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Technology Business Models in a Network Environment

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ABSTRACT:

"The literature about technology business models in network environment is very limited. Therefore the goal of this paper is to draw attention to the role of using of technology business models in creating of new value to customers with network effect. Author analyse a network as an interactive space for creating technology and present a business models in the network environment and technology. This analysis begins with a review of the key aspects of using of network environment to developing of technology business models. The author then presented the technological business models as dynamic platforms for the development of companies in the network environment. Finally, author defined the key conclusions with interpretation".

Keywords: Technology, business model, network, innovation

INTRODUCTION:

The contemporary world is created by new technologies in many areas. Technologies affect both the economic and social dimensions of the contemporary world. At the level of companies, they determine either the collapse or development of companies. Therefore, the way of using the attributes of technology to offer new outstanding value for ever increasing customers' needs is becoming particularly important. The optimal tool used for this purpose may be an effectively designed and implemented company's business model. In the classical approach to business models, technology is a key link in the value chain and it often determines its shape. As regards e-business models, a value chain consisting of a sequence of successive actions may differ significantly from the accepted canons and even not occur at all. In this situation, technology is often a set of solutions used in the field of IT, occurring at the same time and depending on many random, reactionary factors. Technology can thus determine the development of new business models and business models can create new technologies. Technology may also influence the creation of the new opportunities that result from business models. An important element in the development and use of technology is the environment in which it appears. It seems that nowadays this environment is a network environment and virtual space where companies operate.

Keeping in mind the aspects presented, the purpose of this article is to discuss key areas related to the design and use of technological business models in the network environment. The author argues that in today's, increasingly virtual reality, effective and efficient tools used to generate new value proposition for customers are the skillful design and use of technological business models developed by companies' participation in the network environment. It is materialized in the form of achieving superior business results by companies.

METHODOLOGY:

As a research instrument, one basic method was used, i.e. a critical analysis of the literature devoted to network environment, technology business models, and innovation. The paper is structured as follows. First, the theoretical introduction and discussion of the literature is presented. The main sources of theoretical analysis are scientific journals, specifically those publications devoted to role of technology in design of business models. The following section concentrates on a network as an interactive space for creating technology and business models in the network environment and technology and technological business models as dynamic platforms for the development of companies in the network environment - design and operationalization. Finally, I discuss the results of presentation the stages of the design and implementation of the company's technological business model embedded in the network and draw some conclusions determine using of technology business models in network environment.

A NETWORK AS AN INTERACTIVE SPACE FOR CREATING TECHNOLOGY

Nowadays, the network environment shapes the image of competition mechanisms. This is where the companies are embedded, intertwined and entangled in many relationships associated with participation in a number of formal and informal networks. H. Hakanson and I.Snehota define a network as three interrelated categories: participants in the network, the resources that they have at their disposal, and the actions taken (Hakanson, Snehota, 2005).

C. Martin-Rios defines inter-firm networks as voluntary agreements of independent companies that involve knowledge exchange and sharing (Martin-Rios, 2012). In such networks, technology has huge importance. A. Arora defines that in sectors where markets for technology are developed and technology can be traded more effectively, countries or regions should specialize according to comparative advantages. This does not imply that countries should cease to invest in research and development. Rather, it implies that they should be more selective in terms of the sectors and types of activities on which they focus, at least in the short-to medium run (Arora et al, 2001).

In the context of technological thinking, networks can be unqualified and qualified. As regards unqualified networks, the innovation process begins when a problem is defined by the organization, and network members start working on it. The use of the unqualified network is often crowdsourcing-based in its nature and is limited to the phase of idea generation or the initial product design. Qualified networks are managed in a way that ensures confidentiality and protection of intellectual property. They may include producers, experts from various fields, engineers, and even research centers. An example of such a qualified network is a cluster. In both cases, a "from place to space" approach, where a network is a platform for spreading new ideas, knowledge and values, gains significant importance.

All innovations have no broader economic and/or social significance (for both their creators and users) until they are practically used by implementing them into production. The necessary condition for the commercialization of each innovation is the existence of an

appropriate sequence of events (actions), which is defined as the innovation process (Szczepańska-Woszczyna, 2014).

The extent to which the network environment is used in creating technology, depending on the type of innovation adopted for the creation, is determined differently. For example, closed and open types of innovation can be distinguished, as well as breakthrough and incremental types. The closed model of innovation is within the company. It means that both research on new technology or product, as well as their marketing are conducted inside the company by which they are strictly protected (Chesbrough, 2003) Therefore, the network used for the development of this type of innovation may also be closed.

On the other hand, the open model of innovation assumes that valuable ideas (concepts) of innovative solutions can be found everywhere (Chesbrough, 2003). A network appropriate for this type of innovation is an open network without borders.

Breakthrough or disruptive innovations have a different dimension in the interpretative approach to innovation. They consist in introducing new solutions, thwarting the current mode of the operation of the company, industry or sector, and often forcing their transformation. "Generally, disruptive innovations were technologically straightforward, consisting of off-the-shelf components put together in a product architecture that was often simpler than prior approaches. They offered less of what customers in established markets wanted and so could rarely be initially employed there. They offered a different package of attributes valued only in emerging markets remote from, and unimportant to, the mainstream (Christensen, 1997). Breakthrough innovations are most often the result of adopting the strategy of driving innovation through technology. A network, where innovations are created, is then dynamic in its nature, and permanent changes in network interconnections take place. Incremental innovations, also known as continuous, mean improving the existing solutions. Incremental innovations usually result from systematically taking the market signals into account. Thus, the network will be usually evolutionary in this case.

Therefore, the network enables the implementation of joint initiatives of companies embedded in the network aimed to create new technologies.
For example, one of the key factors for developing joint innovative undertakings in the network is the co- creation of value by using similar or the same technology. Especially in the field of e-business models, a dominant role is played by communication platforms and the choice of the environment where a business model is implemented. The dynamic development of digital data processing technology contributes to transferring the business to the Internet. Some or even all of the operational processes are carried out using the tool. It significantly changes the current approach to business models based on the classic value chain.

BUSINESS MODELS IN THE NETWORK ENVIRONMENT AND TECHNOLOGY - ANALYSIS OF THE LITERATURE

Networks are identified as a key element of business models (Shafer, 2005). The actors' business models must be sufficiently compatible to engage in common market practices

(Nenonen, Storbacka, 2010). According to Henry Chesbrough, a better business model often will beat a better idea or technology (Chesbrough, 2007). If there are innovators who lose there must be followers/imitators who win (Teece, 1986). According to Charles Baden-Fuller and Stefan Haefliger, technology from other sectors such as information technology influences the way in which a business model can be created and adapted (Baden-Fuller, Ch., Haefliger, 2013).

The shape, effectiveness and efficiency of the business model is affected by the technology used. Based on the literature review, A. Afuah and C. L Tucci highlighted several new kinds of technology, stimulating the emergence of business models. In long-linked technology, existing interdependencies are sequential and different tasks are performed serially. This type of technology may include the continuous processes of processing in the chemical industry and production lines in the automotive industry. Intensive technology is, however, focused on solving very narrowly defined problems. Techniques for solving a problem are chosen in an iterative manner by taking next steps to achieve the goal. It is a kind of value shop. A model of value shop is characteristic of most service activities. Mediating technology plays the role of a link between two or more customers who want to enter into a certain relationship, e.g. as borrowers and lenders, sellers and buyers. Mediating technologies allow the provision of services called "mediation services". The related configuration of values is called "a value network" (Afuah, Tucci, 2003).

David J. Teece states that the dynamic capabilities framework also recognizes the challenges associated with inventing business models, and the importance of making investments behind new technologies. In the dynamic capabilities framework, sustainable advantage comes from honing internal processes, structures, and procedures to generate and successfully commercialize innovations, be they technological or organizational (Teece, 2006). It should be noted that the network character of economic relationships requires a factor stimulating their sustainability. In the classical approach to building alliances and other forms of building a relatively stable relationship between the entities, it is necessary to understand the needs of partners, but in particular, the chances to create value for the two or more entities. Technology is a factor stimulating the creation of business models, it is also a prerequisite for the sustainability of this model and it determines its potential and opportunities on the way to achieving operational excellence and the ability to capture more value from the market than their competitors. An interesting definition is presented by K. Obłój, who believes that a business model is a combination of the concept of a strategic company and the technology of its practical implementation, understood as the building of a value chain enabling the efficient use and revival of resources and skills. He also states that an effective business model is quickly imitated by other companies (Obłój, 2002). According to A.K. Koźmiński, a business model may but does not have to be the basis and inspiration for defining a strategy and preparing a strategic plan. However, a "shortcut" is possible, or the direct, fast implementation of the business concept and testing it in practice. A.K. Koźmiński also believes that a business model is, on the one hand, determined by the company's technology matrix, on the other hand, it defines this matrix because it creates research and development programme (Koźmiński, 2004).

Presented subjectively, however, it may include the relationships in the Market - Products – Technology system. Figure 1 below presents a classic model of technology transfer, including the defined relationship in the roadmap system.

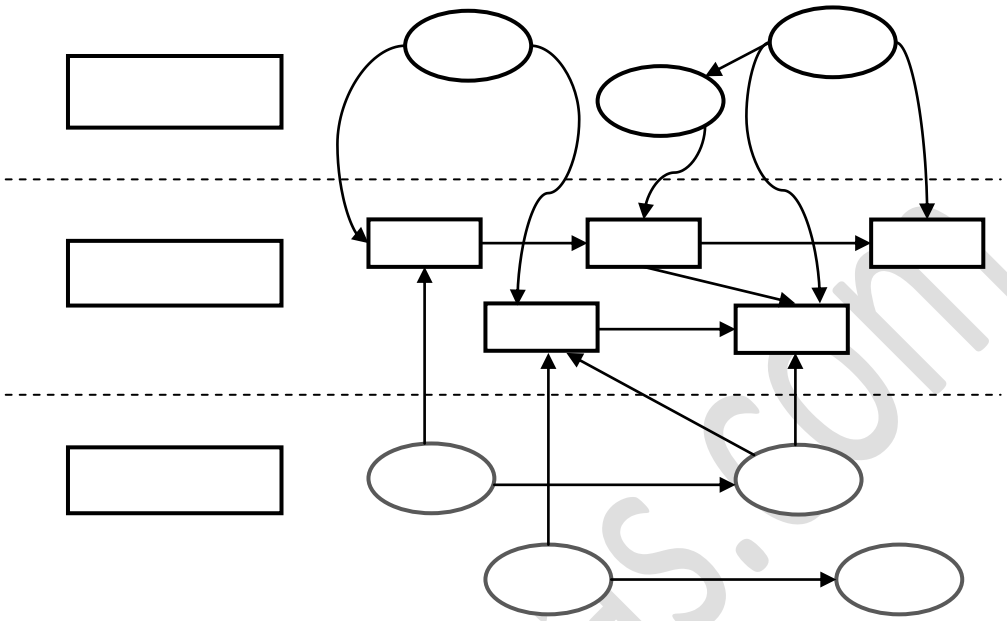

Figure 1. A model of technology transfer using a roadmap
Source: RINNE, M. 2004. Technology roadmaps: Infrastructure for innovation, Technological Forecasting & Social Change 71:69.

Alfonso Gambardella and Anita M. McGahan define that several other major elements of business-model innovation also may emerge over the forthcoming five to ten years.

- First, a reconceptualization of the character and content of customer willingness-to-pay may be imminent. Breaking through the bottlenecks that limit the application of general technologies requires insights that connect them to the willingness-to-pay of ultimate customers. The prevalence of networks such as eBay's supplier rating system, Facebook and YouTube illustrates that customer assessments may be developing into a noteworthy social movement. The endogenization of such mechanisms may be a central element of business-model innovation over the forthcoming decade.
- Second, major business-model innovations have implications for the viability of both upstream and downstream industries. Many of the most successful business strategies for innovation have involved outsourcing or the deconstructing of essential services. Downstream firms can capitalize on the opportunities created by upstream innovation, and vice versa.
- Finally, the evidence on business-model innovation suggests that opportunities across an economic sector may be difficult if not impossible to anticipate entirely. Unexpected leaders may emerge as new industries develop. Business-model innovation is not programmatic, and new generations of modified business models will emerge eventually to solve problems and capitalize on opportunities created by original breakthroughs (Gambardella, McGahan, 2010).

Technological business models as dynamic platforms for the development of companies in the network environment - design and operationalization

A condition favorable to the development of business models is to increase the role of business models in which technology is crucial, so called technological models, e.g. business models depending strongly on the technological capabilities of the components making up the configuration. The network supports, in particular, the formation of technological business models such as the network of suppliers (virtual computer specialists) employed by Google - people from all over the world. When a new technology emerges, companies often manage innovation by, first, analysing its potential impact – the goal is to better understand the "threat" of the technology to the company, and the commercial opportunities that it might offer. Most of the available techniques aim at providing an overall perspective of technological tendencies outside the organisation (this is the case with the Scenario and PESTEL analyses and the Delphi technique, for example). After a preliminary analysis of the strategic importance of the technology, companies concentrate on the development and commercialization of novel applications that incorporate it (Cavalcante, 2013).

RESULTS:

Extant research suggests that technology entrepreneurs who can discover and implement stronger business models for their firms are more likely to achieve higher levels of success. Thus improving the process of business model discovery is of high relevance to both research and practice (Muegge, 2012). The technological business model of the company is defined by the author as a business model whose key, distinguishing components are the components that are innovative technology, its part and / or its configuration, generating a higher value than other possible to apply in the configuration. The configuration of the technological business model provides unique value to customers in the form of a product and / or service offered through modern mechanisms for offering this value. This business model is capable of increasing revenue geometrically. The most common environment of technological business models is a network environment and virtual space.
The various stages of the design and implementation of the company's technological business model embedded in the network are shown in Table 1.

Table 1. The stages of the design and implementation of the company's technological business model embedded in the network.

No.	The stages of the design and implementation of the company's technological business model embedded in the network
1	Defining key markets in which the company intends to operate
2	Defining key products offered in key markets
3	Defining key technologies necessary to be implement by the company
4	Defining the attributes of the network environment in which the company intends to operate
5	Defining the basic attributes of the company's technological business model, with particular emphasis on attributes resulting from technology
6	Treating technology attributes as key success factors of the technological business model

7	Linking the technology attributes of the business model with a selected type of innovation (e.g. open, closed, breakthrough, incremental)
8	Linking the company's technological business model with the company's technology strategy and technology-oriented business processes
9	Scaling the technological business model
10	Implementing the technological business model through the implementation of the technology strategy and technology-oriented business processes
11	Evaluating the effectiveness and efficiency of the implementation of the technological business model regularly.

Source: Own study

CONCLUSIONS:

The network environment shapes the present dimension of modern business. Technologies determine the shape and image of the modern world economy. Technological business models can be an element connecting these two key areas of the business new dimension. They determine the creation of innovation, bring dynamics to the development of the company, and determine the strength of the relationship with the market on which innovative products are offered. Shaping technological business models in a network environment may be the factor determining the emergence of new perspectives in strategic management of companies operating in the market.
The combination of using of network effects and technology for the development of the business model allows the generation of accelerator of specific values. Is created a dynamics, which results in a new products that fulfill the sophisticated needs of the customers. The connection between use of network dynamics and the dynamics of technological business model increases the chances of the enterprises embedded in the network to achieve high performance by them. This is confirmed by scientific research and observations the author in a lot of case study. Particular importance have a designing of technology business models using network.

To sum up, the following conclusions can be defined:

1. In recent years, technology has been essential for the success of the designed business model; its logic depends on it, especially when relationships in the network are based on computer technology.
2. Business models, so called classic ones, are transferred to the Internet, often using solutions such as cloud computing.
3. Technology is very often necessary to create the business environment of different business models.
4. The lifetime of business models is often compatible with the lifetime of technologies.
5. The sustainability of business models depends on the capability of companies to make timely, better, more economical, and safer changes in technology.
6. The network is a collection of transactions taking place, conditioned by the speed of access to data, solutions, and other factors supporting the active cooperation of potential business partners, aimed to use the technology of production or the provision of services.

7. These technologies are necessary for business models to exist, and their sustainability is difficult to assess, which increases the uncertainty of business models creators.

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