



Intellectual property and patent prospecting as a basis for knowledge and innovation – a study on mobile information technologies and virtual processes of communication and management

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Received 10 December 2016; accepted 27 July 2017

Scientific Editor: Felipe Borini

Abstract

Information and knowledge are essential drivers of innovations, technological development, and transformations that foster organizations' competitiveness and constantly change the way people communicate, interact, and work. To hold information and knowledge means the possibility of expanding capacities and ensuring access to opportunities that may bring competitive advantage and economic growth. Considering these assumptions, the purpose of this study was to demonstrate how inventive actions can be collected and correlated as a source of information and knowledge for a given subject. In order to do so, we established as research elements the following topics: mobile information technologies, mobile communication, and management, and we looked for them, in a correlated way, in patent databases. This is a descriptive qualitative study, with secondary data collection in patent bases such as the websites Espacenet.com, Wipo.com and Patent2Net, which provide information on patents' registrations. We used the Gephi software for analysis and visualization of network structures. Through the use of specific filters, considering the three topics together, the results showed 213 patents filed in the period 1988–2015, and a concentration of records between 2012 and 2013, when 32% of them were registered. In addition, China was responsible for 40% of patent applications, followed by South Korea, with 24%, and the United States and Japan, both with nearly 11% of the total.

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Keywords: Intellectual property; Mobile information technologies; Communication; Management

Introduction

Organizations increasingly consider innovation as a key factor in the search for competitive advantage (Manfredi & Nappo, 2012). This assumption is justified mainly by the need of continuous investments in research and development (R&D), as a response to the growing complexity of technologies and fast changes in customer demands (Besanko, Dranove, Shanley, & Schaefer, 2009). The registration of these researches and their

development into innovative actions generate an information and knowledge base that can produce, in turn, new insights and ideas, in a dynamics that is essential to convert these data into something really innovative and advantageous (Quonian, 2015).

Specifically through data that are registered in patents related to mobile technologies, mobile communication and management, it is possible to gather information that can generate opportunities for improvement in these technologies or processes, to understand the content of the proposals and the evolution of initiatives on this subject, as well as to get new insights for the maturation of the interaction and communication processes of teams that connect at distance. In this sense, the use of competitive intelligence and the assessment of competitors' research make the consultation of patent bases an important means to support organizational decision-making, since it provides inputs for better choices that help businesses'

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Peer Review under the responsibility of Departamento de Administração, Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo – FEA/USP.

<http://dx.doi.org/10.1016/j.rai.2017.07.006>

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competitiveness (Manfredi & Nappo, 2012). Organizational strategy, its ability to venture and its knowledge infrastructure are among the main factors that influence an assertive decision-making (Alkhouraji, Liu, Oderanti, Annansingh, & Pan, 2014).

According to Castells, Salvador, and Bosch (2000), technological mapping of the market and of the company itself allows to create scenarios, to question which correlated studies have been done, what the competition is producing, which patents are being filed on a certain subject, hence, to understand the main opportunities and threats, a systematic survey of information can allow a better assessment of the risks involved in an innovative project, thus supporting decision-making by top managers before undertaking it.

In Quoniam's view (2015), although little explored, the content described in patents, whether or not granted, is an important source of information and a valuable basis for knowledge, since it contains the technical details of the projects and the particularities of the authors' inventive intentions (Araújo, 1981; Castells et al., 2000; Ravaschio, Faria, & Quoniam, 2010). In order to be filed, patent applications must have a sufficiently detailed technical content that can be reproduced by a specialist in that subject. Thus, to expand knowledge capacities and not "reinvent the wheel" in R&D, scholars can strengthen their data if they also consider patents' content as an important source of information (Ravaschio et al., 2010).

Considering this context, the study aimed to demonstrate how inventive actions can be collected and correlated as a source of information and knowledge on a given subject; to do this, we used as research key elements the topics 'mobile information technologies', 'mobile communication', and 'management', and consulted them in a correlated way, through free and open access softwares and APIs (Application Programming Interface), in order to prospect information and knowledge in global patent bases.

We decided to search these three correlated topics because they are a matter of growing interest, since innovations in mobile information technologies have produced a series of changes in the way people communicate, interact and collaborate (Saccol & Reinhard, 2007; Sorensen, 2011); they also enable labor mobility and allow tasks to be managed at distance, through electronic communication, and in several conditions, such as geographical or temporal distance, social influences and cultural or organizational differences (Lu, Yao, & Yu, 2005; Lyytinen & Youngjin, 2002; Sorensen, 2011; Weiser, 1991).

Mobile information technologies, mobile communication and management processes

Radical improvements in microprocessors, higher performance of computing devices, lower cost of these resources and access to data networks allow technology to be increasingly incorporated in different parts of our environments (Lyytinen & Youngjin, 2002). This phenomenon was named by Weiser (1991) "ubiquitous computing", which is omnipresent and inseparable, being at any time and space in people's lives. The deepest technologies are precisely those that 'disappear', that is, they

are present, but we do not even perceive them in our daily life.

The term "mobile information technologies", in turn, refers to mobility and portability, that is, any technology device that can be used during the geographic displacement of its user, at any time or place (Saccol & Reinhard, 2007; Sorensen, 2011). For Jarvenpaa and Lang (2005, p. 8), "the purposes of using technology include communication (voice and data), coordination (tasks and people) and sociability (family, friends and colleagues)". Therefore, mobile telephony, Internet and wireless networks, Wi-Fi, portable computers and miniaturization are examples of technological advances that have expanded access to communication, data and information, beyond time and space boundaries (Besseyre des Horts, Isaac, & Leclercq, 2006).

The expansion and increasing use of these technologies bring new dimensions of interaction between people, and interrelate and overlap the social roles of individuals (Kakihara & Sorensen, 2001). In the interaction at distance, the user can receive simultaneous interference of different concerns and problems, and has the free will over what to prioritize and when to act. For Sorensen (2011), situational factors are those that influence these decisions and challenge the logic of the relationship between what technology offers and how it is used. Also for Jarvenpaa and Lang (2005), the actions and experiences of mobile technology users depend on situational and contextual factors and, regardless of purpose, mobile technology may create decision conflicts for them.

At the same time, new forms of structuring work emerge, and it now can be 'mobile', carried out at distance, remotely (Saccol & Reinhard, 2007). However, there are new challenges to face regarding labor mobility. For Lu et al. (2005), there are strong causal relationships between the social influences on the individual and his intention to adopt mobile technology. Other strong users, in turn, develop deep relationships with their mobile devices, using them as a form of personal expression and identity as well (Jarvenpaa & Lang, 2005; Lyytinen & Youngjin, 2002). In addition, virtual workers have learning limitations because, under the control of mobile technologies, they keep an 'on' status all the time, with greater challenges for setting limits between their work assignments and their personal life issues (Reyt & Wiesenfeld, 2015). Similarly, virtual teams have a larger difficulty in achieving a joint understanding, because they rely heavily on technologies to mediate their communications but are not in the same working environment, which makes it difficult to disseminate and share knowledge (Hinds & Weisband, 2003).

Thus, for organizations that adopt structures of remote working, there are new needs and concerns. Some of them were described by Jarvenpaa and Lang (2005), such as: concerns about the management of activities; privacy protection and data security; need for some kind of control over the presence and availability of professionals, among others. In short, the opportunities created by these concerns and needs, for example, for system designers, are relevant in this research, since for both individuals and organizations, it is necessary to have new conditions and processes to better manage these mobile interactions.

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