Sharing Ideas Openly to Reduce Cost, Time, Risks and Add Value in Product Development

Charles Bombardier

***Abstract*—The research presented here attempts to identify the best methodology to manage innovative ideas coming from inventors, customers, and employees in an open environment. The goal consists in creating a new product development system designed to manage a constant flow of creative ideas while adding value in the process and reducing risk and cost.**

To test his hypothesis, the author assembled a team of over 25 individuals in the fields of engineering, industrial design, marketing, and media. He created, collected, and processed 230 ideas related to the future of mobility over a period of 45 months by transforming them into design concepts. All those concepts were published online on Imaginactive.org and in other newspapers, magazines, and social networks.

With this experiment, the author was able to reach hundreds of thousands of people and generate millions dollars of media value. The experiment was a success since it generated results but it did not allowed the author to measure precisely the interest of the participants for each given concept. The author is now working on an improved experiment that will use virtual reality equipment and brain computer interfaces to achieve his goals.

***Index Terms*—Copyleft, crowdfunding, design, inventors.**

I. Introduction

To help our economy keep pace with worldwide competition, we need to innovate constantly. Inventors are trying hard to come up with new ideas, and they are increasingly using crowdfunding websites to introduce new product prototypes and attract capital. However, a significant number of projects fail due to internal and external factors, which translates into increased costs and risks for inventors, the angel investors who back them up, and society in general.

In March 2013, the author decided to try a new approach with the specific goal of reducing those risks and cost by creating and sharing his own innovative vehicle concepts online before investing too much time and resources on patents or prototypes. For each given idea presented, the objective was to:

- Measure the public's interest
- Get feedback from customers and experts
- Attract investors and collaborators

The author mostly concentrated his ideas around the field of recreational products and transportations. After almost four years, the author has created over 230 concepts in collaboration with industrial designers from around the world, most of which have been published online.

The purpose of this experiment was to save time, money, and risks. It was designed to use the wisdom of crowds to achieve the three objectives stated above. If the experiment yielded good results, the author would start using this process to pinpoint the best ideas to develop and finance. The process could also be made available to other inventors or corporations who wish to improve parts of their innovation process.

Specifically, internal staff from companies could use this new methodology to make sure the ideas submitted from the public are worth developing. In other words, companies could test and rate ideas submitted by inventors by using such a method.

The experiment hypothesis could be summed up as follows:

- Sharing ideas openly will allow inventors and investors to save time and money.
- The process will add value to the ideas.
- Publishing will inspire people to act on those ideas.

II. Literature Review

The experiment conducted included a mix of open innovation with a copyleft attitude. It proposed a new way for innovators to develop their ideas and revolved around the first steps which relate to brainstorming, ideation, and market research. Accordingly, the literature reviewed focuses on open innovation and copyleft in the context of product development.

According to H. Chesbrough, "*The central idea behind open innovation is that, in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research, but should instead buy or license processes or inventions (i.e. patents) from other companies*"[1]. This definition seems to focus on patents. However, to generate a patent, an idea first needs to blossom.

Furthermore, he states that "*internal inventions not being used in a firm's business should be taken outside the company (e.g. through licensing, joint ventures or spin-off)*" [1]. Therefore a nonprofit organization could help generate ideas for large corporations or help them test out ideas from their employees before investing time in them.

In their research paper about the "dark energy" of open innovation, the authors explain that the rise of quick prototyping technologies and the capacity to share information has found a way to profit from people's spare time to create new products [2]. This could help balance and reduce R&D investments.

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Charles Bombardier is with the University of Sherbrooke, Quebec, Canada (e-mail: Charles@imaginactive.org).

Similarly, inventors who have interesting technical ideas could benefit from a system where they can test out their concepts with a group before investing too much free time or "love money" in them. The "dark energy" could thus become "smart, innovative energy."

In their paper titled "Pratiques coopétitives dans l'Open Innovation: Les enseignements des patent pools", Cécile Ayerbe et Jamal Eddine Azzam found that open innovation is "*A method of innovation in which different competing companies give each other access to complementary patents. Cooperation is encouraged by royalties for the use of patents on one hand, and the production of a better product on the other"* [3].

In "Open R&D and open innovation: exploring the phenomenon", Ellen Enkel1, Oliver Gassmann and Henry Chesbrough muse that companies who do not take part in an open innovation program have a much smaller access to innovative technologies and will have a harder time entering an "open innovation program" in the long run. One of the important sources of innovation is the input from companies in related fields of work [4].

In his article titled "A review of literature on open innovation in small and medium-sized enterprises," Mokter Hossain states that small and medium-sized enterprises benefit more from open innovation initiatives during the commercialization phase, as the protection of intellectual property raises more issues earlier in the development phase. Enterprises entering a market are more likely to use open innovation than the ones already operating in said market [5].

According to the website copyleft.org: "*Copyleft is a strategy of utilizing copyright law to pursue the policy goal of fostering and encouraging the equal and inalienable right to copy, share, modify and improve creative works of authorship*" [6]. Copyleft is a form of licensing that can be used to maintain copyright conditions for works ranging from computer software to documents to art.

In general, copyright law is used by an author to prohibit recipients from reproducing, adapting, or distributing copies of their work. In contrast, under copyleft, an author may give every person who receives a copy of the work permission to reproduce, adapt, or distribute it, with the accompanying requirement that any resulting copies or adaptations are also bound by the same licensing agreement [6], [7].

This attitude could certainly be adapted to the field of engineering. Accordingly, an inventor could decide to share his idea and permit other corporations to copy his idea as long as he is recognized as the idea's original creator.

III. Methodology

To carry his experiment, the author used a simple four-step process.

1) **Live Brainstorm** The first step consists of writing down ideas whenever they occurred to the author. He simply used the notepad feature on his Smartphone and typed a few keywords to help him remember what the idea was about. Sometimes the idea could be inspired by exciting work or a comment by a friend or a family member. Back in his office, the author started structuring the idea into words, usually by defining the purpose, shape, and features of the vehicle. The author also invented a name that has an origin or a link for each of his ideas.

2) **Concept Design** The second step consists of hiring industrial designers to convert the ideas into images. Due to the average delay needed to draw a concept, the author was obliged to work on simultaneous projects. He then started approaching different designers online and asked them if they wanted to create renderings of vehicles that would be published. Some accepted the challenge, some refused, but in the end, there were enough interested parties to start converting ideas on a weekly basis.

This process involved explaining the idea, providing examples like images from Google, sometimes hand sketches (from the author), or dimensions. Each concept involved a back and forth exchange of e-mails, some of which lasted months at a time. The author always asked the designer to provide his final drawings with a pixel size of 7016 x 4961, the equivalent of the A2 international paper size (approximately 24'' x 16'') so that the drawings could later be printed on posters and also to create a standard among the concepts.

3) **Writing the article** The third step consisted in writing an original article describing the concept. To simplify things for the readers, each article was divided into five sections: 1. Introduction, 2. Origin of the idea, 3. How it works, 4. Potential market and 5. Acknowledgments. Each article needed to be easy enough to read but technical enough to attract collaborators. The average length of the article was 450 words, written in English and in French, each of them revised by a professional reviewer.

4) **Publish** The last step consisted in publishing the concepts online. At first, the author used his own personal website to publish his stories. Then the Wordpress software was used to manage the articles that were also posted on a few social media websites. Over the years, Toronto's Globe and Mail, Wired Magazine and Forbes Magazine hired the author to publish some of the concepts on their platform. The author posted all concepts on Imaginactive.org.

Google Analytics online software was used to track the number of page views and unique views related to each concept. Other sources of information were also used to measure the popularity of each idea.

IV. Results

Basic metrics were obtained from Google analytics software and data provided by the Toronto Globe and Mail. Other sets of data were gathered online on Jan 30, 2017. Some concepts were published on multiple sites, thus benefiting from a combined exposure.

This experiment covers 230 published concepts.

- First concept published on March 5th, 2013 (Motosub).
- Last concept published December 20th, 2016 (Nexus).
- Minimum days of combined exposure: 73 days.
- Average days of combined exposure: 941 days.

COST On average, each concept cost 346$ in direct expense to produce without taking into account the author's salary or other related costs.

TIME The average time required by an industrial designer to create the concept renderings is 38 days.

UNIQUE VIEWS The average number of unique views

for all concepts is 882 per concept on the author's website (Imaginactive.org). This amount increases to an average of 2 124 for the 48 concepts published on the Globe and Mail's website. The data for the unique views of the 10 concepts published on Wired Magazine is not yet available, however it should be high due to the fact that Wired online magazine has four times (28 million) the traffic of the Globe and Mail. By conservatively extrapolating the numbers of unique views, the author estimates that the 230 concepts generated 601 287 unique views on all three websites for an average of 2 905 per concept. This excludes all other websites.

AVERAGE VIEWING TIME The total time spent on all concept pages amounts to 4 815 hours when measuring Imaginactive.org analytics. By extrapolating the average amount of time spent on each page, the author estimates that the 230 concepts generated approximately 14 332 hours of viewing for an average of 69 hours per concept.

COMMENTS The 230 concepts generated lots of various comments and feedback by e-mail. An average of 11 comments were generated for the concepts published on The Globe & Mail and Wired magazine.

SHARES The 48 articles published on the Globe and Mail were shared 471 times on average. The 10 articles on Wired were shared 1 127 times on average. This accounts to an average of 686 shares per concept excluding the shares on the author's website. This definitely underlines the importance of partnering with media outlets to leverage the potential of each concept.

V. Discussion and Implications

The experiment's first hypothesis was that sharing concept ideas openly would allow inventors and investors to save time and money. Since the average direct cost of publishing concepts amount to around 360$ and takes about a month, it seems that this hypothesis is validated.

By employing an improved version of this method, inventors could test out technical ideas cheaply and rapidly. Of course they would need to build their credibility the way the author did, or they could use the existing system which might prove easier.

The second hypothesis proposed that sharing ideas openly would add value to them. On average, each idea was viewed by approximately 2 905 people for a combined viewing time of 69 hours per concept. These numbers will increase as the open innovation network developed by Imaginactive.org grows.

Hiring a marketing firm to develop one single idea into a concept and create a basic market study that would include the participation (sharing) and comments of various people from dozens of countries would cost a minimum of 10 000$ per project. The current method achieved this goal at almost no costs since each concept generated 355$ in publication revenues. Sharing ideas online openly using the author's method method does add value to the original idea.

The third hypothesis stated that sharing ideas openly would inspire people to act on those ideas. The author estimates that each concept was shared 422 times on average by including the three websites. Some concepts generated hundreds of mentions or articles online: the Solar Express concept gets 17 Million results on Google while the Skreemr, Antipode, and Paradoxal Jet have 376 000 results. Thousands of inventors, investors, and members of the public also commented on the ideas and contacted the author. This tends to prove without any doubt that sharing those ideas openly inspired people to act upon them.

Three of the initial objectives sought by the author have been met one way or another. By reviewing the data, the author was able to verify the public's interest and get feedback from customers and experts through comments. He was also able to inspire the next generation indirectly and found over 50 collaborators. This means that the proposed method could become an effective tool for inventors if it is developed further.

One objective that was not met was about attracting investors. The reason seems that the concepts were not presented as investment opportunities but rather as ideas to be discussed and shared. It's the author's opinion that this objective should be excluded from the coming research. The methodology should focus on converting ideas into concepts, adding value to them, and measuring the interest of customers more accurately.

VI. Limitation and Future Research

Focusing on recreational products or transportation projects can be a limiting factor. It would be interesting to include consumer products that can be manufactured in the near or medium term in the mix of projects. During the last four years, a few consumer products have been introduced. The number of those could be increased in the new study.

The product readiness of each idea seems to attract different crowds, which in turn helps shed light on all the other ideas. As an example, car enthusiasts visiting the site might be intrigued by an idea related to search and rescue drones. Therefore future research should keep accepting ideas from all parts of the spectrum.

The involvement of students and universities in this process could be an excellent way to reduce costs and risks while attracting and training students for entrepreneurial businesses. The involvement of experts in the process will further reduce the risks associated with the release of each concept. Therefore, an effort to include those two groups should be made for future research.

VII. Conclusion

This initial experiment showed promising results. In four years, the author started from zero and was able to create and publish over 230 ideas that were viewed by millions of people online. The estimated commercial advertising value generated well exceeds 6 million dollars including all the third party mentions, shared posts, and comments. Keep in mind that the whole experiment was self-funded by using the publication revenues to pay the design costs.

The three hypotheses were proved valid and the objectives were met. The product development method should be further developed, improved, grown, and used as part of a larger research project that will use virtual reality tools and brain computer interface to measure more precisely how the viewers feel about the concept and how much there are

interested in it.

The goal remains to add value and reduce risk and cost to the inventors or investors. The Imaginactive method takes its roots in design and engineering but is has also grown strong ties with media websites and social networks. The doctoral research experiment will have to be devised, structured, and launched to build upon what has been learned so far.

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REFERENCES

[1] H. Chesbrough, "The era of open innovation," *MIT Sloan Management Review*, vol. 44, no. 3, pp. 35-41, 2003.

[2] C. Defeo, J. A. Harding, and R. L. Wood, "User communities and the 'Dark Energy' of open innovation," presented at the Proceedings of the 11th European Conference on Innovation and Entrepreneurship, Jyvaskyla, Finland.

[3] C. Ayerbe and J. E. Azzam, "Pratiques coopétitives dans l'open innovation : Les enseignements des patent pools," *HEC Montréal et Université Paris Dauphine*, vol. 19, no. 2, pp. 95-114, 2015.

[4] E. Enkel, O. Gassmann, and H. Chesbrough, "Open R&D and open innovation: Exploring the phenomenon," *R&D Management*, vol. 39, no. 4, pp. 311-316, 2009.

[5] M. Hossain, "A review of literature on open innovation in small and medium-sized enterprises," *Journal of Global Entrepreneurship Research*, 2015.

[6] Copyleft.org, Licence: CC-BY-SA-4.0. [Online]. Available: https://copyleft.org/

[7] R. M. Stallman, What is copyleft?, *GNU Operating System*. [Online]. Available: https://www.gnu.org/copyleft/

Charles Bombardier was born in Valcourt, Canada, in 1974. He completed his bachelor's degree at École de Technologie Supérieure in Montreal, Quebec in 1998. In 2015, he completed his master's degree in applied science (M.Sc.A.) writing a memoir on the subject of crowdfunding and innovation management. He is currently working on his Ph.D at Université de Sherbrooke.

Charles began his career working for Bombardier Recreational Products (BRP) in 1999. He was project manager for the Bombardier Traxter XL ATV, the Elite Snowmobile by Ski-Doo, and the spyder roadster motorcycle by Can-Am. In 2013, he launched his own organisation called imaginactive in montreal. He publishes new vehicle concepts on his website weekly and in Toronto's Globe & Mail.

Bombardier was elected on the board of the order of engineers of quebec in June 2016. He invests in high tech start-ups and incubators and also advises new ventures. Bombardier is also a major donor for centraide montreal.