Mediating Role of Predictive Analytics in Building Absorptive Capacity

Despite the recognition of the role of customers for innovation processes, companies might fail to maximize the value of external ideas utilization due to the business context and market scope. Besides, in order to fully benefit from open innovation, companies need to build absorptive capacity - an ability to integrate external ideas. Thus, in consumer goods suppliers in B-to-C face significant challenges to integrate customer input at the early stage of open innovation processes. To overcome those challenges which are predominantly determined by managing data complexity, we assume predictive analytics being an appropriate technological tool to process data and generate meaningful insights for the managers. This paper outlines the potential of predictive analytics to enhance absorptive capacity and offers conceptual basis for the subsequent empirical study of this issue by developing specific qualitative propositions which are to be tested.

Key words: open innovation, predictive analytics, absorptive capacity, customer involvement

Introduction

In the last decades customers were recognized as an important source of innovation (Hippel, 1976). Indeed, technological development was a significant catalyst to boost customers' awareness about the products and provided an infrastructure for extensive interaction with other customers. This goes along with arising opportunities to exchange knowledge and experience about products, or unite into communities. Eventually, triggered by this eve, companies were pushed to involve customers into innovation processes at different levels. A massive shift in a mindset towards the increasing role of customers made manufacturer-based innovation system obsolete and set a foundation for user-centered innovation system (Hippel, 2005). Further, increasing the role of networks pushed companies towards involvement not only customers' but other external ideas from the market (for example, from sub-suppliers or distributors) (Foss, Laursen, & Pedersen, 2011), setting up a new type of innovation, namely open innovation (Chesbrough & Crowther, 2006).

In order to maximize the value through open innovation, companies need to build absorptive capacity (AC) which is defined as an ability of companies to recognize the role of external ideas and to utilize them within a firm (Cohen & Levinthal, 1990). Zahra and George (2002) extended the debate and reconceptualize the AC construct in the light of dynamic capabilities. The initial thoughts of integration of the ideas outside the firm boundaries bring the concept of open innovation into the debate. Lichtenthaler et al. (2009) claimed that knowledge utilization outside and inside firm boundaries is crucial and coined a new term - knowledge management capacity - as building upon dynamic capability perspective.

All these studies use knowledge in an absolutely broad sense. As in this paper we focus on knowledge generated from customers and delimit given business settings as B-to-C. Looking at the companies in such business settings, we instantaneously face the challenges of knowledge assimilation determined by a market scope. However, to support the processes of external knowledge integration in such settings, we need to find efficient tools which would

technically support and tackle complexity of the problem. In this search, we assume predictive analytics (PA) being a sufficient technological tool to manage knowledge discoveries processes (Davenport & Harris, 2007). In its turn, business analytics would contribute to the creation of absorptive capacity of a firm. The paper aim to address this idea and explore whether PA would really enhance absorptive capacity and open innovation processes in companies.

Open Innovation

The practice of customer involvement was extended by the increasing role of network interaction and development of network relationships between business actors (Dittrich & Duysters, 2007). The increasing role of networks sparked in different industries, in particular in high-tech. Eventually, it had an impact on innovation processes as well, replacing dyadic relationships between customer and supplier with industry-wide networks (Jacobides, Knudsen, & Augier, 2006). As different business actors possess certain knowledge, skills and competence, each of them can contribute to innovation processes. This emerging trend of the involvement of external ideas was conceptualized by Chesbrough and Crowther (2006) as open innovation.

Customer involvement into innovation processes is a complex issue, and in different cases interaction is enabled and possible to a different extent. Involvement of customer ideas is particularly significant at the early phase of innovation processes. Such a phase was defined by Khurana and Rosenthal (1998) as “fuzzy front end” (FFE), implying a starting point of the innovation process. Koen et al. (2001) developed a unified model which describes the crucial factors for the FFE which are idea genesis, idea selection, opportunity identification, opportunity analysis and concept development. In fact, these factors are a combination of “need” information possessed by customers and “know-how” information which resides at the manufacturer side (Thomke & von Hippel, 2002). This paper focuses on the customer side, namely customer involvement into FFE of open innovation which leads to identification of

new markets. Further, in B-to-C context, companies struggle to involve customers in a systematic way or identify lead users which would ensure identification of new markets and initiate creation of new markets. Academia does not offer any coherent practices of how to deal with open innovation in such settings. Logically deduced, that peculiarities of B-to-C settings would require a specific approach for dealing with networks; generating, processing and utilizing all kinds of information. Yet, practice suggests that open innovation takes place in such constellations when coupled with technological development (Baloh, Wecht, & Desouza, 2006).

Predictive Business Analytics

Technological development set completely different rules for competition in terms of sustaining competitive advantage. In this vein, Davenport and Harris (2007) shed the light on competing on analytics on a critically new strategic level. What is so special and crucial about business analytics? First of all, it is bound to the exponentially increasing amount of data generated via different sources. Some companies ignore it as being impeded by data complexity and diversity; while other recognize the potential of data and search for the tools which would technically support data generation, assessment and analysis processes. These companies benefit in terms of dominant knowledge about their customer needs, market trends, operational costs and supply chain as the role of coherent data management techniques (Davenport & Harris, 2007; Trkman, McCormack, Oliveira, & Ladeira, 2010; Waller & Fawcett, 2013).

Complexity of Big Data in business is tackled by a variety of applications, where business analytics plays a crucial role as it has a potential to sustain firm's competitive advantage (Sharma et al., 2010). Business analytics is defined as "[...] an integration of disparate data sources from inside and outside the enterprise that are required to answer and act on forward-looking business questions tied to key business objectives" (Isson & Harriott, 2013, p. 3). Business analytics differs with regard to the purposes it serves. Descriptive analytics, for

example, is oriented to process historical data on the past events in a systematic way (Davenport, 2006; LaValle et al., 2010). On the contrary, predictive analytics addresses predominantly the question "why certain events happened and what can we learn from it?". Siegel (2013, p. 11) defines predictive analytics as a "[...] technology that learns from experience (data) to predict the future behavior of individuals in order to drive better decisions".

The advantages of PA are usually argued on a generalized to decision-making processes in all the corporate areas (Siegel, 2013; Srinivasan, 2012). Scrutiny indicated that less if anything was said about utilization of PA for innovative purposes. Thus, we wonder whether PA, by leveraging a proper data from the data pool, could be a sufficient tool for facilitative open innovation.

Managing Customer Involvement: An Absorptive Capacity Lens

The integration of customers into the innovation process was proven to be critical by a number of studies (Shah, 1999; Morrison et al., 2004; Ulwick, 2002). Yet, this process is rather dependent on a number of factors: industry, organizational structure and strategy, business context and organizational readiness to recognize the value of external idea integration. Even those companies which find innovation being a distinctive and crucial driver of competitive advantage fail to utilize all the sources of innovations. Especially mature companies with well-established business models and rather in-house innovation processes, for different reasons resist opening up innovation processes and generating ideas outside the firm boundaries.

The concept of external idea generation was coined by Cohen and Levinthal (1990, p. 128) who define "(...) the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends (...)" as absorptive capacity. However, not only *recognition* but *exploitation* of external information is crucial for a company. Zahra and George (2002) reconceptualize the absorptive capacity and define it as dynamic capability

of a firm to create knowledge in order to enhance other organizational capabilities and distinguished between potential and realized absorptive capacities. In this vein, Lane et al. (2006) distinguished between three forms of learning - exploratory, transformative and exploitative - as processes which constitute absorptive capacity. Building upon this debate, Lichtenthaler & Lichtenthaler (2009) developed a unified knowledge management capacities framework where absorptive capacity stands for external knowledge exploration capabilities.

Debates on open innovation, absorptive capacity and the synergy of both are often exemplified by high-tech companies (García-Morales et al., 2007). However, looking at the FFE of open innovation processes in consumer goods companies in B-to-C settings, we observe how challenging the processes of customer involvement are. In other words, development of absorptive capacity is crucial for successful involvement of customer ideas at the FFE of open innovation processes.

In this regard a few interesting findings could be identified: (1) Cohen and Levinthal (1990) highlight that absorptive capacity rests on the prior knowledge. Dwelling on this peculiarity of absorptive capacity, those companies which have experience and realized the need of customer involvement and ready to open up their innovation processes, would be rather open towards searching for different techniques to enhance those processes and build absorptive capacity. (2) Implementation of business analytics is efficient when it is utilized at the strategic, not only operational level (Davenport & Harris, 2007). In this case, absorptive capacity will be sustained in a continuous manner, when predominantly top management will be building decisions regarding new market development upon customer real data. (3) Technological side of the PA implementation require sufficient amount of data in order to develop accurate models and algorithms (Nisbet, Elder, & Miner, 2009) which bring to question whether PA could be used by SMEs as these companies might not have extensive data warehouses. However, according to Maisel and Cokins (2013), the main barriers to PA adoption are rather organizational culture, than technology related. Even though SMEs are

challenged by lacking human and financial resources for implementation of PA (Davenport & Harris, 2007), they are more flexible regarding change processes, and transformation to data-backed decision-making processes would not face organizational and cultural obstacles. In this vein, we can deduce that firm size does not play a crucial role in PA utilization for enhancing absorptive capacity development.

Methodology

In this paper we undertake exploratory research to shed the light on the potential of business analytics for creating absorptive capacity in open innovation processes. We start with the observation of key concepts related to open innovation, especially FFE or outside-in dimension (Enkel, Gassmann, & Chesbrough, 2009); business analytics and its implications in different industries, sectors and organizational functions; and discuss them in the theoretical lens of absorptive capacity. This paper is conceptual and strives to set a foundation for further empirical testing of the aforementioned issue. In this vein, a set of theoretical propositions were developed.

Conclusions

Predictive business analytics is relatively new concept for the business, predominantly sparking in IT industries. However, its promising growing potential to manage data and provide managers with meaningful insights for decision-making processes at different levels, triggers companies to extract potential of this technology.

The study will offer a conceptual basis for analysis of mediating role of business analytics in enhancing absorptive capacity in the companies at the FFE of open innovation. We strive to shed a light on the concept PA from business perspective, identifying its potential application for managing open innovation processes, predominantly customer involvement at the FFE.

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