology section comprised information about data collection, sample, measures and instrument validation. Sections 3 and 4 present the results of the study, along with a discussion of the findings. An insight into the contributions, limitations and implications of the study for future research conclude the paper.

"The focus on the organizational intangible assets entails the significance of the intellectual capital in sustaining the organization's performance and effectiveness in response to the environmental opportunities and pressures."

"The empirical data supported the research model in that organizational policies and practices influence the configuration and use of the network-based IC components in a positive and significant manner."

2. Literature review

2.1 An insight into the intellectual capital

The research field of the IC has become prominent, starting with the seminal works of Edvinsson and Malone (1997), Roos *et al.* (1997), Stewart (1997) and Sveiby (1997). The initial approach of the IC was based on "static, deterministic and linear thinking patterns" (Brătianu, 2007), but an important step toward a dynamic perspective was taken by Edvinsson (2002), Andriessen (2004), Roos *et al.* (2005), Alcaniz *et al.* (2011), Johnson *et al.* (2011), etc. From their standpoint, IC is simultaneously a stock and a flow, describing the intangible resources and assets of an organization. In other words, Cegarra-Navarro and Dewhurst (2006, p. 49) describe "the environment provided by an organization to facilitate learning and create knowledge" as a "shared organizational context", while "the value to an organization of knowledge created by the shared organizational context is called intellectual capital". Likewise, Carneiro (2000, p. 88) considers knowledge as the primary source of intellectual assets, while "knowledge levels can be an asset only if they are enhanced and efficiently used".

Despite the wide spectrum of definitions and conceptualizations of the IC, researchers and theorists have reached a consensus regarding its main components, namely, human capital, relational capital and structural capital (Dean and Kretschmer, 2007; Leitner *et al.*, 2014). The first dimension – the human capital – describes the individual knowledge stock of a certain organization which is represented by its employees (Bontis, 1998). In fact, the essence of human capital lies in the intelligence of the organization's members, whereas its scope covers the knowledge entities (e.g. highly skilled workforce). The human capital should be seen as an innovation and renewal source, as it embodies the accumulated value of investments in the future and development of the employees, as important actors of the organizational system (Skandia, 1996). The second dimension – the structural capital – refers to "all the non-human storehouses of knowledge in organizations which include the databases, organizational charts, process manuals, strategies, routines and anything whose value to the company is higher than its material value " (Bontis, 1998, p. 88). The relational capital – the third component – stands for the relationships with internal and external entities, like stakeholders, partners, customers and suppliers. Moreover, relational capital relies on the idea that organizations are not isolated systems, but active and open systems which greatly depend on their connections with the environment (Hormiga *et al.*, 2011). Martin de Castro *et al.* (2004) and Martínez García de Leaniz and Rodríguez del Bosque (2013) consider relational capital as the most important intangible resource of the organization, as it plays a paramount function in linking and bridging different organizational entities.

Sullivan (1999, p. 133) acknowledges two main categories of IC which are illustrative of the learning organizations: the human capital comprising the employees (with their know-how, skills, competencies and knowledge) and the intellectual assets, a reification of the tacit knowledge pertaining to each individual. Once codified, every unit of knowledge flows into the patrimony of the entire organization, as a whole. Organizations should encourage knowledge workers to codify their knowledge so that the institution may capitalize it and eventually turn it into a competitive advantage (Sullivan, 1999; Sharkie, 2003).

In this front, Lam (2005) urges that, in a successful knowledge-intensive organization, there should be a very tight connection between knowledge management and knowledge culture. The latter should be supported by management and should consist of: lack of competition between employees, valuing sharing knowledge with others, reward or stimulants for sharing this knowledge and for trust in someone else's ideas, appreciation of employees, combination between transmitting knowledge in a classic face-to-face manner in a new manner, online, through academic networks, trust in the quality of knowledge of the younger employees, etc. An organization which develops a culture based on shared goals and social ties between members will likely encourage knowledge sharing: "management must develop a clear mission and goal so that everyone in the organization can appreciate and contribute knowledge, and recruiting employees who share common interests and goals is a critical task for human resources departments" (Chow and Chan, 2008, p. 463).

These considerations may be also traced in Nonaka and Takeuchi's (1995) spiral model for stimulating the organizational knowledge which comprises two interconnected dimensions – the epistemological axis (i.e. explicit and tacit knowledge) and the ontological axis (i.e. individual, team and organizational knowledge). Tacit knowledge encompasses the individual knowing potential, while the explicit knowledge embeds the capacity of individual knowledge transfer. As inherent parts of a dyad, tacit knowledge refers to a potential capacity, while explicit knowledge points to an operational capacity (Nonaka and Takeuchi, 1995; Davenport and Prusak, 2000; Holden and Glisby, 2010; Brătianu, 2013).

2.2 Intellectual capital, organizational policies and competitive advantage achievement

The extant literature on IC and knowledge management underscores the fact that the organization's strategy and capacity to leverage its knowledge-based resources highly determine the attainment of a tenant competitive advantage (Carneiro, 2000; Perez and Ordóñez de Pablos, 2003; Kianto *et al.*, 2013; Tzortzaki and Mihiotis, 2014; Tseng *et al.*, 2015). IC is to be seen as "the future basis of sustained competitive advantage" (Perez and Ordóñez de Pablos, 2003, p. 82), all the more so its roots are tied to the levels of organizational learning and knowledge acquisition (Dierickx and Cool, 1989; Felício *et al.*, 2014).

In this front, Sharkie (2003, p. 20) underlines that "the development of sustainable competitive advantage is a vital management function and an important requirement is the nurturing of a knowledge creating environment". This kind of climate would improve the organization's competitiveness and would support it in the process of meeting the "industry's future success factors". Furthermore, intelligent organizations have the ability to integrate and harmonize the employees' knowledge in "competitively valuable ways" and to develop their capabilities on purpose to achieve performance goals in a highly competitive context (Carneiro, 2000; Ordóñez de Pablos, 2010; Ling, 2013). At this level, the rapid rhythm of capturing, creating, disseminating and re-using knowledge will become a viable source of advantage and a prerequisite of organizational productive potential, as well (du Plessis, 2007; Swain and Booto Ekionea, 2008).

Managing IC requires a systematic and strategic array of activities in accordance with the organization's purpose and vision is settled through explicit institutional policies (Jones *et al.*, 2009; Nazari *et al.*, 2011). As Sullivan (1999, p. 134) also posits: "Any journey without a destination may be interesting, it may be enriching and it may be educational; but it will be neither direct nor without frustration".

The suitable management of IC entails a series of processes liable to transform knowledge into a paramount value-generating factor – it implies ensuring the institutional policies and infrastructure for knowledge creation, acquisition and transfer and the embodiment of knowledge in the organizational behavior (Perez and Ordóñez de Pablos, 2003). Additionally, it should settle proper tools for the use and re-use of knowledge as part of the organizational culture (Adams and Lamont, 2003; Nazari *et al.*, 2011; Gunsel *et al.*, 2011).

In most cases, the organizational culture is the only one to garner and potentiate the organization's capability to orient knowledge workers toward proper capitalization of their competencies and skills. An effective culture is liable to establish a learning and sharing work environment as a fundamental organizational competence with direct effect on the organizational development and success (Zwell, 2000; Sharkie, 2003; Fernando, 2010; Andrei and Iacob, 2011). In this vein, Thurow, 1999 (cited in Sharkie, 2003, p. 20) urges that "skilled people operating in a supportive culture become the only sustainable competitive advantage", while Carneiro (2000, p. 88) highlights that "managers must purposely organize, motivate and control the development of their knowledge workers".

High-skilled employees will share knowledge when these actions sustain their reputation at the workplace (Davenport and Prusak, 2000) – when hierarchical means can no longer prescribe the appropriate behavior in detail, in the context of complexity and ambiguity of work tasks, employees' self-images have a greater significance (Alvesson, 2001). More, clear and transparent reward criteria will increase the level of trust among employees, which will lead to greater knowledge sharing (Inkpen and Tsang, 2005).

Managers should assume the fact that their organizations cannot be considered self-sufficient in terms of employees' knowledge and abilities and, as a consequence, the openness to create value networks would be of critical importance (Ordóñez de Pablos, 2010). Hereby, to generate significant value, knowledge management should be addressed both within and among organizations, a fact which involves sharing knowledge among the network members (Perez and Ordóñez de Pablos, 2003; Gokmen, 2009; Leung *et al.*, 2013). The inherent adage pertains to Malone (2004) who speaks about the emergence of a collective intelligence brought about by the intensive usage of the information technology, keeping people connected and stimulating cohesive network structures. This approach leads to the following hypotheses regarding the organizational policies and practices and the extent of leveraging network-based IC and its inherent components:

H1. The organizational policies and practices generate a significant influence on the leverage of network-based human capital.

H2. The organizational policies and practices generate a significant influence on the leverage of network-based structural capital.

H3. The organizational policies and practices generate a significant influence on the leverage of network-based relational capital.

The sharing of the individual's tacit knowledge with other members by means of organizational support will result in the creation of new knowledge and ultimately in innovation (Sharkie, 2003; Jones *et al.*, 2009; Fernando, 2010; Kruse and Geißler, 2014). Moreover, the organization's rationale to encourage the valuation of public knowledge through formal integrators is liable to catalyze its conversion into organizationally genuine knowledge and into individual and organizational competitiveness (Swan *et al.*, 1999; Darroch, 2005; Burgman *et al.*, 2007; Santos-Vijande *et al.*, 2012).

Knowledge generated as a strategic building block and the valuation of IC as an organizational inherent process would provide a suitable answer to the fast-changing environments and to their challenges. They would effectively foster the conditions for exploiting the captured knowledge correspondingly, by reducing the gap between knowledge generation and use. Additionally, establishing a culture of sharing or exchanging tacit knowledge through value networks – at both intra- and inter-organizational levels – is prone to yield substantial benefits for individuals, groups, organizations and networks at the same time (Sharkie, 2003; Ordóñez de Pablos, 2010; Leung *et al.*, 2013). As Porter (1999) posits, the competitive advantage is system-driven, and it does not rely on remote capabilities or activities.

Knowledge workers are subject to give way to information sharing; still, in many cases, they fail in doing so because "they are not able to see the organization as a system, where the

global objectives should be accepted as a common value" (Carneiro, 2000, p. 89). Here, managers should act effectively to stimulate knowledge sharing at different levels all the more so as the value of intellectual assets accrue when they are properly used. In this particular point, the main role of management is to stress on the importance of a systemic network for knowledge sharing and exchange on purpose to ensure a consistent flow of innovation and to establish the parameters of a real learning organization (Carneiro, 2000; Fernando, 2010; Tzortzaki and Mihiotis, 2014; Kruse and Geißler, 2014). The selection and then the rewarding or promotion of employees may be decided not only on the basis of their knowledge but also on their propensity to learn, to share their knowledge and thus to increase organizational knowledge (Cabrera *et al.*, 2006). While a traditional manager spends most time supervising, delegating, controlling and ensuring that procedures are complied, a "smart manager" (Sornlertlamvanich, 2005), of a knowledge-intensive organization, focuses on organizational learning to ensure a company's excellence and provides opportunities for knowledge workers to brainstorm ideas and to exchange knowledge, share best practices and reinforce benefits of knowledge sharing among employees. The manager would be more of a facilitator than a supervisor, acting more like a teacher than like a ruler.

2.3 The network-based intellectual capital as a step forward and toward competitiveness

When speaking about the dynamics of today's society, we come across two major frames that are rather complementary than concurrent: the *knowledge society* and the *network society* (Castells, 2000a, 2000b). Beyond what was previously seen as the "information society", the knowledge society focuses not so much on the informational content, but on fostering knowledge-sharing and knowledge-transfer flows, thus favoring a more process-based approach. In other words, knowledge societies take the boundaries of the informational society further and lay stress on how both the unprecedented amount of information available and the speed of its transmission can be leveraged on (Wang, 2013; Fang *et al.*, 2013; Ferguson and Taminiau, 2014). Nevertheless, knowledge sharing and transfer involve connectivity, which is a core element of the network society, hereby providing the basis for hybrid forms of *knowledge networks*. To be competitive in this new context means to be connected to both the knowledge- and network-based axes of the wider socio-economic dynamics (Uzzi and Lancaster, 2003; Rathi *et al.*, 2014).

It is thus not so much about the knowledge of individual actors as it is about them searching, accessing and using the available knowledge through different social networks. This is why many studies have focused on the process of knowledge transfer, whether at the interpersonal, inter-unit or inter-organizational levels, building on two general premises: the fact that knowledge is mainly generated through social interaction (Brown and Duguid, 2002; Vătămănescu and Cicei, 2010; Wang, 2013) and the fact that the mere process of knowledge transfer is a key-driver in the overall emergence of innovation (Owen-Smith and Powell, 2004; Shu *et al.*, 2012). Also, some researchers (Valkokari *et al.*, 2012) identify a strong relationship between knowledge management and networked innovation, emphasizing that the collaboration and interaction processes within networked innovation – rather than simply the formation of innovation networks – play a crucial role in knowledge-sharing process within the network. However, as shown by Filieri and Alguezaui (2014), in their complex and systematic review, knowledge types and transfer processes are important factors when measuring the influence of different network configurations on knowledge processes and innovation, thus arguing for a more contextualized approach of this relationship.

Hereby, a multidisciplinary framework may account for how social networks influence goal pursuits within and beyond the organizational systems. The dynamic network theory developed by Westaby (2012) offers new perspectives on goal achievement at the individual, team and organizational levels using the advantages of social networks. The network goes beyond the organization's boundaries; its actors (elements) develop

intra-organizational and inter-organizational relationships at the same time, within a collaborative macro-environment (Nowicka *et al.*, 2012). What give value and substance to the network are the strong ties among members, the shared vision and purpose and the awareness of being part of the whole system. As Westaby (2012, p. 7) posits "New advances across the social sciences are highlighting social networks as phenomena that can motivate people and change lives. But what the literature has not addressed is what gives social networks such power".

Knowledge is not only generated through interaction as discussed before, but knowledge transfer is facilitated through network structures, the speed of this sharing and exchanging process being accelerated when it comes to online networks. Moreover, we can argue that, despite the speed and wide-scale dimension that are made possible by the digital landscape, these flows of knowledge go from an incremental knowledge accumulation to a progressive increase of innovation hops that are triggered by the combination phase of knowledge connectivity (Brown and Duguid, 2001; Contu and Willmott, 2003; Rathi *et al.*, 2014). These Web affiliations link people, knowledge, information, ideas, competence, stimulating the individual, group, organizational and social learning and collective intelligence, as underscored by Soto-Acosta *et al.* (2014) when discussing Web knowledge sharing and its effect on innovation. This is how inter-organizational online communities emerged, bringing together professionals who seek getting access and generating expertise across organizational borders (Ferguson and Taminiau, 2014).

Underlining the imperative to give "voice and dignity" to individuals and to bring "every brain into the game", Welch (2005, p. 56) affirmed the importance of individual's vision-driven collaboration. Further, Adler *et al.* (2011, p. 97) deemed that sustainable organizational performance and competitiveness rely on shared purpose, on the pursuit of the same goal and on a collaborative culture "in which collaboration is valued and rewarded". In this context, by bridging the temporal and space gap, social media are not only contributing to the development of cognitive capital across organizational boundaries but also increasing the opportunities that people from different organizational and general social settings have to engage each other and to collaborate with each other (Bharati *et al.*, 2015).

Whereas the dynamic network theory goes beyond the organization's formal borders, underlining how out-group entities influence in-group entities, and how all these entities collaborate and co-evolve, we advance a new approach on the dynamics of the IC, placing it in the aforementioned framework. Thereby, the concept of "network-based IC" describes the configuration and process of value creation from the individual's micro-universe to the entire social system, by linking people, knowledge, information, expertise, competence and know-how within complex and dynamic social networks. Also, the network-based IC entails an ambivalent goal pursuit: the individual's goal to learn, to have access to the network's resources for self-improvement and organizational competitiveness through cross-organizational networking. In line with the aforementioned studies that have laid stress on the positive effect of social media on harnessing varied forms of IC, the present contribution aims to further explore the valuation of network-based IC components toward competitiveness achievements. Against this backdrop, the following hypotheses were formulated:

H4. The leverage of network-based human capital generates a significant positive influence on the professional and organizational competitiveness.

H5. The leverage of network-based structural capital generates a significant positive influence on the professional and organizational competitiveness.

H6. The leverage of network-based relational capital generates a significant positive influence on the professional and organizational competitiveness.

Here, studies posited that this type of wide-scale online networks, which are rather dominated by weak ties, are merely defined by a transfer of *explicit knowledge* (mainly

scientific documents), thus "know-what" oriented, than on *tacit knowledge* ("know-how"), which has more strategic value (Pérez-Luño *et al.*, 2011).

2.4 Intellectual capital within the higher education institutions framework

The IC construct was initially coined and developed in the context of the business sector, profit-oriented organizations becoming a recurrent issue in the knowledge management analyses. Yet, due to the topicality and challenges of the knowledge-based economy, the debate on capitalization of IC by public institutions came as an organic step forward (Guthrie and Dumay, 2015; Dumay *et al.*, 2015), with a focus on universities and research laboratories (Leitner, 2004; Mouritsen *et al.*, 2004; Cañibano and Sánchez, 2008; Ramírez, 2010; Ramírez Córcoles *et al.*, 2011; Brătianu, 2009; Wu *et al.*, 2012; Ramírez and Gordillo, 2014; Veltri and Silvestri, 2015).

Nowadays, higher education institutions are subject to a dynamic process of transformation which entails a greater extent of flexibility, transparency, competitiveness and correlation (Elena and Warden, 2011; Leitner *et al.*, 2014; Veltri and Silvestri, 2015). The analysis of the IC within the higher educational framework has imposed itself mainly because the universities' rationale is dealing with knowledge – producing, delivering, disseminating, absorbing, sharing and even innovating knowledge (Ramírez *et al.*, 2007). Similarly, Ramírez and Gordillo (2014, p. 173) argue that "IC approaches have become of prime importance in institutions of higher education, because knowledge is their main output and input. Universities produce knowledge, either through scientific and technical research [. . .] or through teaching".

This perspective is consistent with Gorgani *et al.*'s (2014) opinion that universities have to adopt a strategic rethinking of structures and organizational processes to access and capitalize the intangible knowledge patrimony of complex social networks. Only through well-defined programs and strategies developed by higher education centers and through the personal proficiency, skills and capabilities of the teaching staff, should the university efficiently manage the IC. Furthermore, only institutions with high innovative capabilities may preserve their competitiveness on specialized education markets, the self-efficiency of the personnel being a strong moderator (Ramírez, 2010; Dumay *et al.*, 2015; Veltri and Silvestri, 2015).

As the innovation entails the translation and the exploitation of the existing knowledge, it is imperative that researchers from different universities share information and knowledge, and learn from the more developed systems and from the high performance education institutions (Gorgani *et al.*, 2014). It should be considered a personal responsibility for every researcher to identify, select, access, organize, accumulate and disseminate relevant knowledge with a view to self-improvement and organizational development (Assi Ahmed Al-Dujali, 2012), all the more so as studies have underscored a significant and positive relationship between commitment and knowledge sharing (Cabrera *et al.*, 2006; Soto-Acosta *et al.*, 2015). Still, a study conducted by Leon and Vătămănescu (2015) in several Romanian Management colleges indicated that researchers rarely act as knowledge sharers because they do not embrace a systemic thinking. The highly competitive organizational climate makes them keep relevant knowledge just for themselves as a form of protecting a personal competitive advantage. Even though the university would benefit by the "collectivization" of knowledge, the individualism and personal interests prevail.

Additionally, the reasons for the lack of motivation of academic staff – at the international level – in 27 countries from Central Asia, Eastern Europe, Maghreb, Middle East and Western Balkans were (European Commission, 2012, p. 93): the inadequate salary, which was one of the most often mentioned reasons (32 per cent), together with the lack of reward mechanisms (23 per cent), lack of research opportunities (15 per cent), lack of career perspectives (14 per cent) and lack of time, due to heavy workload (12 per cent). That's why we consider that the management of a higher education institution should pay attention

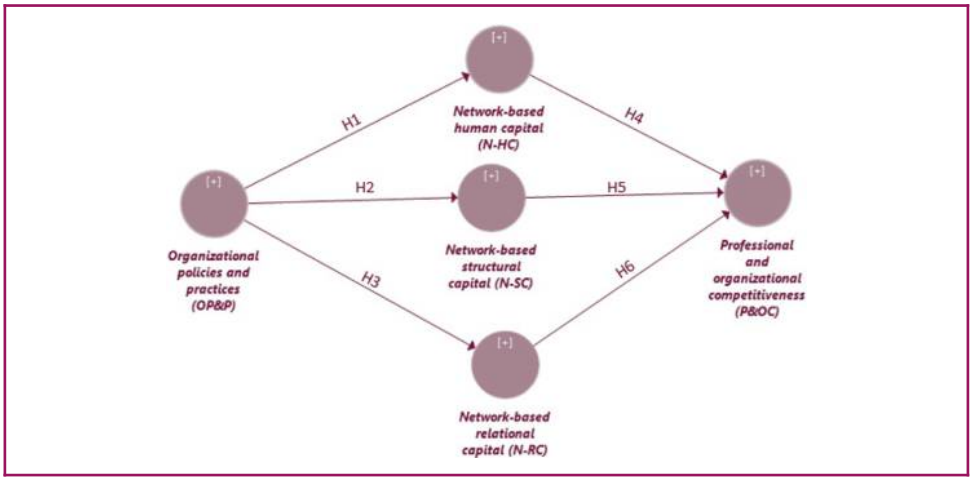
to institutional strategies regarding human resources management. This would consist of applying transparent and open recruitment procedures, motivating staff through incentives including for knowledge sharing, creating attractive working conditions, training of staff, employees involvement in major decision-making processes, etc.

Against this backdrop, universities' management should pay heed to purposely engage in creating knowledge assets and to sustain the IC valuation. The process is far more complex, as the prominent function of the university is potentiated by additional factors, which stimulate production and innovation – "particularly communications and computing infrastructure, networks which include trade but also university and research networks, and ability to renew or innovate with research and development underpinned by the financial and economic conditions to do so" (Leitner *et al.*, 2014, p. 8). Higher education institutions have to deploy suitable resources and deliver proper solutions for the under-funding constraints (Sánchez *et al.*, 2009; Secundo *et al.*, 2010; Elena and Warden, 2011; Habersam *et al.*, 2013). As Veltri and Silvestri (2015, p. 446) conclude, "universities today are operating in a highly competitive environment mainly owing to the decrease of public funding and a subsequent demand by their stakeholders for the effective use of public funding".

Even though a progressive adoption of IC "as a key strategic factor to confront the competitive challenges currently facing universities" (Ramírez and Gordillo, 2014, p. 181) is topical, "Humboldt-style universities are characterized by low innovation rate, weak links with the industry and poor human resources management policies" (Fazlagic, 2005, p. 2). This state-of-the-art triggers the imperative for exploring and applying new mechanisms of learning and of increasing the creative potential of human resources (Jones *et al.*, 2009; Ramírez and Gordillo, 2014; Lerro *et al.*, 2014). Despite the absence of generally applicable solutions, the management of European universities should potentiate the reification of their IC for an incremental performance increase. It is in this vein that European knowledge organizations should pay more attention to the management approaches and tools used by the for-profit sector (Fazlagic, 2005; Kok, 2007; Brătianu, 2009). This perspective is also found in Kok's (2007, p. 183) work, the author highlighting the imperative to adopt proper management models in universities as "the development of academic research capacities carries within itself the seeds of future economic and social development in the form of human capital, tacit knowledge and intellectual property".

Starting from the aforementioned theoretical developments and advanced hypotheses, the current paper will address – in the context of the online academic networks – the following research model (Figure 1)

Figure 1 Research model with hypotheses



3. Methodology

3.1 Data collection and sample

A total of 724 university members – researchers, assistant professors, associate professors and professors – from higher education institutions in European developing countries were contacted to take part in a survey regarding their online academic networks (Table I for further details). The convenience sampling focused on the available subjects, but this fact did not alter the research objectives. In total, 210 valid questionnaires were retrieved, yielding a response rate of 29 per cent. The survey was conducted online between May 10 and May 24, 2015. Once they agreed to participate in this study, academics were invited to complete a self-administered questionnaire. To ensure a higher degree of objectivity in categorizing the answers, the questionnaire consisted of closed-ended questions. Scales were measured on a five-point Likert scale, ranging from "*to a very small extent*" (1) to "*to a very great extent*" (5).

3.2 Measures

The questionnaire items referred to facts, opinions and attitudes related to subjects' activity within online academic social networks, stressing on the dimensions of the network-based IC which were previously theoretically depicted. Questions fall into five main categories:

1. network-based human capital configuration and usage;
2. the network-based structural capital configuration and usage;
3. the network-based relational capital configuration and usage;
4. organizational formal policies and practices; and
5. professional and organizational competitiveness achievements (as presented in Table II).

Although the construct of *network-based IC* and its inherent components have not been operationalized as such before, the advanced indicators for each category relied on prior conceptualizations and measurement scales used in the organizational frameworks (Webb, 2008; Dumay, 2009; Longo and Mura, 2010). Emphasis was laid on the scales developed for measuring IC within universities (Leitner *et al.*, 2014; Veltri and Silvestri, 2015), with the

Table I Socio-demographic characteristics of respondents ($N = 210$)

Variable	*% of subjects*
Age (years)	
20-30	26.7
31-40	46.7
41-50	15.2
51-60	9.5
Over 60	1.9
Academic title	
PhD candidate	40.5
PhD degree	47.1
Postdoctoral degree	12.4
Academic position	
Researcher	21.9
Assistant professor	29.5
Associate professor	18.6
Professor	30
Faculty field	
Arts & Humanities	16.2
Economics & Social sciences	70.5
Natural sciences & Mathematics	9.5
Other	3.8

Table II Constructs and items

Construct	*Variables*	*Items*
Organizational policies and practices (OP&P)	OP1	Our university management formally encourages its members to capture and transmit knowledge within online network(s)
	OP2	Our university management encourages becoming part of online professional network(s) in an informal manner
	OP3	The organizational culture of my university supports knowledge sharing among its members
	OP4	Our university acknowledges that being part of online professional network(s) ensures the competitiveness of its members
	OP5	Our university acknowledges that being part of online professional network(s) ensures the competitiveness of the institution itself
	OP6	Our university encourages us to capitalize the knowledge acquired within online network(s) to update our research, textbooks or teaching methods
Network-based human capital (N-HC) (Reflective)	N-HC3	I usually join online social networks which gather notable scholars in my field
	N-HC4	I usually look into the profiles of new members (e.g. skills, expertise) who join my online networks
	N-HC5	I consider notable scholars within my online networks as knowledge promoters
	N-HC6	Notable scholars within my online network(s) are active members (share ideas, information, publications, etc.)
	N-HC7	In my online network(s), there are members internationally acknowledged for their expertise in the field
	N-HC8	In my online network(s), there are members internationally acknowledged for their affiliation to well-reputed universities
	N-HC9	In my online network(s), there are members internationally acknowledged for their innovative or breakthrough research
	N-HC10	In my online network(s), there are members who have publications in top-ranked journals
Network-based structural capital (N-SC) (Reflective)	N-SC1	Notable scholars within my online network(s) publish interesting and compelling research
	N-SC2	Notable scholars within my online network(s) publish information about research projects and grants
	N-SC4	Notable scholars within my online network(s) publish information about the latest research methods and techniques in the field
	N-SC5	I usually read the works published by notable scholars within my online social network(s)
	N-SC6	I usually read the works recommended by notable scholars within my online social network(s)
	N-SC7	The works of notable scholars within my online networks provide me with new research ideas and direction(s)
	N-SC8	I consider the works of notable scholars within my online network(s) as models to be followed
	N-SC9	I usually send requests to notable scholars within my online network(s) to provide me with their full papers
	N-SC10	As a member of online network(s), I was granted access to researches of notable scholars which otherwise should have been paid for
	N-SC11	I usually follow the topics developed by notable scholars within my online network(s)
Network-based relational capital (N-RC) (Reflective)	N-RC1	I have got in touch with notable scholars within my online network(s) to discuss or share viewpoints
	N-RC2	I have approached notable scholars within my online network(s) to propose different research/ academic collaborations
	N-RC3	I have been approached by notable scholars within my online network(s) in order to collaborate on different research or academic issues
	N-RC4	I have personally contacted notable scholars within my online network(s) to ask for full papers or additional materials after seeing a certain post
	N-RC5	Notable scholars within my online network(s) are open to communication on field-related topics
	N-RC6	I have developed strong relationships (collaborations) with notable scholars in my field only through online channels
	N-RC7	I have developed strong offline relationships with notable scholars in my field after meeting them within my online network(s)
	N-RC8	I have met most of the notable scholars in my online network(s) in person
	N-RC9	I would define my online network(s) as collaborative environments
Professional and organizational competitiveness (P&OC) (Formative)	POC1	Number of ISI articles published on your own or in collaboration with your colleagues
	POC2	Please specify how is your university ranked in the national classification of universities

amendment that indicators were adapted to meet the reality of online social networks (Baehr and Alex-Brown, 2010; Pérez-Luño *et al.*, 2011). Here, to define suitable indicators for a network-driven perspective, preliminary exploratory endeavors were conducted and specific features of online academic networks were established.

The multi-item constructs describing IC components (Table II) focused on leveraging weak ties as they facilitate non-redundant information access (Granovetter, 1973; Uzzi and Lancaster, 2003). In this light, scales were construed stressing on the presence and activity of "notable scholars" within online academic networks, assuming their roles as knowledge wells and the fact that, usually, the peripheral and semi-isolated actors in a network are more beneficial for developing new ideas (Fang *et al.*, 2012). Further, the indicators measuring *organizational formal policies and practices* relied on the theoretical developments pertaining to Carneiro (2000), Sharkie (2003) and Kruse and Geißler (2014), while *professional and organizational competitiveness achievements* comprised two objective measures (*number of ISI articles published on your own or in collaboration with your colleagues and university ranking in the national classification of universities*). A final section included the respondents' personal information which consisted of age and country, academic title and position and faculty field.

3.3 Assessment of measurement properties

The measurement and structural model were assessed by using the component-based partial least squares (PLS) tool with the Smart-PLS software package. PLS–structural equation modeling was used given the exploratory nature of the investigation as the advanced framework is merely new (Bharati *et al.*, 2015).

The psychometric properties of the constructs tested in the research are presented in Table III. As Barclay *et al.* (1995) suggested, the required measurements refer to the investigation of convergent validity, individual item reliability, composite reliability (CR) and discriminant validity of the measurement model.

The authors assessed the convergent validity by using factor loadings and cross-loadings of the indicators on their reflective constructs, average variance extracted (AVE) and CR (Table III). The reflective item factor loadings were significant and greater than 0.70, with the exception of one indicator (N-SC9, whose value was 0.69). Also, as presented in the table, the AVE values were greater than 0.60. Due to the fact that CR is considered to be more accurate than Cronbach's alpha (Chin, 1998; Henseler *et al.*, 2009), we used it to overcome potential deficiencies by taking into account the different indicators loadings. In this vein, the reflective construct measure loadings were above the recommended threshold of 0.70 for CR, complying with the guidelines provided by Yi and Davis (2003). In the present research, CR values ranged from 0.93 to 0.97 while AVE ranged from 0.63 to 0.83.

The discriminant validity of constructs was scrutinized by comparing the square roots of the AVEs with other correlation scores in the correlation matrix (Table IV). As shown in the table, none of the construct correlations (non-diagonal entries) exceeded the corresponding square root of the AVE (diagonal entries). The values confirm the criteria advanced by Fornell and Larcker (1981), that is, the measures of each construct correlated more highly with their own items than with items depicting other constructs. Additionally, Cronbach's alpha values of all indicators exceeded the recommended threshold of 0.6 (Nunnally, 1967), as shown in Table III. Hence, the overall measurement items conform to the reliability adequacy and, consequently, the discriminant validity of the constructs in the research model was supported.

The level of common method bias was measured by performing the Harman's one-factor test – all constructs being subject to an unrotated principal component factor analysis. Given the fact that no single factor accounted for more than 50 per cent of variance (Harman, 1960), the common method bias was considered non-incumbent on the present analysis.

Table III Psychometric properties of reflective and formative constructs

Construct	*CR*	*AVE*	*Indicator*	*Mean*	*Median*	*SD*	*Weight (Formative)*	*Loading (Reflective)*
OP&P (Reflective)	0.967	0.829	OP1	2.74	3.00	1.31	–	0.90
			OP2	2.74	3.00	1.29	–	0.94
			OP3	3.08	3.00	1.21	–	0.82
			OP4	2.77	3.00	1.31	–	0.94
			OP5	2.77	3.00	1.38	–	0.94
			OP6	2.73	3.00	1.30	–	0.92
N-HC (Reflective)	0.939	0.631	N-HC3	2.99	3.00	1.22	–	0.76
			N-HC4	2.78	3.00	1.31	–	0.70
			N-HC5	3.23	3.00	1.20	–	0.82
			N-HC6	3.12	3.00	1.20	–	0.85
			N-HC7	3.33	3.00	1.24	–	0.86
			N-HC8	3.08	3.00	1.22	–	0.86
			N-HC9	3.19	3.00	1.12	–	0.81
			N-HC10	3.34	4.00	1.25	–	0.83
N-SC (Reflective)	0.945	0.635	N-SC1	3.40	3.00	1.10	–	0.83
			N-SC2	2.76	3.00	1.19	–	0.70
			N-SC4	2.97	3.00	1.27	–	0.74
			N-SC5	3.17	3.00	1.25	–	0.88
			N-SC6	3.09	3.00	1.27	–	0.86
			N-SC7	3.25	4.00	1.26	–	0.87
			N-SC8	3.17	3.00	1.26	–	0.85
			N-SC9	2.51	2.00	1.24	–	0.69
			N-SC10	2.53	3.00	1.36	–	0.71
			N-SC11	2.85	3.00	1.26	–	0.82
N-RC (Reflective)	0.955	0.701	N-RC1	2.42	2.00	1.21	–	0.90
			N-RC2	2.25	2.00	1.24	–	0.85
			N-RC3	2.30	2.00	1.21	–	0.86
			N-RC4	2.45	2.00	1.28	–	0.87
			N-RC5	2.91	3.00	1.20	–	0.80
			N-RC6	2.28	2.00	1.32	–	0.87
			N-RC7	2.16	2.00	1.24	–	0.80
			N-RC8	2.21	2.00	1.27	–	0.72
			N-RC9	2.53	2.00	1.32	–	0.85
P&OC (Formative)	–	–	POC1	2.74	2.00	1.38	0.27	–
			POC2	2.62	3.00	1.36	0.81	–

Notes: OP&P = Organizational Policies and Practices; N-HC = Network-based human capital; N-SC = Network-based structural capital; N-RC = Network-based relational capital; P&OC = Professional and organizational competitiveness; CR = Composite Reliability; AVE = Average Variance Extracted. $N = 210$. All loadings are significant at $p < 0.001$ level

Table IV Square root of AVE and latent variable correlation

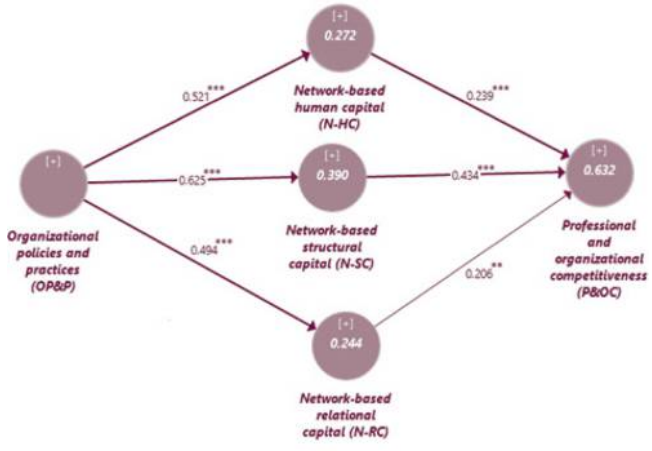
Scales	*OP&P (Reflective)*	*N-HC (Reflective)*	*N-SC (Reflective)*	*N-RC (Reflective)*	*P&OC (Formative)*
OP&P (Reflective)	*0.91*				
N-HC (Reflective)	0.52	*0.81*			
N-SC (Reflective)	0.63	0.75	*0.80*		
N-RC (Reflective)	0.49	0.56	0.75	*0.84*	
P&OC (Formative)	0.48	0.68	0.77	0.67	*NA*

4. Results and discussion

PLS structural model results are shown in Figure 2. Applied to the context of online academic networks, the model accounts for 63 per cent of variance in professional and organizational competitiveness.

As shown in Figure 2, the effect of organizational policies and practices on leveraging network-based human capital is significant and positive ($\beta = 0.52$, $p < 0.001$), supporting

Figure 2 PLS test of the proposed structural model



H1. Similarly, the path coefficients for the other two components of the network-based IC, namely, network-based structural capital and network-based relational capital, are both positive ($\beta = 0.63$ and $\beta = 0.49$) and highly significant ($p < 0.001$). Thus, the first three hypotheses are all supported by empirical evidence, confirming the positive relationships between organizational policies and practices and the leverage of network-based IC components. This situation is consistent with Ordóñez de Pablos' (2010) and Fernando's (2010) considerations that competitive knowledge organizations encourage knowledge sharing – by means of the organizational culture – both within and among organizations.

Nevertheless, despite the fact that, generally speaking, universities prove to have an embedded knowledge culture, what remains highly debatable is the individualistic nature of this culture, as Fullwood *et al.* (2013) have concluded after their survey on knowledge sharing amongst academics in the UK universities. Thus, although organizational policies and practices do indeed have a significant influence on the leverage of network-based human, structural and relational capital, knowledge-sharing flows among academics seem to remain mainly dependent on the ties that are created and developed between individual academic actors and, second, on those between organizational academic actors. In terms of the knowledge management in universities, we argue that one of the main challenges is to provide a more strategic approach in terms of balancing the individual and the institutional components of the IC.

Furthermore, when it comes to the four dimensions of the knowledge-sharing behavior, as they have been identified by Ramayah *et al.* (2014), the online gains primacy over the offline dimension, as written contribution is mostly visible and disseminated online, communities of practice are more active in the social media landscape, while organizational communications and personal interactions are mainly online mediated.

Moving forward, each of the network-based IC components proved to be positively and significantly related to the professional and organizational competitiveness. Hereby, leveraging network-based structural capital accounts for the highest effect on the professional and organizational competitiveness ($\beta = 0.43$, $p < 0.001$), supporting *H5*. This is followed by the path coefficients stressing the network-based human capital ($\beta = 0.24$, $p < 0.001$) and the network-based relational capital ($\beta = 0.21$, $p < 0.01$). Hence, the study found support for the positive and highly significant relationships between leveraging network-based IC and professional and organizational competitiveness. The results are illustrative of the theoretical developments presented which sustained the paramount

importance of IC and social media valuation in generating competitive edges (Gunsel *et al.*, 2011; Martín and Delgado, 2012; Rathi *et al.*, 2014).

As the competition between both individual and institutional academic actors has become more and more intense, the university rankings are no longer only about gaining symbolic–reputational resources, but also about attracting and retaining human resources (teaching staff and students), as well as financial resources (governmental founding, private investments and sponsorships, research grants, etc.). Nevertheless, the core indicators and their weights in the ranking formula are mainly related to the network-based IC infrastructure, as citations, international collaboration, number of PhDs awarded, global and regional research reputation enhance the network-based model that lays beyond academic performance (see the Thomson Reuters Academic Reputation Survey or the US News Best Global Universities Rankings).

In other words, competitiveness within the academic field means being highly integrated and capitalizing on the global network-based IC. Still, in the long run, competitiveness should be less about "ranking" universities and more about finding alternative ways of "measuring" the potential for performance, more present and future oriented than over-counting the past achievements and, probably, most important, more about adapting the competitiveness methodologies to the ongoing changes within the socio-academic dynamics (see the European Commission MERITUM Project, the Danish IC Guidelines or the Austrian Research Centers' IC Report).

Elaborating on the findings, we may argue that the organizational policies and practices which, in fact, refer to the IC management mechanisms, considerably influence the leveraging of the network-based structural capital embodied by the online academic networks ($\beta = 0.63$, $p < 0.001$), explaining 39 per cent of the construct variance. Furthermore, it is the leverage of the network-based structural capital that prominently impacts on the professional and organizational competitiveness of university members of higher education institutions ($\beta = 0.43$, $p < 0.001$). This fact is indicative of Filieri and Alguezaui's (2014) and Pérez-Luño *et al.*'s (2011) findings, the latter highlighting that the wide-scale online networks – mostly dominated by weak ties – give way to the transfer of *explicit knowledge* (mainly scientific documents), thus "know-what" oriented, rather than on *tacit knowledge*, "know-how" driven. Here, one of the ready-at-hand mechanisms of assuring a critical active network-based IC is to strategically mobilize the diasporic academics (Larner, 2015) in sustaining the universities efforts to create or to be part of global knowledge networks.

The value of these results should be placed within the wider framework of the increasing use of social media in the academic field, not only for teaching purposes, but also for other professional activities such as the scientific research one. The regular surveys conducted by Pearson company in America have shown that the professional use of social media has increased since 2009, with more than half (55 per cent) of their academics saying that they use social media for professional purposes other than teaching at least monthly (Seaman and Tinti-Kane, 2013). Moreover, a recent survey conducted in 2014 among academics from different disciplines and countries – UK (37 per cent), Australia/New Zealand (25 per cent), the USA (20 per cent), continental Europe (10 per cent) and Canada (6 per cent) – also confirms the increased interest and usage of social media within the academic field, laying stress on the fact the most prominent benefit gained from using social media was related to the connections or networks they had established with other academics from all around the world, which, in turn, had stimulated conversations, eliciting feedback on their research online (Lupton, 2014). Nevertheless, the study confirms the lack of institutional reward for using social media, even though universities are now aware of the benefits this might bring in terms of the network-based IC not only at the individual but also at the organizational levels.

5. Conclusions

5.1 Summary of the findings

The present paper investigated the relationships between a new construct – *network-based* IC (with its inherent components: network-based human, structural and relational capitals) – and two other constructs, namely, the organizational policies and practices and the professional and organizational competitiveness. The online academic networks joined by university members from European developing countries provided the analysis framework.

The empirical data supported the research model, in that organizational policies and practices influence the configuration and use of the network-based IC components in a positive and significant manner. Further, harnessing network-based IC components has a positive and highly significant effect on achieving professional and organizational competitiveness. In total, 63 per cent of the organizational competitiveness of higher education institutions is determined by the exploitation of the IC embedded in online academic networks ($R^2 = 0.632$, $p < 0.001$). In this vein, the network-based structural capital leveraging is the one that determines the professional and organizational competitiveness to the greatest extent ($\beta = 0.43$, $p < 0.001$).

5.2 Research originality and value

This research adds to the extant literature on four main levels.

First, it advanced a new concept – the *network-based* IC – and its subsequent dimensions, namely, the *network-based human capital, network-based structural capital and network-based relational capital*. The overall construct refers to an intricate configuration and to consistent interaction process among people, knowledge, information, expertise, competences, know-how within complex and dynamic online social networks. This view goes beyond the organization's boundaries and underscores the importance of extending the individual and organizational "know-what" in the context of cohesive online affiliations which become stronger as the shared purpose is achieved. Even though the idea of converging the IC issues with social media and online social networks has been previously discussed (Carneiro, 2000; Brown and Duguid, 2001; Contu and Willmott, 2003; Kok, 2007; Pérez-Luño *et al.*, 2011; Ordóñez de Pablos, 2013; Rathi *et al.*, 2014), none of the reviewed studies proposed an IC construct to specifically describe the network framework.

Second, the work placed the issue of harnessing the network-based IC in the context of the online academic social networks and, which is more, the emphasis was laid on academics from developing countries. This situation fostered a valuable insight into the subjects' practices and approaches regarding the configuration and use of online academic networks. To the best of our knowledge, a network-driven perspective on the IC exploitation at academic inter-organizational levels was yet to be addressed. Indeed, the extant literature have underscored the imperative for theoretical developments in this respect (Kok, 2007; Leitner *et al.*, 2014; Gorgani *et al.*, 2014; Veltri and Silvestri, 2015).

Third, the paper proposed the investigation of the network-based IC components from a competitive advantage standpoint. Although the correlation between the capitalization of IC and the attainment of competitive edges have been previously discussed, the focus was on profit-oriented organizations (Sullivan, 1999; Sharkie, 2003; Isaac *et al.*, 2009; Kianto *et al.*, 2013; Ling, 2013; Soto-Acosta *et al.*, 2015; Tseng *et al.*, 2015) and on the group and organizational approaches (Gokmen, 2009; Grimaldi and Hanandi, 2013; Sumedrea, 2013; Soto-Acosta *et al.*, 2014).

Finally, the value of the paper resided in the advancement, measurement and validation of a research model which simultaneously considered the relevance of organizational policies and practices and of network-based IC leveraging with a view to generate competitive advantage. The multi-item constructs resulted from a thorough examination of the

theoretical developments to date, articulating the issues on IC, online social networks and academic particularities in an integrative framework.

5.3 Limitations of the research and findings

As one of the incipient studies empirically investigating the relationship between organizational policies and practices, IC components and competitiveness in the context of online academic networks, this study was mainly exploratory in nature and, thus, availing some limitations.

The first limitation refers to the fact that all survey respondents come from the European developing countries, which may limit the general applicability of the findings and may account for region-specific descriptions. The convenience sample comprised participants from eight developing countries in Europe (classified by the International Monetary Fund, 2014) and the subjects' distribution relied solely on their availability to participate in the study. Also, the distribution of participants in terms of age points to the increased number of young academics (73.4 per cent are aged between 20 and 40 years, namely, 26.7 per cent between 20 and 30 years and 46.7 per cent between 31 and 40 years), stressing that this age category is the one who intensively use the online knowledge resources. This aspect may explain the main tendencies in building and harnessing the network-based IC and thus future research would benefit from elaborating on the topic.

The second limitation is brought about by the sole investigation of the network-based IC components in the framework of public institutions, namely, universities. A future research would benefit from a comparative analysis between the public and private sectors, either considering the case of European developing countries or a broader context, either discussing the usage of online professional or generic social networks. Also, a more elaborate analysis concentrated on specific academic fields would have enriched the findings.

The third limitation is determined by the fact that, although relying on the extant literature, the developed instrument is still subject to an ongoing procedure of development, testing and refinement. Therefore, further confirmatory studies are necessary to determine the external validity of the results.

The fourth limitation regards the self-reporting nature of most of the items. Despite the fact that the questionnaire items simultaneously address opinions, attitudes and conducts, the ratings provided by respondents may be influenced by subjectivity. To overcome this limitation, future studies might include additional measures or methodological triangulation. Here, as far as the methodology is concerned, new measures may be considered for model testing and assessment. For instance, to confer a more general perspective, future studies may consider reporting the ordered weighted average variance (Merigó *et al.*, 2015), as it provides a parameterized family of variances between the minimum variance and the maximum variance.

5.4 Implications for practitioners and researchers

Despite the aforementioned limitations, the paper may be considered a starting point for future applications and researches.

As far as practitioners (university management and members) are interested, the consideration that harnessing the network-based IC components yields benefits in terms of professional and organizational competitiveness may generate a competitive advantage in its own right. This implies a formal acknowledgement through policies and practices that university members should engage in knowledge networks which often surpass the organizational boundaries. Further, it stresses that the growing competition between universities have pushed higher education institutions out of their domestic habitats toward identifying and exploiting new knowledge sources with a view to innovate, become or remain competitive. A highly qualified workforce should be engaged in knowledge creation

and sharing to ensure top-quality graduates and research deliverables. This is why universities are prone to adopt a network-scale perspective on purpose to attain higher standards in research and teaching, to find new knowledge wells for members' improvement and for institutional development.

The current context of the transition to the knowledge economy created new requirements for higher education systems: a solution consists of the development, in concept and in practice, of the entrepreneurial university, characterized by innovation through its research, knowledge exchange and external relations, bringing together universities and businesses to find mechanisms for cooperation and encouraging the transfer and sharing of knowledge (OECD, 2012). Despite these signals, our findings give credit to the results presented by Leon and Vătămănescu (2015, p. 466) – "the faculty boards or superiors fail in the process of [. . .] leveraging the academic or professional experiences of their senior members, and, eventually, in building a strong organizational culture based on a participatory and collaborative human architecture".

University representatives and members should acknowledge that the IC renewal depends greatly on assuming the work of notable scholars and on inter-organizational learning, the knowledge-intensive organization progressively extending its capacity to shape the future to develop itself and not only to survive. This exigency mainly points out that universities and academics from developing countries have to surpass the stage of adaptive learning and strive for generative learning through innovation and continuous changing (as Cardoso *et al.*, 2012 and Martínez García de Leaniz and Rodríguez del Bosque, 2013 also argued).

In a work environment based on a management style focused on the expert-employees, as an essential resource of the organization, where the financial stimulation of the "golden collar" employees is deemed as insufficient, the members' propensity to transform their tacit knowledge into organizational knowledge is higher. Here, management would purposely act by offering opportunities of personal and organizational development, reducing overload, consulting employees with regard to different research tasks and decisions, organizing social activities between co-workers and creating a climate that could emphasize collaboration, mutual aid and informal communication at cross-organizational levels, as well. (Leovaridis and Popescu, 2015; Vătămănescu *et al.*, 2015). This strategic approach would pave the way for aligning to worldwide research teams and to authentic knowledge and innovation.

In what concerns the implications for researchers, the present study underscores the relevance of the IC from a competitive advantage standpoint, even in the case of higher education institutions. Although recent research has concluded the crucial role of knowledge exploitation within professional and business networks, more importance is to be attached to non-profit organizations and universities. Further contributions are apposite for testing the impact of the network-based IC components on competitiveness achievements. The focus may be on either developed or developing countries, but studies should examine the importance of the knowledge exchange within different networks, facilitating organizational learning and proper responses to the field dynamics. In this front, improved research models and instruments are welcomed, including the mediating or moderating effects of other constructs as the personal goals, trust, knowledge transfer, etc.

References

Adams, G.L. and Lamont, B.T. (2003), "Knowledge management systems and developing sustainable competitive advantage", *Journal of Knowledge Management*, Vol. 7 No. 2, pp. 142-154.

Adler, P.S., Heckscher, C. and Prusak, L. (2011), "Building a collaborative enterprise", *Harvard Business Review*, Vol. 89 Nos 7/8, pp. 94-101.

Alcaniz, L., Gomez-Bezares, F. and Roslender, R. (2011), "Theoretical perspectives on intellectual capital: a backward look and a proposal for going forward", *Accounting Forum*, Vol. 35 No. 2, pp. 104-117.

Alvesson, M. (2001), "Knowledge work: ambiguity, image and identity", *Human Relations*, Vol. 54 No. 7, pp. 863-886.

Andrei, A. and Iacob, A.G. (2011), "Human capital and organizational performance", *Managerial Challenges of the Contemporary Society*, Vol. 1 No. 2, pp. 130-136.

Andriessen, D. (2004), "Making sense of intellectual capital", *Designing a Method for Valuation of Intangibles*, Elsevier, Amsterdam.

Assi Ahmed Al-Dujali, M. (2012), "Influence of intellectual capital in organization innovation", *International Journal of Innovation Management and Technology*, Vol. 3 No. 2, pp. 128-135.

Baehr, C. and Alex-Brown, K. (2010), "Assessing the value of corporate blogs: a social capital perspective", *IEEE Transactions on Professional Communication*, Vol. 53 No. 4, pp. 358-369.

Barclay, D., Higgins, C. and Thompson, R. (1995), "The partial least squares (PLS) approach to causal modeling: personal computer adoption and use as an illustration", *Technology Studies*, Vol. 2 No. 2, pp. 285-309.

Bharati, P., Zhang, W. and Chaudhury, A. (2015), "Better knowledge with social media? Exploring the roles of social capital and organizational knowledge management", *Journal of Knowledge Management*, Vol. 19 No. 3, available at: http://dx.doi.org/10.1108/JKM-11-2014-0467 (accessed 17 May 2015).

Bogner, W. and Bansal, P. (2007), "Knowledge management as the basis of sustained high performance", *Journal of Management Studies*, Vol. 44 No. 1, pp. 165-188.

Bohlander, G. and Snell, S. (2007), *Managing Human Resources*, Thomson-Southwestern, Mason, OH.

Bontis, N. (1998), "Intellectual capital: an explanatory study that develops measures and models", *Management Decision*, Vol. 36 No. 2, pp. 63-76.

Brătianu, C. (2007), "Thinking patterns and knowledge dynamics", *Proceedings of the 8th European Conference on Knowledge Management*, Academic Publishing International, Reading, 6-7 September, pp. 152-157.

Brătianu, C. (2009), "The intellectual capital of universities", *Annals of the University of Ljubljana*, Ljubljana, 30 June-1 July.

Brătianu, C. (2013), "The triple helix of the organizational knowledge", *Management Dynamics in the Knowledge Economy*, Vol. 1 No. 2, pp. 207-220.

Brătianu, C. and Orzea, I. (2013), "The entropic intellectual capital model", *Knowledge Management Research and Practice*, Vol. 11 No. 2, pp. 133-141.

Brown, J.S. and Duguid, P. (2001), "Knowledge and organization: a social-practice perspective", *Organization Science*, Vol. 12 No. 2, pp. 198-213.

Brown, J.S. and Duguid, P. (2002), *The Social Life of Information*, Harvard Business Press, Boston, MA.

Burgman, R., Roos, G., Boldt, L. and Pike, S. (2007), "Information needs of internal and external stakeholders and how to respond: reporting on operations and intellectual capital", *International Journal of Accounting, Auditing and Performance Evaluation*, Vol. 4 Nos 4/5, pp. 529-546.

Cabrera, A., Collins, W.C. and Salgado, J.F. (2006), "Determinants of individual engagement in knowledge sharing", *International Journal of Human Resource Management*, Vol. 17 No. 2, pp. 245-264.

Cañibano, L. and Sánchez, P. (2008), "Intellectual capital management and reporting in universities and research institutions", *Estudios de Economía Aplicada*, Vol. 26 No. 2, pp. 7-26.

Cardoso, L., Meireles, A. and Peralta, C.F. (2012), "Knowledge management and its critical factors in social economy organizations", *Journal of Knowledge Management*, Vol. 16 No. 2, pp. 267-284.

Carneiro, A. (2000), "How does knowledge management influence innovation and competitiveness?", *Journal of Knowledge Management*, Vol. 4 No. 2, pp. 87-98.

Castells, M. (2000a), "The information age: economy, society and culture", *The Rise of the Network Society*, 2nd ed., Vol. 1, Blackwell, Oxford.

Castells, M. (2000b), "The information age: economy, society and culture", *End of Millennium*, 2nd ed., Vol. 3, Blackwell, Oxford.

Cegarra-Navarro, J.G. and Dewhurst, F.W. (2006), "Linking shared organisational context and relational capital through unlearning", *The Learning Organization*, Vol. 13 No. 1, pp. 49-62.

Chin, W.W. (1998), "The partial least squares approach to structural equation modeling", in Marcoulides, G.A. (Ed.), *Modern Methods for Business Research*, Lawrence Erlbaum Associates, Mahwah, NJ, pp. 295-336.

Chow, W.S. and Chan, L.S. (2008), "Social network, social trust and shared goals in organizational knowledge sharing", *Information & Management*, Vol. 45 No. 7, pp. 458-465.

Contu, A. and Willmott, H. (2003), "Re-embedding situatedness: the importance of power relations in learning theory", *Organization Science*, Vol. 14 No. 3, pp. 283-296.

Darroch, J. (2005), "Knowledge management, innovation and firm performance", *Journal of Knowledge Management*, Vol. 9 No. 3, pp. 101-115.

Davenport, T.H. and Prusak, L. (2000), "Working knowledge", *How Organisations Manage What They Know*, Harvard Business School Press, Boston, MA.

Dean, A. and Kretschmer, M. (2007), "Can ideas be capital? Factors of production in the postindustrial economy: a review and critique", *Academy of Management Review*, Vol. 32 No. 2, pp. 573-594.

Dierickx, I. and Cool, K. (1989), "Asset stock accumulation and sustainability of competitive advantage", *Management Science*, Vol. 35 No. 12, pp. 1504-1511.

du Plessis, M. (2007), "The role of knowledge management in innovation", *Journal of Knowledge Management*, Vol. 11 No. 4, pp. 20-29.

Dumay, J. (2009), "Intellectual capital measurement: a critical approach", *Journal of Intellectual Capital*, Vol. 10 No. 2, pp. 190-210.

Dumay, J., Guthrie, J. and Puntillo, P. (2015), "IC and public sector: a structured literature review", *Journal of Intellectual Capital*, Vol. 16 No. 2, pp. 267-284.

Edvinsson, L. (2002), "Corporate longitude", *What You Need to Know to Navigate the Knowledge Economy*, Prentice-Hall, London.

Edvinsson, L. and Malone, M.S. (1997), *Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Brainpower*, Harper Business, New York, NY.

Elena, S. and Warden, C. (2011), "Visualising the hidden value of higher education institutions: how to manage intangibles in knowledge-intensive organisations", in Vallejo, B., Rodríguez, A. and Arregui, G. (Eds), *Identifying, Measuring, and Valuing Knowledge-Based Intangible Assets, New Perspectives*, IGI Global, New York, NY, pp. 177-207.

European Commission (2012), "Human resource management in public higher education in the Tempus Partner countries", No. 10, available at: http://eacea.ec.europa.eu/tempus/tools/documents/issue10_hr_mngt_120720_en.pdf (accessed 29 September 2015).

Fang, C., Lee, J. and Schilling, M.A. (2012), "Balancing exploration and exploitation through structural design: the isolation of subgroups and organization learning", *Organization Science*, Vol. 21 No. 3, pp. 625-642.

Fang, C., Yang, C.W. and Hsu, W.Y. (2013), "Inter-organizational knowledge transfer: the perspective of knowledge governance", *Journal of Knowledge Management*, Vol. 17 No. 6, pp. 943-957.

Fazlagic, A. (2005), "Measuring the intellectual capital of a university", *Proceeding of the Conference on Trends in the Management of Human Resources in Higher Education*, OECD, Paris, available at: www.oecd.org/dataoecd/56/16/35322785.pdf (accessed 30 April 2015).

Felício, J.A., Couto, E. and Caiado, J. (2014), "Human capital, social capital and organizational performance", *Management Decision*, Vol. 52 No. 2, pp. 350-364.

Ferguson, J. and Taminiau, Y. (2014), "Conflict and learning in inter-organizational online communities: negotiating knowledge claims", *Journal of Knowledge Management*, Vol. 18 No. 5, pp. 886-904.

Fernando, I. (2010), "Community creation by means of a social media paradigm", *The Learning Organization*, Vol. 17 No. 6, pp. 500-514.

Filieri, R. and Alguezaui, S. (2014), "Structural social capital and innovation: is knowledge transfer the missing link?", *Journal of Knowledge Management*, Vol. 18 No. 4, pp. 728-757.

Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

Fullwood, R., Rowley, J. and Delbridge, R. (2013), "Knowledge sharing amongst academics in UK universities", *Journal of Knowledge Management*, Vol. 17 No. 1, pp. 123-136.

García-Merino, J.D., García-Zambrano, L. and Rodriguez-Castellanos, A. (2014), "Impact of relational capital on business value", *Journal of Information & Knowledge Management*, Vol. 13 No. 1, pp. 1450002-1450008.

Goebel, V. (2015), "Estimating a measure of intellectual capital value to test its determinants", *Journal of Intellectual Capital*, Vol. 16 No. 1, pp. 101-120.

Gokmen (2009), "A qualitative research regarding the university administrators' capacity to use of management information tools", *Procedia – Social and Behavioral Sciences*, Vol. 1 No. 1, pp. 2480-2490.

Gorgani, T., Nazem, F., Sharifi, H.P. and Karimzade, S. (2014), "Investigating the multivariate relation of the intellectual capital, organizational intelligence and organizational innovation at the Islamic Azad University, district of 3 in province of Mazandaran", *Management Research Report*, Vol. 2 No. 4, pp. 501-510.

Granovetter, M. (1973), "The strength of weak ties", *American Journal of Sociology*, Vol. 78 No. 6, pp. 1360-1380.

Grimaldi, M. and Hanandi, M. (2013), "Evaluating the intellectual capital of technology transfer and learning public services", *International Journal of Engineering Business Management*, Vol. 5 No. 7, pp. 1-10.

Gunsel, A., Siachou, E. and Acar, A.Z. (2011), "Knowledge management and learning capability to enhance organizational innovativeness", *Procedia – Social and Behavioral Sciences*, Vol. 24 No. 1, pp. 880-888.

Guthrie, J. and Dumay, J. (2015), "New frontiers in the use of intellectual capital in the public sector", *Journal of Intellectual Capital*, Vol. 16 No. 2, pp. 258-266.

Habersam, M., Piber, M. and Skoog, M. (2013), "Knowledge balance sheets in Austrian universities: the implementation, use and re-shaping of measurement and management practices", *Critical Perspectives on Accounting*, Vol. 24 Nos 4/5, pp. 319-337.

Harman, H.H. (1960), *Modern Factor Analysis*, University of Chicago Press, Chicago, IL.

Henseler, J., Ringle, C. and Sinkovics, R. (2009), "The use of partial least squares path modeling in international marketing", *Advances in International Marketing*, Vol. 20 No. 1, pp. 277-320.

Holden, N. and Glisby, M. (2010), "Creating knowledge advantage", *The Tacit Dimension of International Competition and Cooperation*, Copenhagen Business School Press, Copenhagen.

Hormiga, E., Batista, R. and Sánchez, A. (2011), "The role of intellectual capital in the success of new ventures", *International Entrepreneurship Management Journal*, Vol. 7 No. 1, pp. 71-92.

Inkpen, A.C. and Tsang, E.W.K. (2005), "Social capital, networks and knowledge transfer", *Academy of Management Review*, Vol. 30 No. 1, pp. 146-165.

International Monetary Fund (2014), "World economic outlook", available at: www.imf.org/external/pubs/ft/weo/2014/01/pdf/text.pdf (accessed 30 April 2015).

Isaac, R.G., Herremans, I.M. and Kline, T.J.B. (2009), "Intellectual capital management: pathways to wealth creation", *Journal of Intellectual Capital*, Vol. 10 No. 1, pp. 81-92.

Johnson, G., Whittington, R. and Scholes, K. (2011), "Exploring strategy", *Text and Cases*, Prentice-Hall, London.

Jones, N., Meadow, C. and Sicilia, M.A. (2009), "Measuring intellectual capital in higher education", *Journal of Information & Knowledge Management*, Vol. 8 No. 2, pp. 113-136.

Kianto, A., Andreeva, T. and Pavlov, Y. (2013), "The impact of intellectual capital management on company competitiveness and financial performance", *Knowledge Management Research & Practice*, Vol. 11 No. 2, pp. 112-122.

Kok, A. (2007), "Intellectual capital management as part of knowledge management initiatives at institutions of higher learning", *The Electronic Journal of Knowledge Management*, Vol. 5 No. 2, pp. 181-192.

Kong, E. and Prior, D. (2008), "An intellectual capital perspective of competitive advantage in nonprofit organisations", *International Journal of Nonprofit and Voluntary Sector Marketing*, Vol. 13 No. 2, 119-128.

Kruse, P. and Geißler, P. (2014), "Benefiting from external knowledge in open innovation processes", *International Journal of Knowledge and Systems Science*, Vol. 3 No. 4, pp. 16-27.

Lam, W. (2005), "Successful knowledge management requires a knowledge culture: a case study". *Knowledge Management Research & Practice*, Vol. 3 No. 4, pp. 206-217.

Larner, W. (2015), "Globalising knowledge networks: universities, diaspora strategies, and academic intermediaries", *Geoforum*, Vol. 19, pp. 195-205.

Leitner, K.H. (2004), "Intellectual capital reporting for universities: conceptual background and application for Austrian Universities", *Research Evaluation*, Vol. 13 No. 2, pp. 129-140.

Leitner, K.H. and Warden, C. (2004), "Managing and reporting knowledge-based resources and processes in research organizations: specifics, lessons learned and perspectives", *Management Accounting Research*, Vol. 15 No. 1, pp. 33-51.

Leitner, K.H., Elena-Perez, S., Fazlagic, J., Kalemis, K., Martinaitis, Z., Secundo, G., Sicilia, M.A. and Zaksa, K. (2014), "A strategic approach for intellectual capital management in European universities, guidelines for implementation", Final Report, UEFISCDI Blueprint Series, Bucharest, available at: http://aer.forhe.ro/sites/default/files/blueprint_ic_management_in_universities.pdf

Leon, R.D. and Vătămănescu, E.M. (2015), "Storytelling as a knowledge strategy in higher education institutions", in Garlatti, A. and Massaro, M. (Eds), *Proceedings of the 16th European Conference on Knowledge Management*, Academic Conferences and Publishing International Limited, Reading, MA, pp. 458-467.

Leovaridis, C. and Popescu, G. (2015), "Organizational innovation – a means to enhance quality of life for employees in knowledge economy", *Management Dynamics in the Knowledge Economy*, Vol. 3 No. 1, pp. 25-43.

Lerro, A., Linzalone, R. and Schiuma, G. (2014), "Managing intellectual capital dimensions for organizational value creation", *Journal of Intellectual Capital*, Vol. 15 No. 3, pp. 350-361.

Leung, N.K.Y., Lau, S.K. and Tsang, N. (2013), "An ontology-based collaborative inter-organisational knowledge management network (CIK-NET)", *Journal of Information & Knowledge Management*, Vol. 12 No. 1.

Ling, Y.H. (2013), "The influence of intellectual capital on organizational performance: knowledge management as moderator", *Asia Pacific Journal of Management*, Vol. 30, pp. 937-964.

Longo, M. and Mura, M. (2010), "A methodology for measuring intellectual capital: a structural equations modelling approach", in Sharma, M.K. (Ed.), *Advances in Measurement Systems*, InTech, available at: www.intechopen.com/books/advances-in-measurement-systems/amethodology-for-measuring-intellectual-capital-a-structural-equations-modelling-approach (accessed 30 April 2015).

Lupton, D. (2014), "Feeling better connected: academics' use of social media", *News & Media Research Centre*, University of Canberra, Canberra, available at: www.canberra.edu.au/research/faculty-research-centres/nmrc/publications/documents/Feeling-Better-Connected-report-final.pdf (accessed 2 October 2015).

Malone, T.W. (2004), "The future of work: how the new order of business will shape your organization", *Your Management Style, and Your Life*, Harvard Business School Press, Boston, MA.

Marr, B., Gupta, O., Pike, S. and Roos, G. (2003), "Intellectual capital and knowledge management effectiveness", *Management Decision*, Vol. 41 No. 8, pp. 771-781.

Martín de Castro, G., López, P. and Navas, E. (2004), "The role of corporate reputation in developing relational capital", *Journal of Intellectual Capital*, Vol. 5 No. 4, pp. 575-585.

Martín, G. and Delgado, M. (2012), "Assessing knowledge assets in technology-intensive firms: proposing a model of intellectual capital", *Journal of Centrum Cathedra*, Vol. 5 No. 1, pp. 43-59.

Martínez García de Leaniz, P. and Rodríguez del Bosque, I. (2013), "Intellectual capital and relational capital: the role of sustainability in developing corporate reputation", *Intangible Capital*, Vol. 9 No. 1, pp. 262-280.

Merigó, J.M., Guillén, M. and Sarabia, J.M. (2015), "The ordered weighted average in the variance and covariance", *International Journal of Intelligent Systems*, Vol. 30 No. 9, pp. 985-1005.

Mouritsen, J., Thorbjørnsen, S., Bukh, P.N. and Johansen, M.R. (2004), "Intellectual capital and new public management", *The Learning Organisation*, Vol. 11 Nos 4/5, pp. 380-392.

Nazari, J.A., Herremans, I.M., Isaac, R.G., Manassian, A. and Kline, T.J.B. (2011), "Organizational culture, climate and IC: an interaction analysis", *Journal of Intellectual Capital*, Vol. 12 No. 2, pp. 224-248.

Nonaka, I. and Takeuchi, H. (1995), "The knowledge creating company", *How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, New York, NY.

Nowicka, M., Dima, I.C. and Stefan, C. (2012), "Integrating the IC concept into strategies for the development of regional network systems", *European Journal of Business and Social Sciences*, Vol. 1 No. 6, pp. 21-33.

Nunnally, J.C. (1967), *Psychometric Theory*, McGraw-Hill, New York, NY.

OECD (2012), "A guiding framework for entrepreneurial universities", available at: www.oecd.org/site/cfecpr/ECOECD%20Entrepreneurial%20Universities%20Framework.pdf (accessed 27 September 2015).

OECD (2013), "New sources of growth: knowledge-based capital", Key Analyses and Policy Conclusions, Synthesis Report", available at: www.oecd.org/sti/inno/knowledge-based-capital-synthesis.pdf (accessed 10 March 2015).

Ordóñez de Pablos, P. (2010), "Preface to the special issue: emerging information technologies for effective knowledge management-towards high-performance business organizations and value networks", *Human Factors and Ergonomics in Manufacturing & Service Industries*, Vol. 20 No. 2, pp. 99-102.

Ordóñez de Pablos, P. (2013), "Measuring and reporting knowledge-based resources: the intellectual capital report, Facultad de Ciencias Economicas", University of Oviedo, available at: www.google.ro/url?sa=tandrct=jandq=andesrc=sandsource=webandcd=1andved=0CCMQFjAAandurl=http%3A%2F%2Fwww2.warwick.ac.uk%2Ffac%2Fsoc%2Fwbs%2Fconf%2Folkc%2Farchive%2Foklc3%2Fid392.pdfandei=yuY3VMvpLMjnywPGjoFgandusg=AFQjCNHHsirIvWlux8kIGlOiGX8V2qYCjwandbvm=bv.77161500,d.bGQ (accessed 30 April 2015).

Owen-Smith, J. and Powell, W.W. (2004), "Knowledge networks as channels and conduits: the effects of spillovers in the Boston biotechnology community", *Organization Science*, Vol. 15 No. 1, pp. 5-21.

Perez, J.R. and Ordóñez de Pablos, P. (2003), "Knowledge management and organizational competitiveness: a framework for human capital analysis", *Journal of Knowledge Management*, Vol. 7 No. 3, pp. 82-91.

Pérez-Luño, A., Cabello Medina, C., Carmona Lavado, A. and Cuevas Rodríguez, G. (2011), "How social capital and knowledge affect innovation", *Journal of Business Research*, Vol. 64 No. 12, pp. 1369-1376.

Porter, M.E. (1999), "Creating advantage", *Executive Excellence*, Vol. 16 No. 11, pp. 13-14.

Ramayah, T., Yeap, J.A. and Ignatiu, J. (2014), "Assessing knowledge sharing among academics: a validation of the knowledge sharing behavior scale (KSBS)", *Evaluation Review*, Vol. 38 No. 2, pp. 160-187.

Ramírez Córcoles, Y., Santos Peñalver, J.F. and Tejada Ponce, A. (2011), "Intellectual capital in Spanish public universities: stakeholders' information needs", *Journal of Intellectual Capital*, Vol. 12 No. 3, pp. 356-376.

Ramírez, Y. (2010), "Intellectual capital models in Spanish public sector", *Journal of Intellectual Capital*, Vol. 11 No. 2, pp. 248-264.

Ramírez, Y. and Gordillo, S. (2014), "Recognition and measurement of intellectual capital in Spanish universities", *Journal of Intellectual Capital*, Vol. 15 No. 1, pp. 173-188.

Ramírez, Y., Lorduy, C. and Rojas, J.A. (2007), "Intellectual capital management in Spanish Universities", *Journal of Intellectual Capital*, Vol. 8 No. 4, pp. 732-748.

Rathi, D., Given, L.M. and Forcier, E. (2014), "Interorganisational partnerships and knowledge sharing: the perspective of non-profit organisations (NPOs)", *Journal of Knowledge Management*, Vol. 18 No. 5, pp. 867-885.

Roos, G., Pike, S. and Fernstrom, L. (2005), *Managing Intellectual Capital in Practice*, Elsevier, Amsterdam.

Roos, J., Roos, G. Dragonetti, N.C. and Edvinsson, L. (1997), *Intellectual Capital: Navigating the New Business Landscape*, MacMillan Business, London.

Sánchez, P., Elena, S. and Castrillo, R. (2006), *The Intellectual Capital Report of Universities: Guidelines for Disclosing IC Information*, in Observatory of the European University (Ed.), PRIME-OEU Methodological Guide, pp. 223-251.

Sánchez, P., Elena, S. and Castrillo, R. (2009), "Intellectual capital dynamics in universities: a reporting model", *Journal of Intellectual Capital*, Vol. 10 No. 2, pp. 307-324.

Santos-Vijande, M.L., López-Sánchez, J.Á. and González-Mieres, C. (2012), "Organizational learning, innovation, and performance in KIBS", *Journal of Management & Organization*, Vol. 18 No. 6, pp. 870-904.

Seaman, J. and Tinti-Kane, H. (2013), "Social media for teaching and learning", available at: www.pearsonlearningsolutions.com/assets/downloads/reports/social-media-for-teaching-and-learning-2013-report.pdf (accessed 3 October 2015).

Secundo, G., Margheritam, A., Elia, G. and Passiante, G. (2010), "Intangible assets in higher education and research: mission, performance or both?", *Journal of Intellectual Capital*, Vol. 11 No. 2, pp. 140-157.

Sharkie, R. (2003), "Knowledge creation and its place in the development of sustainable competitive advantage", *Journal of Knowledge Management*, Vol. 7 No. 1, pp. 20-31.

Shu, C., Page, A.L., Gao, S. and Jiang, X. (2012), "Managerial ties and firm innovation: is knowledge creation a missing link?", *Journal of Product Innovation Management*, Vol. 29 No. 1, pp. 125-143.

Skandia (1996), "Supplement to the annual report", *Customer Value*, Government of Canada publications, Stockholm.

Sornlertlamvanich, V. (2005), "Managing knowledge workers", *Knowledge Management System*, available at: https://c94802e54cc924512ac741b2dd7ce153f56d021c.googledrive.com/host/0B2REGbqyuOJNaTFQS3IzcDNlSlk/lecture/kms/kms-ch12.pdf (accessed 25 September 2015).

Soto-Acosta, P., Colomo-Palacios, R. and Popa, S. (2014), "Web knowledge sharing and its effect on innovation: an empirical investigation in SMEs", *Knowledge Management Research & Practice*, Vol. 12 No. 1, pp. 103-113.

Soto-Acosta, P., Popa, S. and Palacios-Marqués, D. (2015), "E-business, organizational innovation and firm performance in manufacturing SMEs: an empirical study in Spain", *Technological and Economic Development of Economy*, available at: http://dx.doi.org/10.3846/20294913.2015.1074126 (accessed 29 September 2015).

Stewart, T. (1997), "Intellectual capital", *The New Wealth of Organizations*, Nicholas Brealey Publishing, London.

Sullivan, P.H. (1999), "Profiting from intellectual capital", *Journal of Knowledge Management*, Vol. 3 No. 2, pp. 132-143.

Sumedrea, S. (2013), "Intellectual capital and firm performance: a dynamic relationship in crisis time", *Procedia Economics and Finance*, Vol. 6 No. 1, pp. 137-144.

Sveiby, K.E. (1997), *The New Organisational Wealth*, Berett-Koehler, San Francisco.

Swain, D.E. and Booto Ekionea, J.P. (2008), "A framework for developing and aligning a knowledge management strategy", *Journal of Information & Knowledge Management*, Vol. 7 No. 2, pp. 113-122.

Swan, J., Newell, S., Scarbrough, H. and Hislop, D. (1999), "Knowledge management and innovation: networks and networking", *Journal of Knowledge Management*, Vol. 3 No. 4, pp. 262-275.

Tseng, K.A., Lin, V.I. and Yen, S.W. (2015), "Contingencies of intellectual capitals and financial capital on value creation", *Journal of Intellectual Capital*, Vol. 16 No. 1, pp. 156-173.

Tzortzaki, A.M. and Mihiotis, A. (2014), "A review of knowledge management theory and future directions", *Knowledge and Process Management*, Vol. 21 No. 1, pp. 29-41.

Uzzi, B. and Lancaster, R. (2003), "Relational embeddedness and learning: the case of bank loan managers and their clients", *Management Science*, Vol. 49 No. 4, pp. 383-399.

Valkokari, K., Paasi, J. and Rantala, T. (2012), "Managing knowledge within networked innovation", *Knowledge Management Research & Practice*, Vol. 10 No. 1, pp. 27-40.

Vătămănescu, E.M. and Cicei, C.C. (2010), "The specificity of the experiential learning process in virtual communities: a Romanian case study", *Proceedings of ICERI2010 Conference*, IATED Digital Library, Madrid, pp. 2843-2849.

Vătămănescu, E.M., Andrei, A.G., Leovaridis, C. and Dumitriu, L.D. (2015), "Exploring network-based intellectual capital as a competitive advantage. an insight into European universities from developing economies", in Cegarra Navarro, J.G. (Ed.), *Proceedings of The 7th European Conference on Intellectual Capital ECIC 2015*, Academic Conferences and Publishing International Limited, Reading, MA, pp. 350-358.

Veltri, S. and Silvestri, A. (2015), "The free state university integrated reporting: a critical consideration", *Journal of Intellectual Capital*, Vol. 16 No. 2, pp. 443-462.

Wang, X. (2013), "Forming mechanisms and structures of a knowledge transfer network: theoretical and simulation research", *Journal of Knowledge Management*, Vol. 17 No. 2, pp. 278-289.

Wang, Z., Wang, N. and Liang, H. (2014), "Knowledge sharing, intellectual capital and firm performance", *Management Decision*, Vol. 52 No. 2, pp. 230-258.

Webb, C. (2008), "Measuring social capital and knowledge networks", *Journal of Knowledge Management*, Vol. 12 No. 5, pp. 65-78.

Welch, J. (2005), *Winning*, Harper Collins Publishers, New York, NY.

Westaby, J.D. (2012), *Dynamic Network Theory: How Social Networks Influence Goal Pursuit*, American Psychological Association, Washington, DC.

Wu, H.Y., Chen, J.K. and Chen, I.S. (2012), "Ways to promote valuable innovation: intellectual capital assessment for higher education system", *Quality & Quantity*, Vol. 46 No. 5, pp. 1377-1391.

Yi, M.Y. and Davis, F.D. (2003), "Developing and validating an observational learning model of computer software training and skill acquisition", *Information Systems Research*, Vol. 14 No. 2, pp. 146-169.

Zwell, M. (2000), *Creating a Culture of Competence*, John Wiley, New York, NY.

Further reading

Szulanski, G. (1996), "Exploring internal stickiness: impediments to the transfer of best practice within the firm", *Strategic Management Journal*, Vol. 17, pp. 27-43.

About the authors

Elena-Mădălina Vătămănescu is Lecturer, PhD, at the Faculty of Management, SNSPA, Bucharest, Romania. At present, she is Deputy Head of the Research Center in Management and Leadership and Post-doctoral Researcher in Communication Sciences. She is Associate Editor of the *International Journal of Interdisciplinary Social Sciences*, Editorial Assistant of the *Journal of Management Dynamics in the Knowledge Economy* and Reviewer for the *International Business Review*. Her main research interests are: organizational theory, knowledge management, intellectual capital, organizational diagnosis, etc. Elena-Mădălina Vătămănescu is the corresponding author and can be contacted at: madalina.vatamanescu@yahoo.com

Andreia Gabriela Andrei is Researcher, PhD, at "Alexandru Ioan Cuza" University of Iasi, Romania. Her main research interests are: branding, marketing, communication strategies and campaigns, and structural equation modeling.

Diana-Luiza Dumitriu is Assistant Professor, PhD, at the Faculty of Communication and Public Relations, SNSPA, Bucharest, Romania. Her main research interests are: sports, marketing, social media and branding.

Cristina Leovaridis is Lecturer, PhD, at the Faculty of Communication and Public Relations, SNSPA, Bucharest, Romania. Her main research interests are: intellectual capital, innovation, corporate culture and knowledge-based organizations.