Skills for disruptive digital business

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ABSTRACT

This article analyses the concept of skills and also investigates the skills needed to create and manage disruptive digital business which is emerging from the IT evolution. The primary purpose is to identify skills which need to be developed to manage a disruptive digital business.

The technologies, disruptive business and the skills needed by managers were identified through content analysis of semi-structured interviews with seven IT specialists. To analyze the development of the level of skills needed was conducted an online survey with managers and the final output of the research is a proposal of a model of skills` development for managers of the disruptive business.

Ultimately, the result of this research are the lessons uncovered and the proposal made for a model of skills development for disruptive business managers, which identifies three types/categories of skills needing development – innovation, leadership, and management.

1. Introduction

The primary aim of this research was to identify skills for disruptive digital business managers and to propose a model of skills development aligned with the market evolution.

The identification and the development of skills are challenging tasks for companies and, in the context of this article, the focus will be on the identification by the IT specialists of sets of skills needed to manage disruptive business, and identify the level of development perceived by a sample of managers, and finally suggest a model of skills development.

However, and first of all, this research also focuses on the role of Information Technologies (IT) as a driver for creating a new disruptive business which needs specific competencies development. The technologies under analysis were the Internet of Things, Cloud Technology, Big Data, Mobile Technologies, and Artificial Intelligence and Robotics, being these technologies identified by the specialists who participated in the study.

This article identifies the disruptive digital business that are emerging from the impact of these technologies on the markets and explores the concepts of skills needed by the managers to manage this kind of business. The article ends with the research findings and the model proposed for skills development for disruptive business managers.

2. Literature overview

2.1. Skills concept

In the 80s, the concept of skills starts to have a great importance due to technological, organizational, and economic factors. It is possible to identify in the literature a complementarity between technology and high-skilled labor, or skill-biased technological change (Acemoglu & Autor, 2011). Skills are considered as a resource – of individual and organizational nature – which would allow competitiveness and productivity advantages to companies.

Historically, the word *skills* have been used to refer individual characteristics. However, in the concept of Prochno (2001), although the skills and skills assume a rather large scope which makes it complex and makes its comprehension/understanding and concept delimitation difficult.

The concept has been studied by several authors as (Heckman & Kautz, 2012; Heckman, Stixrud, & Urzúa, 2006; Kuhn & Weinberger, 2005; Mulder, 2000, 2001; Weinberger, 2014) and previously by Norris (1991) and Ellström (1997). The skills` development prevails as a research issue very important for the competitiveness of the markets and are perceived as a strategic management tool to cope with the current business environment (Nyhan, 1998), mainly because the market has changed from a market of mass production to a market of customization where quality, price, and speed of delivery are stressed. This change has brought new circumstances in which many organizations struggle to

cope: new and emerging customer segments, cultural diversity in a global marketplace, market volatility, raised customer expectations about quality of products and services, and the impact of the internet on an organization's core business (Akerman, Gaarder, & Mogstad, 2015; Markowitsch et al., 2001). In the job market, there has been a growth in higher-level jobs such as managerial and professional positions that require flexibility and problem-solving skills.

In this context, the complexity and the uncertainty, partly due to the globalization and accelerated rhythm of technological change, demand managers with skills that help the organizations to overcome the appearing challenges (Vasconcelos, Kimble, & Rocha, 2016).

2.2. Emerging IT

Internet, mobile technologies, artificial intelligence, big data, robotics, nanotechnology, and other disruptive technological phenomena are potentially causing profound changes in organizations and society (Brem & Voigt, 2009).

The Internet has changed the music industry, tourism, trade and services and the digital assumed considerable importance in all economic activities. Emerged new services such as e-tourism, e-health, e-marketing, and digital learning, among others.

Artificial intelligence is changing the industry, especially in areas that require close collaboration between people and computers. The Big Data is changing the way we organize, access, select, visualize and use information. Robotics has introduced significant changes, mainly in the automotive industry, aeronautics and also health. Nanotechnology is changing the computer industry, the energy industry, and the health industry.

These advanced technologies are assumed to be drives of change and have an enormous impact on the economy through the creation of new business (Dedrick, Kraemer, & Seever, 2007; Porter & Heppelman, 2014; Mejia, Muñoz, & Rocha, 2014; Gonçalves, Martins, and Rocha, 2016; Gonçalves, Rocha, and Cota, 2016).

Despite the fact that the introduction of digital products, services, channels, and interfaces emerges from the knowledge sharing processes in organizations and digital technology are transforming all kind of industries (Routley, Phaal, & Probert, 2013).

The definition of digital differs in terms of types of digital technologies: Internal technologies include analytics, search engine optimization, competitive intelligence, and social media monitoring; and External technologies consist of the platforms used to reach customers and deliver content—website, ads, landing pages, e-mail campaigns, and apps of all kinds (Phaal, Farrukh, & Probert, 2004; Routley et al., 2013; Timmers, 1998).

In resume, companies are adding digital offerings such as analytics, mobility, social media, and smart-embedded devices into their core businesses (Routley et al., 2013). On one hand, digital technology, and particularly its manifestation as big data analytics, will become a fifth strategic dimension needing to be accounted for in many companies. More and more firms will need to find a way to integrate this capability into their existing business models. Digital technologies can be used to create a user and consumer communities, provide brand building and e-commerce channels (Haegeman, Marinelli, Scapolo, Ricci, & Sokolov, 2013).

On the other hand, organizations need to define its digital vision and leaders must translate that vision into a set of targets that drive to succeed. Even if the digital function is not measured as a business, it should have clear performance indicators that create accountability and serve as guideposts of progress.

Thus, the main technologies analyzed in this research are the following:

2.2.1. Internet of Things (IoT)

During the past few years, the Internet revolution has redefined the business-to-consumer (B2C) industries, such as the communications

industry, trade and financial services (Guinard, Trifa, Mattern, & Wilde, 2011; Maló et al., 2013). Focusing on the Internet of Things it is possible to state that is a network of systems, equipment, and devices capable of acquiring and processing information that can be shared using the internet communication protocol (Guinard et al., 2011). In the coming years, the Internet of Things will change the manufacturing, energy, agriculture, transport and other industrial sectors (Gluhak et al., 2011). These technological implications will lead to new business opportunities (Bucherer & Uckelmann, 2011; Chui, Löffler, & Roberts, 2010; Fan & Zhou, 2011; Hui, 2014; Sun, Yan, Lu, Bie, & Thomas, 2012) along with new risks, for companies and for society, as it combines the global reach of the Internet with the ability to control the physical world, including machines and plants (Maló et al., 2013). It will also radically transform work processes due to new interactions between people and machines (Porter & Heppelman, 2014).

2.2.2. Cloud technology

Is a model of technology and Internet-based services in real time or on-demand. According to the National Institute of Standards and Technology (USA) cloud computing is a model that allows access to the ubiquitous network upon request from a shared pool of configurable resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or interaction with the service provider (Chard, Caton, Rana, & Bubendorfer, 2010). The concept involves the use, anywhere and platform-independent applications through the Internet without being installed on personal computers or organizations. Application providers develop, store, perform maintenance, update, backup and scaling, which allows a reduction of costs through new business models (Osunmakinde & Ramharuk, 2014). The concept of cloud computing includes among others the concept of Software as a Service (SaaS), there is no need to purchase software license usage, being paid value for the resources used and by the use of time. The Cloud services further include Platform as a Service (PaaS), for example, an application framework and Infrastructure as a Service (IaaS) provides technical infrastructure components such as storage, CPU, memory, and network (Chard et al., 2010).

2.2.3. Big data

The big-data is a new phenomenon associated with increased volume of data (McAfee & Brynjolfsson, 2012) as a result of the Internet, social networks and mobile devices. The potential value of this data has led to the development of new management techniques and analysis of large data sets such as images, text or speech. Skills such as data analysis, data selection, data security are of high relevance to all employees of an organization (Chen, Chiang, & Storey, 2012). This technology allows you to capture and interpret data, in order to enable companies to have access to details of their operations, in order to make strategic decisions, including intelligence on solutions based on analysis of large volumes of data with the following characteristics: volume of data to be analyzed; variety of data which result in different information for the same operation (Taylor, 2015). Speed, veracity, and value of the data.

2.2.4. Mobile technologies

Include mobile communications devices and applications that are integrated and that allow multiple uses and collaboration. Mobile technologies bring new business models for companies and offer opportunities for growth and new working methods (Brynjolfsson & McAfee, 2014). There are innumerable possibilities of using mobile devices as they allow access to information in real time (Ben-Zeev et al., 2014; Bhalla & Bhalla, 2010) and mobile applications can be quickly and affordably downloaded (Free et al., 2013) with the benefit that mobile phones are continuously dropping in cost (Ben-Zeev et al., 2014). Examples of these technologies include laptops or notebooks, palmtops or PDAs, smartphones, GPS devices (global positioning system). These mobile tools allow performing a set of activities,

increasingly important for businesses and the individual as they allow the sending of high-definition photos, videos, PowerPoint presentations, and messages, also allowing to perform information updates, make payments, consult balances and statements, manage the contact list and calendar. Access and send e-mails quickly and practice and allow the access to information anywhere, anytime. Allow also to be trained using mobile devices (m-learning).

2.2.5. Artificial intelligence

Is the development of computer systems able to perform tasks that typically require human intelligence? This technology has numerous applications in the industry (Brynjolfsson & McAfee, 2014). Human tasks can be defined in a tight and computers form may mimic this, the AI currently being applied in different situations, such as games, software, security systems, robotics, to writing recognition devices and voice, medical diagnosis and telecommunications programs (Bostrum, 2014). There is also the application of Artificial Intelligence to Business Intelligence processes, through the processing of dynamically calculated indicators.

2.2.6. Robotics

Integrates technologies that automate systems and have tiny and high-performance sensors. The new generation of robots work alongside people and flexibly perform many tasks in unpredictable environments (Brynjolfsson & McAfee, 2014). Examples include unmanned aerial vehicles, vacuum cleaners, as well as consumer products such as toys and equipment for the home. Robots are still limited to the factory assembly lines and other controlled tasks, but a new era of robotics is emerging and will allow its use through GPS technology, like smartphones, in other precision activities (Brynjolfsson & McAfee, 2014).

The analysis of this technology helped to identify potential new businesses (Haegeman et al., 2013; Phaal et al., 2004; Routley et al., 2013; Timmers, 1998) which were explored with the people interviewed during the empirical research process.

3. Research questions

Emerging from the literature review and the interviews with the IT specialists arise some research questions, which oriented the study:

RQ 1: What are the leading technologies that drive the new disruptive business?

RQ 2: What are the disruptive businesses that are emerging due to IT?

RQ 3: What are the skills needed to manage the new disruptive business?

RQ 4: What is the level of skills identified by managers to manage the disruptive business?

RQ 5: What is the relationship between the perceived management skills needed for the disruptive business and the various factors such as gender, type of organization and job level variables?

The ultimate goal and primary concern of the research are to analyze the lessons learned to propose a model to develop disruptive business manager's skills.

4. Research methodology

In this study the methodology was qualitative in its first phase, being realized seven interviews to a convenience sampling, a non-probability sampling technique where subjects were selected because of their convenient accessibility and proximity to the researcher.

The interviews were conducted by the researcher, recorded on videotapes, written down, interpreted and analyzed. The interviews were semi-structured with the support of an interview guide. During the interviews the 7 IT specialists interviewed shared experiences about their experience and work. This technique facilitated the access to more in-depth information and helped to create the questionnaire, applied after the interviews data analysis.

For the analysis of the data collected it was created a grid with main categories which emerged from the interviews related to disruptive technologies and business and the skills that the managers perceived as essential to manage a new emergent business.

The second phase of the research it was also designed a questionnaire based on the data collected by the interviews. This questionnaire was structured with a section about the professional context of the respondent and a set of multiple-choice questions about skills. All the items related to the skills identification emerged from the interviews and also from the literature review. The questionnaire was tested and validated by three IT specialists, in what refers to content, language used and structure of the questions.

In summary two sources of data were collected as follows: a) interviews with IT specialists and b) an online survey.

a) The primary technique used was content analysis from the outputs of the interviews with seven IT specialists. This methodology was used to identify the technologies, the new disruptive business and the skills needed by new disruptive business managers.

b) The second technique to collect data was an online survey (during the 2nd semester of 2015) applied to 250 managers (being also a convenience sampling, with the help of dissemination from a software house company) and were obtained 147 valid questionnaires equivalent to 58,8% response rate. The statistical analyses Cronbach's alpha Coefficient, Chi-square Tests, and Mann-Whitney Tests, conclusions point to generally positive perceptions of the manager is about the need of skills development by disruptive business managers.

In total, the questionnaire consisted of 24 questions covering the following areas: managers background information (Question 1–3) and list of skills evaluated by managers on a Likert 5-point scale (Question 4–24).

5. Results and discussion

In this section, we present the results sorted according to the research questions. First, it will be made the analysis of the data collected by the interviews and secondly the data collected by the online survey.

To answer to the first research question "What are the main technologies that drive new business?" and research question two "What are the new businesses that are emerging due to IT?" it was developed a content analysis from the outputs of the interviews.

5.1. IT driving new business

In the analysis of the interviews, it was identified and explored the disruptive opportunities for new business according to the technologies identified in the literature.

5.1.1. Internet of Things

Create new products and services: IoT will help to create and distribute new products and services at an unprecedented rate and scale. Create and destroy industries: IoT brings new opportunities for generating new economic opportunities and industries. IoT allows to define and create new digital processes, new infrastructure to manage the enormous amount of data that needs to be treated. It will transform the way work is done: The IoT will lead to the redefinition of new types of jobs to be created and will reshape the nature of the work.

5.1.2. Cloud technology

Potential to change the way of provisioning IT services within large companies. Use of hardware features and software delivered computers in a network or on the Internet, as a service. The concept of Cloud

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Computing offers the flexibility and the speed of execution to allow companies increase agility and respond faster to changes in the market. Resources are massively scalable over the Internet. Cloud is an infrastructure that can enhance the markets and makes them more competitive.

5.1.3. Big data

The IT industry will have several disruptive opportunities because of Big Data for most of the software and hardware to store and manage large amounts of data. The short-term opportunity lies in operational efficiency and productivity. In the long run, there will be new business models around pay-per-use services. Vertical industry segments will emerge through shared relationships with customers and partners.

5.1.4. Mobile technologies

Can be applied to various organizations and also to the market itself, regarding purchasing, logistics, distribution, service, sales, and maintenance. Business models based on App Stores allows easy access to personalized information on mobile devices anytime and anywhere. 3D screens for smartphones and tablets will drive large-scale use of 3D products. This trend is starting through portable game applications because of the increasing amounts of data. It can be applied to data simulations with a 3D application for military purposes, medicine, fashion, architecture, and entertainment, among others.

5.1.5. Artificial intelligence and robotics

The latest generation of robotics by applying AI systems achieve significant advances in productivity and the improvement of performance. For example, the automation of the cars, which allows them to be self-directed, could lead to reducing the number of accidents, avoid human error and lapses in concentration, among others. Robots have faster access to information and store large amounts of data.

In medicine can be used to perform high-precision operations, as they can respond without emotions, and can also aid in the diagnosis of diseases, as they can analyze an enormous amount of data in real time.

5.2. Disruptive businesses emerging from IT

These technologies are changing the way markets and organizations work. The possibility of workers bringing their technological device to work (BYOD), leads to structural changes in the work organization and as a consequence of the IT evolution new businesses associated to new clusters like e-education, energy, e-tourism, e-health, creative industries, smart cities and intelligent transport systems are emerging, as shown in Table 1.

Table 1
Digital businesses emerging due to IT.

Industry	E-education	Creative industries
• Processes monitoring	Digital learning	3D printing
• Analytics	Mobile learning	Wearables
• Distributed manufacturing	eLearning	
• New materials		

Energy	E-tourism	E-health
• Monitoring	• New processes	• Monitoring
• Batteries	• New technologies	• Home care

Smart city	Intelligent transport systems
• Monitoring	• Traffic monitoring
• Security	• Intelligent parking
• Energy consumption	

The focus on the new business should be in coordination between the various existing economic activities, establishing symbiotic relationships of growth. Innovation favors a growth-oriented to the market and more sustainable by creating opportunities to expand these activities in new ways, with new joints and more significant economic and financial sustainability.

The different businesses have activities which may have a multiplier effect on business, acting as a "broad-spectrum technologies" which encourage innovation and differentiation both increasingly important in the construction of competitive advantages.

5.3. IT specialists identification of skills needed by disruptive business managers

The third research question analyses "what are the needed skills by managers to manage the new disruptive businesses?", Was developed a content analysis, based on the outputs of the interviews, which analyzed the presence of skills associated with the following dimensions: "innovation," "leadership" and "management." A list of skills was organized with the following structure:

Innovation Skills:

- Capacity to innovate and creativity;
- Capacity to diversify the business area;
- Capacity to identify and exploit new business opportunities;
- Project management skills to link project goals with business context;
- Capacity and willingness to undertake risk;
- Capacity to organize the necessary resources to respond to the opportunity;
- Capacity to create and develop national and international networks.

Leadership Skills:

- Skills related to the employee's performance development;
- Skills associated with the development of new opportunities for the employees through techniques such as coaching and mentoring.
- Skills associated to motivation techniques to potentiate the employee's performance;
- Skills associated to technique to improve employee's satisfaction, especially through recognition instruments
- Communication skills to improve the commitment of the employees;
- Skills related to the management of employee's expectations regarding their development in the organization;
- Skills associated with the management of the cultural differences among employees.

Management Skills:

- Skills associated with new forms of work organization, in what regards the methods of teamwork, flexibility to adapt to changes in the working processes (as a response to a high rhythm of innovation);
- Knowledge about different types of technologies;
- Skills regarding a more significant initiative, decision, and responsibility;
- Skills associated with the analysis of information related to productivity, to what concerns workforce optimization of costs;
- Capacity to adapt to organizational change;
- Capacity to manage strategic deals and alliances;
- The capacity of developing social and relational competencies which allows the ultimate of working teams, taking advantage of all the potential of its elements.

5.4. Disruptive digital business skills survey

Regarding the survey, the respondents were presented with 21 items

representing innovation skills, leadership skills, and management skills which emerged from the content analysis of the interviews. The managers needed to identify the level of development needed for the set of skills under analysis.

The dimensions of the questionnaire are presented in Table 5:

First dimension of the questionnaire integrates the innovation skills needed by managers: Capacity to innovate and creativity, Capacity to diversify the business area, Capacity to identify and exploit new business opportunities, Project management skills to link project goals with business context, Capacity and willingness to undertake risk, Capacity to organize the necessary resources to respond to the opportunity, Capacity to create and develop national and international networks.

The second dimension of the questionnaire integrates the leadership skills: Employees performance, Development opportunities, Motivation of employees, Satisfaction of employee, Communication, Managing expectations, Integrating cultural differences.

Finally, the third dimension integrates the management skills on New forms and models of work organization, New technologies, Organizational change, Initiative, decision making and responsibility, Capacity to manage strategic deals and alliances, Information Analysis, Social and relational competencies.

Respondents were asked to rate the skills on a 5-point Likert scale ranging from 1 = no development; 2 = weak development; 3 = moderate development; 4 = considerable development; 5 = strong development.

5.4.1. Features of the managers

The first analysis of the collected data in the survey was a frequency analysis to manager's characterization, with the following results: Respondents were primarily from male gender (n = 85), and secondly from female gender (n = 62), please see Table 2.

The types of respondent organizations were primarily education (n = 18), public sector (n = 18), health and social work (n = 13), commercial services (n = 23), manufacturing non-food (n = 26), Transportation, communication (n = 18), Financial services (n = 16) and other (n = 15), please see Table 3.

Respondents characterized their jobs as Top management (n = 16), Middle management (n = 86), Executive managers (n = 45), please see Table 4.

5.4.2. Managers identification of skills level of development needed for managing disruptive business

According to the perceived skills level (Table 5) needed to manage a disruptive business, the resulting mean scores varied for innovation skills between 3.0 and 3.8, for leadership skills between 3.2 and 4.5, and management skills between 3.3 and 4.4, as outlined in Table 4. Therefor all the skills identified in the interviews were evaluated as needing a moderate/considerable development.

5.4.3. Influences of managers characteristics on the perceived skills needed to manage disruptive business

The relationships between the perceived skills development needed and various factors such as gender, type of organization and job variables were analyzed and the Cronbach's alpha (α) for all 147 respondents' innovation skills items was calculated and a value of 0.76 was obtained, which allows for the creation of a new variable by combining the 7 items. Similar calculations were made for the seven

Table 2
Background information on managers – gender.

	N	%
Male	85	57,8
Female	62	42,2
Total	147	100.0

Table 3
Background information on managers – type of organization.

Type of organization (n = 147)	n = 147	
	n	%
Education	18	12,2
Public sector	18	12,2
Commercial services	23	15,6
Health and social work	13	8,8
Manufacturing non-food	26	17,7
Transportation, communication	18	12,2
Financial services	16	10,9
Other	15	10,2
	147	100,0

Table 4
Background information regarding managers – job level.

Job characterization of respondents (n = 147)	n	%
Top management	16	10,9
Middle management/line manager	86	58,5
Executive managers	45	30,6
	147	100,0

Table 5
Perceived development of skills by managers (1 = no development; 2 = weak development; 3 = moderate development; 4 = considerable development; 5 = strong development) - (Cronbach's alpha (number of items) mean (1–5) (SD)).

Rank	Skills	Cronbach alpha	Mean	S.D.
Innovation skills		0,76 (n = 7)		
1	Capacity to innovate and creativity		3.10	0.50
2	Capacity to diversify the business area		3.50	0.42
3	Capacity to identify and exploit new business opportunities		3.80	0.79
4	Project management skills to link project goals with business context		3.00	0.65
5	Capacity and willingness to undertake risk		3.20	0.55
6	capacity to organize the necessary resources to respond to the opportunity		3.30	0.5
7	Capacity to create and develop national and international networks		3.70	0.30
Leadership skills		0,82 (n = 7)		
1	Employees performance		3.20	1.20
2	Development opportunities		4.50	0.50
3	Motivation of employees		3.80	1.13
4	Satisfaction of employee		3.90	1.15
5	Communication		3.80	0.40
6	Managing expectations		3.07	0.65
7	Integrating cultural differences		3.50	1.12
Management skills		0,85 (n = 7)		
1	New forms and models of work organization		3.30	0.52
2	New technologies		4.30	0.84
3	Initiative, decision growth-oriented and responsibility		4.25	0.25
4	Analysis of information		3.90	0.28
5	Organizational change		3.45	1.12
6	Capacity to manage strategic deals and alliances		4.17	0.60
7	Social and relational knowledge		3.35	1.05

leadership skills items and the seven management skills items to achieve scores of 0.82 and 0.85 respectively.

The differences between various factors of interest and these three new key variables were assessed using Mann-Whitney *U* Test (gender, type of organization and job level). The results showed significant relationships between perceived skills development and job level (X2 = 181.67; df. = 44; Sig. = 0.00); perceived leadership skills

development (X2 = 172.13; df. = 53; Sig. = 0.00); and perceived management skills development (X2 = 170.35; df. = 48; Sig. = 0.00). No significant differences were found between the three skills variables and type of organization and gender variables.

On resume, the reliability of the measures regarding skills development level was examined with Cronbach's alpha which has a minimum value 0.7 (Cronbach, 1951). As shown in Table 4, Cronbach's of all set of variables for the full sample were higher than 0.70 indicating the adequate level of reliability.

This give this research the validity to state that the manager of disruptive business must be a resilient person focused on the business implementation and its viability. He identifies himself with the project success and works to achieve that goal. He has a learning agility capability and adapts to ambiguous and unfamiliar situations, reflecting on experience to improve future performance (Gonçalves, Martins, and Rocha, 2016; Gonçalves, Rocha, and Cota, 2016, Gonçalves, Rocha, & Cota, 2015). The judgment process is complicated, and he need to be able to make decisions in stressful situations, balancing execution efficiency with risk mitigation. These central ideas are in line with Mulder (2000, 2001, 2006) studies regarding the skills and competencies development in high complex contexts due to the uncertainty of the markets, partly due to the globalization and accelerated rhythm of technological change. This kind of contexts demands managers with skills that help the organizations to overcome the appearing challenges (Nyhan, 1998).

The managers of disruptive business work mainly with projects and in this context the team leadership it is critical because he needs to motivate teams to support organizational goals and to develop staff skills and capabilities efficiently. He also needs to create stakeholder partnerships, managing competing stakeholder needs and communicating effectively.

Another significant capability is to manage risk, anticipating and efficiently mitigating significant risks and aligns decisions with company's risk profile executing standard project management methodology and linkage project goals with business context.

6. Model proposal for disruptive business skills development

The skills identified in the interviews were the basis for building a model of development of skills (Table 6) that fits the dimensions: Innovation, Leadership, and Management.

The implementation of this model will promote the acquisition of skills with regard to business development, which include the strategy that the company will adopt, products and/or services, management

Table 6
Proposed model for the development of skills in order to manage disruptive business.

Category of skills	Skills
Innovation skills	– Innovation and creativity
	– New business opportunities
	– Project management
	– Risk management
	– Efficiency and efficacy
	– Networking
Leadership skills	– High-performance teams management
	– Talent management
	– Motivation and satisfaction
	– Communication
	– Careers management
	– Leadership of multi-cultural employees
Management skills	– New models of work organization
	– Emergent technologies
	– Decision making tools
	– Big data analysis
	– Organizational change
	– Strategic management
	– Social and relational knowledge

systems which integrate knowledge (Kimble, de Vasconcelos, & Rocha, 2016) about potential strategies to adopt in the company, capacity planning and the setting of strategic goals and ability to make strategic decisions on company policies in their various areas of expertise. Will give the knowledge to identify the best marketing strategy for business development, taking into account the analysis of the environment, competitive analysis, market analysis and the company itself. Create know-how to develop a corporate and brand name for products and services such as media publicity image.

Regarding products and services' skills development is important the technical specifications and the forms of using the products and/or the implementation of services, as well as the types of possible customizations to meet the needs of the market, and more specifically, potential customers. Management systems put into practice the company's processes: business management, marketing, human resources management, financial management and risk management. Also knowing to deal with the formal and the informal structure of a company is essential when need to lead high-performance teams. Finally knowing how to create and manage informal networks related to partners and formal networks related to customers, suppliers, and official bodies.

7. Conclusion

The motivation for this research has its roots in a lack of a systematic development approach about skills needed by organizations, especially the ones that are creating new disruptive business and the competitive market context. There is a little theoretical and empirical support to connect these two dimensions regarding disruptive business, which has made it a fascinating challenge to embrace.

This research identified three types of skills through the content analysis of the interviews made to the IT specialists – innovation, leadership and management, and tries to analyze the perception of a sample of managers from different economic sectors regarding the level of development needed by managers of disruptive business for those same skills.

According to the managers, the skills identified need a moderate/considerable development. It is also possible to conclude that there is a significant relationship between perceived skills development and the manager's job level, but no significant differences were found between the three skills dimensions – innovation, leadership, and management - and the type of organization, and gender variables.

This study will help to develop a higher level of awareness regarding the skills needed by the managers of new disruptive businesses and to rethink the company's strategies according to skills development to respond to the challenges of the market.

8. Limitations and further research

Some limitations should be mentioned in this research study. First, there was only a small sample selected for this study, with a total of 147 valid participants. Future studies may look at a larger sample so that the results can be generalized and extrapolated to other contexts.

A second limitation is that the skills required for IT new disruptive business were collected only by interviews. We could conduct an additional Delphi process to fully cross-validate the list of skills needed by the IT managers. However, the list was obtained from the knowledge of 7 specialists in the field. Further empirical studies are required to check the impact and size of the gaps identified.

Once we have further empirical evidence, we will be in a situation as to propose a theoretical information system that develops skills to improve the performance of IT managers.

Another exciting research to be conducted is to identify and analyze the processes of skills development that can be used to achieve the market requirements and competitiveness.

Competing interests

The authors declare that they have no competing interests.

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