7th International Conference on Mass Customization and Personalization in Central Europe (MCP-CE 2016)
Mass Customization and Open Innovation
September 21-23, 2016, Novi Sad, Serbia

CLOSED VS. OPEN INNOVATIONS – LIBERALIZATION CHALLENGE

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Abstract: *The open innovation concept is one of the latest trends successfully implemented in the business process, and an example for applying of this concept can be found in global companies such as Apple, Google and IBM. The paper presents two approaches: closed and open innovation, illustrate their differences, and special focus is placed on open innovation. It also shows the classification of organizations by type of openness, and describes different topologies of business models in the ICT industry and sources of open innovation. Open innovation systems have appeared to allow greater liberalization of knowledge exchange and its more effective implementation.*

Key Words: ***Open innovation, Closed innovation, Business models in the ICT Industry, Sources of open innovation***

1. INTRODUCTION

The term "Open innovation" was introduced by professor H. Chesbrough, faculty director of the Center for Open Innovation at the University of California. The term refers to the use of both inflow and outflow of knowledge to improve internal innovation and expand the markets for external exploitation of innovation [1]. Open innovation is a paradigm that assumes that firms can and should use external and internal ideas to advance their technology. Alternatively, innovating can be done with partners by sharing risk and sharing reward, so as the boundaries between firms and in its environment become more permeable and innovations can easily transfer inward and outward.

Many companies in the world cannot afford to rely entirely on their own development but cooperate with other companies. In this sense, it is understood the systematic encouragement and exploration of a wide range of internal and external sources for innovative opportunities, the integration of this exploration with firm capabilities and resources, and the exploitation of these opportunities through multiple channels.

In recent years, the former leading industrial companies face strong competition from new companies. These new companies conduct very little or no basic research on their own, but instead get new ideas to market through different processes. Moreover, there has been a fundamental shift in the way companies generate new ideas and bringing them to the market. In the old model of closed innovation, enterprises have followed the philosophy by which successful innovation requires control, that is, companies have to generate their own ideas to be developed, and used as basis for their manufacturing, sales, distribution and service. This approach requires self-reliance. For years, the logic of closed innovation has been considered as the obvious "right way" for the adoption of new ideas to the market. Successful companies have invested more in R&D than their competitors, hiring the best and most capable. Thanks to these investments, they were able to create most of the best ideas. Of course this meant higher profits for those companies who have aggressively defended the control of intellectual property, protecting themselves from competitors. Such companies were able to reinvest profits, to strengthen R&D and thus to achieve further development of new ideas [2].

At the end of the twentieth century, a combination of factors led to the disruption of the foundations of the closed model of innovation in the US. Perhaps the main among these factors was a drastic increase in the number and mobility of knowledge workers, aggravating companies control over ownership of ideas and expertise. Another important factor was the increasing private capital available for investment in the new companies. This capital has helped to fund new companies and to commercialize ideas that have spread beyond the silos of corporate research laboratories. In this new model of open innovation, companies commercialize external as well as internal ideas, carving its way to the market. In specific situations, companies can commercialize ideas through internal channels outside of their current job, in order to generate value for the organization. Some of the ways to achieve this are Startup companies and license agreements. Startup companies can be funded and staffed by personnel from the company itself. In addition, original ideas can come from outside the company and commercialized in the company. The boundary between the company and its environment is more porous, allowing to easily spread innovation.

The prevailing logic of generation and placement of ideas has changed. New companies are in competition with leading companies as they conduct very little or no basic research, but promote ideas in a new way. The use of external sources of ideas and their alignment with internal research and development (R&D), outside current operations of the company, is the essence of open

innovation by Chesbrough. In the linear model of closed innovation (Closed Innovation - CI) full control of successful innovation is required, from generating ideas to the placement of the same (Rothwell, 1994 [5]; Chesbrough, 2003). Industry practice was to invest profits from internal R&D breakthroughs into new R&D projects (Chesbrough, 2003). Internal R&D success needed the best researchers, intellectual property management (Intellectual Property - IP) is essential and has a natural aversion to external sources of knowledge.

Chesbrough put together a list of CI and OI principles:

Table 1: *Contrasting principles of CI and OI as depicted in Chesbrough (2003)*

	Closed Innovation (CI)	**Open Innovation (OI)**
Expertise	The smart people in our field work for us.	Not all the smart people work for us so we must find and tap into the knowledge and expertise of bright individuals outside our company.
Function of the own R&D	To profit from R&D, we must discover, develop and ship it ourselves.	External R&D can create significant value; internal R&D is needed to claim some portion of that value.
Attitude regarding research	If we discover it ourselves, we will get it to market first.	We don't have to originate the research in order to profit from it.
Market ambition	If we are the first to commercialize an innovation, we will win.	Building a better business model is better than getting to market first.
Ideas	If we create the most and best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
Intellectual property	We should control our intellectual property (IP) so that our competitors don't benefit from our ideas.	We should profit from others' use of our IP, and we should buy others' IP whenever it advances our own business model.

As no company represents strictly OI and CI concept, it is important to illustrate the differences between them. Companies that tend to closed innovation, manage the processes differently from companies that have opted for open innovation. Since the research inherently requires new knowledge about the market and technical knowledge, companies representing the concept of open innovation will have advantage in many areas, while unlike them, companies representing closed innovation are most often focused on in-house development and can overlook functional solutions.

In the closed innovation method companies focus on research projects that originate from within the company boundaries, research these and only continue to develop those that support current business models. According to the traditional model, the R&D activities are carried out internally, and products are developed and commercially offered by the same company (Chesbrough 2006). Closed innovation rests on a number of assumptions, and the company's needs to:

- fully research, develop and offer a new product to market;
- recruit talents and rely on them in order to introduce innovation;
- bring restrictive measures of intellectual property management in order to prevent other companies to benefit from its technology (Chisbrough 2003).

Generally speaking, the traditional approach to innovation centers is "to engage the genius, give him the money and leave him alone" (Chesbrough 2003).

In the case of the open innovation method, when it comes to research and development, projects do not necessarily have to follow in-house concept, so that they can be initiated by the user, other companies etc. These projects are then further developed into a market-ready concept but those projects that do not support the existing business models open up the possibility of exploitation through the spin-off, joint ventures models, licensing models and others. Managers can use the concept of open innovation in three main areas: financing, generation and commercialization.

Creating innovation may be exploitative or exploratory in nature, no matter what type of manager supports the use of external sources of knowledge. Commercialization can be done either through a focus on profitable market of ideas, taking into account the knowledge of the user, or by building a portfolio of best ideas, regardless of the source. Both methods are followed by sets of challenges.

Wheelwright & Clark (1992) and Chesbrough (2003) identify three forms of the open innovation model [3]:

- "Inbound" open innovation model that refers to the use of external sources of innovation within the company. For instance, a firm may in-licence a technology developed elsewhere, and decide to use licenses for technologies that have already been developed outside the company, and does not aspire to develop equivalent technology "in-house";
- "Outbound" open innovation refers to the use of external pathways for the purpose of developing and commercializing innovations (Chesbrough & Growther 2006) [6]. For instance, a firm may out-licence its product to another firm that can help to further develop the product and for obtaining necessery regulatory approvals or for distribution;
- The so-called "coupled innovation process" that combines these two models mentioned above,

and companies work together to develop new solutions (Gassmann & Enkel, 2004) [7]. This model can involve close integration, for instance a joint venture, or a looser affiliation such as engagement through an innovation competition.

Firms may adopt open innovation for defensive reasons, that is, to manage and reduce costs and risks associated with product development. More frequently, they collaborate for offensive reasons, that is, to proactively leverage innovations and knowledge from outside the firm in order to improve their own offerings and stay ahead of competitors (Chesbrough & Growther 2006; Van de Vrande et al. 2009).

Companies have always integrated knowledge from outside of their boundaries into their product development to some extent (Huizingh 2010 [9]; Pénin et al. 2011 [8]). For instance, Edison's Invention Factory at Menlo Park, which pioneered the commercial development of electric lighting in the late nineteenth century, relied on multi-disciplinary teams (Pénin et al. 2011). In the real economy, the distinction between open innovation models and the traditional "closed" approach to innovation, described below, is not as clear-cut as sometimes presented. In fact, businesses frequently employ hybrid approaches (Dahlander & Gann 2010 [10]; Lichtenthaler 2011 [11]).

A key feature of the open innovation model is its flexibility. There are different forms that companies can use to pursue this innovation model, including bilateral collaboration, networks, and innovation "ecosystems" in which participants retain their knowledge and collaborate informally (Williamson & De Meyer 2012). Open innovation also offers a variety of ways in which an idea can be developed and taken to market, such as in-licensing, out-licensing, cross-licensing, joint R&D agreements, corporate venture capital, joint ventures, and inorganic growth through acquisition. These channels generally depend on clear, predictable IP arrangements. Other activities include incubation, as well as spin-offs or spin-ins and crowdsourcing - or collection of knowledge by a large informal group of people (Chesbrough 2006; Pénin et al. 2011).

Processes, products, or both may be exposed to collaboration. For instance, through its "Connect & Develop" program, Procter&Gamble opened its innovative process while keeping the outcome closed: the company sources ideas externally but retains control over commercialization of the products developed (Huizingh 2010). Most firms tend to engage simultaneously in open innovation and internal R&D. Evidence indicates that large firms can benefit from collaboration with small and medium enterprises (SMEs), including spin-offs (Christensen 1997). For example, although the leading pharmaceutical companies have large R&D budgets (equivalent to some 15-20 per cent of sales revenues), they rely increasingly on external research and integrate niche actors into their pipelines (Bhattacharya & Guriev 2005 [12]). Relying on a combination of open and in-house innovation enables firms to benefit from collaboration while ensuring they retain adequate absorptive and innovative capacity (Dahlander & Gann 2010 [13]).

Linear closed innovation processes are becoming less common, often from some of the following reasons:

- Increased mobility of experts between firms;
- Increased quality and relevance of university research;
- Increased quantity and quality of human resources, as well as the number of graduates;
- Increase the quality and quantity of international research.

While it has generated impressive research achievements, as evidenced by AT&T Bell Labs and Xerox PARC, this inward-looking model has some serious shortcomings. First and foremost, a firm bears the entire cost and risk of product development, which is becoming increasingly untenable as offerings become more complex. Also, internally organized innovation structures are often prone to budget cuts and survive only for a short period of time (Wolpert, 2002 [14]). In addition, the internal projects could be stopped if they do not fit the current business strategy or capacities, resulting in missed opportunities.

When we talk about open innovation, organizations can be divided into open and closed organization organization. However, organizations that do not strictly belong to the above categories are called semi (semi-open). The following figure shows how those semi-open organizations split open competency and closed competency as well as customers‟ activity which is reaction to the open competency. (Mooyoung Zou Dan & Son, 2011 [15]).

This research is figure out how those semi-open organizations split open competency and closed competency as well as customers‟ activity which is reaction to the open competency.

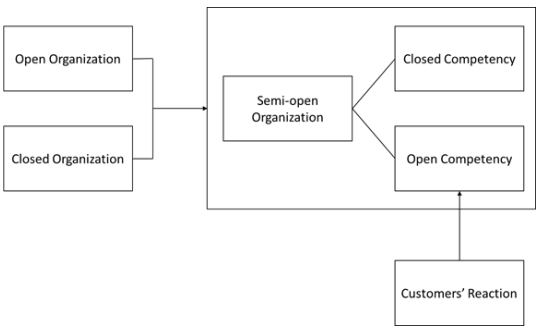

Fig. 1. *Organization type*

Research conducted by Mooyoung Son and Dan Zou is basically related to the relations between the organizations that have opened their competence for certain products such as platforms for example. The users are also divided into those who have created products using the platform and those who just use the platform. In this regard, the first group of users are called "Developers" and the other "End-users" as they do not participate in the creative process.

The selection of companies by type of openness is made for four companies:

- Fully-open (Google);
- Semi-open (Apple and LEGO);

- Closed (Cyworld).

Apple and Google are global companies, the platform providers that use different strategies in a competitive market.

The rapid growth of Google happened thanks to the pooling of product chains, acquisitions of other companies and partnerships related to the corporate core business - that is a search tool. The company offers e-mail services, social networking tools, such as Google+. Google's products extend to the desktop computers with applications such as Google Chrome, Picassa photo organizer and the Google Talk instant messaging applications. Google leads the development of the Android mobile operating system, used on many platforms. In order to compete with Apple, Google has launched a smartphone in 2008. However, sales of this phone (Nexus One) did not go well as the products of Apple iPhone, so Google is focused on a completely open platform, so that big companies such as Samsung and LG use the Android operating system pre-installed on their smart phones. Google has founded the Open Handset Alliance with several other organizations in 2007 with the intention to establish standards for mobile devices, and in this sense is fully open Android source code for free use, so that the opening of platform strategy contributed to the increase in market share and popularity of Android operating system on smartphones in 2010.

On the other hand, this strategy of Google has led to many different versions of Android, so the problem of compatibility has emerged. According to the research by Robert W. Baird & Co. Google withdrew from the Chinese market in 2010, so many manufacturers from China began to introduce an alternative browser such as Baidu. Also, Google had to pay Apple for the use of Google's search engine on the iPhone, and it is then reflected on other manufacturers that also ask Google to pay them for the use of search engines on their smart phones. The dominant market position of Google has exposed it to the oversize criticism for many things including privacy, the copyright and censorship.

In addition to Google's open Android operating system, it did not open competences for advertising, because in this area Google has significant revenues.

An example of open innovation in Apple company is Apple App store. This concept is launched by Steve Jobs with iTunes as originally place to buy music, but the concept has slowly grown into the app store. Depending on the application type, they can be free or not. App store is not the first software that appeared on the market, Nokia and Samsung had developed similar products before. The difference is that Apple opened its App store to users to upload applications unlike the Nokia and Samsung, and thus achieved a great success in the market.

LEGO Group is an example of the semi-open innovation. Founded in 1932 in Denmark, Lego originally made wooden toys that would later produce plastic cubes, and now LEGO collection includes movies, video games and theme parks. Over the years LEGO has faced competition which produced similar plastic cubes at a lower price. To meet the challenges, the company introduced the Mindstorm robot in 1998, an educational toy that has had sensors, engines, CPU and software. Several weeks after the presentation of Mindstorm, students at Stanford University hacked RCX (Robot Control System) - the main controller toys, and put the source code of the operating system on the Internet, so that other hackers could develop an operating system known as Legos. Faced with this challenge LEGO Company has decided to open an SDK (Software Development Kit) software tool to users in order to change the operating system. So there are different types of LEGO products - robots that are able to perform various functions such as climbing stairs, playing poker etc. Currently, LEGO has about 120 employees in R&D team and over of 120 000 hackers that enhance LEGO products.

The company Cyworld was the first organization in the world to offer services of social networks. It was founded in 1999 by Lee Dong-Hyung, and after four years of SK Communications, the largest telecommunications company in Korea, Cyworld has completed acquisition. At that time, 90% of teens (DMC 2010) and 82.8% of Internet consumers in Korea used Cyworld. After the successful service launch in Korea, Cyworld has started expanding its range of services in other countries such as USA, Germany, Japan, Taiwan, China and Vietnam, but the results were below expectations. As a pioneer in the field of social networking service, Cyworld has not been successful in these markets because Facebook has become dominant, and the use of Facebook service has prevailed in Korea as well. There are several reasons why Cyworld achieved poor results while organizations that provide social network services recorded growth.

One of the reasons for the failure of Cyworld's is related to the inclusion of users, ie the possibility of numerous open source content that they create. Regarding music services, Cyworld has tried to allow users to create covers, music content and to sell them. On the one hand Cyworld had a monopoly at that time, so they thought that they can provide the best products according to customer requirements. On the other hand, Cyworld did not want to give up their business partners who helped to design services from the very beginning to the commercial phase.Generally, Lee wanted to use an open strategy, but it was not easy to accomplish. As a very conservative organization, SK Communication focused on profit rather than long-term investments.

2. BUSINESS MODELS

When talking about business models, it was found that there is no clear-cut definition of Business Model. Baden-Fuller and Morgan (2010) [16] propose that business models help to describe and classify the businesses, operate as sites for scientific investigation, and to act as recipes for creative managers [4]. They further explain two different types of models of business, scale model that present scaled-down version of any real world business and role model initiated by other participants. In conclusion, the business models are not explicitly fall under any of the categories, so it's not just about scaling model, role model, or about the

predetermined (recipes) models, but often on their combination.

Finally, a definition widely used in the Business Model Generation book (Osterwalder, Pigneur and Smith, 2010) states that: "A business model describes the rationale of how an organization creates, delivers and captures value".

Osterwalder, Pigneur and Smith (2010) [19] created nine building blocks for any given business model as shown.

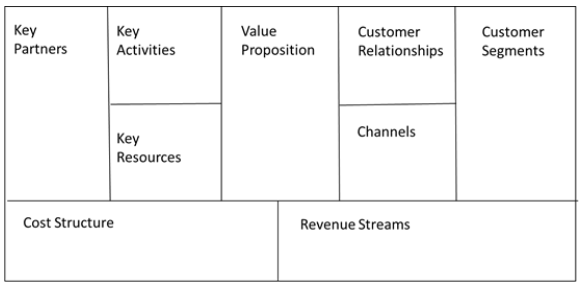

Fig 2. *Business Model Structure*

The building blocks are defined as follows:

1. Customer Segments: defines which group of people or organizations the enterprise is aiming at to reach and serve.
2. Value Proposition: describes the bundle of products or services that create value for the customer segment defined above.
3. Channels: describes how the enterprise reaches its customer segments in order to deliver the value proposition. It includes salesforce, web sales, partner stores, own stores etc.
4. Customer Relationships: the type of relationship the enterprise set up with the customer segment. It could be direct or non-direct relationship such as personal assistance, self-service or automated services.
5. Revenue Streams: represents the cash-in the enterprise generates from each customer segment. Such as usage fee, asset sale, subscription fees, renting, licensing, advertising etc. It can also include non-monetary value that the company gains such as reputation.
6. Key Resources: the assets required to offer and deliver value. It includes what the enterprise has to create this value. It could be physical (manufacturing facilities, building etc.), intellectual (copyrights, patents, brands etc.), human or financial resources.
7. Key Activities: the most important things an enterprise must do to make its business model work. It include production, problem solving and platform/network (software's and websites used by companies such as eBay, amazon, Visa).
8. Key Partnerships: describes the network of suppliers and partners that make the business model function. The motivation behind this is to reach optimization in allocating resources and activities as most enterprises outsource some activities to suppliers to finally create their products or services, to reduce risk and uncertainty, or acquisition of particular resources and activities.
9. Cost Structure: describes all costs incurred to operate the business model. Usually business models are situated between cost-driven or value-driven. Cost structure can operate with fixed costs, variable costs, economies of scale or economies of scope.

According to Teece (2010) [17] the foundations of business model design are to determine:

1. The technologies selected to be embedded in the product or service;
2. The benefit the customer attains;
3. The market segments to be targeted;
4. Available revenue streams;
5. Mechanisms to capture value.

A good business model is one with a value proposition that lures customers in, achieves advantageous cost and risk structures and enables value capturing by offering products and services. It is critical for the enterprise success to design a business model that fits it and correctly implement and refine it, it also needs superior technology, competent people, good leadership and to be appropriate to the enterprise culture or environment.

Scientific articles and publications on Business Models are still quite infrequent, and there are different definitions for it. Many authors agree on several aspects, for instance:

- All elements within a Business Model are interrelated ;
- Business Models alone is not enough. The model have to be exclusive for the enterprise and hard to imitate, gaining competitive advantage and leverage over incumbents or newcomers alike;
- Business models are conceptual models rather than financial ones and are not an organizational form;
- Selecting, adjusting and improving business models is a difficult art rather than science, however they facilitate and represent innovations.

Itami and Nishino (2010) [20] divide business models to two essential parts, a Profit Model and a Business System. Business system is the production and delivery system the firm has, that goes spirals internally and externally beyond its borders to deliver what intended to customers. While the profit Model, which get most attention, is how the firm plan to capture value or its strategic intent to achieve differentiation and competitive advantage. In any case a successful profit model won't work unless there a business system. Itami i Nishino showed how Google for example has multisided platform business model, in which they do their own software development and they learn from it to capture upcoming trends or improve current ones. For this reason, it is strongly suggested for firms to develop their own business system as by producing the component in house, even at an extra cost, since they themselves learn during the process. Profit model is important for the short term while business system looks beyond today and

have more growth potential from the learning process when taken into consideration.

3. BUSINESS MODEL INNOVATION

The term business model innovation has not yet achieved its converged definition in academic literature. Authors have presented different business aspects which are outlined by term business model innovation. The competitive advantages among companies mostly stems from novel resources. There are two main phenomena behind organizational move toward business model innovation. First phenomenon is as Casadesus-Masanell & Ricart (2010) [21] suggest the on-going development of modern technology such as the Internet (Perkman & Spicer, 2010) and second organizational efforts to enter new markets in emerging economies (Prahalad & Hart, 2002 [22]; Prahalad, 2010 [23]). The organizations using new technologies have employed innovative business methods to extend their reach to customers all around the globe and by operating worldwide. To become successful at international level organizations have to strive for not only traditional innovation approach but their business model innovation.

Zott & Amit (2010) [18] argue that business models bring a new innovation around traditional modes of product, process, and organizational innovation and that may serve as source of superior performance and competitive advantage. This suggests that firms can compete through their business models (Casadesus-Masanell & Ricart, 2007). Chesbrough (2007) proposes that organizations should focus on business model innovation because increasingly expensive technologies are being commoditized at such a fast pace than ever. The business model innovation brings strong competitive advantage which is hard to replicate. According to Chesbrough (2007), the innovation of business models has more important strategic implications than other forms of innovation, as a superior and robust business model will beat a better idea or technology. For sustainable competitive advantage business model innovation seems to be the right approach nowadays.

According to Teece (2010), business model innovation requires creativity, insights and a good deal of customer-competitor and supplier intelligence and information. This information enables management to mobilize their scarce resources in an efficient way to gain competitive advantage. Opsahl and George (2010) suggest that the organizations flexible with their strategies are more capable of business model innovation. They further propose that organizations have to engage in business model innovation to gain strategic flexibility by increasing their capabilities to respond to environmental changes while decreasing formal design complexity.

A recent research (Mashelkar & Prahalad, 2013) emphasizes the need for business model innovation but nothing is said about its components where innovation should take place. However, there are already some efforts going on and we expect research on suggesting the right level for business model innovation to take place.

When we talk about the process of business model innovation, below is exposed its importance for the company in terms of seeking innovation in business models.

Amit and Zott (2012) noticed that to increase revenue and achieve growth companies tend to improve process and products via innovation but it is often time consuming and requires a considerable upfront investment, moreover future returns are always uncertain. Business model within organizations often goes unchallenged and unchanged for a long time, missing out on many business opportunities. Companies that have adopted business model innovation led them to grow faster than using traditional product or process development, as it opens areas of future value, second it takes companies a step ahead, making it difficult for competitors to replicate a novel activity. Moreover when designed well it transforms into a sustainable performance advantage.

Innovations in business model can occur either by adding novel activities through backward or forward integration, by linking activities in innovative fresh ways or by changing one or more parties that perform any of the activities. But first six questions must be answered before business model innovation:

1. What customer needs will the new business model address?
2. What novel activities could help satisfy those needs?
3. How those activities can be linked in a novel ways?
4. Who should perform those activities?
5. How will value be created to each stakeholder?
6. What revenue models can be used to complement the business model?

Amit i Zott (2012) found four major business model interlinked value drivers. Novelty as it captures the degree of business model innovation, Lock-in as in creating switching costs or enhanced incentives by inciting customers to be locked-in similar to business models of Nespresso, Gillette razor blades and Apple's iTunes in which customers have to buy their coffee, blades, mobile phone to have full usage of their espresso machines, razors, apps. Complementarities, in which a firm seeks a value enhancing effect to, improve its business, such as eBay acquiring Paypal to help facilitating transactions between buyers and sellers. And finally efficiency through cost saving, citing Wal-Mart is a spot on example for designing its cost efficient system to help cater its low-price strategy.

Chesbrough (2010) [24] contemplates the fact that most companies while having the ability to create and come up with new business ideas fail with innovation of appropriate business models for them in order to take them to market. Mediocre technology when exploited with the right business model can be more valuable than a great one without the proper business model. Same technology with two different models can yield two different returns. The author have noticed that while working with Xerox in the 1980s, many excellent innovations sprang from R&D division, but the problem was Xerox focused on innovation that are only related to

its current business model of making return via selling consumables and in turn discarded many other ideas. The author noted that many of those ideas flourished as they were taken out externally for instance development of the Ethernet was a Xerox invention from the start but failed internally and turned out to be of huge value as an independent product

Wirtz, Schilke and Ullrich (2010) [25] had pointed out that the wave of web 2.0 brought drastic changes to competitiveness, how business models are designed and how value is created and captured. The article suggests that for firms to keep up with this they always have to put customers at the core, they are the source of improvements and helps firms understand technological changes as in applying the concept of open innovation by involving customers in the innovation process. After keeping track and deep knowledge of market trends, managers can then implement changes to their current business model. They need to act as agents of change and positive attitude, helping and motivating employees towards the desired change.

Markides (2008) points to the fact that companies going along integration approach have succeeded and companies choosing the separation strategies have failed. However Markides (2008) argues that the questions should be formulated from "to separate or not" to "when to separate and when to integrate". Different integration strategies are recommended for different scenarios, presented in the figure below. In A – separation strategy the new business models are innovated in entirely separate entity with no foreseeable merge plan into old business. In B – Phased integration strategy the business model innovation takes place in a new entity with plan to reintegrate the new entity into the old business. C – Integration strategy enables new business model to grow within the organization alongside the old business model, with no spinoff plan on the roadmap. D – Phased separation strategy develops new business model within the same organization and with time spins it out.

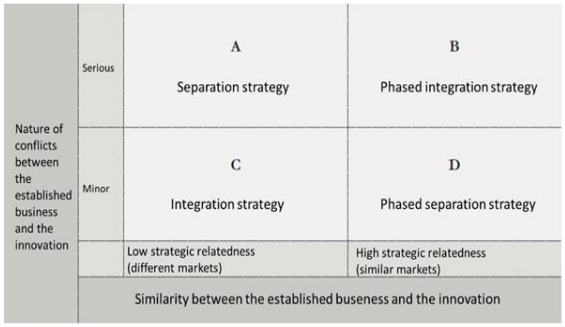

Fig 3. Different models of business model innovation strategies

The important aspects of business model innovation process according to the table above are management decisions on if and how a new business model should be managed and adopted. Analyzing business model relationships as shown offers strategic knowledge as where to initiate the innovation.

Incumbent enterprises within well-established industries have great difficulty crossing the chasm created by a radical innovation, while new entrants rise to market dominance (Hill and Rothaermel, 2003 [26]). Literature has various opinions about the failure of incumbents to extract value from new business model.

Incumbents have difficulty to adopt new business models mainly due to their previous commitment with existing models. The transition towards a new business model potentially renders existing investments obsolete (Chandy and Tellis, 1998) [27], and magnifies switching costs (Barnett and Burgelman, 1996) [28]. Moreover, the transition to new business model is associated with huge cost for big firms which management prefers to mitigate. In this way, a firm's previous investments and its repertoire of routines that is attached to them constrain the firm's future behaviour (Teece et al., 1997).

The other prominent barrier to business model innovation is related to the competency and Know-How which incumbents accumulate over years and do not want to give it away. As Foster (1986) mentioned, the attained knowledge encourages incumbents to maintain a focus on current business and competencies (Foster, 1986). That influence management's perception about the new strategic opportunities and their actions. Other researchers argue that the organizational filters of incumbents make them less effective at radical innovation (Chandy and Tellis, 2000 [29]; Hannan and Freeman, 1984 [30]; Henderson and Clark, 1990).

Sometimes the benefit of leverage from legacy business models or processes makes firm's behavior towards innovation slightly passive whereas new entrants are very active to any new opportunity. Incumbents have developed organizational routines or procedures to carry out repetitive tasks related to a current product or business efficiently (Chandy and Tellis, 2000; Henderson and Clark, 1990 [31]; Hannan and Freeman, 1984). The leverage and reuse benefits of proved business models are very high, in such situation to convince management does not remain a trivial task. As Heffernan (2003) suggest the strategists emphasize on existing routines or processes and expectations are formed around them, making them costly to change.

4. BUSINESS MODELS TOPOLOGY IN THE ICT INDUSTRY

There are four types of business models in the ICT industry set forth in the following table:

Table 2: *Four types of business models*

	Service	Publisher
Convenience	Consultancy, installation help and general assistance for ICT problems and (sometimes) multiple software applications. Value is extracted by selling man-hours and knowledge.	Simple software that provides a solution for daily ICT problems in multiple sectors. Value is extracted by selling software in large amounts.
Specialization	Specialized consultancy and assistance in the adoption of new software components in an existing ICT environment. Value is extracted by selling specialized knowledge and experts.	Very specific software for a small amount of customers often in the same industry/sector. Value is extracted by selling specific software (components) with higher margins.

To acquire data about what business model is used by a software developer good indicators are needed. Valuable indicators can be how much turnover comes from selling software or complementary products and service. This gives an indication about the service or publisher focus of a developer. A valuable indicator for specialization can be if the development team focuses more on user needs than technical possibilities.

The external environment for innovation has changed in recent years, affecting firms in every sector. Several factors in particular may induce innovators to adopt open innovation strategies :

- Globalization reduces barriers to international collaboration and facilitates the entry of competitors. It confers a comparative advantage to businesses that innovate more rapidly and adapt better to new opportunities (Gassmann 2006 [32]). At the same time, globalization entails increasing mobility of skilled labour, which foster knowledge distribution.
- Product complexity has increased to the point that even the largest companies can no longer afford to do everything in-house (Gassmann 2006; Pénin et al. 2011). At the same time, companies face growing pressure to focus on their core competencies. As a result, firms tend to partner to obtain the resources and knowledge they need to compete effectively, without the complexity and cost of attempting to do everything in-house (Williamson & De Meyer 2012).
- Industry convergence, which is the "blurring of technical and regulatory boundaries between sectors of the economy" (OECD 1992), gives rise to new inter-industry segments. To successfully compete in new segments, firms must combine knowledge from different entities across sectors. An example is the convergence of the food industry and the pharmaceutical industry, which has yielded the new segment of nutraceuticals and functional foods.
- Advancements in information and communications technology (ICT) reduce the perceived distances between actors, thereby enabling integration of new actors into the product development process (Gassmann 2006). ICT solutions make it easier to identify appropriate partners, and to pursue partnerships across borders (Pénin et al. 2011).
- Increasing tradability of intellectual property rights has simplified the exploitation and sharing of knowledge and investments in innovation (Granstrand, 2011). Firms can more easily "transfer" knowledge and rights to use their inventions. As in the past, patents are used to protect innovations and to secure freedom to operate. Increasingly, they are also viewed as being more than mere protection methods. They are strategic assets, supporting out-licensing and the systemic commercialization of internal expertise outside of the firm (Gassmann 2010). Whereas, under the old innovation model, unused outputs from the R&D process were written off as a cost of doing business, they can now be sold or monetized through licensing.
- The growth in private venture capital makes it easier to create start-ups, increasing the tendency of individuals to establish firms to commercialize inventions originating in enterprises or research centres (Herzog, 2008). Small firms are likely to overcome size-related liability by opening up their innovation process and partnering, particularly during the commercialization stage (Enkel et al. 2010).

5. OPEN INNOVATION CHANNELS

Innovation demands collaborative arrangements to be effective. Consequently, vertical, horizontal and cross-industry innovation partnerships and alliances are increasing to enhance value creation activities. As a result of the collaboration´s advantages multinational corporations are moving from Closed Innovation attitudes to an Open Innovation mind-sets (Gassmann et al, 2009). Companies' ability to generate new combinations to existing knowledge and to exploit the unexplored potential of knowledge and innovation is crucial (Grant, 1996). Sloane (2011) presents different Open Innovation channels that companies could work with to transfer the Open innovation concept into practice. The author argues that companies should attempt to create a tailored Open Innovation programme aligned with the company's policies, culture and as well the specific business unit, and not force an adoption of a specific Open Innovation programme.

Organizations progressively rely on external Open Innovation sources through their inter-organizational networks (Perkmann & Walsh, 2007 [33]). Companies uses their external business network to gain knowledge, the external network provides the company with specific competitive advantages (Forsgren et al, 2005 [35]) and innovation is a source to competitive advantages (Tidd et al, 2005 [34]). The largest source of Open Innovation channels is customers, suppliers and competitors (Gassmann et al, 2009) all included as external business actors in the company's network (Forsgren et al, 2005). A well-coordinated external relationship is a mechanism, which influences the knowledge development positively; it is a vehicle for internal knowledge development (Forsgren et al, 2005).

Multinational corporations can collaborate with its customers to gain new innovations. The customer partner channel focuses on the outside-in process flow of knowledge (Sloane, 2011 [36]). Companies use a small or a large group of customers as an external innovation partner; the compensation is usually non-cash incentives (Ibid).Users constitute and new approach in the development of new custom products where the consumer can design, build Open Innovation Channels and also test the innovation and thus provide a feedback-loop (Thomke & Von Hippel, 2002 [37]).

Another channel to reach new innovations is suppliers. Companies in cooperation with partners, suppliers, try to integrate external knowledge Gassmann et al, 2009). Collaboration with suppliers is a vertical

relationship and the primary motive is to reduce costs. Further advantages of using suppliers as innovators are to reduce risk Potential disadvantages and transaction costs of the supply- chain channel are search costs and reduced quality (Tidd et al, 2005). Collaboration with suppliers according to develop non-core activities and relationships with suppliers are usually associated with short-term solutions; however, the partnership is long-term relationships where suppliers contribute with a significant involvement in developing new innovations and products and reduce time to market.

Tidd et al (2005) highlight that innovation collaboration with competitors is a horizontal relationship; explained as companies collaborate with competitors to gain sources of new technologies or market know-how. Companies can learn through alliances and develop new technologies through collaboration with competitors.

Universities and other types of research institutions do not take the ideas to the market, in most cases universities are satisfied to have real world cases, the incentive to use universities as an Open Innovation channel is that the compensation rate is low (Sloane, 2011).

Perkmann & Walsh (2007) make a distinction between the types of cooperation between companies and universities. The first type of cooperation involves a higher level in their relationship, taking into account the conditions of cooperation between teams from both sides on a project in order to achieve a common goal. Another type of cooperation involves the transfer of intellectual property rights in the partnership, and finally a third type of collaboration where individuals from the university with a high level of mobility involved in projects of the company. That cooperation is important in the context of open innovation because it allows mutual exchange and build long-term relationships between organizations.

It is necessary for technological innovation to be coupled with a commercialization strategy. Two common models for innovators to capture value from innovation, either by being responsible from the whole supply chain of the product from manufacturing to distribution or by outsourcing almost all aspects by following the licensing model. In fact the hybrid model of both is the most common which requires strong selection and orchestration of service providers and suppliers to attain highest returns. Capturing value from technological innovation framework such as new discoveries or inventions involves embedding it in the product and revenues are created by the consumer buying the product. Firms need to always seek and strive for improvements in their business models that would capture more value and add value to customers, putting in mind creating ones that are hard to imitate.

As Christensen and Raynor (2003) argue that companies should develop disruptive innovation in a separate entity and organization to avoid potential conflicts. The underlying logic of this argument suggests procedures of parent company, culture, and systems will inhibit new innovation which would enable business model development to its full potential.

6. CONCLUSION

There are several prerequisites for successful open innovation. Most importantly, firms must have sufficient absorptive capacity to identify valuable external information, to integrate it into the internal innovation process, and to exploit it commercially. Open innovation generally requires significant organizational change within a firm, such as the establishment of decision-making pathways and of processes to manage the intellectual assets of different partners.

Businesses adopting an open innovation model engage in proactive IP management in order to manage their knowledge and innovations in the most strategic manner. More specifically, they use intellectual property rights (IPRs), whether registered rights such as patents, or unregistered rights such as trade secrets, to clarify ownership and control over resources that will be shared with or transferred to external actors in the context of the collaboration . In addition, they establish knowledge management processes to ensure that expertise is shared outside the firm in a managed and strategic way.

Patents are particularly important contributors to collaborative innovation, enabling sellers of technological and other information to disclose and to trade the right to use their technologies and know-how without losing control over them. Without clear ownership of and protection for knowledge, in the form of IPRs such as patents, the “open” exchanges required under open innovation may never occur. By enabling firms to diminish the risk of free-riding or misappropriation by partners, IPRs facilitate and encourage sharing, stimulating flows of information and knowledge. The concept of open innovation relies in large part upon markets for intellectual capital, underpinned by effective IP protection systems that enable companies to protect and enforce IPRs.

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