

The ecology of innovation and the role of Strategic Design

A ecologia da inovação e o papel do Design Estratégico

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Abstract

In the competitive global market, innovation is not only a condition to differentiation, but to survival. Creating continuous innovations, however, is a challenge, and requires a structuring process and a supportive ecosystem, capable of integrating innovation from the firm's strategy to the commercialization of solutions in the market. In this way, Strategic Design offers a path to orchestrate the tangible and intangible elements that are necessary to support innovation – whether incremental or radical. This article discusses the ecology of innovation and the central role of Strategic Design in this process.

Key words: ecology of innovation, innovation culture, strategic design.

Resumo

Inovação não é apenas uma condição para diferenciação no competitivo mercado global, mas para sobrevivência. Criar inovações continuamente, entretanto, é um desafio, e requer um processo estruturante e um ecossistema de apoio, capaz de integrar inovação da estratégia da empresa à comercialização das soluções no mercado. Neste sentido, o Design Estratégico oferece um caminho para orquestrar os elementos tangíveis e intangíveis necessários para apoiar a inovação – quer incremental ou radical. Este artigo discute a ecologia da inovação e o papel central do Design Estratégico neste processo.

Palavras-chave: ecologia da inovação, cultura de inovação, design estratégico.

Introduction

Innovation has become the foundation stone of successful companies all over the world (Fasnacht, 2009; P&G, 2007). Barrett and Sexton (2006) propose that innovation is an end and a path to achieve sustainable competitive advantage. But in the endless search for growth, increase of profit and customer loyalty, firms have developed new technologies, products, processes, contents, services and means of presentation that are often times poorly successful. In this way, despite the fact that innovation is a condition for differentiation and survival in the competitive global market, investments on it do not always bring the expected results. For instance, in the last decade, the number of new products introduced to the consumer in the American market grew from 7% to 32,000 a year, according to Productscan Online research (Kandybin and Kihn, 2004), while sales

only increased 3%. Therefore, the route to profitable innovation, although pursued by many, is not known to all. In fact, several aspirants take an unstructured and fragmented journey towards innovation, far from the understanding of the real needs of the users for whom these products are meant.

In 2005, BusinessWeek published a special report about innovative companies, celebrating the emergence of a creative economy, where executives started discovering both Strategic Design and design thinking (Brown, 2009; Martin, 2009), and their potential role in structuring the innovation process. A central aspect of these firms is the presence of an innovation culture, forming an ecosystem based on multidisciplinary collaboration, amongst other interrelated elements, such as a cyber infrastructure and spaces for experimentation and tinkering (Moura *et al.*, 2009). Schull (2006) emphasizes that innovation and creativity have collaboration as their essence, and that

they agonize without it. Rigby *et al.* (2009) highlight that a both-brain leadership, combining the right hemisphere, with its creative abilities, and the left hemisphere, with its business management capacity, gives companies the best chance to succeed in the market. And the use of hybrid company structures, combining bottom-up and top-down business strategies, in contrast to those uniquely hierarchic or those completely open and unstructured, for instance, favors the success of innovative solutions (Coffman, 2007). This article discusses the ecology of innovation and the central role of Strategic Design in this process.

Defining Innovation

By definition, innovation is connected to change – whether incremental, radical or revolutionary – in concepts, products, processes, interfaces, systems, organizations or human experience. According to Rogers (1998, p. 2), “Innovation is the process of introducing new ideas to the firm, which result in increased firm performance.” The Oslo Manual (OECD, 2005) defines innovation as the implementation of a new, or significantly improved product (good or service), process, marketing approach, or organizational method in business practices, workplace organization or external relations. Its view of innovation on a systemic level highlights both the importance of the transfer and the diffusion of ideas, abilities, knowledge, information, and messages of various types. Strategic Design (Ainamo, 2008; Eckersley, 2003) includes that it should, also, add significant new value to users and bring sustainable profit to the firm in order to be considered innovation.

Joseph Schumpeter is often thought as the first economist to draw on the importance of innovation (Schumpeter, 1930). In 1939, he defined five types of innovation: (a) introduction of a new product or a qualitative change in an existing product, (b) process innovation that is new to an industry, (c) opening of a new market, (d) development of new sources of supply for raw materials or other inputs, and (e) changes in industrial organization. The Doblin Group (2007), in contrast, presents ten types of innovation, organized into four categories: (a) Finance, (b) Process, (c) Offerings, and (d) Delivery. These are: (a.1) Business Model, (a.2) Networks and Alliances; (b.1) Enabling Process, (b.2) Core Process; (c.1)

Product Performance, (c.2) Product System, (c.3) Service; and (d.1) Channel, (d.2) Brand, (d.3) Customer Experience.

Palmer e Kaplan (2007) compare intentional innovation to those that occur by chance, and disruptive or radical innovation to those that are incremental (Figure 1), affirming that several organizations rely on serendipitous acts of creativity to foster innovation, using unstructured approaches that often result only in incremental improvements with poor implementation and lack of sponsorship in the firm. Strategic innovation, in comparison, point the authors, offers a structured and systematic model, as well as a repeatable process, that can help firms to innovate continuously and deliberately, focusing on disruptive innovation. Strategic Design of Innovation (Moura, 2010a, 2010b) brings design thinking (Brown, 2009; Martin, 2009) to the innovation process, making it more human-centered and responsive to real world needs – whether articulated or latent – by drawing closer the universes of companies and users, while also considering market opportunities.

Judy Estrin (2008) adds the orthogonal innovation next to incremental and disruptive ones – referring to innovative solutions formed through the combination of existing innovations that are used for entirely new purposes. Additionally, Chesbrough (2003) distinguishes two other types of innovation, making reference to the innovation management model, which can be open or closed. Open innovation refers to an open flow of resources between the firm and the market, where, on a world of distributed information, the companies resources are applied both internally and externally, as in the acquisition of patents from other firms, or, for instance, the license to others of internal inventions that are not used by the firm businesses. In contrast, closed innovation refers to the process of limiting the firm’s knowledge to internal use, and not making use, or making limited use only, of the exterior knowledge.

The Ecology of Innovation

Innovation is not an isolated activity in a firm, and exists within an ecosystem involving and interrelating tangible and intangible elements, that are internal and external to the company, including (Figure 2): (a) internal

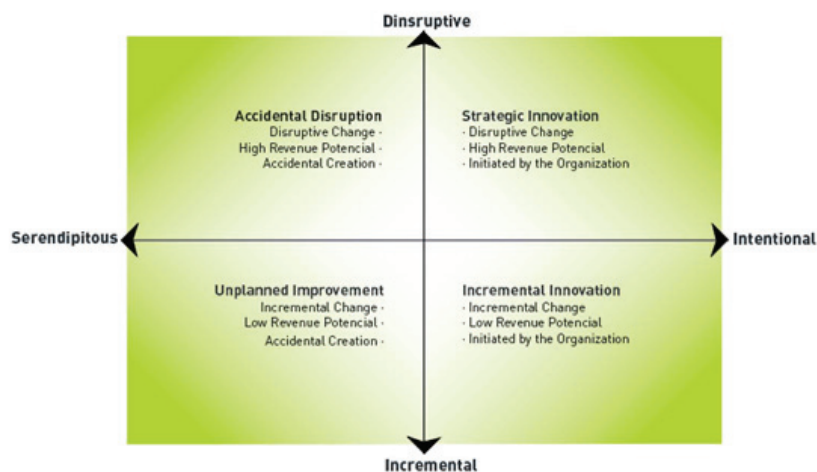


Figure 1. Types of Innovation.

resources, (a.1) human resources (people, knowledge, information, abilities, competencies and mental models – or thought processes regarding how things work in the world), (a.2) material and technological resources (physical spaces, artifacts, production materials, media channels, tools and technological infrastructure), (a.3) cultural resources (cultures, subcultures, values, meanings, interpersonal relations and maturity for innovation), (a.4) strategic resources (objectives, organizational structures, strategies, processes and competitive advantage, amongst others), and (a.5) financial resources (income, expenditure, cash flow, profit, loss, reserves, debt, investment and so forth); (b) external forces, (b.1) industry forces, (b.2) market forces, (b.3) macroeconomic forces, and (b.4) relevant trends (such as regulatory, technological, socio cultural and economic); and (c) articulators, (c.1) actions, (c.2) interactions, and (c.3) verbal, non-verbal, direct, mediated, indirect or quasi-direct communications. This ecosystem interacts with those ecosystems of clients and partners, producing, as a result, for instance, new products and innovative services.

Ecosystems are ecological communities and their environments interacting with one another, forming complex groups of relations amongst its elements – living or inanimate – which work as a unity. Milbergs and Vonortas (2005) propose that an innovation ecosystem includes more than knowledge inputs, embracing all relevant factors and actors that are necessary to create value to clients. A highly evolved innovation ecosystem allows its participants to: work beyond the limits of the firm, focus on creating value to clients, give fast response to market demand changes, speed the transition between research and production, and quickly adapt to changes in general. Innovation ecosystems, affirm the authors, build competitive advantage – a strategic resource for growth and profit that remains for many years to come.

Aulet (2008), director of the *MIT Entrepreneurship Center*, identifies seven components of the innovation ecosystem: (a) culture – entrepreneurial spirit, visible role models, high esteem for risk taking, failure as part of the learning process in business, high level

of ambition, encouragement of young people to be global entrepreneurs instead of accommodating to safe prestigious positions in large companies; (b) entrepreneurship – education, entrepreneurial skills, business contacts, knowledge networks and network building capacity; (c) infrastructure – physical and services; (d) funding – debt, equity, full range of options; (e) invention – universities, corporate Research & Development, open innovation; (f) demand – economy, big companies and other companies; and (g) government – regulations, laws (such as bankruptcy), taxes and incentives. In contrast, Bloom and Dees (2008) divide the innovation ecosystem into two main categories – artificially distinguished, since one usually affects the other: (a) actors, and (b) environmental conditions. The first includes individuals and organizations; and the second includes norms, regulations and markets, which, potentially, can influence the ability to create or sustain the impact intended by the organization. Smith (2006) highlights three main components of an innovation ecosystem: process, culture and competencies. And Ghemawat (2007) points three critical components of the innovation ecosystem: resources, competencies and connectivity. Mohan (2007), exemplifying his firm's actions to support the innovation ecosystem, places emphasis on the inclusion of: a extreme Blue Ocean view, process acceleration, speed teams, information sharing networks, mentoring networks, innovation days, experimentation spaces, client information centers or briefing centers, solution development labs by industry, patent cafes and business value institute.

Meyer (1998) suggests an ecosystem where innovation metrics stay in the middle of a relationship network amongst: (i) leadership and management, (ii) strategic alignment, (iii) innovation process and (iv) organization and individuals. According to the author, innovation leaders both offer a fertile soil for new ideas and take the necessary critical decisions to make them happen – such as project selection, resource allocation, technology strategy development, and risk management. Therefore, fast and effective innovation is the result of a

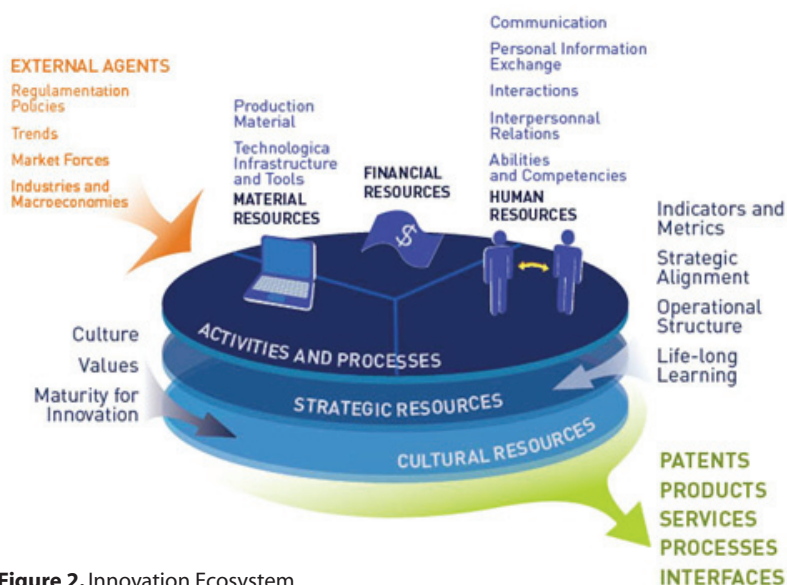


Figure 2. Innovation Ecosystem.

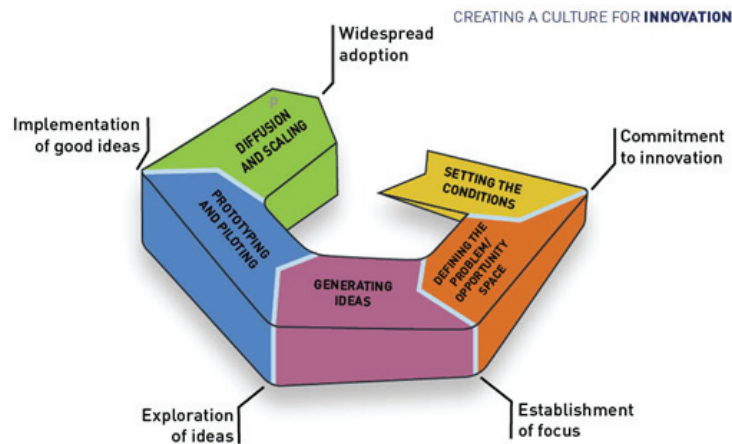


Figure 3. Adapted from Kellogg Innovation Framework (W.K. Kellogg Foundation, 2008, p. 12).

certain type of leadership that is, at the same time, loose and tight, where creativity is balanced with selection of alternatives based on criteria. And strategic alignment is the result of a process of defining, assessing and connecting innovation alternatives to the firm's strategy and operational processes. Through the use of a portfolio based approach, Meyer proposes that it becomes possible to evaluate and reduce risk in relation to market requirements, competitors' actions and internal executing capacity of the firm.

Regarding the innovation process itself, according to Meyer, it is responsible for the definition of key roles, responsibilities, team formation, workflow infrastructure, and tools for effective execution. Beginning with research and ideation, the innovation process goes beyond the solution release to the market. In relation to people and organization, the fourth item of the ecosystem, the author affirms that only individuals can create and execute the necessary ideas for innovation to be successful, and that the way to cultivate and utilize individual differences frequently determines the result. Consequently, without flexible organization structures and clearly defined roles, good ideas can easily be left behind or meet difficulties on their execution. That is why innovation metrics should provide guidance and system feedback: without them it is not possible to identify problems and correct the course on a timely and efficient manner.

Finally, Estrin (2008) describes a sustainable innovation ecosystem that includes variables organized in two levels: (a) nuclei – research, development and application; and (b) influence forces – culture, education, policies, financing, and leadership. According to Yoon and Tello (2009, p. 88), sustainable innovation can be defined as “the development of new products, processes, services and technologies that contribute to the development and well being of human needs and institutions while respecting the worlds' natural resources and regenerative capacity.” To Hautamäki (2010), sustainable innovation refers to activities that are based on ethically, socially, economically and environmentally sustainable principles, such as: sustainable development, participatory innovation, continuous innovation, global innovation and innovative management. And in accordance with Charter

and Clark (2007), it is a process where considerations regarding sustainability – environmental, social and financial – are integrated into the firm systems, since idea generation, through research and development, until commercialization – applying to new products, services and technologies, as well as business models and forms of organization. In this way, as with the generic definition of innovation, it is recognized that sustainable innovation is not simply related to new concepts, but also to: commercialization of technologies, products and services; entrepreneurship; and adoption of new processes and systems by society. Consequently, a sustainable innovation ecosystem does not only create the conditions for innovation to occur on a structured and continuous way, but also guarantees the social, environmental and financial sustainability of the proposed innovations – from idea generation to innovative solution commercialization.

Competences for Innovation and the Role of Strategic Design

Innovation is a multifunctional capacity that requires several types of competences. In reality, successful innovations are the result of the expression of a well organized value chain. Instead of creating the ability to simply give response to change, the innovation capacity generates a type of change that, at the same time, allows the organization to adapt to the world around it and to influence this world to adapt itself. The innovation capacity does not function as a neutralizer of changes, but a propeller of changes. And it can be considered a natural capacity as well, since all individuals are innovative by nature. Within organizations, such capacity can be developed through practice and by encouragement of abilities in individuals over time, such as those proposed by Moura and Adler (2010), including innovation strategies, integrative thinking (Martin, 2009), user empathy and analysis skills, amongst others.

Considering the development of competencies for innovation, W.K. Kellogg Foundation (2008) proposes an innovation framework that represents what means to innovate, and introduces the fundamental elements that it considers necessary for well-succeeded innovations

to occur, within a pattern of: thinking, doing, improving and diffusing. Such framework (Figure 3) includes five stages contained within innovation culture: (a) creation of the necessary conditions to support innovation, (b) identification of the problems or opportunities for innovation, (c) generation of ideas to solve the problems or capture the opportunities, (d) experimentation and piloting of ideas in order to test how well they work in practice, and (e) sharing of the innovations with a larger range of actors.

According to Kandybin and Kihn (2004), the ability to innovate requires the presence of four groups of skills: ideation, project selection, development and commercialization. Innovation frameworks such as those do not include the understanding of the real needs of people to whom the solutions are being developed. In this regard, the Strategic Cycle for Design and Management of Innovation (Moura, 2010a, 2010b) – based on Strategic Design and design thinking (Brown, 2009) – proposes a structured model, focused on co-creation, in order to include users and clients inside the whole innovation process, and make sure that the result meets both articulated and non-articulated human needs and market opportunities. In summary, the referred cycle suggests additional activities and supporting abilities for innovation, including: strategic orientation, project framing, ethnographic immersion in the context of users, market research of systemic global issues and local trends, analysis and synthesis of qualitative and quantitative data, collaborative ideation, fast iterative prototyping, solution development supported by Agile methods, integrated marketing and commercialization of the solution, continuous monitoring of the results and adaptation of the solution, and management of innovation.

And in order to develop competencies for innovation within firms, the authors suggest starting with the definition of the corporation strategic intent and offering design thinking workshops to staff members, besides other actions. Strategic design, consequently, has a central role in the structuring of the innovation process, and should be adopted by companies that seek to innovate systematically. Its growing importance is seen in large corporations such as Procter & Gamble, where it started replacing Strategic Planning, and in renowned education institutions such as Toronto University, Rotman School of Management and Northwestern University, Kellogg School of Management, where it started being included in core disciplines of MBA curricula.

Conclusion

The acknowledgement of the importance of innovation by firms within every industrial sector has grown worldwide. But although investments on innovation have increased significantly, they did not always bring the desired results, since the strategy and process of innovation of several companies are still unstructured and fragmented, or based on serendipity. Additionally, they are frequently distant from the understanding of the real needs of users to whom the products or services are being developed, bringing, as a result, solutions to market that are destined to fail and to waste valuable financial

resources. In this context, the creation of an ecosystem for innovation, centered on the firm's strategic view or intent, and permeated by an innovation culture, can bring positive market differentiation, as well as competitive advantage. In the same way, it can help orchestrate the tangible and intangible elements that are necessary to support innovation – whether incremental or radical. In this process, Strategic Design holds a fundamental role in the structuring and systematization of the innovation process and in the supporting of all its steps, connecting unarticulated human needs to solutions that, at the same time, can add value to users and bring profit to the firm in a sustainable way – environmentally, socially, economically, and institutionally.

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References

- AINAMO, A. 2008. Strategic Design and Innovation Rules of the Game: Pathways to Success. In: INTERNATIONAL DMI EDUCATION CONFERENCE, Paris, 2008. *Proceedings...* Paris. Available at: <http://www.dmi.org/dmi/html/conference/academic08/papers/Ainamo/dmiSTRADI20080328.pdf>. Access on: 02/15/2010.
- AULET B. 2008. How to build a successful innovation ecosystem. *Xconomy*. Available at: <http://www.xconomy.com/national/2008/10/14/how-to-build-a-successful-innovation-ecosystem-educate-network-and-celebrate/3/>. Access on: 02/15/2010.
- BARRETT, P.S.; SEXTON, M.G. 2006. Innovation in Small, Project Based Construction Firms. *British Journal of Management*, **17**:331-346. <http://dx.doi.org/10.1111/j.1467-8551.2005.00461.x>
- BLOOM, P.; DEES, G. 2008. Cultivate your ecosystem. *Stanford Social Innovation Review*, Winter, p. 45-53. Available at: https://www.self-help.org/about-us/about-us-files/SH_SSIR_Ecosystems.pdf. Access on: 02/15/2010.
- BROWN, T. 2009. *Change by design: how design thinking transforms organizations and inspires innovation*. New York, HarperCollins Publishers, 272 p.
- BUSINESS WEEK ONLINE. 2005. Get Creative: How to Build Innovative Companies. *BusinessWeek*, Aug. 1. Available at: http://www.businessweek.com/magazine/content/05_31/b3945401.htm. Access on: 02/15/2010.
- CHARTER, M.; CLARK, T. 2007. Sustainable Innovation. *The Centre for Sustainable Design*. Available at: http://cfsd.org.uk/Sustainable%20Innovation/Sustainable_Innovation_report.pdf. Access on: 02/15/2010.
- CHESBROUGH, W. 2003. *Open innovation: The new imperative for creating and profiting from technology*. Boston, Harvard Business School Press, 272 p.

- COFFMAN, B. 2007. *Building the innovation culture: Some notes on adaptation and change in network-centric organizations*. Walnut Creek, Innovation Labs, 13 p.
- DOBLIN. 2007. Doblin Ten Types of Innovation. Available at: <http://www.doblin.com/AboutInno/innotypes.html>. Access on: 02/15/2010.
- ECKERSLEY, M. 2003. Integrated Design Strategy Management: Challenges and Opportunities. Available at: <http://www.dmi.org/dmi/html/publications/news/ebulletin/ebvmarme.pdf>. Access on: 02/15/2010.
- ESTRIN, J. 2008. *Closing the Innovation Gap*. New York, McGraw-Hill, 272 p.
- FASNAUGHT, D. 2009. *Open Innovation in the Financial Services: Growing Through Openness, Flexibility and Customer Integration The Strategic Value of Growth and Innovation*. Berlin, Springer Berlin Heidelberg, 225 p.
- GHEMAWAT, P. 2007. Managing Differences: The Central Challenge of Global Strategy. *Harvard Business Review*, **85**(3):59-68.
- HAUTAMÄK, A. 2010. Sustainable Innovation: A new age of innovation and Finland's Innovation Policy. *SITRA Reports*, 87. Available at: http://sustainableinnovation.fi/sustainable_innovation_book.pdf. Access on: 02.15.2010.
- KANDYBIN, A.; KIHN, F. 2004. Raising your return on innovation investment. *Strategy + Business*, **2004**(35):01-14.
- MARTIN, R. 2009. *The design of business: Why design thinking is the next competitive advantage*. Boston, Harvard Business Press, 256 p.
- MEYER, C. 1998. Five Levers to Speed Innovation. Available at: <http://www.fastcycle.com/Articles/Five%20Levers%20to%20Speed%20Innovation.pdf>. Access on: 02/15/2010.
- MILBERGS, E.; VONORTAS, N. 2005. Innovation metrics: measurement to insight. In: NATIONAL INNOVATION INITIATIVE 21ST CENTURY INNOVATION WORKING GROUP, IBM Corporation.
- MOHAN, C. 2007. Innovation tools, systems and structures. Available at: www.almaden.ibm.com/.../mohan/Innovation_Tools_Systems_and_Structures_CII_The_India_Innovation_Summit_6-2007_Bangalore.ppt. Access on: 02/15/2010.
- MOURA, H.T. 2010a. Ciclo Estratégico de Design e Gestão da Inovação. Available at: <http://www.wikid.com.br/tag/ciclo-estrategico-do-design-de-inovacao>. Access on: 02/15/2010.
- MOURA, H.T. 2010b. Design e Gestão Estratégica da Inovação no Brasil. In: CONGRESSO BRASILEIRO DE PESQUISA E DESIGN, 9, São Paulo, 2010. *Anais...* São Paulo, p.2174-2185. Available at: <http://blogs.anhembi.br/congressodesign/anais/artigos/69534.pdf>. Access on: 02/15/2010.
- MOURA, H.T.; ADLER, I.K. 2010. Criando uma cultura de inovação em empresas de Tecnologia da Informação através do Design Estratégico. In: CONGRESSO BRASILEIRO DE PESQUISA E DESIGN, 9, São Paulo, 2010. *Anais...* São Paulo, p. 2149-2161. Available at: <http://blogs.anhembi.br/congressodesign/anais/artigos/69523.pdf>. Access on: 02/15/2010.
- MOURA, H.T.; FAHNSTROM, D.; PRYGROCKI, G.; MCLEISH, T.J. 2009. Thinkeringspace, Designing for Collaboration: Around the book and beyond. *Visible Language*, **43**(1):46-61.
- ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). Oslo Manual – The measurement of scientific and technological activities: Proposed guidelines for collecting and interpreting technological innovation data. Available at: <http://www.oecd.org/dataoecd/35/61/2367580.pdf>. Access on: 02/15/2010.
- P&G GLOBAL SUSTAINABILITY REPORT. Available at: http://www.pg.com/en_US/downloads/sustainability/reports/gsr07_Web.pdf. Access on: 02/15/2010.
- PALMER, D.; KAPLAN, S. 2007. A Framework for Strategic Innovation: Blending strategy and creative exploration to discover future business opportunities. Available at: <http://www.innovation-point.com/Strategic%20Innovation%20White%20Paper.pdf>. Access on: 02/15/2010.
- RIGBY, D.K.; GRUVER, K.; ALLEN, J. 2009. Innovation in turbulent times. *Harvard Business Review*, **87**(6):79-86.
- ROGERS, M. 1998. The definition and measurement of innovation. Available at: <http://www.melbourneinstitute.com/wp/wp1998n10.pdf>. Access on: 02/15/2010.
- SCHULL, J. 2006. Creating a collaborative ecology for innovation, invention and creativity at RIT. Available at: www.istrit.edu/~jis/landl/collective/InnovationCollective.doc.pdf. Access on: 02/15/2010.
- SCHUMPTER, J.A. 1930. Mitchell's Business Cycles. *Quarterly Journal of Economics*, **45**:150-172. <http://dx.doi.org/10.2307/1882530>
- SCHUMPTER, J.A. 1939. *Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process*. New York/London, McGraw-Hill, 385 p.
- SMITH, K.R. 2006. Building an Innovation Ecosystem: Process, culture and competencies. Available at: http://www.eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/detailmini.jsp?_nfpb=true&_ERICExtSearch_SearchValue_0=EJ743616&ERICExtSearch_SearchType_0=no&accno=EJ743616. Access on: 02/15/2010.
- W.K. KELLOG FOUNDATION. 2008. Ten key characteristics of creating a culture of innovation. Available at: http://ww2.wkcf.org/DesktopModules/WKF.00_DmaSupport/ViewDoc.aspx?LanguageID=0&CID=6&ListID=28&ItemID=5000545&fld=PDFFile. Access on: 02/15/2010.
- YOON, E.; TELLO, S. 2009. Drivers of Sustainable Innovation: Exploratory Views and Corporate Strategies. *Seoul Journal of Business*, **15**(2):85-115.

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