



## CROWDSOLVING: TRUST AND MOTIVATION

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### ABSTRACT

1. Abstract demarcation of the crowdsolving of the closed innovation to the contemporary innovation

Chesbrough H. [CHE 03] proposed a new modeling of the innovation process “the open innovation” which opposes the closed innovation. The latter is thwarted essentially by two limits, the first one of which was raised by Joy's law "No matter whom you are, most of the smartest work for someone else ". The second limit leaves the principle of the advantages of the specialization and the division of labor and therefore, the company has more interest to create some value by agreeing to share the inventions with third parties and/or by agreeing to collaborate on innovative projects. As illustrated in the following table (Table1), contrasts exist between both closed and opened models.

**Key Words:** innovation, crowdsolving, modelling

### Introduction

The recent literature regarding management is rich in works concerning the innovation concept. With the succession of the new generation of innovation or as certain authors call the contemporary innovation as well as open, agile, user- centered, the researchers give more and more interest in their works to these new forms of innovation

The crowdsolving is classified by the literature as a modality among others of the open innovation T.Burger-Helmchen and J.Pénin [PEN 10]. IT constituted an enriching line of thought, however rare are the researches which focused on the exploration in the context of this mode of innovation; the relation enters trust in knowledge sharing, the motivation to share and knowledge sharing via crowd solving mode.

The western experience of the crowd solving proved its efficiency on the ground, but this remains insufficient to justify its success in Tunisia. The rarity of the works on this theme in the Tunisian context constitutes a strong argument justifying the access of this subject.

It is in this current of idea that our problem tries to study at the same time in theory and empirically the link between variables: Crowd solving and sharing of the inventions, the trust in sharing of the innovations and the motivation to be shared.

Being situated in this problem, the present article tries to answer following both questions:

1-What are factors under ownerless in the crowd solving? 2-Which is the link between variables: trust in sharing of the innovations, the motivation to share the innovations and the sharing of the knowledge: crowd solving?

On the basis of a review of literature, we shall develop at first the points which appeared to us as the main things to understand that is the open innovation today then the crowd solving as mode among others of the open innovation.

Then, we shall present our methodological frame (executive) followed by the results and the required comments.

Toward the end we try to supply recommendations which can establish (constitute) areas of research in the future.

**Table 1. Closed innovation and open innovation**

<b>Principles of closed innovation</b>	<b>Principles of open innovation</b>
We have a competent team in our company making us relatively autonomous to reach our goals	Competent people are not all in our company. We have to identify them and invite them to work or to collaborate with us.
The biggest profits of R-D result essentially from our efforts to discover, to develop and to market by ourselves.	R-D made by partners can be value-creating significant. R-D made for the internal contributes then to appropriate a part of this value.
If we are the first ones to make a discovery, we shall be then the first ones to put her in market.	We do not have to reinvent the wheel to take advantage of various discoveries. It is possible to take advantage of it if we know how to fit in the dynamics of the market.
The company which is the first one to introduce its innovation is the best placed to outstrip the competitors.	To develop a better business model is preferable in the fact of being the first one on the market.

If we have the best ideas, we shall be ahead of the competition.	If we know how to exploit our ideas and those of the collaborators, we shall be ahead of the competitors.
We strictly have to control our Intellectual Property (IP), so that our competitors can benefit neither from our ideas nor from our work.	We have to take advantage of our sales of Intellectual Property (IP) and acquire IP of others to strengthen and revitalize our own business model.

By Chesbrough, 2003, p. xxvi, free translation) open Innovation, capacities and organizational innovations - Examination of the documentation 2003-2010

The closed model bases first of all on the culture of the protection and some secret (importance of the control justified by the fact that the innovation is the main source of a sustainable competitive advantage) and secondly on the reliable absence in the inventions developed by others and this for lack of guarantee on their quality and of their reliability.

In the case of the open innovation, we recognize the value, the trust and the sharing with others.

### **The opened innovation definitions and modalities**

The concept of open innovation was introduced by the American Henry Chesbrough [CHE 03] to help companies to manage their process of innovation. We share its own definition. "Open innovation is based on a different knowledge landscape, with a different logic about the sources and uses of ideas. Open Innovation means that valuable ideas can come from inside or outside the company and can go to market from inside or outside the company as well. This approach places external ideas and external paths to market on the same level of importance as that reserved for internal ideas and paths to market during the Closed Innovation. ". [CHE 03]. Since then, other definitions of the open innovation were proposed. In a general way, all the definitions which were born West, Vanhaverbeke and [VAN 06]; Leadbeater [LEA 07]; Henkel [HEN 06] mentions a company making appeal to innovations (new contributions of knowledge) or of expertise with the aim of increasing the value proposition, to decrease the development costs of products, to shorten the time of marketing and to optimize the gains (value capture). In a context of open innovation, the borders of companies are permeable, porous. Numerous flows of knowledge occur between the company and its environment. These flows can go to double senses, either outgoing flows of the company, or flows incomers towards the company, where from two faces of the open innovation: OUTSIDE-IN and INSIDE-OUT and being able to be simultaneously mobilized. From the moment a company does not control the whole process innovation, it is possible to speak about open innovation. Numerous studies emphasized the importance of the role of the brokers in technology and in intellectual property to reduce

transaction costs as well as on the progress of the ICTS (INFORMATION AND COMMUNICATION TECHNOLOGIES) which favored the development of the open innovation, strengthened the existing open modalities of innovation and has resulted news. Where from we attend good to one very large number of modalities which arouses the necessity of presenting a classification of the various modalities of the open innovation as proposed him Julien and Pénin [PEN 13] in the following Table2.

**Table 2. Open innovation modalities**

	Open Innovation 1.0	Open
		Innovation 2.0
Outside-in	Licensing-in Spin-in	Crowdsourcing
Pure Partnership (mixes of outside-in and of inside-out)	Co-conception Co-développement Consortium of research: Research joint-venture Clusters industriels	Innovation with communities / open source
Pure Inside-out	Licensing-out Spin-out	Marketplaces / "e-Bay ideas" (ex. : Yet2

		.com )
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Source: Jullien & Pénin (2013)

In this work we focus on the outside-in facet and more exactly on the crowdsourcing as the axis of develop.

### **The open innovation: the crowdsourcing and the crowdsolving**

Howe [HOW 06], offer the following definition: "Simply defined, crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call. This can take the form of peer- production (when the job is performed collaboratively), but is also often undertaken by sole individuals. The crucial prerequisite is the use of the open call format and the large network of potential laborers." For the journalist economist Henk van Ess, [HEN 10], the crowdsourcing consist in channeling needs or desires of experts to solve a problem and then to share freely the answer with everybody. Google and Wikipedia are for H. Van Ess the biggest users of crowdsourcing. According to [MAU 04] we attend good in a rejection of customer / designer's binary notion where the old notion of an individual with a dream of perfection is replaced by the distributed resolution of problems and the multidisciplinary practice with team. Three ideas dominate the reality for the advanced design today: distributed, plural, collaborative. It is not any more approximately a designer, a customer, a solution, a place. The problems are taken everywhere, the solutions are developed and tested and contributed and these ideas are tested against other solutions. The effect of this has to imagine a future for the conception which is so much more modest than more ambitious. Mau [MAU 04]. For Markus Krause [MAR 12], working on the collective intelligence and its public utility, human beings and machines have to work hand in hand: " the combination of the human intellectual capacities and the power of computers to store and spread the data can be a very effective model to help the humanity". And therefore, we assist an increase of platforms today that some lists them in two types: platforms of competition (help, competitions) (crowd solving) and more or less creative participations. It is about a trend including the notion of creativity, exchange, sharing. This does not contradict itself with T.Burger-Helmchen and J.Pénin [PEN 02] who distinguishes three types of crowdsourcing: the crowdsourcing of creative/ inventive activities, tasks creatures of habit and of contents. In first case the company calls on to producers of knowledge (individual pioneers or in crowd) to solve sometimes complex and/or creative problems whereas in two others, we do not solve a problem but we bring some contents, calculation capacities, of time, etc. The crowd solving takes the shape of a race in the solution «winner takes all ", with remunerations for the winner which can be sometimes very important in comparison for previous both cases.

The virtual platform of the crowd solving allows to make the intermediary between companies which have a problem complex to solve (most of the time a technical problem which the teams

of R&D do not manage to resolve) and a crowd of inventors ready to share their time and their knowledge in the resolution of these problems. The company so shares its problem on the site in the form of well formalized challenge: clarify his problem, place of the site of proposed development, the schedule (the calendar) activities in the zone (the domain), the locations, clarify data even strongly technical which should be made available: the dimensions of roads, environmental and municipal laws and code, given by currents of traffic. It against part this company offers a bonus for the best brought solution. The inventors "amateurs" propose solutions in adequacy with the specifications and the best wins the bonus (premium). Thus it is the invention and not the innovation that, generally, is crowd sourced.

In this present article we chose to work on the crowd solving term where from the platforms of competition and to study its underlying factors. It will thus be important in a first phase to understand well the relation between the crowd solving and the following terms: sharing of knowledge, the trust in sharing and the motivation in sharing, and to study then the link between these various.

## **2. Theoretical executive: the underlying factors in the crowd solving**

### **The knowledge sharing in crowd solving mode**

The arrival of the digital in organizations represents a great opportunity to revitalize and to optimize the Knowledge management if this one is mastered. According to (Kensing and Blomberg, 1998), the development of tools and techniques is a key axis for the concept of knowledge sharing. The knowledge sharing in crowd solving mode has for purpose the resolution of a problem or the acquisition of the ideas or the original realizations. A value-creating mode and underlining the notion of authenticity mobilized by Lebraty and Lobre, [LEB 10].

We consider the knowledge sharing between the service receiver and the supplier as one of the major motives for the partnership of outsourcing based on the mutual trust.

Thus, for a knowledge sharing made a success in a partnership of outsourcing, the service receiver and the supplier should have a clear common vision and purposes for partnership as well as a faith that their partners will not act in a opportunist way; this can be the quality of partnership named key source of successful knowledge sharing is an organizational capacity to learn or acquire the necessary knowledge of the other organizations.

### **The trust in knowledge sharing**

There is a lack of consensus among the theorists and the researchers about a definition of the trust but they all underlined its importance. [ROT 67] indicated that the trust is a hope held by a person where a word group, promises, verbal or written declarations of another individual or group. (Lewis and Weigert, on 1985) expressed this trust as a feeling of confidence and security

in the answers friendly of the partner and the strength of the relation. Zucker [ZUC 86] indicated that the trust includes a set of expectations shared between the individuals who are involved in an interaction. Chiles and McMackin, on [CHI 96] asserts that the trust translates the anticipation which a partner will not adopt opportunist behavior in the face of short- term incentives. Notebook [PEN 02] proposed a two-tier approach to the confidence, based on two reliable types, In the case of the crowdsolving the confidence is mutual between the company customer and the crowd:

- The trust in intentions of the company: the company can use proposals emanating from the crowd, while there is risk of opportunist behavior: formally, it rejected them. Where from Crowd solving works under the condition that the crowd trusts in the intentions of the company. This trust is dependent on the reputation of the latter, as well as in the institutional and contractual arrangements allowing to limit the risks of opportunism Liotard, [LIO 10].
- The trust of the company in skills of the crowd which constitutes a condition for the appeal to Crowdsolving.

A human factor such as the trust is a mattering element to obtain effective knowledge, and also, attribute to improve the performance.

### **The motivation to share knowledge**

The stakes in the company are to mobilize the skills held by the crowd and to integrate the creative capacity of the individuals; Amabile and al., [AMA 16]. Otherwise it is a question of benefiting from the effect of crowd via the call of participants / suppliers' large number for the realization of very large-scale simple tasks as well as the activities of resolution of problems in contexts of innovation and from the creative activities.

Numerous authors as Eisenberger and Shanock,[EIN 03], Sist and Jegen [SIS 01]; Frey and Osterloh, [OST 02]; Frost and al ., [FRO 10] evoked two types of motivations for the realization of intellectual and creative tasks: first of all an intrinsic motivation which results from the satisfaction associated with the task as such task enjoyment, Puca and Schmalt, [PUC 99] or in his social dimension Forgas and al ., [05 FOR] and in the second place an extrinsic motivation associated with remunerations. Once we presented each of variable to part it is necessary now to clarify the existing links between the latter.

### **3. Link between variables**

As we have already said it, we are going to show the link between trust in the sharing and the motivation to share and sharing of knowledge in crowdsolving mode.

### **Trust and knowledge sharing**

Without having a valid reason, most of people are not going to share their knowledge if they do not arrange good sensations and any trust Ellis [ELL 01]. Without trusting, the potential of the maximal brain will not be reached by the firm Geoffrey [GEO 97]. The important factor is the mutual trust AnnWalmsley, [WAL 93]. The knowledge sharing will not be successful that if companies trust in the knowledge of the inventor on one hand and the inventor trusts in the intentions of the company on the other hand. In this work, we consider that within the framework of the crowd solving the trust of companies in the knowledge of the inventor already exists because the profitable company has already taken the initiative to throw the challenge via the platform of the crowd solving. It remains then to verify the link between the trust of the crowd in the intentions of the company and the knowledge sharing via the crowd solving, what allows us to formulate the following hypothesis: **Hypothesis 1: an increase of the confidence(trust) of the inventor in the intentions of the company increases its motivation to share its knowledge in mode of crowd solving.**

### **Motivation and parage of knowledge**

Certain searches as Hanna Timonen and Jari Ylitalo[HAN 07] noticed that reciprocity was a factor mattering in the knowledge sharing, that the share is easier in situations where both parts considered that they took advantage of the collaboration (situations of win-win). However, the fear of exploitation seems to attend even in these situations and the confidence which was created is easily destroyed if one of the two left: profitable company and inventor (s), spreads knowledge received in other parts. Previous researches suggest that there is a number of problems crowd solving in the knowledge sharing in the internet. In a context of crowd solving the call is launched by the profitable company through a challenge where the counterparty is clarified between inventor owner of knowledge, the company and the virtual platform. The challenge of the "work of knowledge ", the motivation seems to be an underlying factor in the crowd solving as the mode of knowledge sharing. And what allows us to formulate the following hypothesis: **Hypothesis 2: the motivation of the inventors increases the intention to share their knowledge in crowdsolving mode.**

### **4. Methodology of the research**

At the level of our research, we followed a very precise methodological approach, by choosing a sample of adhérents 250 (likened to the inventors suppliers of the knowledge) of diversified specialties and by questioning them via a questionnaire to clear the link enter knowledge sharing via crowd solving, the trust of the inventor in the knowledge sharing via crowd solving and motivation to share. And to develop our questionnaire, we were inspired by the research for Siemsen, Enno. Roth, Alenda V., and Balasubramanian, Sridhar. [SIM 14] to measure these variables by a scale of Likert in 5 points translating the degree all right respondents. The examination of the matrix of the correlations between the items of three variables shows that the latter are positive and significant and give evidence afterward of the uniqueness of the scale. Also, there is excellent integrity between items, all the conditions are verified .



## 5. Check of the hypotheses and the discussion of the results

According to the obtained results, there is a positive relation between confidence in division and motivation to be shared. This relation is confirmed by the past works of Siemens, Enno. Roth, Alenda V., and Balasubramanian, Sridhar, [SIM 14] which showed the positive link between these two variables. The examination of a magazine of the literature showed us that the confidence of the owner of knowledge (inventor) in the intentions of the company affects positively the motivation of the latter to share its knowledge. Indeed, this hypothesis was verified in the Tunisian context. However, because the confidence is based on the individual perception towards a certain thing, a guardian of the platform of the crowd solving will need to put additional efforts on the creation or to influence this perception. When the relations are based on the mutual trust, people are more pious to supply useful knowledge. So, people are more of avid to exchange the knowledge and between them. In the present study, we studied the effect of the trust on the motivation to share knowledge. The hypothesis was confirmed. It means that the trust has a direct, indirect and significant effect on the development of the knowledge sharing in crowd solving mode. The trust is a main component to supply an effective knowledge and a mattering attribute to improve the performance.

When the platform has the support and the cooperative systems to assure the trust of the candidate inventors, the part and the transfer of the knowledge towards the profitable company through the crowd solving will be easier and being also translated by an effective and efficient performance and, possibly, will increase the production.

Furthermore, the examination of a review of the literature showed us that the motivation of the owner of knowledge increases its intention to share knowledge in mode of crowd solving. Indeed, this hypothesis was verified in the Tunisian context. This result confirms well with the one who was found by Siemsen, Enno. Roth, Alenda V., and Balasubramanian, Sridhar. [SIM 14]. These authors showed that there is a significant link between these two variables. In the present study, the effect of motivation on the knowledge sharing in the first hypothesis was studied and the hypothesis was confirmed, worth knowing the motivation in a positive effect on the development of the processes of the knowledge sharing via the crowd solving. The virtual platform of crowd solving is not only a platform of development and innovation of products but also presents a place where the knowledge manages; that is a context within which the explicit and tacit individual knowledge are exchanged, harmonize, are divided and become collective thanks to the interactions which can take place between the various members implied in the crowd undertaken to solve the problem. The platform of crowd solving so creates a context of sharing, creation and capitalization of the knowledge allowing its members to collaborate team there and to solve the problems in a more effective way.

Of this fact we can propose recommendations to strengthen the contribution of the crowd solving as new mode of open innovation which could establish axes of deepening:

- The importance to institutionalize and to regulate the transfer of intellectual property rights in mode crowd solving to strengthen the confidence and the motivation of the crowd.
- The valuation of synergies of co-partnerships between the producers of knowledge (inventors).
- The study of the prices of the premiums granted in a purpose to motivate and to attract more participants, to reduce the time of obtaining of solutions in returns to the challenge.
- The development of customer loyalty the candidates having participated to give acceptable and capitalizable solutions (not only the best) and to build further to that a base of human datum of skills.

## **6. CONCLUSION**

In this paper, we tried to show that the crowd solving embodies a new mode of innovation among those recently developed. We saw that it establishes a mode of Open Innovation which takes a big success at the moment when the model of management in network and in collaborative mode becomes widespread thanks to develop ICTS (INFORMATION AND COMMUNICATION TECHNOLOGIES).

The deficiency of the researches on this matter, mainly in developing countries, strongly motivated this study. On one hand the number limited by researches carrying on the determiners of the knowledge sharing in crowd solving, and on the other hand their absence in the Tunisian context justifies abstract and empirical reaches of this work. We saw that through platforms virtual of crowd solving on the Internet, companies tend to welcome favorably these mechanisms of open innovation appealing to a crowd of inventors to solve a problem of complex nature often requiring a research and development. The present study wondered about the link between variables: the trust of the inventor in the intentions of the profitable company, the motivation to be shared and the knowledge sharing in crowd solving. Of a highly-rated the results of our research show that the trust has a direct, indirect and significant effect on the development of the knowledge sharing via crowd solving. Of other one they reveal that the motivation in a positive effect on the development of the processes of knowledge sharing via the crowd solving. The next lines of thought and of search could concern how the next lines of thought and to look for could concern how the guardian of the platform of the crowd solving will have to act to strengthen this confidence in the division as well as the motivation of the crowd of inventors. Our research work would pertinently be better more exhaustive thanks to future searches which would complete him. On one hand, he would be more relevant to understand and to explain the role of the developers of platforms crowd solving in the strengthening of the values of division and motivation. Of other one, he would be more convenient to refer to the qualitative tool to enrich that quantitative. Indeed, a future searches appeal, besides the quantitative tool, in that qualitative would allow understanding in depth the phenomenon of division of knowledge in mode crowd solving.

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