Available online at www.sciencedirect.com

RAI Revista de Administração e Inovação 14 (2017) 301–310

http://www.rai-imr.com.br/pt/

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

Sirlei de Almeida Pereira *, Luc Quoniam

Universidade Nove de Julho, São Paulo, SP, Brazil

Received 10 December 2016; accepted 27 July 2017
Available online 18 September 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.

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 (Quoniam, 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'

* Corresponding author.
E-mails: apereira.sirlei@gmail.com (S.A. Pereira), mail@quoniam.info (L. Quoniam).

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

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 (Alkhuraiji, 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 allows 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.

Intellectual and industrial property and patent databases

Intellectual property is intended to ensure rights to inventors or to those responsible for any intellectual activity in several areas. According to the São Paulo Intellectual Property Association (ASPI), it provides to the applicant the "right to get, for a certain period of time, a reward for his own creation". The World Intellectual Property Organization (WIPO) divides intellectual property in two categories: *industrial property*, which concerns patents for inventions and utility models, brands, industrial design, geographical indication and repression to crimes against industrial property; and *copyright* for literary, cultural and artistic works, as well as trademarks, designs, symbols, internet, softwares, etc. According to WIPO (2015), the main objective of intellectual property is to achieve a balance between the inventors' interests and public interest, in an environment that stimulates creativity and innovation.

Lesser (2011), in his paper on the effects of industrial property and patent evaluation systems, observes that there is a causal relationship between the strength of a country's patent system and its economic growth. Besides that, the adoption of international agreements, which include issues related to intellectual property rights and the intention to protect investments in innovation, indicates that middle-income countries have the potential to improve up to 50 percent, mainly as a result of increasing government efficiency and reducing the possibility of corruption.

In Brazil, regarding specifically the category of industrial property in patents and utility models, the rights and obligations are governed by Act 9279, in effect since May 1996, which considers the social interest and the country's technological and economic development. Articles 8 and 9 describe that: it is patentable the invention that meets the requirements of novelty, inventive activity and industrial application; and it is patentable, as a utility model, the object of practical use, or part of it, that may have industrial application, which presents a new form or arrangement, and involves an inventive act, that results in a functional improvement in its use or in its manufacture. In addition, Section II, Art. 24 of that act states that: "The report should clearly and sufficiently describe the object, so as to allow its implementation by a specialist in that subject, and indicate, where applicable, the best way of performance". Besides that, and in most countries, the content of a patent application is published 18 months after its registration, thus becoming of public domain, even if the patent is not granted, since the record only guarantees that the applicant was the first to submit and request the idea's authorship, which will be examined until its approval or denial.

Methodological procedures

This is a descriptive research, which aims to allow greater knowledge about data collection in patent bases. It describes and exemplifies how inventive actions can be collected and correlated by searching them from a certain topic, as the key element of research. Descriptive research is precisely the type that makes it possible to detail the attributes of a given phenomenon, reporting it as it occurs in practice (Martins & Theóphilo, 2009).

The evolution of the internet, in a new architecture of applications distributed and accessible, interactively, at any time and place – a phenomenon made popular as *Web 2.0* (O'Reilly, 2007), made available a set of free information and in massive amounts that can be accessed through search engines, especially the application programming interfaces (APIs), which enable to get and transfer such data, from their bases to the information processing softwares that request them.

In this study, we worked with secondary data (Fink, 2003), delimited by the topics 'mobile information technologies', 'mobile communication' and 'management'. We collected them on the sites Espacenet.com, Wipo.com and Patent2Net, in a correlated way, to retrieve data on patents, and used Gephi software for the analysis and visualization of network structures.

We put a series of filters on the site Espacenet.com, in order to refine the words selected as search keys. We started with more generic filters, such as 'mobile management', to enable a preliminary analysis of the findings and to add new and more specific words, to better delimit the search. New filters were added until we reached the final filter, which established as a criterion a minimum number of 200 patents, related to mobile information technologies, mobile communication and management processes, which resulted in a sufficiently good sample (Castells et al., 2000; Quoniam, 2015) to demonstrate that data collecting on patent bases can be important sources of information and knowledge; in this case, focusing on the theme selected by the search key. In addition, we defined a search period between the years 1988 and 2015, which included those years before the commercial popularization of the internet, so that we could observe the evolution of the topic, until the year 2015, when data for this research were collected.

Considering these criteria, the final filter adopted the following query: 'virtual* communic*' or 'mobil* communic*' or ta = 'remot* communic*' and (ta = process* or ta = manag* or ta = work*) and ta = project*. In this query, smart search masks were used, combining field identifiers and **and** and **or** functions, where: **ta** indicates the delimitation of words search, only in title and abstract; the asterisk (*) indicates which word can be complemented from that point, for example, in 'virtual* communic*' it is possible to find 'virtualizing communication' or 'virtualized communicator', among others; and in **and** and **or** functions we define the connection or not of the terms, that is, if they can be excluding or not. The main filters used and the number of patents identified in each stage in Espacenet can be seen in Table 1.

One of the field indicators used during the choice of the best search query was **cl**, which delimits the IPC or CPC codes (International Patent Classification or Cooperative Patent Classification). These codes represent an important filter because they are encoding patterns used internationally for patents' classification. IPC, for example, uses a "hierarchical system of symbols, independent of language, for the classification of patents and utility models, according to the different areas of technology" (WIPO, 2015); that is, it allows identifying which aspect of the technology is related to the patent. As for CPC, it is an extension of IPC, with new subdivisions into classes, subclasses, groups and subgroups, used in the European Community (European

Table 1
Research filters used.

Query (research key on Espacenet – filter refinement)	Number of patents
ta = "mobil* manag*"	6249
ta = "virtual communication" or ta = "mobile management"	1798
ta = virtual* and ta = work* and ta = manag*	1348
(cl = G06Q10/06 and (ta = remot* or ta = virtual* or ta = mobil*)) not (ta = clinical or cl = G06F)	2242
(ta = communic* and ta = management and ta = wireless and ta = mobil* and ta = informati*) not (ta = clinical or ta = medical or cl = G06F)	2276
(ta = "virtua* communic*" or ta = "mobil* communic*" or ta = "remot* communic*") and ((ta = process* or ta = manag*) and ta = project*)	143
(ta = "virtual* communic*" or "mobil* communic*" or ta = "remot* communic*") and ((ta = process* or ta = manag* or ta = work*) and ta = project*) *Query* with the final filter adopted	**213**

Note: cl, codes IPC or CPC; ta, title or abstract.

Patent Office). Table 2 presents the main IPC codes related to this study.

There is still a classification named *Kind Codes*, used to identify the stages and distinguish patent documents, managed by different international bodies such as WIPO and EPO. The *Kind Code* follows a pattern defined by an international agreement and is represented by combinations of letters and numbers in two digits. For example, letter 'A' is used to designate a patent application not yet examined, 'B' for an application examined, and 'C' for a granted patent. In turn, numerical suffixes indicate the number of times that the document was published.

From these initial parameters, data collection identified: (a) the evolution in the number of patents related to the subject, from 1988 to 2015; (b) the concentration of these patents, considering their countries of application; (c) total number of patents *versus* their stage of analysis; and (d) the network of connections between inventors, IPCs and applicant companies. In addition, the study chose two patents, among the 213 identified in the data survey, to synthesize the inventive project of their authors and suggest that their content may lead to new information, new insights and knowledge for researchers. Besides this, it may also be part of the theoretical basis or problems of future studies.

Table 2
Examples of IPC codification.

IPC code	Description (macro) of the meaning of IPC
H04W	Wireless communication networks
H04M	Telephone communication
H04N	Images communication
G06F	Electrical processing of digital data
G06Q	Systems or methods of data processing, especially adapted for administrative, commercial, financial and management purposes

Source: Adapted from WIPO (2015).

Results and discussion

Patent gathering delimited by the query 'virtual* communic*' or 'mobil* communic*' or ta = 'remot* communic*' and (ta = process* or ta = manag* or ta = work*) and ta = project*, returned 213 patents, from 1988 to 2015, with an increasing volume from 2001 to 2013, with peaks of 35 patents in 2012 and 33 patents in 2013. In fact, Weiser (1991) had already anticipated the evolution trend and growing interest on mobile information technologies and mobile communication, which remains both in academic research about the challenges of mobility (Jarvenpaa & Lang, 2005; Lu et al., 2005; Lyytinen & Youngjin, 2002; Reyt & Wiesenfeld, 2015), and in R&D on inventive activity in patent applications, as shown in Fig. 1.

Concentration of patents registration by countries

Regarding the global concentration of patent applications, Fig. 2 shows the prominence of four countries, which concentrate 86% of the 213 initiatives identified in this study. The ranking among them was: (1) China, with 85 patents; (2) South Korea, with 51; (3) the United States, with 25; and (4) Japan, with 23 patents.

Showing the development of inventive initiatives in each country can facilitate, for example, understanding of the concentration of applied research on a given subject, as well as knowledge about the collaborative networks in these projects (Le Moigne, 1994; Quoniam, 2015; Ravaschio et al., 2010). For the subject selected in this study – a data survey on patents that correlate the topics 'mobile information technologies', 'mobile communication' and 'management processes' – we observe that the four main countries are China, which holds almost 40% of the initiatives dealing with these three topics together, followed by South Korea, with 24%, the United States with 11.7%, and Japan with 10.3%. This concentration provides an overview of the main investments in R&D related to the challenges that technology brings regarding communication and management (Jarvenpaa & Lang, 2005; Reyt & Wiesenfeld, 2015; Sorensen, 2011).

Total number of patents and their stage of analysis (Kind Code)

When comparing the total number of patents and their number per stages, or *Kind Code*, there is a disparity between the amount of patents filed (A) and granted (C). Table 3 shows this data, where it can be seen that of the 213 patents filed, from 1988 to June 2015, only one was granted. However, this fact does not disqualify the use of patent bases in research. As already mentioned in the introduction of this paper, it is precisely through patents, whether or not granted, that the knowledge of researchers with inventive projects is available, meaning that it is an immense field of opportunities.

1988	1992	1995	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Totals
1	1	1	1	1	5	6	10	4	6	7	18	12	19	15	14	35	33	21	3	213

Fig. 1. Number of patents per year.
Source: Patent2Net.

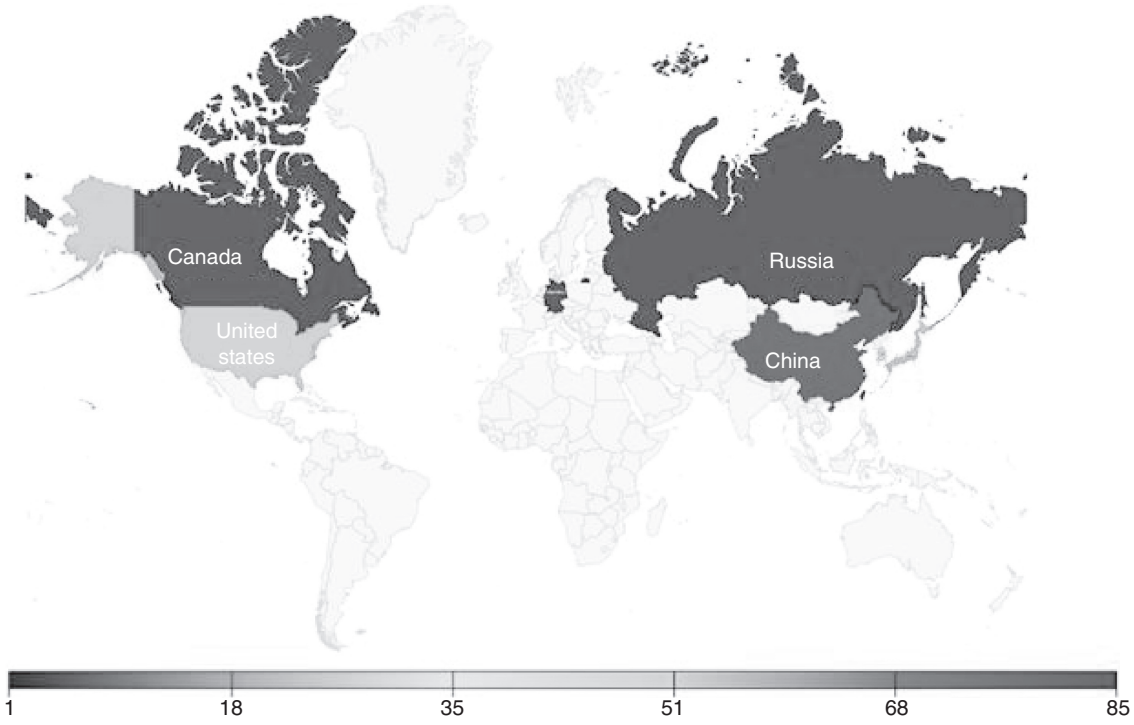


Fig. 2. Worldwide concentration of patents registration.
Source: Patent2Net.

Table 3
Total of patents *versus* their stage of analysis (*Kind Code*).

Kind Code	A	A1	A2	A3	A4	B1	C1	U	Y	Total
Total	123	42	1	4	2	10	1	22	8	213

Source: Patent2Net (*Kind Code Table*: http://documents.epo.org).

IPC codes with highest concentration of patents

Regarding IPC codes, identified in the 213 patents selected, 60% are registered in Section H – electricity, and in its subgroups transmission, networks and communication; 14% are concentrated in Section G – physics and its subgroups computing, processing, systems and processes; and the other 26% are distributed among other classifications, in a lesser amount. Table 4 shows the breakdown of this distribution and numbers by IPC.

From these evidences, and resuming the challenges present in the mobility environment, where communication and management are carried out at distance, mainly through electronic media interactions (Jarvenpaa & Lang, 2005; Reyt & Wiesenfeld, 2015; Sorensen, 2011), it is possible to observe that patent bases can be a truly relevant source for seeking knowledge on the subject (Araújo, 1981; Ravaschio et al., 2010).

Regarding this study, there was a concentration of initiatives classified in H04W – wireless communication networks, with 38 patent applications; H04B – data transmission, with 27 requests; H04M – telephone communication, 23 patents filed; H04N – images communication, 22 patents filed; H04L – transmission of digital information, 20 applications; G06F – digital data processing with 17 requests; G06Q – systems or methods

Table 4
IPC codes and concentration (number) of patents.

IPC code	Brief description of IPC meaning	Total of patents
H04W	Wireless communication networks	38
H04B	Data transmission	27
H04M	Telephone communication	23
H04N	Images communication	22
H04L	Digital information transmission	20
G06F	Electrical processing of digital data	17
G06Q	Systems or methods of data processing, especially adapted for administrative, commercial, financial and management purposes	12
Other IPC Codes	**Number per IPC**	
H01Q	6	6
G03B; H04Q; H05K	4	12
G08C	3	3
E05D; G06K; G06T; G09F	2	8
A63H; B05C; B60R; E01D; F16C; F16J; G01N; G01R; G01S; G02B; G02F; G05B; G07F; G09B; G09G; G10L; H01H; H01J; H01M; H02N; H03B; H03K; H04H; H04J; H04R	1	25
Total of patents identified in this study		213

Source: adapted from WIPO (2015).

of data processing, with 12 patents filed; and in other related codes, fewer patents were filed (see Table 4).

These data strengthen the focus on research and development, aiming at a better performance of interactions and the exchange of secure and assertive information, even at distance (Jarvenpaa & Lang, 2005; Lu et al., 2005; Reyt & Wiesenfeld, 2015; Sorensen, 2011).

Network of connections between inventors, IPCs and applicant companies

In this study, some connections deserve at least a brief discussion, as for example the network between inventors, in projects that they elaborate and register jointly in patent bases. Fig. 3, generated by softwares Patent2Net and Gephi, brings a passage of the inventors' network, where each line is a joint work and each color indicates a given subject, depending on the IPC code.

Another relevant aspect is the connections between the inventors and the IPC codes of their patents. As seen in Section "IPC codes with highest concentration of patents", the highest concentration of IPCs is registered under codes H04W; H04B; H04M, H04N, G06F and G06Q, exactly as shown in Fig. 4, which presents part of the patent interconnections in these IPCs and their respective inventors.

An in-depth study of this network may, for instance, reveal research opportunities with a particular group of researchers dedicated to the subject addressed in the IPC (Ravaschio et al., 2010).

In addition, Fig. 5 illustrates a fragment of the network of connections between companies that filed patents, where each color indicates the subject, with the corresponding IPC code.

In this network, we can look at the competition and specialization by subject, which is a source of research for adapting businesses to customers' needs or to bring innovations and competitiveness (Besanko et al., 2009; Castells et al., 2000; Manfredi & Nappo, 2012). Companies in the telephony segment, for example, connect with other specialists and smaller companies through their inventions and; by visually comparing LG with Samsung, there appears to be greater decentralization in the former, as this company keeps a larger number of interconnections.

Although shortly discussed in this study, these views suggest that, through a deeper analysis of these connections it is possible to expand knowledge of the subjects addressed by these inventors, to summarize the connections by a given subject or R&D group, and to identify relevant and correlated topics (Araújo, 1981; Ravaschio et al., 2010), thus assisting organizations in their competitive strategies (Besanko et al., 2009; Manfredi & Nappo, 2012).

A brief look at two selected patents

As an example, two patents were selected to briefly demonstrate what they refer to. The first patent is the only one actually granted*: Kind Code* – C1, published in 2003 under the title *System, Method, and Relevant Devices for Video Data Transmission and Presentation*. The core of the invention is the transmission and presentation of video information that, through data projected on the user's retina and filtered by special resources of virtual visualization, reduces the volume of data transmitted, a solution that can result in cost savings with infrastructure, for example. Its inventors are Rudol F. Ritter and Ehrik Lauper, the applicant company is Svisskom Mobile AG, and the country is Albania.

Fig. 6 shows the front page of this patent on Espacenet, with some of the details above mentioned. The words marked in yellow in the Abstract were the ones used in our research query.

The invention purpose indicates that part of the likely course of the initiatives in mobile information technologies, mobile communication and management address the means for data transmission, in order to improve the performance and efficiency of remote interactions (Besseyre des Horts et al., 2006; Lu et al., 2005; Saccol & Reinhard, 2007).

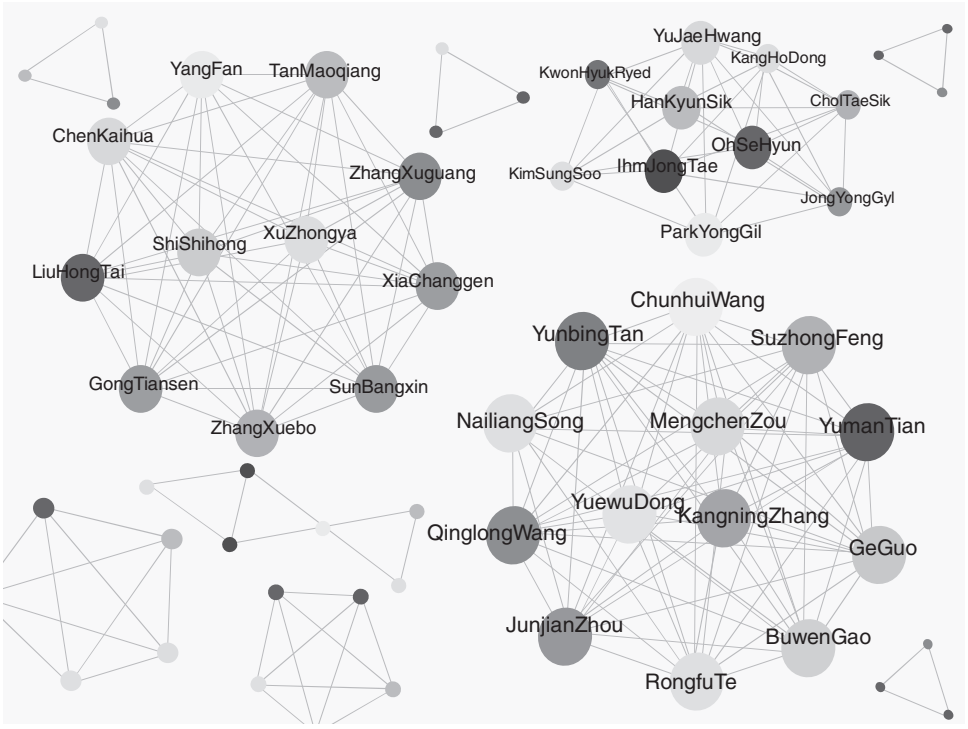


Fig. 3. Connections between inventors.
Source: Patent2Net e Gephi.

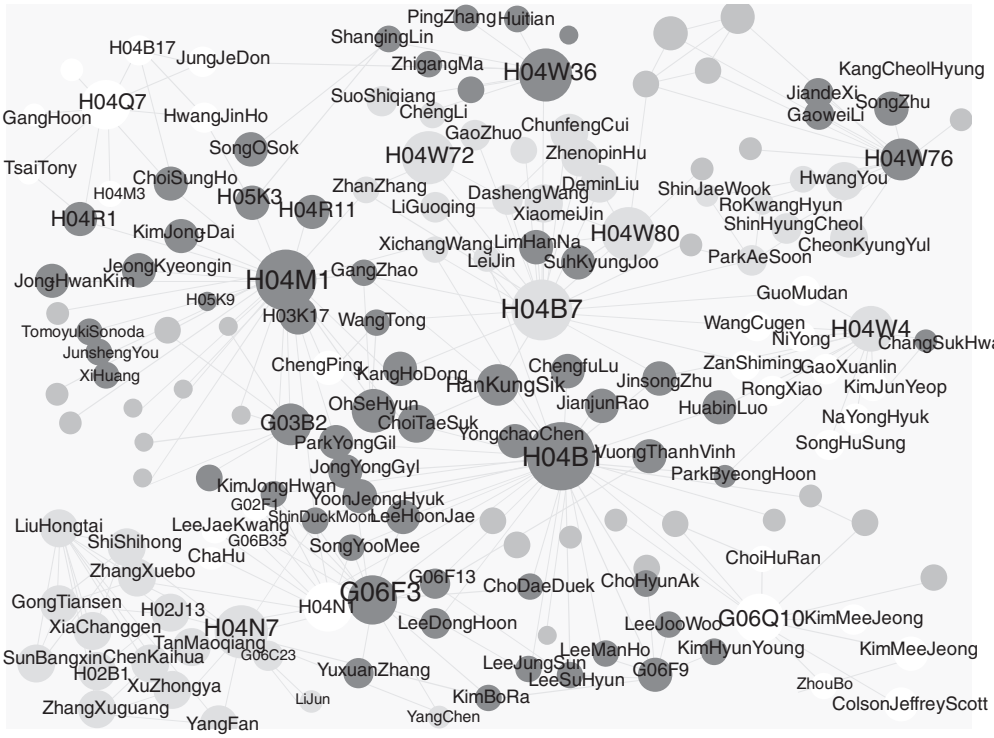


Fig. 4. Connections between IPCs and inventors.
Source: Patent2Net e Gephi.

A recent patent, regarding project management processes, is entitled *System and Method for Managing Concurrent Steps in Processes and Communicating Step Attributes to Project Members*, and was published on June 25, 2015, under Registration number US2015178666 (A1). The focus of the inventors Joseph Green Brian and John Russell Gravett, from the United States, was to enable the management of project activities through a Web application, accessible through mobile devices, which

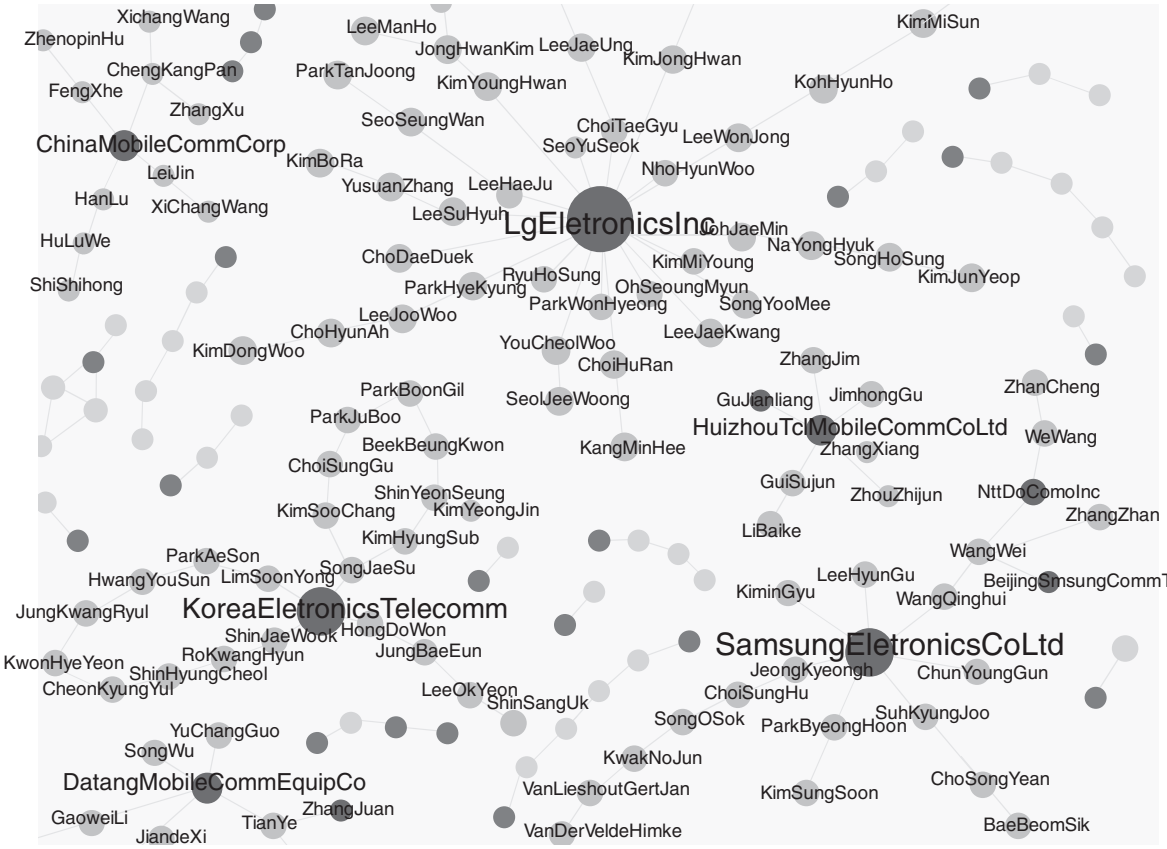


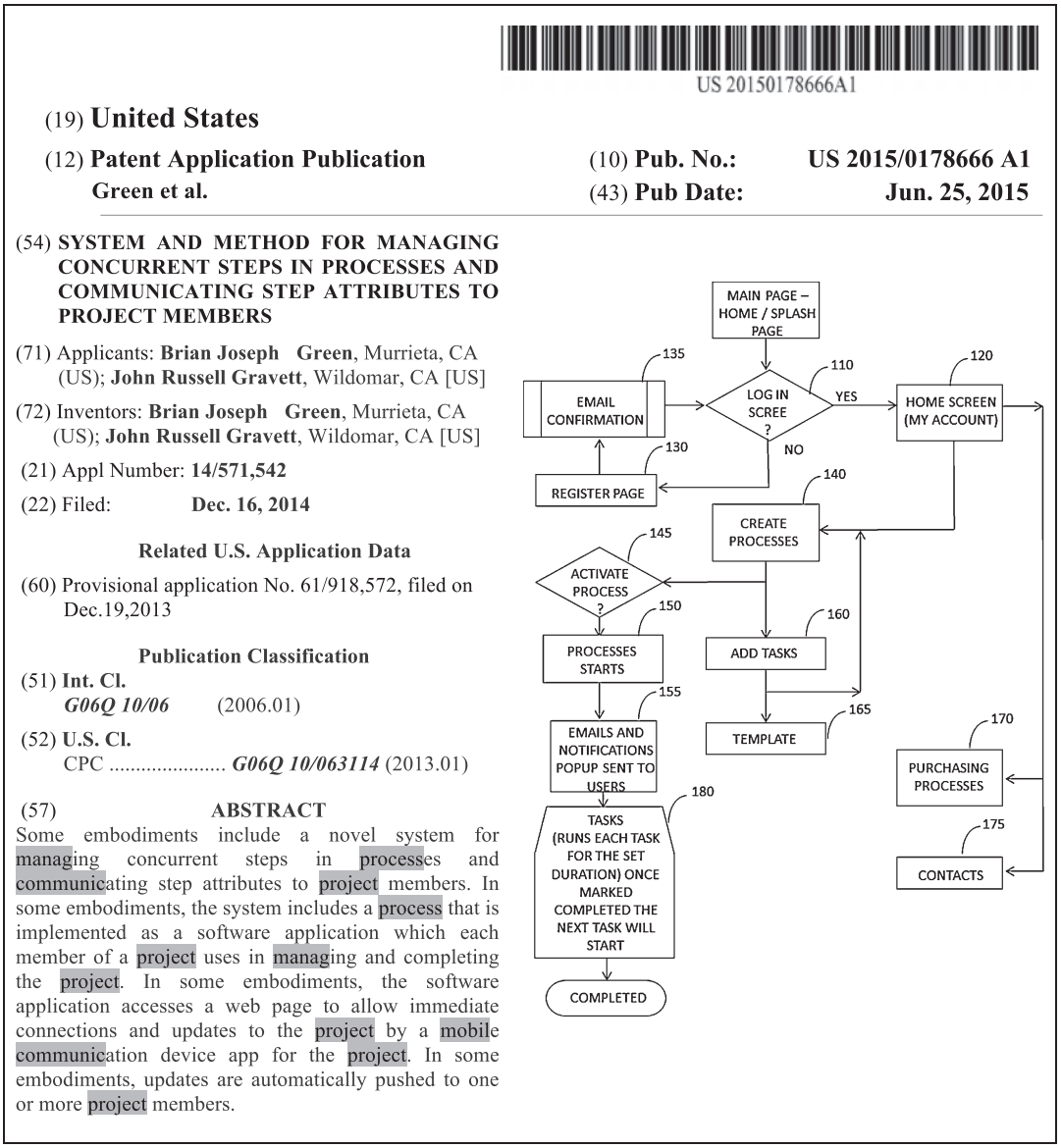
Fig. 5. Connections between firms and applicants.

Source: Patent2Net e Gephi.

Bibliographic data: RU2212114 (C1) — 2003-09-10	
SYSTEM, METHOD, AND RELEVANT DEVICES FOR VIDEO DATA TRANSMISSION AND PRESENTATION	
Page bookmark	RU2212114 (C1) — SYSTEM, METHOD, AND RELEVANT DEVICES FOR VIDEO DATA TRANSMISSION AND PRESENTATION
Inventors:	RITTER RUDOL F (CH) ; LAUPER EHRIK (CH)
Applicants:	SVISSKOM MOBILE AG (CH)
Classification:	**- international:** ***G02B27/01; G09G5/00; H04L29/06; H04N1/41; H04N5/64; H04N7/14; H04N7/173; H04N7/24; H04N7/26;*** (IPC1-7): G09G5/00; H04N7/14
	- cooperative: H04N21/234363; H04N21/44213; H04N21/4621; H04N21/6582; H04N7/17318; G02B27/0093
Application Number:	RU20020100822 19990618
Priority number(s):	WO1999CH00267 19990618,
Also published as:	RU2002100822 (A); WO0079759 (A1); NO20016016 (A); N2516543 (A); CN1352849 >>
Abstract of RU2212114 (C1)	
Translate this text into Select language patenttranslate powered by EPO and Google	
FIELD: video data transmission and presentation. SUBSTANCE: users can request and receive video data from central video-data transmission control station 2 with aid of communication terminal 4, in particular with aid of mobile communication terminal 4, through telecommunication network 3, in particular through mobile radio communication network 3. In the process image signals corresponding to video data received are projected onto user's retina 51 by means of special-purpose virtual display 41 at communication terminal 4. Current positions of user's eyes are determined in communication terminal 4 and transferred to central video-data control station 2. The latter has video data filtering module 22 designed for pre-transmission filtering of mentioned video data basing on data on current position of user's eyes so that outer areas of image corresponding to video data which are projected onto retina beyond retina recess 511 have lower resolving power than video data corresponding to inner areas of image which are projected onto recess 511 of retina 51. EFFECT: reduced data level in filtered video data compared with that in unfiltered ones. 16 cl, 1 dwg	

Fig. 6. Front page of granted patent RU2212114 (C1).

Source: Espacenet.



US 20150178666A1

(19) **United States**

(12) **Patent Application Publication**
Green et al.

(10) **Pub. No.: US 2015/0178666 A1**
(43) **Pub Date: Jun. 25, 2015**

(54) **SYSTEM AND METHOD FOR MANAGING CONCURRENT STEPS IN PROCESSES AND COMMUNICATING STEP ATTRIBUTES TO PROJECT MEMBERS**

(71) Applicants: **Brian Joseph Green**, Murrieta, CA (US); **John Russell Gravett**, Wildomar, CA [US]

(72) Inventors: **Brian Joseph Green**, Murrieta, CA (US); **John Russell Gravett**, Wildomar, CA [US]

(21) Appl Number: **14/571,542**

(22) Filed: **Dec. 16, 2014**

Related U.S. Application Data

(60) Provisional application No. 61/918,572, filed on Dec.19,2013

Publication Classification

(51) **Int. Cl.**
G06Q 10/06 (2006.01)

(52) **U.S. Cl.**
CPC ***G06Q 10/063114*** (2013.01)

(57) **ABSTRACT**

Some embodiments include a novel system for managing concurrent steps in processes and communicating step attributes to project members. In some embodiments, the system includes a process that is implemented as a software application which each member of a project uses in managing and completing the project. In some embodiments, the software application accesses a web page to allow immediate connections and updates to the project by a mobile communication device app for the project. In some embodiments, updates are automatically pushed to one or more project members.

Fig. 7. Front page of the original document filed for patent US2015178666 (A1).

Source: Espacenet.

allows the virtual update of the achievements, simultaneously, by several project members. The patent applicants are the inventors themselves, with no associated company. Fig. 7 shows the front page of the original document of this register, which includes the abstract and the process flow proposed by the inventors.

This invention, related to administrative processes for project management, also proposes to improve remote interactions, by suggesting a new application, as a more efficient means to share the improvements and knowledge in projects (Hinds & Weisband, 2003).

Final remarks

This study reached its main objective, by describing and exemplifying how inventive actions can be collected and correlated through the quest of a given topic, as the key element of research. It also shows that searching in patent databases can be a productive path to achieve information and knowledge.

Considering that the study established the topics 'mobile information technology', 'mobile communication' and 'management processes', which were searched in a correlated way, the results showed an increase in the number of patents between the years 2000 and 2012 (from one to thirty five patents), confirming Weiser's (1991) perspective, who highlighted the growing production of mobile information technologies in the 21st century. In this research, 213 patents were found, with China holding 40% of them, followed by South Korea, with 24%, the United States with 11.7%, and Japan with 10.3% of the total patents.

Moreover, as Araújo (1981) and Ravaschio et al. (2010) observe, the search for information and knowledge in patent databases was worthy in several aspects: evidence of the concentration of innovative production in some countries; confirmation

of the correct choice in searching the IPC codes specific of wireless communication networks, data transmission, communication and management methods; and the existence of a network of connections between inventors, applicant companies and IPC codes, which may create joint research opportunities with a group of researchers dedicated to the subject addressed in the IPC, or even the analysis of the companies that hold these technologies.

Therefore, it is evident that consulting patent databases can, in fact, provide inputs to support competitive intelligence and technological surveillance actions (Castells et al., 2000; Manfredi & Nappo, 2012), by assisting the generation of organizational knowledge and its strategic decisions (Alkhuraiji et al., 2014). In terms of economic potential, studies that increase the knowledge on the effects of industrial property also allow to extend knowledge and capacity of discussion, in new agreements to protect investments, thus enhancing organizational and governmental efficiency (Lesser, 2011).

The main contribution of this study was precisely to bring evidence that proves the feasibility of collecting information and knowledge through patents, besides presenting to readers how this data survey is carried out – which softwares to use, which parameters to consider – in order to better select the key elements of research. In addition to supporting organizations in their analysis in patent databases, data described in this study can also help future researchers, who can make use of the presented details, if they consider research in patent bases as a complementary source of data collection.

Conflicts of interest

The authors declare no conflicts of interest.

References

Alkhuraiji, A., Liu, S., Oderanti, F. O., Annansingh, F., & Pan, J. (2014). Knowledge network modelling to support decision-making for strategic intervention in IT project-oriented change management. *Journal of Decision Systems*, *23*(3), 285–302.

Araújo, V. M. R. H. (1981). Informação: instrumento de dominação e de submissão. *Ciência da Informação*, *20*(1), 37–44.

Besanko, D., Dranove, D., Shanley, M., & Schaefer, S. (2009). *A Economia da Estratégia* (3a ed.). Porto Alegre: Bookman.

Besseyre des Horts, C.-H., Isaac, H., & Leclercq, A. (2006). Les conséquences paradoxales de l'usage des outils mobiles de communication sur les situations perçues de travail: une étude exploratoire sur l'impact humain et organisationnel des technologies mobiles. In *Annales du XVIIe Congrès de l'AGRH – Le travail au coeur de la GRH* (pp. 1–20).

Castells, P. E., Salvador, M. R., & Bosch, R. M. (2000). Technology mapping, business strategy, and market opportunities. *Competitive Intelligence Review*, *11*(1), 46–57.

Fink, A. (2003). (2nd ed.). *The survey handbook* (Vol. 1) Thousand Oaks, CA: Sage.

Hinds, P. J., & Weisband, S. P. (2003). Knowledge sharing and shared understanding in virtual teams. In C. B. Gibson, & S. G. Cohen (Eds.), *Virtual teams that work* (pp. 21–36). San Francisco: Jossey Bass. Chapter 2

Jarvenpaa, S. L., & Lang, K. R. (2005). Managing the paradoxes of mobile technology. *Information Systems Management*, *22*(4), 7–23.

Kakihara, M., & Sorensen, C. (2001). Expanding the "mobility" concept. *ACM SIGGROUP Bulletin*, *22*(3), 33–37.

Le Moigne, J. L. (1994). *La théorie du système général: théorie de la modélisation. Collection "Les Classiques du Réseau Intelligence de la Complexité"*. Publication digitale. Retrieved from http://www.mcxapc.org/inserts/ouvrages/0609tsgtm.pdf

Lesser, W. (2011). Measuring intellectual property 'strength' and effects: An assessment of patent scoring systems and causality. *Journal of Business, Entrepreneurship & The Law*, *4*(2), 345–380. Retrieved from http://digitalcommons.pepperdine.edu/jbel/vol4/iss2/4/

Lu, J., Yao, J. E., & Yu, C. S. (2005). Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology. *The Journal of Strategic Information Systems*, *14*(3), 245–268.

Lyytinen, K., & Youngjin, Y. (2002). Ubiquitous computing. *Communications of the ACM*, *45*(12), 63–96.

Manfredi, S., & Nappo, F. (2012). The implementation of intellectual property strategies inside the organization: Patent and brand's assessment, management and protection. *International Journal of Mathematical Models and Methods in Applied Sciences*, *6*(1), 53–62.

Martins, G. A., & Theóphilo, C. R. (2009). *Metodologia da investigação científica para ciências sociais aplicadas*. São Paulo: Atlas.

O'Reilly, T. (2007). What is Web 2.0: Design patterns and business models for the next generation of software. *Communications & Strategies*, *1*, 17.

Quoniam, L. M. (2015). *Palestra sobre Inovação e Propriedade Industrial. Programa de Pós-Graduação em Administração*. São Paulo: Universidade Nove de Julho.

Ravaschio, J. P., Faria, L., & Quoniam, L. (2010). O uso de patentes como fonte de informação em dissertações e teses de engenharia química: o caso da Unicamp. *RDBCI – Revista Digital de Biblioteconomia e Ciência da Informação*, *7*(2), 219–232.

Reyt, J. N., & Wiesenfeld, B. M. (2015). Seeing the forest for the trees: Exploratory learning, mobile technology, and knowledge workers' role integration behaviors. *Academy of Management Journal*, *58*(3), 739–762.

Saccol, A. Z., & Reinhard, N. (2007). Tecnologias de informação móveis, sem fio e ubíquas: definições, estado-da-arte e oportunidades de pesquisa. *Revista de Administração Contemporânea*, *11*(4), 175–198.

Sorensen, C. (2011). *Enterprise mobility: Tiny technology with global impact on work*. London: Palgrave Macmillan.

Weiser, M. (1991). The computer for the 21st century. *Scientific American*, *265*(3), 94–104.

World Intellectual Property Organization. (2015). *Patent cooperation treaty yearly review*. Geneva: WIPO. Retrieved from http://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2015.pdf