

20th International Scientific Conference Economics and Management - 2015 (ICEM-2015)

Open Innovation, Knowledge Flows and Intellectual Capital

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Abstract

This study aims to discuss the link between open innovation, knowledge flows and intellectual capital. As far as the concept of open innovation is based on the knowledge in- and outflows across organizational boundaries, it makes influence on company's knowledge stock and has positive or negative impact on its intangible resource portfolio. The main issue addressed within this study is what influence open innovation makes on company's intellectual capital from the resource management point of view. The essence and the nature of open innovation are discussed first and foremost. Knowledge flow as the intermediary factor between open innovation and intellectual capital is presented afterwards. Intellectual capital construct is introduced from the resource based management theory point of view with a focus on strategic management. The link between open innovation and intellectual capital is analysed by discussing intellectual capital structure and distinguishing relevant components within it.

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Peer-review under responsibility of Kaunas University of Technology, School of Economics and Business

Keywords: Open innovation; Knowledge stock; Knowledge flows; Intellectual capital.

Introduction

Recently growing attention has been devoted to open innovation (further OI) and its successful management. The central idea behind OI is that in a world of widely distributed knowledge and intellectual resource enterprises cannot rely entirely on their own research, but should instead incorporate external knowledge, processes, inventions and contributors into joint research and development processes and leverage such connections. In addition, internal inventions not being used in a firm's business should be externalized via selling or licensing intellectual property, joint ventures or spin-offs (Chesbrough, 2003).

Since the introduction of open innovation concept by Chesbrough (2003) a lot of academic studies has been done

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in the field. However, despite the considerable amount of research, more rigorous academic studies on theoretical foundation of OI are still required (Lichtenthaler, 2011).

To date, there are very few research on the links between OI and other related management paradigms, such as knowledge management, performance measurement, business model innovation, etc. The research of such links deserves attention as expanding fundamentals of management research, bringing synergy to corporate management solutions and opening up new relevant issues for discussion. However, empirical studies providing fast tangible results based on the “learning by doing” as well as recommendations focused on the instant decision making are increasingly dominant so far (Rohrbeck et al., 2009; Harison & Koski, 2010; Bigliardi & Dormio, 2012).

Intellectual capital (further IC) theory is considered to be one of the theories of knowledge economy determined by transformation of importance of tangible resource towards intangible. It deals with challenges of strategic management and has close connections with organizational innovation (Kohl, et al., 2014). The relevance of the link between IC, innovation capabilities and OI is observed in various contexts (Fan & Lee, 2009; Laine & Laine, 2012; Gonzalez-Loureiro & Figueroa Dorrego, 2012; Kohl, et al., 2014). IC theory counts the third decade already and it is not surprising that the subsequent paradigms make influence on it. However, comprehensive research on the impact of OI on IC theory can not be found.

The question is what influence do the knowledge flows arising from the OI make on company’s knowledge stock and thereby on the portfolio of intangible resource? Which intangible resource is effected the most? What IC management challenges arise under this influence? Does expansion of the processes of organizational innovation across organizational boundaries make influence on intangible resource in general?

The main purpose of this contribution is to discuss the link between open innovation, knowledge flows and intellectual capital by highlighting the influence emerging OI paradigm takes on company’s intellectual capital (IC) from the resource management point of view. The constructs of OI and IC as well as the nature of the knowledge flows are discussed first of all within the study. OI influence on company’s intellectual capital is analysed discussing IC structure and distinguishing relevant components within it. The link between open innovation, knowledge flows and intellectual capital is being examined in the context of the opening up of organizational boundaries and focusing on IC management issues.

1. Conceptual background

1.1. Open innovation and knowledge flows

Nowadays companies are increasingly rethinking the ways in which they generate ideas and bring them to the market. This leads them to the harnessing external ideas and leveraging their in-house R&D outside their current operations to a greater extent (Chesbrough, 2003). The boundaries between companies and their surrounding environment become porous, enabling innovation to move easily through them. Companies take advantage of different internal and external knowledge sources for innovation opportunities, integrate them with their capabilities and resources, and exploit these opportunities through multiple channels, such as IP licensing, joint ventures, spin-offs and similar. According to the initiator of OI paradigm H.W. Chesbrough (2006), open innovation is defined as “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively”.

Openness is a key characteristic of OI paradigm, referring to the porousness of corporate boundaries and knowledge flows across them. It does not refer to all information company has about its innovation, but the voluntary exchange of knowledge to some extent in order to increase productivity and make more profit. However, in practice such openness can increase or decrease company’s opportunities to achieve potential benefits (Chesbrough, 2006).

Laine & Laine (2012) claim that important role in OI paradigm belongs to different knowledge sources. The inflows of knowledge in the OI framework can stem from multiple sources, such as suppliers, universities, end-users and competitors. These knowledge inflows positively contribute to the knowledge stock of the company by means of organizational learning. Consequently, the increased knowledge stock can accelerate company’s innovations through new knowledge combinations. While the outflows of knowledge, such as licensing some of company’s technology, do not diminish company’s knowledge, but rather helps to economize on it through established contracts.

According to Fan & Lee (2009), inter-organizational knowledge flows is an important factor for organizational innovation and new knowledge creation. Appropriate management of inter-organizational knowledge flows increases company's innovation capabilities what in turn increases its competitive advantage. An important role here belongs to knowledge management responsible for generation, implementation and exploitation of organizational innovation (Egbu, et al., 2001) as well as inter-organizational relationships as a cause of organizational ability to learn and innovate (Fan & Lee, 2009).

Open innovation possess new challenges that need to be met by companies in the globalised business environment. Selection of the most appropriate OI based business strategy, OI-related risk management, maximization of benefits from opening up innovation processes by balancing between inflows and outflows of knowledge are among the most frequently mentioned in OI literature.

Waiyawuththanapoom, et al. (2013) identifies the key internal and external factors that are crucial for OI implementation. Appropriate knowledge management, strategic management and change management are among the most important internal factors determining success of OI. While organizational culture, flexibility, innovativeness, outward focus and reflexivity are essential internal dimensions in the implementation process. When it comes to the external factors, authors identify relevant IP characteristics, appropriate external networks and environmental moderators, such as technological turbulence, transaction rate and competitive intensity, as the most important.

1.2. Intellectual capital as a factor influenced by open innovation

Dozens of definitions of IC can be found within IC literature since the start of IC theory development in 1991 when T. Stewart used this term in the popular press. Some of them define IC as a unique bundle of intangible assets that are the basis of sustainable competitive advantage (Andriessen, 2004), or more precisely as the nonmonetary and nonphysical resource that is fully or partly controlled by the organization and contribute to the organization's value creation (Roos, et al., 2005). However, this contribution is based on the definition proposed by Edvinsson & Malone (1997) which is the first and the most common in IC literature. Based on it, IC is a sum of useful knowledge that can be converted into value.

There are many different classifications of IC proposed in IC literature. In his latest book Viedma, et al. (2012) compares more than twelve of the most important. However, the most common among the authors is to divide IC into three categories as follows: (1) human capital; (2) structural capital; and (3) relational capital. Human capital refers to such factors as employees' skills, competencies, experience, education, motivation, and the like. It is a foundation of IC not owned by organization, but controlled by the individuals working for the organization. Structural capital comprises internal processes, infrastructures, information systems, culture, routines, and procedures that enables human capital function and be productive. It is fully owned and controlled by the organization. While the relation capital refers to the knowledge embedded in the relationships with customers, strategic partners, suppliers, distributors, investors, public bodies and other stakeholders that influences the organization's life. It is not owned or controlled by the organization. At the best it can only be influenced by it.

Each category of IC represents different phenomena of the ownership, behaviour and control. In general, IC has nonlinear return to scale, does not exhibit diminishing return behaviours, and is not necessarily owned or controlled by the organization (Roos, et al., 2005). Two additional important points must be noted while speaking on the value creation based on IC. The first one is that the value does not arise directly from any form of IC, but only from the interactions between all of them (Edvinsson & Malone, 1997). A certain configuration of intangibles used in a certain way in particular context creates value added. Consequently, the second point is that strategy plays an important role while speaking on the management of intangibles.

A clear relationship exist between IC and organizational innovation (Fan & Lee, 2009; Gonzalez-Loureiro & Figueroa Dorrego, 2012; Kohl, et al., 2014; Chen, et al., 2015). In most academic research IC is treated as an input to innovation determining higher innovativeness and innovation performance. Higher innovation productivity in turn leads to the increased competitive advantage and higher corporate value created. However, existence of the opposite impact direction can also be considered, claiming that the higher degree of innovativeness through the creation of new knowledge and novel beneficial combinations of intangibles opens up possibilities to increase the level of IC.

So, based on a widespread treatment of IC as a bundle of organizational knowledge, and taking into account increasing knowledge flows across organizational boundaries caused by OI paradigm, the question arises, what influence OI makes on organizational IC against such background. Does openness of organizational innovation affect only the stock of IC? Or there is a need to revise basic principles of the measurement and management of IC as well? Or perhaps there is a need for even more radical adjustments and solutions looking at the perspective of IC theory?

2. Explaining the link between open innovation, knowledge flows and intellectual capital

As far as the essence of OI paradigm is based on the knowledge flows across organizational boundaries, the link between OI and knowledge flows is encoded in OI definition by itself. IC refers to the bundle of knowledge organization has inside, may use with the permission or control through the individuals working for the organization. Consequently, if the traffic of knowledge flows across organizational boundaries increases and the content of knowledge possessed by the organization changes, this leads to the consideration that openness of innovation makes influence on IC, while the knowledge flows perform the role of intermediate factor here.

Looking at IC from the resource based management point of view, it becomes clear that the boundaries of IC as the internal organizational resource along with the boundaries of innovation process get blurred and difficult to control. This leads to the conclusion that treatment of IC based on the internal dimensions mainly is no longer appropriate for OI practice.

When analysing the structure of IC, it turns out that OI has different effects on different forms of intangibles. Thinking in IC categories, OI especially affects relational capital. Relational capital along with knowledge management are the key drivers of organizational innovation (Fan & Lee, 2009). Under the influence of OI, due to the new partnerships established relational capital tends to expand and becomes more diverse. Consequently, such expansion requires monitoring and management.

As a result of increased inter-organizational knowledge flows, the landscape of human capital changes substantially as well. Knowledge borrowing and lending dimensions were relevant before the emergence of OI (Roos, et al., 2005). However, under OI practice their relevance increases even more. It becomes difficult to assess which part of human capital is used exceptionally for the organizational purposes and which contributes to the welfare of partners as well. Consequently, the assessment of return on investments in human capital becomes complicated even more than before OI, when it was challenging enough.

Observing the behaviour of structural capital under the influence of OI, it can be seen that organizational value creation schemes go beyond organizational boundaries and acquire matrix form. Some of the internal systems and mechanisms deliver value for partners instead of (or along to) the organization. And in contrary, the organization gets access of the systems shared by partners and take advantage of them in joint value creation process.

From IC measurement point of view, indicators that take into account migration of knowledge across organizational boundaries become required. However, due to the problems of poor controllability of resource, collection of information for such indicators looks to be complicated. And this in turn leads to IC auditing difficulties determined by the spread of intangibles across organizational boundaries.

The management of IC is also affected as becomes more complex. As far as the resource becomes less controlled, the risk associated with its management increases. On the other hand, OI solutions provide new space and alternatives for strategic management of IC and development of IC strategies in particular. And, it should also be mentioned that as far as IP is an important component of IC which plays a special role in OI processes as well, OI paradigm brings new challenges for IP management as well.

Whereas certain management functions such as auditing of resource, performance measurement and assessment of return on investments become more complicated in OI practice, until the appropriate management solutions are suggested, the monitoring of organizational value creation focused on particular projects, products or activities instead of the complex system of resource can be recommended.

Based on the discussion above, it can be argued that the emerging OI paradigm causes a set challenges related to identification, auditing, measurement and management of IC. Discussion of the links between OI, knowledge flows and IC started within this contribution is intended to draw attention to the fact, that such links exist and require

attention. It is expected that in the near future more in-depth theoretical and empirical research on these links will be carried out and required solutions will be suggested.

Conclusions

Knowledge flows in the OI framework either positively contribute to the knowledge stock, or erode competitive positioning of the company, thus influencing IC management effectiveness. Until today IC management has been focussing mostly on a single company and internal knowledge processes. However, the emergence of OI paradigm opens up company's boundaries and brings new challenges that have to be investigated.

This contribution assesses potentially necessary development of IC theory considering the state of practice in the field with regards to the challenges posed by OI. Especially small and medium sized companies are affected by this issue. Being highly vulnerable to knowledge loss in general, they might also profit the most from the paradigm shift initiated by H.W. Chesbrough. Companies need decision making support about chances and risks related to knowledge flows when applying OI. Therefore understanding of the relevance of particular intangible resource in OI processes and their impact on the company's innovation performance is important.

The study demonstrates that the emerging OI paradigm poses a set of challenges related to identification, auditing, measurement and management of IC. OI makes different influence on different categories of IC. The most active role among the interactions of OI and IC probably goes to relational capital, while the knowledge flows perform the role of intermediator here.

It is obvious that organizational boundaries under the influence of OI becomes blurred and porous. In fact, this management transformation takes place continuously since the era of Henry Ford. Increasing networking of organizations, operational specialization, customer involvement in product creation, all these tendencies belong to the same transformation towards globalised business environment. While the OI paradigm just makes it even more intensive and brings new colours of innovation.

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