



Innovation, New Product Development and Internet Technologies: study in Brazilian companies

Inovação, Desenvolvimento de Novos Produtos e as Tecnologias Internet: estudo em empresas brasileiras

André Grützmann¹
André Luiz Zambalde¹
Paulo Henrique de Souza Bermejo²

How to cite: Grützmann, A., Zambalde, A. L. & Bermejo, P. H. S. (2019). Innovation, New Product Development and Internet Technologies: study in Brazilian companies. *Gestão & Produção*, 26(1), e1451. <https://doi.org/10.1590/0104-530X1451-19>

Abstract: This paper focused on the use of internet technologies to support product innovation in Brazilian companies, following a qualitative approach. A scoping review of the literature revealed the main uses of the aforementioned technologies for every stage of innovation. Interviews with companies' representatives showed that innovative companies use mainly social networks to support innovation activities, but there are reports of investments in co-creation platforms. In the scope of this work, internet technologies are used to some innovation stages. Basic technologies like e-mail, website and search mechanisms can provide basic support information for all innovation stages. The early stages (ideation, design and testing) require more targeted information which may be provided by technologies like ideas competition tools, co-creation platforms, and web mining. Finally, blogs, wikis, discussion forums and social networking sites support the final stages (launch and support) of the product innovation process.

Keywords: New product development; Innovation management; Information technology; Internet.

Resumo: Este estudo investigou, a partir de abordagem qualitativa, o uso de tecnologias internet no apoio à inovação de produtos em empresas brasileiras. Uma revisão de escopo da literatura evidenciou os principais usos destas tecnologias para cada estágio da inovação. A abordagem mostrou que as empresas inovadoras entrevistadas utilizam, principalmente, as redes sociais no suporte às atividades de inovação, mas existem relatos de investimentos em plataformas de cocriação. No contexto do estudo, considerando o processo de desenvolvimento de novos produtos, as tecnologias internet podem ser utilizadas conforme o estágio de inovação. As tecnologias de suporte básico podem disponibilizar informações para todos os estágios da inovação. Os estágios iniciais, como ideação, projeto e teste, necessitam de informações mais direcionadas, as quais podem ser providas pelas tecnologias como ferramentas de competição de ideias, plataformas de cocriação e web mining. Por fim, as tecnologias blogs, wikis, fóruns de discussão e redes sociais sustentam informações para os estágios finais (lançamento e suporte) do processo de inovação de produtos.

Palavras-chave: Desenvolvimento de novos produtos; Gestão da inovação; Tecnologia da informação, Internet.

1 Introduction

Innovation refers to the development of new solutions that fulfill market needs or generate value for society. In addition, innovation can be understood as the search for added value in new products, services or markets, production methods or management systems (OECD, 2005; Crossan & Apaydın, 2010).

It may occur within a company, closed innovation, or through collaboration with external partners, or open innovation (Chesbrough, 2003).

The concept of a product has been seen as a set of tangible and intangible attributes that can be consumed and supply needs and desires of

¹ Departamento de Ciência da Computação, Universidade Federal de Lavras – UFLA, Campus Universitário, CEP 37200-000, CP 3037, Lavras, MG, Brasil, e-mail: andre5@ufla.br, zamba@ufla.br

² Departamento de Administração – ADM, Faculdade de Economia, Administração, Contabilidade e Gestão Pública – FACE, Universidade de Brasília – UnB, Asa Norte, CEP 70910-900, Brasília, DF, Brasil, e-mail: paulobermejo@unb.br

Received June 20, 2016 - Accepted May 27, 2017

Financial support: Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG), Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Capes).

a market (Semenik & Bamossy, 1995; Kotler, 2000; McCarthy & Perreault, 2003; Levitt, 2004). Therefore, product development implies systematic information gathering to discover consumers' needs and search for solutions to them (Pugh, 1991; Clark & Fujimoto, 1991). Stage-Gate® process is an evidence of this systematization which has moved towards virtual environments (Cooper, 1990; Cooper, 2008).

Product innovation is characterized by several authors (Wheelwright & Clark, 1992; Urban & Hauser, 1993; Ulrich & Eppinger, 2004; Rozenfeld et al., 2006) as a process of development of a new product that spans through five stages: Ideation - to gather new ideas and product concepts; Design - to structure and develop the product; Test - to assess the product and address the problems; Launch - to make product available to the market and receive feedback.

Integrating customers into product innovation allows faster and more efficient reactions to face market changes (Sandmeier et al., 2010). In this sense, Internet plays an important role in innovation, increasing contact with consumers and potential contributors. The network society (Castells, 2003) has brought new economic possibilities for actors capable of using information and communication technologies.

Huizingh (2011) points out that consumers, especially the most active and critical, have been invited to product tests or launch reviews. Innovation has been perceived by researchers as a way of transforming knowledge, internally or externally, into products that could be accepted by market. The literature highlights that technologies such as e-mail, websites, blogs, social networks and web mining can be used for innovation activities, mainly to the development of new products (Shaw et al. 2001; Su et al., 2006; Yan et al., 2009).

Sethi et al. (2003) recommend studies on the role of Internet and Web technologies in each stage of new product development. Meyer (2010) suggests new research to investigate the use and combination of different types of Web software to prepare for innovation. Although the customer should not be a passive recipient of innovation, there are still doubts as to whether companies are integrating Internet tools into their product development and innovation processes (Prandelli et al., 2006; Sawhney et al., 2005). In this context, we are interested in understanding the use of Internet technologies for product innovation, specifically in Brazilian companies, based on a literature scoping review, associated to a qualitative-empirical approach.

The concepts and applications of Internet technologies are diverse and there are differences between the

terms Internet, Web and Web 2.0. The latter refers to an evolution of the second where people can use platforms to generate content and new applications in a collaborative way (O'Reilly, 2005). In this work, the concepts were used interchangeably.

Internet technologies such as e-mail and website constitute the preliminary steps of a company in the online environment (Kotler, 2000; Vassos, 1997; Wind & Mahajan, 2001). In addition, search engines are used to identify relevant content to business (Brin & Page, 1998; Singhal & Nagar, 2013). Companies also have used discussion forums, virtual meeting places for interaction between people who share same interests (Nambisan & Baron, 2009; Haavisto, 2012). Social media facilitate user interactions and have been used and investigated for innovation. These networks are web-based services, where people can create profiles and establish connections with other people, allowing shared communication (Boyd & Ellison, 2007; Kaplan & Haenlein, 2010).

Weblogs or blogs are used for information sharing and interactivity, albeit with a different mechanics of social media. Blog content tends to be opinionated and personal (Anderson, 2007; Murugesan, 2007; Walker, 2007). In turn, Wikis are web tools that allow users to create and edit online content (Gonzalez-Reinhart, 2005; Bean & Hott, 2005). The main difference between wikis and blogs is in content editing control. While in blogs there is usually a person in charge of the control, in the wikis the content can be created or altered at any time by enabled users (Stephens, 2009). According to McKinsey (2008), blogs, wikis and social networks are the most common web 2.0 technologies used by companies.

While aforementioned technologies are more geared towards the Internet user interactivity, others focus on finding content, solutions, funding, or other contributions from crowds. These technologies are called crowdsourcing (Anderson, 2007). It should be noted that crowdsourcing could reduce costs, since the participations are spontaneous, demanding rewards for collaborations in some of the opportunities (Howe, 2006). The idea competition tools consist of environments where users are urged to offer solutions to a given problem proposed by an organization (Piller & Walcher, 2006). For this reason, Blohm et al. (2011) consider them one of the ways to bring customers closer to the initial stages of innovation, while Zwass (2010) points out that the co-creation platforms enable consumers to create value.

The technologies presented so far have been used to increase interaction with consumers. The participation and contribution of users in various web environments has grown and led to overwhelming amounts of

information. Web mining or web mining can help in the collection and separation of content that is relevant (Etzioni, 1996) for innovation.

2 Methodology

A scoping review on product innovation and internet technologies was conducted to build the theoretical background for this study. Scopus and Web of Knowledge databases were selected because of their scientific relevance and multidisciplinary.

Keywords related to internet technologies combined with the term innovation were introduced in the search mechanism of databases. The search was limited to papers written in English after the year 2000 from management, production and economics areas. Figure 1 illustrates the generic search string.

The search returned 1,396 results in Scopus and 1,030 in Web of Knowledge. The abstracts were analyzed to eliminate those out of scope. Duplicated results were also withdrawn. After removing unrelated papers, 133 articles were selected for full reading. From the analysis, a framework emerged relating the most used internet technologies at each stage of innovation. The theoretical background allowed shaping a semi-structured interview script. This script provided the guidelines for conducting conversations with key people in selected companies.

(Innovation AND web) OR (Innovation AND internet) OR (Innovation AND www) OR (Innovation AND net) OR (Innovation AND virtual) OR (Innovation AND online) OR (Innovation AND network) OR (Innovation AND wiki) OR (Innovation AND website) OR (Innovation AND site) OR (Innovation AND blog) OR (Innovation AND forum) OR (Innovation AND twitter) OR (Innovation AND communities)

Figure 1. Generic search string.

Innovative companies operating in Brazil, preferably with activities related to the development of products or services focused on the domestic market were selected (Chart 1). Websites of Brazilian associations of innovative companies were used to identify the companies.

Respondents are involved with innovation, market or strategy of eight leading innovative companies of great prominence in their sectors in Brazil. Among the selected companies, there are two from the automotive sector, two from cosmetics and beauty sector, two in the construction sector and two multi-sector companies. Respondents agreed to participate in the survey under the condition of anonymity and non-disclosure of companies' names.

The interviews, totaling approximately nine hours, were recorded with the consent of the interviewees and later transcribed. For this qualitative step, content analysis was used and the transcripts were analyzed with the aid of ATLAS.ti software. According to Bardin (2009), content analysis

[...] will be a single instrument, but marked by a wide disparity of forms and adaptable to a very wide field of application: communications (Bardin 2009, p. 33).

Although it may suffer variations inherent in the objects of study, authors such as Amado (2000) and Vala (1986) suggest that content analysis contemplates the definition of the objectives, the codification of documents, the specification of a theoretical frame of reference, constitution of the corpus of analysis, repeated and exhaustive readings.

From the literature guidelines, the content analysis of the interviews followed the selection of the theoretical framework. The documents were

Chart 1. Characteristics of selected companies and interviewees.

Company	Sector	Activity (years)	Employees (in thousands)	Revenues (in billions R\$)	Interviewee position	Date of interview	Length (in hours)
A	automotive	35	20	20	Strategic Planning and Innovation Manager	08/17/2013	01:06
B	automotive	60	22	26	Corporate Strategy Manager	10/02/2013	01:29
C	construction	60	5	4	Digital and Institutional Marketing Manager	10/04/2013	01:07
D	construction	35	3.5	1	E-business and Social Media Specialist	10/03/2013	00:52
E	multi-sector	65	4	3	Corporate Marketing Manager	09/25/2013	01:02
F	multi-sector	65	14	8	Interaction and User Experience Designer	10/22/2013	01:15
G	cosmetics	35	5.5	2	Innovation Research Manager	08/30/2013	01:01
H	cosmetics	45	6.5	6	Innovation Networks Manager	10/03/2013	01:06

thoroughly read, analyzed, and then categorized, based on the theoretical framework. In order to illustrate the codifications and analyzes, the most relevant transcripts were highlighted and quoted in the discussion section.

3 Results and discussion

3.1 Scoping Review

The papers from scoping review were analyzed to identify evidence of use of internet technologies in the different stages of the product innovation process: ideation, concept, development, pre-launch, launch and support. The names used for the innovation process stages followed the concepts found in scoping review. Chart 2 highlights the relationships among the themes found in the selected articles. The technologies are presented in the lines and the stages are presented in the columns. This Chart shows the most used internet technologies in stages of product innovation from papers found in the scoping review.

It is possible to notice the large number of works relating to the technologies of platforms of co-creation, competition of ideas, social networks and forums of discussion with the ideation. It should also be emphasized the large number of works reporting the use of the co-creation platforms at all stages of the innovation process, being the technology present in the largest number of articles. The mentions of the co-creation platforms can be understood, in part, because they are offered as an integrated solution for companies. In addition, the recency of these tools may have attracted many researchers.

Search engines do not appear in the results because no reports were found. However, names related to the applications of internet technologies in innovation were found. These technologies are virtual questionnaire (online), virtual world (for example, Second Life) and collaborative tagging (website classification).

3.2 Qualitative approach – companies

The organizations in this study highlight the following elements of an innovative company as pointed out by Tidd et al. (2005): 1) high involvement in innovation; 2) shared vision, leadership and willingness to innovate; 3) appropriate organization structure; 4) effective team working; and 5) extensive communication.

Innovation appears to be not restricted to a single department in studied firms, given that the component of high involvement in innovation was noticed on all interviews. Creative capabilities and problem-solving skills are common to a large number of employees. The testimonials showed that innovation is a distributed task, with key people designated to monitor the progress and evolution of activities.

Another common point is the sharing of ideas among departments to facilitate decision-making of which innovation initiatives will be funded.

The “shared vision, leadership and the will to innovate” component encompasses sense of purpose, and top management commitment. Data collected identified that the strategic intent for innovation has been expressed in the vision of the companies and reinforced by the executives, making clear to collaborators the guidance to innovate.

It has also become clear that employees should be committed to innovation, since innovation is understood as central to the companies’ goals. The respondents highlighted this, stating that the employees’ mentality and energy need to be in harmony with innovation.

The existence of flexible structures and processes that allow the changes to thrive is required by the “appropriate structure” component. The study found that the innovation appears not to be confined to research and development laboratories.

Respondents referred to multidisciplinary teams that permeate the organizational structure, complementing appropriate structure. Innovation tasks happen in small groups with companies assessing the likelihood to boost promising innovation projects.

Extensive communication allows information to flow through the organization at all hierarchical levels, using multiple channels. Some of the reports showed the use of meetings for communication within teams besides making clear the use of multifunctional teams in projects. There were also indications of the intensive use of information technologies to support the organizations activities.

Study also verified the existence of new processes within companies. Respondents stated that companies have innovation processes designed in line with the existing literature (ideation, design, test and launch), but adapted according to their needs.

Companies A, D, G and H have the stages of ideation, feasibility analysis, implementation/execution, and launching. Some mentioned the term funnel to the innovation process. Companies seek ideas for new projects and use mechanisms of prioritization. The thinking of Company D sums up the concern of other firms: execution of the innovation project to generate a product for the consumer.

We have a specific innovation process, which was designed for our innovation funnel called Nous. [...] put the idea to execution is the most difficult task. Truth to be told, information is not power. Execution is power. (Company D, 2013).

The Stage-Gate process (Cooper, 1990) was cited by companies B, E and H. Company B pointed out the need for constant approvals for the project. For its turn, Company H mentioned both the innovation funnel and the Stage-Gate.

Chart 2. Stages of Product innovation versus internet technologies.

	Ideation	Concept	Development	Pre-launch	Launch	Support
E-mail	Eisenberg (2011)					
Website			Kozinets et al. (2008)			
Wiki	Blohm et al. (2011)					
Blog	Bilgram et al. (2008)	Bilgram et al. (2008)		Droge et al. (2010)	Droge et al. (2010)	
Discussion forums	Hewer & Brownlie (2010); Howe et al. (2000); Jeppesen & Molin (2003); Nambisan & Baron (2009); Nambisan & Baron (2010); Wu & Fang (2010)		Jeppesen & Molin (2003); Nambisan & Baron (2009)	Nambisan & Baron (2009)	Iivari (2010)	Iivari (2010); Janzik & Raasch (2011); Jeppesen & Molin (2003); Nambisan & Baron (2009); Nambisan & Baron (2010)
Social media	Kozinets et al. (2008); Lovejoy & Sinha (2010); Amaral & Rego (2010); Sawhney et al. (2003); Kim et al. (2008); Di Gangi et al. (2010); Marchi et al. (2011)		Kozinets et al. (2008); Hienerth & Lettl (2011); Sawhney et al. (2003)	Hienerth & Lettl (2011)		Janzik & Raasch (2011)
Idea competition	Antikainen & Vaataja (2010); Blohm et al. (2011); Frey et al. (2011); Gofman & Moskowitz (2009); Piller & Walcher (2006); Sawhney et al. (2003); Füller et al. (2011); Ebner et al. (2009)	Gofman & Moskowitz (2009)				
Cocreation platforms	Antikainen & Vaataja, (2010); Füller et al. (2010); Hemetsberger & Godula (2007); Mahr & Lievens (2012); Hewer & Brownlie (2010); Jeppesen & Frederiksen (2006); Müller-Seitz & Reger (2010); Rohrbeck et al. (2010); Chu & Chan (2009); Füller et al. (2007); Füller & Matzler (2007)	Hemetsberger & Godula (2007); Nambisan & Baron (2009); Rohrbeck et al. (2010)	Füller et al. (2010); Hemetsberger & Godula (2007); Jeppesen & Frederiksen (2006); Nambisan & Baron (2009); Rohrbeck et al. (2010); Bell & Loane (2010)	Füller et al. (2010); Hemetsberger & Godula (2007); Nambisan & Baron (2009); Chu & Chan (2009)	Hemetsberger & Godula (2007); Rohrbeck et al. (2010); Chu & Chan (2009)	Füller et al., 2010; Jeppesen; Frederiksen, 2006
Virtual forms	Wu & Fang (2010)	Howe et al. (2000); Sawhney et al. (2003)		Sawhney et al. (2003)		
Virtual worlds	Kohler et al. (2009)	Kohler et al. (2009)		Kohler et al. (2009)	Kohler et al. (2009)	
Colaborative tagging	Bilgram et al. (2008)	Bilgram et al. (2008)				

[...] we use the Stage-Gate process a lot, from a guy named Robert Cooper, who systematized those pipeline thoughts, so you have idea, concept, feasibility, development, [inaudible], launch, and post-launch. In our case, we map out this business to put it before the idea, each microcosm I told you before, it has to have a warehouse of ideas, which are in many ways, does not have a single standard (Company B, 2013).

So, the product innovation I think is the most established process, it is a process, it is only one process but it has different paths and in particular, we have two paths, the technology path and the product path, they are processes that have the base, obviously, same as the basis of any Stage-Gate process, but it has different phases, the other innovations they have less established processes, because they are newer (Company H, 2013).

Some of the companies in this study are concerned with the documentation of the innovation projects, probably linked to the process used, but this was not mentioned on all interviews. All companies showed evidences that the innovation activities are organized with established stages, corroborating theoretical aspects found in the literature.

Since companies in this study are considered innovative using specific processes for innovation, content analysis was performed to understand the use of internet technologies and innovation in the development of new products. The following technologies were considered as categories: website, e-mail, search engines, discussion forums, blogs, social networks or social media, wikis, idea competition tools, co-creation platforms, virtual surveys and virtual worlds.

The content analysis sought for actual instances of internet technologies use in companies activities or projects. However, they have also been referred to as technologies. Given that the most of respondents were not specialists in internet technologies, the mention of related expressions within an activity context meant its use in the organization.

The internet technologies studied in this research have diverse uses in firms, influenced by industry, culture, availability and other factors. The use of internet technologies by companies has grown significantly. Part of this is due to the evolution of the information technology environment as a whole. However, for some organizations, digital activities have represented a significant increase in the business. The case of Company D deserves highlight, where the respondent emphasized that the digital area accounts for 40% of the company's revenues.

Today the digital area of our business is accountable for 40% of the company's revenue and people buy apartments using digital means. Apartments of one million reais, two thousand reais, three millions reais, our area accounts for 40% of the sales of the company. So if you imagine that the company is making 2.5 billion Brazilian reais, 40% is a significant number that helps all those digital people (Company D, 2013).

This remark is reinforced by data from (IBGE, 2013) stating that computerized information networks are the most important source of information. The aforementioned report corroborates Kafouros (2006), Lan & Du (2002) and Sethi et al. (2003) on the importance of the Internet to generate positive results for companies. The Internet and the web are growing consistently and it is possible to notice companies restructuring their processes and observing returns on the investments made in this digital environment.

Firms' websites aggregate information for the general public and the consumer, and serve to orientate those people to other specific technologies. Companies C and D characterized the institutional use of the website and the centralization of information for the digital audience. The website represents one of the first initiatives of companies to establish presence in the virtual environment, serving as a channel of direct communication, controlled by the company. "If you access our website, you will see a bar of contacts and you will see how many technologies are already there [...]" (Company D, 2013).

Companies C and E reinforced the role of the website to strengthen the relationship with customers or consumers. Company C aims to convert most of the communication with customers to the web environment.

So you have a customer relationship website all over the web, where they can follow the work, see photos of the work, generate duplicate invoices. [...] So, all this part of relationship with the client is almost 100% over the web platform (Company C, 2013).

Company E uses the website to stimulate interactions with consumers to gather opinions and support decisions on investment in products.

So we started developing websites, going there and building upon the trend of participative consumers, aggregating on these platforms or searching for vendors that allow those ratings and reviews that we talk about, that there are the bazaar voices, those tools, I no longer remember the names of the suppliers, you include these features within the websites to allow people to express themselves, to evaluate and to become a foundation for you to invest in new products, adapting new ones, improve packaging experiences, and so on (Company E, 2013).

Companies A and H brought another functionality to the websites: the sale to consumers or business partners. Company H highlighted the importance of the website for multiple uses, centralizing the presence of the organization on the web. A recognized website and linked to the brand makes the consumer have an official source to search for information about the company and eventually communicate with it.

Similar to the website, e-mail is a widespread technology and its use as a communication tool is broad in business. However, as innovation-supporting technology, only companies C and E have cited it. Perhaps, due to the fact that people use it on daily basis, that they have not remembered to mention it. Further, corporate emails tend to be disclosed only to close contacts and not to the public.

In addition to aforementioned technologies, companies to identify consumer interests have used search engines. Company G reports that information about searches made by Internet users on Google is used to foresight the company's launches. To Company G, a greater number of searches on a given subject evidences demand for products or its features. The company uses this information to launch products accordingly. "[...] Google tools, so we can map out and know the people profile in each region of Brazil, what are the subjects people are looking for" (Company G, 2013).

Besides focusing on the interests of the consumer, Companies B and H use search engines to market research, partner and competitor discovery. Company H highlights the use of search engines focused on universities and research centers. They use the 'Capes Portal', a tool that aggregates information on Brazilian professors and researchers. "[...] we also use some, more for partner mapping, for example, we perform analyses using the 'Capes Portal'" (Company H, 2013).

Websites, e-mail, and search engines are technologies that allow information access, with limited interactivity. In turn, discussion forums are technologies that allow the creation of segmented topics, where participants can ask questions, respond to others or post messages. Company E reports the use of a specific tool made available to its internal public (employees) for these exchanges of information, which can be characterized as supporting innovation and competitiveness.

So we have our Intranet where we create internal communities here from [Company E], so the area of government relations, or the marketing area or the supply chain area, they can all go there to create a share point which is a place where people can set up compartmentalized libraries with relevant information available, or exchange information, or register demonstrations, or competitive information (Company E, 2013).

Blogs are interactive technologies commonly used by key people for the companies, the so-called lead users. Texts published, also called posts, deserve attention as it can affect the image of a product or brand. Companies can also create blogs to offer an informal communication channel to their consumers, seeking interactivity through the comments in the posts. Companies B, G and H distinguish blogs from the other internet technologies, showing particular attention to it, and to the content of lead users blogs. "We scan blogs, Twitter, Facebook, what is online we are analyzing, we keep in touch" (Company G, 2013). "[...] we use blogs a lot, YouTube to spread out our launchings that connect with our innovations. There's a lot of stuff here" (Company H, 2013).

I know it has, there is monitoring within the sales and marketing department, yes, some specific forums, we have an area that I think interesting to mention, a super well structured area about corporate relations with the press, so there is a news monitoring, so for example blogs, have plenty Internet monitoring on the radar of what is told about the [Company B] (Company B, 2013).

Companies B, G and H reinforce the arguments of Droge et al. (2010) that blogs have been used in the marketing stages. However, respondent of Company G indicates that is not clear if the blogs scanning is linked to the commercialization stage. For its turn, Companies B and H stated that association of blogs with sales sector (Company B) and launching stage (Company H) is clear, corroborating the literature.

Wiki is a technology where participants can share information and documents in a collaborative way, providing support for knowledge management. Company D indicates the role of the wiki in the retention of knowledge built over time and facilitating access to the information needed to accomplish the tasks. In this case (Company D), the wiki appears to be accessible only by company employees.

The wiki we've been using since 2006 [...] We play around with our information technology actually calling it [Enterprise D] Wiki, which R & D and engineering have access and put everything there, which worked, which didn't, which supplier, which product (Company D, 2013).

Interactivity is one of the main features offered by social media, discussion forums, blogs and wikis. Data analysis showed that the technology most used by the companies in this study was social media. It has been used to monitor the reputation of the brand and consumers, according to companies B, D and E. Some companies have also stated that they monitor their competitors' social media channels. Companies report the use of third-party solutions, although some choose to do the monitoring in-house, using own teams.

Exactly! Communication, the press area constantly monitoring data, things mainly, both monitoring in social media as, for example, in already known channels of communications or complaints, for example, “Reclame Aqui” [a Brazilian portal where consumers post complaints and companies can reply], we know that some of the cases are monitored and there is a discussion group internally, to align performance or positioning (Company B, 2013).

We work with Open Innovation, crowdsourcing. We have presence in some social media and extracting insights from this new consumer or from our customers, or from the market (Company D, 2013).

We have social media monitoring activities, from a reputation point of view, to protect corporate reputation. Social media, as it is very fragmented, we must have twelve Facebook, fanpages of the areas, and we monitor those, also for a possible crisis issue, for gathering, for the customer service, sometimes customer is moving, so he does not want to call our 0800 [toll free hotline] or not send an email to “Fale Conosco” [Contact us], there he wants to talk on the social media, or wants to give a suggestion on the social media, then we also have that kind of use (Company E, 2013).

Among the highlights of social media uses is the case of Company C, which choose Facebook for closer contact with consumers in establishing characteristics for a new real estate construction. Company C is a real estate company and the development in question is a residential building. Company reported interest in differentiation and in reaching the largest number of people nationwide. Also, is concerned in better understanding consumer needs, to lower dissatisfaction.

[Company C] wanted to differentiate itself. Therefore, we decided to ask people what they wanted in their apartment instead of our choices. Because we choose, of course, based on research and everything. But whoever can be disappointed, not us. Therefore, we decided to do it differently. Why not ask people? But how are we going to ask, how can we reach the whole Brazil, talk to everyone, and then be able to turn all this information into reality? So that's when we decided to go to social media, using Facebook (Company C, 2013).

Facebook was used to expand the reach of market research, as well to enable consumers themselves engaged in the campaign to collaborate by commenting on the ideas of others. Company C perceived this interactivity even if compared to other technologies.

So if there was no Facebook today, it would be humanly impossible to make this available. Of course we have email, Internet, have easiness. We certainly have. But social media have a likelihood of engagement,

closeness, and greater conversation / dialogue. Even because we are not talking to you. We are all talking to ourselves. You are talking to [Company E], but if a colleague makes a comment with you, you respond to him and the other one saw it, it is cool ... [Company E] is actually part of it. Everyone built something innovative, and we made part of it. We are one piece only. This is thanks to technology (Company C, 2013).

One of the companies concerns when using social media is the intellectual property. Company E brings an interesting report of using an internal social network for its scientists. The comparison with Facebook denotes the perception of social media characteristics for sharing information and knowledge, grouping each local technical team into a global structure of company research and development.

[...] we have a tool, which is a kind of internal Facebook, for the technical team, our scientists, they have a network that they call [tool name omitted] or something, similar to Facebook. Then, there is this closed community, where there are approximately eight thousand people, and they exchange information, from: look at this interesting article that came out in the Science journal, he sends, filters and everybody can read the recommendation on the article or in a specific situation, in a complicated situation of application development of some product and then this guy has a doubt, he can put in that social media and someone help, whether is a guy from China or northeast Brazil, he can say: try this, I already tried, I went through that. So it is a tool of the technical community that allows this instant exchange of information, knowledge, indications, and so on, which speeds up the innovation process. This is totally closed only to our scientists (Company E, 2013).

In short, the role of social media expanded in companies because this technology allow information sharing whether inside and outside the company. Company F summarizes its interest in social media platforms for consumer contact, trends tracking and competitor monitoring. The final part of the quote shows the importance of extracted content from social media to put guidance on the decisions of the company.

[...]then we use, as I said, social media, search engines, both to search references and see trends that are happening in the world, to see trends related to the competing market, what your competitor is doing, to watch into networks such as the Facebook, YouTube, what consumers are talking about, and this all generates information so that we can evaluate the alternatives that are on the table, and help us to filter and guide to what makes the most sense (Company F, 2013).

Unlike aforementioned technologies, idea competition tools, collaboration platforms, and web mining tools are more geared to the needs of innovation activities. The idea competition tools received attention from companies that consider important the opinions of the consumer posted on the web for better definition of their products. While Company A shows the use of technology in an experimental way, Company E shows a more effective use for gathering ideas, as shown by the number of launched challenges. Company E reported that it is still studying the technology to use it in Brazil, from its experiences in other country.

we did a great thing in the past, it was the [omitted name of the car], it was a fantastic experience, we used a web platform to search for relationship with the customer, and also with not customers, to know about the car, the future of the car, to create a new car concept, it was a really interesting experience (Company A, 2013).

Inside this same web site we have the [omitted], that we have made thirteen challenges in recent times, and searched for this consumer opinion, what he would think for his kitchen in the future, for his office, as would be the washing or take care of his car; all areas in which we have business, but try to stimulate a brainstorming for these solutions, then we have this (Company E, 2013).

Although there may be conceptual differences between the idea competition and co-creation platforms, it was not possible to identify if the companies that reported the employment of the former also advanced to the second. From studied companies, only one highlighted the use of a specific platform for co-creation. Company H, among other technologies, mentioned more than once the use of a co-creation platform. In the case of co-creation, a greater and continuous effort was required to develop of ideas, transforming them into new products or product features.

[...] the sales department also uses a tool to manage the portfolio of suppliers, we use a portfolio management tool that also tells us, it is also via the web, we access via the web, we use parts of documents to access via the web also to use, what else? A platform of co-creation also we use, also Facebook, also social networks, but we, we use also, platform of co-creation, wait just a little bit. Co-creation platform we also use, we use web site, we also use web site also with embedded blog [inaudible] I think they are the ones we have used here (Company H, 2013).

Companies are employing data mining to identify patterns and information from large volumes of data. Usually, it associates several tools for gathering

data on the web, and then its processing, seeking to extract actionable knowledge. Companies B, D, E and G reported the use of tools or techniques related to data mining. Those technologies allow monitoring social media and blogs, and facilitates filtering and discovery of interest subjects for the companies.

Part of data also, data processing, that Big Data, when we do the study, when you pick up using Hadoop techniques, and see how you can apply it, for instance, I'm developing simulators, I'm developing here within the corporate strategy a simulator of strategic indicators to help in the decision-making process (Company B, 2013).

We have some tools that understand which are the channels that give [sic] more return offline (phone for example). Therefore, we have been able to extract enough information from these technologies. So there comes the Big Data question that everyone is talking about now, that we can extract this information and segment this information and draw our plan upon it (Company D, 2013).

We can use a data mining tool, as an analysis module we use a little bit of [inaudible], Excel, we also use a bit of integration with design thinking, also a part of other modules of other external tools, that people go there from a list of tools like patents, scientific publications, analysis of topics of interest that are posted on the Internet (Company G, 2013).

The ideas competition tools and co-creation platforms have been the most studied technologies, according to the theoretical framework built at the beginning of this research. However, as in the theory, the results of this research showed that the initiatives to use these technologies still lack outcomes that justify the investments, as Füller et al. (2008) already emphasized. Rohrbeck et al. (2010) indicated that few companies have implemented these tools, an even a smaller number can focus on using in a specific innovation process stage. The authors emphasize that this focus, when it exists, is in the stage of ideation. In turn, the results of this research are in agreement with what was suggested by Shaw et al. (2001) and Yan et al. (2009).

Only two companies reported the use of virtual surveys for innovation. Company E used it to receive feedback, criticism and suggestions on products already launched, while Company H states that employ this technology for concept testing. Both uses show a concern to collect more targeted information, usually at more advanced stages of new product development.

The data collected in the interviews allowed identifying the importance of internet technologies in companies. The main highlight was the social media, cited and used by all the companies in the

study. The interaction with consumers provided by this technology seems to have aroused more interest and several reports of application have been used both to provide information and to monitor consumers and competitors.

The respondent of Company D highlights the value of the digital environment for the company's billing, including continuous growth. In addition to billing, the organization identifies that the electronic environment positively influences sales, market share, among other indicators. When asked for a detail on the impact of digital channels on company performance, the respondent informs that he could not answer, giving an indication that this is strategic and sensitive for the company.

Around 40% of the billing comes from digital, so this is one of the processes. Last year was 36%. So we have grown every year in both sales, market share, and other steps / metrics that are important for us to evaluate [...].

[Interviewer]: *But, from the technologies you mentioned, you can tell me a specific one and relate it to one of the results?*

[Interviewee]: *I cannot tell you (Company D, 2013).*

The respondent of Company E sums up the value of internet technologies for innovation. In addition to enabling interaction with customers, it offers metrics that help to manage the business. However, its most important role is related to the support given to people.

If people are the most important element of innovation, with their interactions in teams, with their discussions about opportunities, and if communication occurs intensely on digital platforms, then web technology plays a significant role (Company E, 2013).

The data highlight the importance of the website for companies in centralizing their information and contacts. In this way, it is possible to segment and drive audiences to the appropriate technologies in the institutional website. Along with the website, e-mail is a communication technology used by the internal public and can be opened to the external public, offering a direct channel between the consumer and specific people or sectors of the company.

In addition, companies have used search engines in different ways. In addition to the functionality of keyword and expressions search, allowing the exploration of related information, search engines offer information about the most searched topics by Internet users. Companies consider that those keywords denote consumer interest in product or

product features and these results may drive the innovation process. Search engines are also used to monitor competitors, possibly feeding competitive strategy tools.

Website, e-mail and search engines provide basic support for all stages of product innovation process, being largely used but subject to control by organizations. In addition, technologies such as blogs, social media, discussion forums and wikis allow firms to focus on interactivity and communication with a broader base of consumers. Papers from the scope review have pointed out the use of these technologies.

Blogs are places where companies can find lead users (Bilgram et al., 2008) to engage in the initial and final stages of product marketing (Droge et al., 2010). The firms in this study pointed out the importance of monitoring their reputations on blogs and the presence in this channel to communicate and understand consumers.

Social networks are crucial for acquiring knowledge from people inside and outside the organization (Wi et al., 2011), and can be a source for innovation (Kaplan & Haenlein, 2010). The surveyed firms emphasized the use of social networks to interact with consumers. Along with the presence in the online environment, offering a channel of communication appropriate to the customers, companies have monitored their corporate image and of its competitors. Interviewees mentioned actions for consumer engagement like gathering ideas to a new venture.

Discussion forums are sources of incremental product innovation (Haavisto, 2012) and can be used to build communities of innovation (Jeppesen & Molin, 2003) and create electronic word-of-mouth (e-WOM) in product development (Andreassen & Streukens, 2009). This research found companies that used discussion forums focusing internal staff, seeking to centralize and facilitate communication with collaborators.

Wikis have been used with ideas competition tools to achieve contributions to innovation (Blohm et al., 2011). Some of the companies surveyed have used wikis to support knowledge management, indexing the contents shared by the internal teams. However, wikis can be used by outside audiences to organized and objective information sharing than the discussion forums. However, wikis can be used by external audiences to information sharing in a more organized and objective way than, for example, the discussion forums.

In the interviewee's opinions, social networks allow differentiation and closeness to the consumers. One example showed the use of Facebook to the idea collection for a new building and other an internal social network for the company's scientists.

4 Conclusion

The organizations in this research are considered as innovative and prominent in the Brazilian nationwide scenario. The reports show that innovation practices have been influenced by the use of internet technologies.

The researched literature outlined in Chart 2 shows that most studies focused on ideation stage using idea competition tools. These technologies can be considered more suitable for gathering ideas, since they facilitate and guide the process, even though they may disregard the online word-of-mouth available in social media. Brazilian companies could use these technologies in pilot projects to verify their effectiveness in the Brazilian online environment.

Online social networks were considered by the companies in this study the most important technologies for innovation and have been used both for communication with consumers and for monitoring the market and competitors. However, companies aiming to extract knowledge from the web to support the innovation process should consider using multiple internet technologies, especially those aimed at innovation itself, such as competition of ideas and co-creation platforms. In addition, they should not neglect basic support technologies such as website, email, and search engines. This research showed that, although there is a preference for a certain technology, companies made investments on several fronts, seeking to take advantage of each one.

From gathered data, considering new product development process, it is possible to summarize that the internet technologies can be used accordingly to each stage of innovation. Basic support technologies such as website, e-mail, and search engines can provide information for all stages of innovation. Early stages, such as ideation, design and testing, require targeted information, which can be provided by innovation-focused technologies as brainstorming tools, co-creation platforms, and web mining. Blog, wikis, discussion forums, and social media, all support interactivity and communication, putting up information together for the final stages (launch and support) of the product innovation process.

Although the companies have their traditional processes of research and development of new products, the online environment showed relevance according to the reports of the respondents. However, companies seem to focus in the early stages of the innovation process and, strongly, in the use of social media. In this way, innovative Brazilian companies in this study are performing innovation and attempting to listen the consumer to add up value to their products.

Acknowledgements

This work was supported by Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) or Fundação de Amparo à Pesquisa de Minas Gerais (FAPEMIG). The authors are grateful to the anonymous reviewers for the comments and suggestions.

References

- Amado, J. S. (2000). A técnica de análise de conteúdo. *Revista de Enfermagem Referência*, 1(5), 53-63. Recuperado em 15 de agosto de 2011, de https://web.esenfc.pt/v02/pa/conteudos/downloadArtigo.php?id_ficheiro=139&codigo=.
- Amaral, I. S., & Rego, A. (2010). Innovation intelligence: Crowdsourcing in a social network. *International Journal of Technology Intelligence and Planning*, 6(3), 288-299. <http://dx.doi.org/10.1504/IJTIP.2010.035780>.
- Anderson, P. (2007). *What is web2.0? Ideas, technologies and implications for education*. Bristol: JISC – Technology & Standards Watch. Recuperado em 10 de fevereiro de 2012, de <http://www.jisc.ac.uk/media/documents/techwatch/tsw0701b.pdf>.
- Andreassen, T. W., & Streukens, S. (2009). Service innovation and electronic word-of-mouth: is it worth listening to? *Managing Service Quality*, 19(3), 249-265. <http://dx.doi.org/10.1108/09604520910955294>.
- Antikainen, M. J., & Vaataja, H. K. (2010). Rewarding in open innovation communities - how to motivate members. *International Journal of Entrepreneurship and Innovation Management*, 11(4), 440-456. <http://dx.doi.org/10.1504/IJEIM.2010.032267>.
- Bardin, L. (2009). *Análise de conteúdo*. Portugal: Edições 70.
- Bean, L., & Hott, D. D. (2005). Wiki: A speedy new tool to manage projects. *Journal of Corporate Accounting & Finance*, 16(5), 3-8. <http://dx.doi.org/10.1002/jcaf.20128>.
- Bell, J., & Loane, S. (2010). 'New-wave' global firms: Web 2.0 and SME internationalisation. *Journal of Marketing Management*, 26(3-4), 213-229. <http://dx.doi.org/10.1080/02672571003594648>.
- Bilgram, V., Brem, A., & Voigt, K.-I. (2008). User-centric innovations in new product development — systematic identification of lead users harnessing interactive and collaborative online-tools. *International Journal of Innovation Management*, 12(03), 419-458. <http://dx.doi.org/10.1142/S1363919608002096>.
- Blohm, I., Bretschneider, U., Leimeister, J. M., & Kremer, H. (2011). Does collaboration among participants lead to better ideas in IT-based idea competitions? An empirical investigation. *International Journal of Networking and Virtual Organisations*, 9(2), 106-122. <http://dx.doi.org/10.1504/IJNVO.2011.042413>.

- Boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, 13(1), 210-230. <http://dx.doi.org/10.1111/j.1083-6101.2007.00393.x>.
- Brin, S., & Page, L. (1998). The anatomy of a large-scale hypertextual Web search engine. *Computer Networks and ISDN Systems*, 30(1-7), 107-117.
- Castells, M. (2003). *A sociedade em rede*. São Paulo: Paz e Terra.
- Chesbrough, H. W. (2003). *Open innovation: the new imperative for creating and profiting from technology*. Boston: Harvard Business School Press.
- Chu, K. M., & Chan, H. C. (2009). Community based innovation: its antecedents and its impact on innovation success. *Internet Research*, 19(5), 496-516.
- Clark, K. B., & Fujimoto, T. (1991). *Product development performance: strategy, organization, and management in the world auto industry*. Boston: Harvard Business School Press.
- Cooper, R. G. (1990). Stage-Gate Systems - a new tool for managing new products. *Business Horizons*, 33(3), 44-54. [http://dx.doi.org/10.1016/0007-6813\(90\)90040-I](http://dx.doi.org/10.1016/0007-6813(90)90040-I).
- Cooper, R. G. (2008). Perspective: The Stage-Gate® Idea-to-Launch Process - Update, What's New, and NexGen Systems. *Journal of Product Innovation Management*, 25(3), 213-232. <http://dx.doi.org/10.1111/j.1540-5885.2008.00296.x>.
- Crossan, M. M., & Apaydin, M. (2010). A Multi-Dimensional framework of organizational innovation: a systematic review of the literature. *Journal of Management Studies*, 47(6), 1154-1191. <http://dx.doi.org/10.1111/j.1467-6486.2009.00880.x>.
- Di Gangi, M., Wasko, M. M., & Hooker, R. E. (2010). Getting customers' ideas to work for you: learning from dell how to succeed with online user innovation communities. *MIS Quarterly Executive*, 9(4), 213-228.
- Droge, C., Stanko, M. A., & Pollitte, W. A. (2010). Lead users and early adopters on the web: the role of new technology product blogs. *Journal of Product Innovation Management*, 27(1), 66-82. <http://dx.doi.org/10.1111/j.1540-5885.2009.00700.x>.
- Ebner, W., Leimeister, J. M., & Krcmar, H. (2009). Community engineering for innovations: the ideas competition as a method to nurture a virtual community for innovations. *R & D Management*, 39(4), 342-356. <http://dx.doi.org/10.1111/j.1467-9310.2009.00564.x>.
- Eisenberg, I. (2011). Lead-User Research for Breakthrough Innovation. *Research Technology Management*, 54(1), 50-58. <http://dx.doi.org/10.1080/08956308.2011.11657673>.
- Etzioni, O. (1996). The World Wide Web: Quagmire or gold mine. *Communications of the ACM*, 39(11), 65-68.
- Frey, K., Luthje, C., & Haag, S. (2011). Whom should firms attract to open innovation platforms? The role of knowledge diversity and motivation. *Long Range Planning*, 44(5-6), 397-420. <http://dx.doi.org/10.1016/j.lrp.2011.09.006>.
- Füller, J., & Matzler, K. (2007). Virtual product experience and customer participation - A chance for customer-centred, really new products. *Technovation*, 27(6-7), 378-387. <http://dx.doi.org/10.1016/j.technovation.2006.09.005>.
- Füller, J., Faullant, R., & Matzler, K. (2010). Triggers for virtual customer integration in the development of medical equipment - From a manufacturer and a user's perspective. *Industrial Marketing Management*, 39(8), 1376-1383. <http://dx.doi.org/10.1016/j.indmarman.2010.04.003>.
- Füller, J., Hutter, K., & Faullant, R. (2011). Why co-creation experience matters? Creative experience and its impact on the quantity and quality of creative contributions. *R & D Management*, 41(3), 259-273. <http://dx.doi.org/10.1111/j.1467-9310.2011.00640.x>.
- Füller, J., Jawecki, G., & Muhlbacher, H. (2007). Innovation creation by online basketball communities. *Journal of Business Research*, 60(1), 60-71. <http://dx.doi.org/10.1016/j.jbusres.2006.09.019>.
- Füller, J., Matzler, K., & Hopper, M. (2008). Brand community members as a source of innovation. *Journal of Product Innovation Management*, 25(6), 608-619. <http://dx.doi.org/10.1111/j.1540-5885.2008.00325.x>.
- Gofman, A., & Moskowitz, H. (2009). Steps towards a consumer-driven innovation machine for 'ordinary' product categories in their later lifecycle stages. *International Journal of Technology Management*, 45(3/4), 349-363. <http://dx.doi.org/10.1504/IJTM.2009.022658>.
- Gonzalez-Reinhart, J. (2005). *Wiki and the wiki way: Beyond a knowledge management solution*. Houston: Information Systems Research Center.
- Haavisto, P. (2012). Social Media Discussion Forums and Product Innovation: The way forward? *First Monday*, 17(10). <http://dx.doi.org/10.5210/fm.v17i10.3984>.
- Hemetsberger, A., & Godula, G. (2007). Virtual customer integration in new product development in industrial markets: The QLL framework. *Journal of Business-To-Business Marketing*, 14(2), 1-40. http://dx.doi.org/10.1300/J033v14n02_01.
- Hewer, P., & Brownlie, D. (2010). On market forces and adjustments: Acknowledging consumer creativity through the aesthetics of debadging. *Journal of Marketing Management*, 26(5-6), 428-440. <http://dx.doi.org/10.1080/02672570903458730>.
- Hiernerth, C., & Lettl, C. (2011). Exploring how peer communities enable lead user innovations to become standard equipment in the industry: Community Pull Effects. *Journal of Product Innovation Management*,

- 28(1), 175-195. <http://dx.doi.org/10.1111/j.1540-5885.2011.00869.x>.
- Howe, J. (2006). The Rise of Crowdsourcing. *Wired Magazine*, 14(6). Recuperado em 09 de fevereiro de 2012, de <http://archive.wired.com/wired/archive/14.06/crowds.html>.
- Howe, V., Mathieu, R. G., & Parker, J. (2000). Supporting new product development with the Internet. *Industrial Management & Data Systems*, 100(5-6), 277-284. <http://dx.doi.org/10.1108/02635570010301197>.
- Huizingh, E. K. R. E. (2011). Open innovation: State of the art and future perspectives. *Technovation*, 31(1), 2-9. <http://dx.doi.org/10.1016/j.technovation.2010.10.002>.
- Iivari, N. (2010). Discursive construction of 'user innovations' in the open source software development context. *Information and Organization*, 20(2), 111-132. <http://dx.doi.org/10.1016/j.infoandorg.2010.03.002>.
- Instituto Brasileiro de Geografia e Estatística – IBGE. (2013). PINTEC: Pesquisa de Inovação Tecnológica 2011. Rio de Janeiro: IBGE.
- Janzik, L., & Raasch, C. (2011). Online communities in mature markets: why join, why innovate, why share? *International Journal of Innovation Management*, 15(4), 797-836. <http://dx.doi.org/10.1142/S1363919611003568>.
- Jeppesen, L. B., & Frederiksen, L. (2006). Why do users contribute to firm-hosted user communities? The case of computer-controlled music instruments. *Organization Science*, 17(1), 45-63. <http://dx.doi.org/10.1287/orsc.1050.0156>.
- Jeppesen, L. B., & Molin, M. J. (2003). Consumers as co-developers: Learning and innovation outside the firm. *Technology Analysis and Strategic Management*, 15(3), 363-383. <http://dx.doi.org/10.1080/09537320310001601531>.
- Kafouros, M. I. (2006). The impact of the Internet on R&D efficiency: theory and evidence. *Technovation*, 26(7), 827-835. <http://dx.doi.org/10.1016/j.technovation.2005.02.002>.
- Kaplan, A., & Haenlein, M. (2010). Users of the world unite! The challenges and opportunities of Social Media. *Business Horizons*, 53(1), 59-68. <http://dx.doi.org/10.1016/j.bushor.2009.09.003>.
- Kim, J. H., Bae, Z.-T., & Kang, S. H. (2008). The role of online brand community in new product development: case studies on digital product manufacturers in Korea. *International Journal of Innovation Management*, 12(3), 357-376. <http://dx.doi.org/10.1142/S1363919608002011>.
- Kohler, T., Matzler, K., & Füller, J. (2009). Avatar-based innovation: Using virtual worlds for real-world innovation. *Technovation*, 29(6-7), 395-407. <http://dx.doi.org/10.1016/j.technovation.2008.11.004>.
- Kotler, P. (2000). *Administração de Marketing*. São Paulo: Prentice-Hall.
- Kozinets, R. V., Hemetsberger, A., & Schau, H. J. (2008). The wisdom of consumer crowds collective innovation in the age of networked marketing. *Journal of Macromarketing*, 28(4), 339-354. <http://dx.doi.org/10.1177/0276146708325382>.
- Lan, P., & Du, H. H. (2002). Challenges ahead e-innovation. *Technovation*, 22(12), 761-767. [http://dx.doi.org/10.1016/S0166-4972\(02\)00027-5](http://dx.doi.org/10.1016/S0166-4972(02)00027-5).
- Levitt, B. (2004). Marketing myopia. *Harvard Business Review*, 82(7-8), 138-149. PMID:15252891.
- Lovejoy, W. S., & Sinha, A. (2010). Efficient structures for innovative social networks. *Management Science*, 56(7), 1127-1145. <http://dx.doi.org/10.1287/mnsc.1100.1168>.
- Mahr, D., & Lievens, A. (2012). Virtual lead user communities: Drivers of knowledge creation for innovation. *Research Policy*, 41(1), 167-177. <http://dx.doi.org/10.1016/j.respol.2011.08.006>.
- Marchi, G., Giachetti, C., & De Gennaro, P. (2011). Extending lead-user theory to online brand communities: The case of the community Ducati. *Technovation*, 31(8), 350-361. <http://dx.doi.org/10.1016/j.technovation.2011.04.005>.
- McCarthy, E. J., & Perreault, W. D. Jr (2003). *Essentials of marketing: a global-managerial approach*. 9. ed. New York: McGraw-Hill/Irwin.
- McKinsey (2008). *Building the web 2.0 enterprise: McKinsey Global Survey Results*. Seattle: McKinsey Quarterly.
- Meyer, J. (2010). Does social software support service innovation? *International Journal of the Economics of Business*, 17(3), 289-311. <http://dx.doi.org/10.1080/013571516.2010.513814>.
- Müller-Seitz, G., & Reger, G. (2010). Networking beyond the software code? an explorative examination of the development of an open source car project. *Technovation*, 30(11-12), 627-634. <http://dx.doi.org/10.1016/j.technovation.2010.07.006>.
- Murugesan, S. (2007). Understanding Web 2.0. *IT Professional*, 9(4), 34-41. <http://dx.doi.org/10.1109/MITP.2007.78>.
- Nambisan, S., & Baron, R. A. (2009). Virtual customer environments: Testing a model of voluntary participation in value co-creation activities. *Journal of Product Innovation Management*, 26(4), 388-406. <http://dx.doi.org/10.1111/j.1540-5885.2009.00667.x>.
- Nambisan, S., & Baron, R. A. (2010). Different roles, different strokes: Organizing virtual customer environments to promote two types of customer contributions. *Organization Science*, 21(2), 554-572. <http://dx.doi.org/10.1287/orsc.1090.0460>.

- O'Reilly, T. (2005). Web 2.0: Compact definition? *O'Reilly Radar*. Recuperado em 09 de fevereiro de 2012, de <http://radar.oreilly.com/2005/10/web-20-compact-definition.html>.
- Organisation for Economic Co-operation and Development – OECD. (2005). Oslo Manual Guidelines for Collecting and Interpreting Innovation Data. In Organisation for Economic Co-operation and Development. *The Measurement of Scientific and Technological Activities* (3rd ed.). Paris: OECD Publishing. Recuperado em 05 de fevereiro de 2012, de <http://www.oecd.org/sti/oslomanual>.
- Piller, F. T., & Walcher, D. (2006). Toolkits for idea competitions: a novel method to integrate users in new product development. *R & D Management*, 36(3), 307-318. <http://dx.doi.org/10.1111/j.1467-9310.2006.00432.x>.
- Prandelli, E., Verona, G., & Raccagni, D. (2006). Diffusion of Web-based product innovation. *California Management Review*, 48(4), 109-136. <http://dx.doi.org/10.2307/41166363>.
- Pugh, S. (1991). *Total design: integrated methods for successful product engineering*. Reading: Addison Wesley.
- Rohrbeck, R., Steinhoff, F., & Perder, F. (2010). Sourcing innovation from your customer: how multinational enterprises use Web platforms for virtual customer integration. *Technology Analysis and Strategic Management*, 22(2), 117-131. <http://dx.doi.org/10.1080/09537320903498462>.
- Rozenfeld, H., et al (2006). *Gestão do Desenvolvimento de Produtos: uma referência para a melhoria do processo*. São Paulo: Saraiva.
- Sandmeier, P., Morrison, P. D., & Gassmann, O. (2010). Integrating customers in product innovation: Lessons from industrial development contractors and in-house contractors in rapidly changing customer markets. *Creativity and Innovation Management*, 19(2), 89-106. <http://dx.doi.org/10.1111/j.1467-8691.2010.00555.x>.
- Sawhney, M., Prandelli, E., & Verona, G. (2003). The power of innomediation. *MIT Sloan Management Review*, 44(2), 77-82.
- Sawhney, M., Verona, G., & Prandelli, E. (2005). Collaborating to create: The Internet as a platform for customer engagement in product innovation. *Journal of Interactive Marketing*, 19(4), 4-17. <http://dx.doi.org/10.1002/dir.20046>.
- Semenik, R., & Bamossy, G. (1995). *Princípios de Marketing: uma perspectiva global*. São Paulo: Makron.
- Sethi, R., Pant, S., & Sethi, A. (2003). Web-based product development systems integration and new product outcomes: A conceptual framework. *Journal of Product Innovation Management*, 20(1), 37-56. <http://dx.doi.org/10.1111/1540-5885.201004>.
- Shaw, M. J., Subramaniam, C., Tan, G. W., & Welge, M. E. (2001). Knowledge management and data mining for marketing. *Decision Support Systems*, 31(1), 127-137. [http://dx.doi.org/10.1016/S0167-9236\(00\)00123-8](http://dx.doi.org/10.1016/S0167-9236(00)00123-8).
- Singhal, N., & Nagar, Y. (2013). A users search history based approach to manage revisit frequency of an Incremental Crawler. *International Journal of Computers and Applications*, 63(3), 18-22. <http://dx.doi.org/10.5120/10446-5138>.
- Stephens, R. T. (2009). Empirical Analysis of Functional Web 2.0 Environments. In M. D. Lytras et al. (Eds.), *Web 2.0: The business model*. (pp. 1-20). New York: Springer.
- Su, C. T., Chen, Y. H., & Sha, D. Y. (2006). Linking innovative product development with customer knowledge: a data-mining approach. *Technovation*, 26(7), 784-795. <http://dx.doi.org/10.1016/j.technovation.2005.05.005>.
- Tidd, J., Bessant, J., & Pavitt, K. (2005). *Managing Innovation: Integrating technological, market and organizational change*. (3rd ed.) West Sussex: John Wiley & Sons.
- Ulrich, K. T., & Eppinger, S. D. (2004). *Product design and development*. (3rd ed.). Boston: McGraw-Hill/Irwin.
- Urban, G. L., & Hauser, J. R. (1993). *Design and marketing of new products*. (2nd ed.). Englewood Cliffs: Prentice Hall.
- Vala, J. (1986). A Análise de Conteúdo. In: A. S. Silva & J. M. Pinto (Orgs.), *Metodologia das ciências sociais*. Porto: Afrontamento.
- Vassos, T. (1997). *Marketing Estratégico na Internet*. São Paulo: Makron Books.
- Walker, J. (2007). Weblog. In D. Herman, M. Jahn & M. L. Ryan (Eds.), *Routledge encyclopedia of narrative theory*. London: Routledge.
- Wheelwright, S. C., & Clark, K. B. (1992). *Revolutionizing product development: quantum leaps in speed, efficiency, and quality*. New York: Maxwell Macmillan International.
- Wi, H., Oh, S., & Jung, M. (2011). Virtual organization for open innovation: Semantic web based inter-organizational team formation. *Expert Systems with Applications*, 38(7), 8466-8476. <http://dx.doi.org/10.1016/j.eswa.2011.01.044>.
- Wind, Y., & Mahajan, V. (2001). *Digital marketing: global strategies from the world's leading experts*. New York: Wiley.
- Wu, S. C., & Fang, W. C. (2010). The effect of consumer-to-consumer interactions on idea generation in virtual brand community relationships. *Technovation*, 30(11-12), 570-581. <http://dx.doi.org/10.1016/j.technovation.2010.07.005>.

- Yan, W., Chen, C.-H., Huang, Y., & Mi, W. (2009). A data-mining approach for product conceptualization in a web-based architecture. *Computers in Industry*, 60(1), 21-34. <http://dx.doi.org/10.1016/j.compind.2008.09.003>.
- Zwass, V. (2010). Co-Creation: Toward a Taxonomy and an Integrated Research Perspective. *International Journal of Electronic Commerce*, 15(1), 11-48. <http://dx.doi.org/10.2753/JEC1086-4415150101>.