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EMERGING COLLECTIVE INTELLIGENCE BUSINESS MODELS

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Abstract

This paper essays an approach to the emergence of new business models based in collective intelligence through the inclusion of crowdsourcing in business processes.

To contextualize this phenomenon, we present a brief sate of art, highlighting some key terms fundamental to understand collective intelligence and its impact in the business environment and on how organizations are changing the way they perform and produce products and services.

First we approach Web 2.0 and the difficulties of a scientific definition for this expression. Then we have a look into crowdsourcing boost, consequence of the new possibilities opened by Web 2.0 applications and enabled by technology evolution. Regarding Collective intelligence we give particular attention to Malone's Collective Intelligence genoma, due to the possibilities of understanding Collective Intelligence phenomenon brought by this framework into organization's business models.

Then we focus on business models, particularly in the importance of new web 2.0 crowdsourcing based ones in creating value, particularly in the new trend of business processes experimentation supported by collective intelligence activities. We present collective intelligence as having the potential to generate new business models and will present examples of well-succeeded cases. Finally, we present some examples of Portuguese collective intelligence business models and derive some conclusions regarding future research challenges.

Keywords: Collective Intelligence, Web 2.0, Crowdsourcing, Business Models.

1   WEB 2.0

Trying to fill in the lack of a scientific definition for Web 2.0, Hoeg et al. (2006) essay an approach and define it as "the philosophy of mutually maximize the collective intelligence and added value for each participant by formalized and dynamic information sharing and creation". The expression Web 2.0 was popularized by Tim O'Reilly (O'Reilly 2005) and refers to "the business revolution in the computer industry caused by the move to the Internet as platform, and attempt to understand the rules for success of that new platform. Hoeg et al. (2006) also note that this is "mostly applied to emphasize the differences of emerging communities compared to earlier forms of online communities, encompassing various perspectives - technology, attitude, philosophy".

Web 2.0 maximizes the knowledge distributed within a group, as it reflects the knowledge of all participants and continuously adapts to changes in the environment or opinion leadership. On the other hand, Web 2.0 services are characterized by formalized interaction, as users utilize a platform to interact, through which is determined the form of interaction. Web 2.0 services are also dynamic and provide information in the broadest possible form - video, data, text content, as well as metadata, annotations or history. Finally, through Web 2.0 services information is created and then shared - this being actually one of the main distinguishing factors of Web 2.0.

Jeon et al. (2011) present six key ideas that can differentiate Web 2.0 from the previous Web generation:
- *Individual production and User Generated Content* (UGC) also called User Created Content (UCC) - the barrier to produce and create was lowered and UCC has a dramatically faster production rate and a larger individual publisher.
- *Harness the power of the crowd*: the key for 2.0 is using collective intelligence. The Internet creates the possibility and the conditions of using the contributes of several individuals.
- *Architecture of participation*: the web service will become better as the number of people who use the service increases and they are connected to each other.
- *Network effects*: The greater usage of a product and/or service benefits the existing adopters with the increasing size of the network.
- *Openness*: Sharing is a main principle of Web 2.0.

2   CROWDSOURCING

The term was coined by Jeff Howe (2006a) to "describe a new Web-based business model that harnesses the creative solutions of a distributed network of individuals through what amounts to an open call for proposals." According to Howe (2006b) it's a compound of Crowd and Outsourcing referring to the outsourcing of corporate activities to an independent mass of people ("crowd").

As noted by Dawnson and Bynghall (2011), "crowdsourcing" has a long history and begun back in 1714 with a well-know example - the British Government's creation of a "Longitude Prize" for a reliable method of calculating a ship's longitude. These authors present several cases of crowdsourcing through the history to conclude that the rise of crowds and crowdsourcing in the 21st century has been dramatic, due to the above mentioned development of Internet and Web 2.0 applications. Several factors have enabled this phenomenon, such as: 1) connectivity (easy and low cost access to Internet, even in developing countries); 2) the appearance of new collaboration tools, like online services of project management, shared desktops, etc., that afford the remote working; 3) the development of crowdsourcing platforms and emergence of innovations such as hourly billing, screen monitoring, two way feedback, social feedback on competitions; 4) the awareness of the term crowdsourcing, due to the visibility it gained in the media, that enabled greater understanding of it; 5) comfort with remote work - remote work is becoming standard practice; 6) cost and efficiency pressures - all companies continually look for ways of reducing costs and seek ways to increase efficiency.

Giving much better and free access to the crowd, Internet takes Crowdsourcing into a new dimension. It's becoming a popular method of gathering ideas from external sources, collecting and filtering input through Web-based tools such as blogs, wikis and structured databases.

Along with Crowdsourcing, new business models took advantage of Web 2.0 applications, such as social networking, mashups, product customization, and open market business models.

2.1   Crowdourcing and related terms

As a recent phenomenon Crowdsourcing it's sometimes confused with other concepts, namely Open Innovation, User Innovation or Open Source Software. Schenk and Guitard (2005) essayed a clarification, showing the main distinguishing marks between these concepts: although both open innovation and crowdsourcing constitute a powerful way of improving R&D processes: 1) open innovation focuses on innovation processes and Crowdsourcing not; 2) Open Innovation describes knowledge flow between firms, while Crowdsourcing establishes a connection between the firm and the crowd, large set of anonymous individuals.

Regarding User Innovation, it can be mistaken with crowdsourcing because users are anonymous individuals that can be found in the crowd; nevertheless, crowdsourcing does not suppose customer feedback in the innovation process, user innovation does. Last, Open Source Software, as crowdsourcing, relies in the idea that knowledge and competencies are distributed. The main difference between them is the fact that firms usually patent their output and Open Source Software makes use of copyleft licensing.

Brabham (2008) also focus in the distinction between Crowdsourcing and Open Source Production. According to this author, Open Source "involves allowing access to the essential elements of a product (such as source code for software) to anyone for the purpose of collaborative improvement to the existing product, with the continued transparency and free distribution of the product through the various stages of open development".

The philosophy underlying it is that many people will have a better outcome than only one. Also, this way of working is not limited by intellectual property law, and that liberty can have as result "a product that is increasingly better, developed collectively and democratically" (Brabham 2008). Nevertheless, Open Source isn't fit to the solution of all problems, namely when tangible goods are involved, that need to be produced and distributed.

In fact, as pointed out by this author, if hackers give their contribute for free, almost like one hobby, it's unlikely that people will offer free labor and contribute for the costs of producing one improved end product, or that anyone will participate in it without having a cut of profits.

Crowdsourcing, however, overcomes Open Source limitations "by providing a clear format for compensating contributors, a hybrid model that blends the transparent and democratizing elements of open source into a feasible model for doing profitable business, all facilitated through the web" (Brabham 2008). This is where new business models make their appearance since winning crowdsourced solutions have as a goal to maximize profits from the solution and get something in return. For instance, Threadless (please see below a more detailed description of this web site) receives the ideas from the crowd, but still has to take care off all chain of production related to the sell of t-shirts; in return it owns the rights of the drawings, assuring that they are not sold to any other company. Hence, Crowdsourcing gathers the quality and innovation of open source production with an appropriate business model that is viable to the production of tangible goods in a profit-oriented society.

3   COLLECTIVE INTELLIGENCE

Collective Intelligence is not a new phenomenon - it has in fact been in the focus of science and research for many years. Nevertheless, the development of Web 2.0 applications and user generated content through crowdsourcing gave a new meaning and relevance to Collective Intelligence.

The most used approach for Collective Intelligence goes back to evolutionary processes and refers to intelligence in groups, according to Leimester (2010). This author presents the example of team sports and music bands, where each group member evaluates the overall situation (the match, the play/the music), and acts accordingly to achieve the overall goal and also of animal's behavior, as animals coordinate themselves in order to achieve a common goal. Going back to the etymology of the expression, the same author remembers that:

> [...] "collective" refers a group of individuals who are not required to have the same attitudes or viewpoints. Different members can reveal different perspectives and approaches, and thus leading to better explanations or solutions to a given problem. "Intelligence" refers to the ability to learn, to understand, and to adapt to an environment by using own knowledge. (Leimester 2010: 245).

The MIT Center for Collective Intelligence (http://cci.mit.edu/) combines these two terms and defines it as "groups of individuals doing things collectively that seem intelligent" (Malone et al. 2009). This Center presents a framework for identifying the underlying building blocks ("genes") that are at the heart of collective intelligence systems; the conditions under which each gene is useful, and the possibilities for combining and re-combining these genes to harness crowds effectively. Malone's framework uses two pairs of questions: "What is being accomplished? How is it being done?" and "Who is performing the task? Why are they doing it?".

The question "What is being done?" can be divided into the "create" and the "decide" gene. In the first one the actors in the system generate something new (a piece of software code, a blog entry, a T-shirt design), either by themselves or collaborating in a team; in the "decide" gene the actors evaluate and select alternatives (for example, deciding whether a new module should be included in the next release of Linux, or whether to delete a Wikipedia article).

For the question of "Who is performing the task?" there are two dominant genes: "hierarchy" and "crowd". If a task is assigned to someone from a higher position, it is called a hierarchy. If a task is carried out by (many) individuals voluntarily, without being assigned to a task, this is called a crowd and it's possible due to low cost electronic communication, which enables a much more active participation from the crowds than ever.

Furthermore, it is necessary to understand why people perform tasks, what motivates them to participate, what incentives are at work. Motivation can be a financial benefit ("money" gene), but also other motives are possible. "Glory" or recognition is at hand if participants are motivated by the desire to be recognized by peers for their contributions. The "Love" gene can take several forms: people can be motivated by their intrinsic enjoyment of an activity, by the opportunities it provides to socialize with others, or because it makes them feel they are contributing to a deeper meaning.

The final question is "How is it being done?". Many collective intelligence systems will use "hierarchy" but the innovation is on the way how crowds are used. In this case, is important to know if the crowd's contributions and decisions are made independently of each other or whether are strong dependencies between their contributions. According to this insight, four genes should be taken into account: "Collection", "Collaboration", "Individual decision" and "Group decision" genes. The two "How" genes associated with Create task are "Collection" and "Collaboration". For decide tasks, there are two categories of possible genes: "Group decision" genes and "Individual decision" genes.

Analyzing these genes allows a deeper understanding of the mechanisms and functionalities of collective intelligence and thus a better study of its potentials and areas of application. Like the genes from which individual organisms develop, these organizational genes are the core elements from which collective intelligence systems are built. The full combination of genes associated with a specific example of collective intelligence can be viewed as the "genome" of that system (Malone et al., 2009).

EXAMPLE	WHAT		WHO	WHY	HOW
Edit existing Wikipedia article	Create	New version of article	Crowd	Love, Glory	Collaboration
	Decide	Whether to keep current version	Crowd	Love, Glory	Consensus
Decide what Wikipedia articles to include	Create	New article	Crowd	Love, Glory	Collection
	Decide	Whether to delete (preliminary)	Crowd	Love, Glory	Voting
	Decide	Whether to delete (final)	Wikipedia administrator	Love, Glory	Hierarchy

Table 1.   Example that shows the genes distribution for Wikipedia, considering Malone's Collective Intelligence genoma.

4   NEW BUSINESS MODELS

The aim of the present work is to focus our analysis on how collective intelligence is shaping the way companies develop their business processes and lead them to the creation of new business models. But before approaching the new possibilities open by Web 2.0 and Collective Intelligence in companies' value chain, let's have a quick look to the meaning of the expression "business model". This is a broad term, necessarily associated with value creation. It incorporates principles from economics, entrepreneurship, finance, operations, marketing and strategy and it has as main function value creation and value capture (Pourdenhad and Baker, 2011). Slywotsky (1995) defines it as a framework in which is included "the entire system for delivering utility to customers and earning profit from that activity". The first approaches to characterize generic business models included value proposition, market segmentation, value chain, revenue generation, and competitive strategy. A business model articulates the logic, the data, and other evidence that support a value proposition for the customer, and a viable structure of revenue and costs for the enterprise delivering that value (Teece, 2010). According to this author, it's about the benefit the enterprise will deliver to customers, how it will organize to do so, and how it will capture a portion of this in revenues.

Walter and Back (12) noted that it's also relevant to consider the factor "collaboration" within the business model definition since a business model describes ways of creating value for customers and the way business turns market opportunities into profit through sets of actors, activities and collaborations. In effect, the factor collaboration is crucial to the business model innovation that we are watching in the Web 2.0 era through the use of collective intelligence in business processes.

Traditionally, organizations would invest in product development, increase consumer insights or try to grow by acquisition. Nowadays, instead of investing time and money in research and development of specialized resources, facilities and infrastructures, companies tend to benefit of all new possibilities brought by Web 2.0 and use it as a source of future competitive advantage. The exploration of alternative value creation approaches through business model experimentation has advantages - it lowers the risk of taking the wrong decisions and highlights potential new competitors. Sure enough, business model innovation shows up more and more as an alternative or complement to product or process innovation (Amit, R. and Zott, C. 2012). Innovation is indeed a path for value creation; the difficulty is to put it in place methodologically.

In our perspective there is a growing potential for the integration of collective intelligence processes that extend beyond the organizations traditional boundaries in the way they organize to deliver value which can be translated in new business models.

In fact, the company's new business models made possible by collective intelligence processes will impact and determine the way the organization will or not succeed, and, as a consequence, "an unexceptional innovation with a superior business model may prove more profitable than a superior innovation with an unexceptional business model" (Pourdenhad and Baker 2010).

4.1   Collective Intelligence Examples

We believe that companies can enhance their efficiency and effectiveness through the adoption of collective intelligence and its integration in new business models. Collective Intelligence has the potential to increase the corporation's value chain, as it serves the same purpose as outsourcing, but lowers the financial risks, increases flexibility, allows broader access to talent and ideas, reduces costs, increases capabilities and reduces time to market. Therefore, there are several examples of organizations effectively using crowdsourcing to either create or extract value from markets by implementing innovative products and services based on collective input.

Wikipedia, a early adopter of this approach, it's a well know web page that offers a "open content" encyclopedia (www.wikipedia.org). Anyone can add or change anything at any time and frequent contributors watch recent changes to undo or correct errors.

Amazon's Mechanical Turk (http://www.mturk.com/) it's a crowdsourcing market place run by Amazon.com. In this market place, businesses can request human intelligence tasks (HITs - tasks which computers can't perform or have difficulties to do so, like identifying music in CDs, or selecting a pizza store amongst different photos) and the Mechanical turk provides a workforce that can complete HITs for a monetary fee, usually very low.

Threadless.com (http://www.threadless.com) is a company that uses crowdsourced design to create t-shirts which it then sells to customers. Once members join the community, they can design, vote, chat with other users, and purchase the t-shirt products created by others. If a user chooses to participate in the design process, he can download a template to use with commercially available design software such as Adobe Illustrator and upload a completed design. Meanwhile, all users on the site have the ability to rate and critique the contributed designs and, ultimately, select weekly "winners" who are paid each time their design is reprinted. In return, Threadless.com owns the design and earns a significant profit in the process. Threadless.com sold more than $30 million in T-shirts in 2009 - with a 30 percent profit margin and the revenue growth is approximately 200 percent per year, with no help from professional designers, advertising, modeling agencies or a sales force (Small Business Trends, 2011).

Collective Intelligence is also being applied in the field of corporate research and development. One example is InnoCentive, originally founded by pharmaceutical company Eli Lilly as a research venture. InnoCentive allows companies (called "seekers") to offer financial rewards to external innovators by anonymously posting challenges to its community of experts. When large companies such as Proctor & Gamble, Dow, BASF and others become stumped by a perplexing research problem, they can get access to InnoCentive's global network of over 100,000 experts who submit solutions in the hopes of being selected as the winning proposal. InnoCentive 'enables scientists to receive professional recognition and financial award for solving R&D challenges', while it simultaneously 'enables companies to tap into the talents of a global scientific community for innovative solutions to tough R&D problems (Brabham 2008).

5   WHAT'S NEW IN PORTUGAL

The present work is a first step of a new research line the authors are developing with the specific goal of getting a deeper understanding on how collective intelligence is generating new business models that change Portuguese companies business processes through the use of collective intelligence. In that

sense and although we have not done yet an exhaustive identification of such business models in the Portuguese reality, we have already identified some very interesting examples for the time being focused on open innovation that support our initiative and which we present here.

5.1 EDP Inovação "Co-Creation"

The Innovation group of Portuguese electricity company EDP, nowadays a global player in the energy field, in an effort of incorporating collective intelligence in their innovation processes in an open-innovation approach has launched the Co Creation site (http://cocreation.pt). According to the site "Co-creation is about exchanging ideas, sharing knowledge and working together. To support this collaborative activity, nothing better than a social network platform. Here, you will find people and companies, discussing and working on relevant themes to the Energy Sector, namely: Smart Grids; Electric Mobility; Energy Efficiency; Offshore Energy; Solar Energy; and Proccesses & IT."

Through this platform EDP Inovação invites everyone who has a creative and innovative idea, whether concerning a new technology or a business proposal to join this co-creation platform. Besides presenting the ongoing projects, the website gives the opportunity for the submission of ideas for new products and services, but more interesting, it presents challenges to be solved by the community. Any eventual partnership resulting from the submission of any idea, project, initiative, work, creation or invention to EDP Group that may eventually be accepted will be established and formalized by direct and personal contact in the terms defined by the parties involved.

5.2 PT "TalentocomFibra"

Portugal Telecom (PT) is a global telecommunications operator and a Portuguese leader in fixed, mobile, multimedia, data and corporate solutions. The Talent Challenge Fiber (TalentocomFibra - http://www.talentocomfibra.telecom.pt/) is an initiative of the PT directed at university masters and post-graduation students which rewards who presents the best proposals for innovation in response to the challenge "Create a new PT product" in the areas of mobile (TMN), television (MEO), Internet (SAPO), and others.

The selection and decision of the best proposals follows several steps beginning by a crowdsourcing voting procedure where the 200 hundred most voted go ahead and are evaluated by the Talent Challenge Fiber accompanying committee who chooses the best 50 which are evaluated by a PT group of experts (iTeam) resulting in a short list of 5 proposals. Finally this 10 proposals will be presented to PT Administration Board and the best one selected. The winner(s) of the challenge are integrated in a PT Trainee Program and prizes (mobile phones, communication vouchers, etc.) are awarded to the best 50 proposals.

5.3 Innocrowd

Innocrowd, a young Portuguese start-up (https://inocrowd.com), follows the presented above InnoCentive model by allowing companies or organizations (also called "seekers") to offer financial rewards to external innovators by posting challenges to its community of experts. The idea is to offer a prize-based open innovation platform, increasing client's competitiveness. In Innocrowd's webpage the challenges present a deadline and the associated fee. Solvers can then apply and submit solutions. If the proposed solution is selected by the seeker, a pre-determined fee will be paid to the solver by the seeker. The intellectual Property (IP) of the solutions selected by the solvers, whenever applicable, is transferred to the seeker.

6   CONCLUSION

In 2010, Malone et al. compared the changes that are happening in business with the change to democracy in governments: *We are in the early stages of an increase in human freedom in business… that may be as important as the change to democracies has been for governments.*

In effect, it is interesting to note that the ways societies have been organized throughout history reveal a remarkably simple pattern that foreshadows how businesses are now changing. Actually, according to this author, a lot of societies developed from bands (independent), to kingdoms (centralized) and then to democracies (decentralized), which is comparable to businesses evolution: small and independent businesses trend progressed to centralized corporate hierarchies and now to decentralized networking.

This new reality is strongly supported by technology which created the opportunity for organizations to have the benefits of size - economies of scale and knowledge – and at the same time take advantage of the human benefits usually present in the small ones - freedom, creativity, motivation, and flexibility.

The diffusion of simple and easy-to-use technologies enabled users to interact and design web applications without programming skills and had, as a result, the creation of vast amounts of user generated content. Users are now able to engage themselves more critically and more directly in activities on the Web, providing them with collective power. The development of Web 2.0 enabled a new paradigm - instead of trying to improve the productivity or decisions making of individual users, Web 2.0 applications are evolving and starting to be more focused in harnessing the intelligence of groups of people in the organizational context to enable new business models, greater productivity and better decisions. This development creates new challenges and brings new potentials for companies to improve their creativity and innovation capabilities to develop new ways of organizing their business processes and to create new products and services.

In Portugal we are now witnessing the appearance of organizations that take advantage of crowdsourcing to create new collective intelligence genomes, and although some interesting examples are already in place, there is still a huge potential for evolution. Quoting Leimester (2010), the challenge is to understand how to unleash the vastly unused knowledge or experience of their employees, customers, or partners, and thus leveraging their inherent collective intelligence. This will definitely takes business into another level and will certainly lead to new and challenging business models yet unknown.

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