



# Point of View Paper

## How A Problem in The Fuzzy Front End of Innovation Can Inspire

*Borut Likar, Klemen Širok & Katarina Košmrlj*  
*The Faculty of Management, University of Primorska*

*Received: 16 Nov. 2015, Accepted: 29 Nov. 2015, Published: 1 March 2016*

**Abstracts:** Organisations often focus on the “idea-creation” phase and less on the perception of problems and opportunities. In some cases it works, e.g. the discovery of the steam machine was a pure idea which triggered the industrial revolution, yet usually, innovating is merely hard work. On the other side, specific business problems are a crucial starting point for the “ideation” phase. Since the problem is often unclear or hidden, this starting point is usually forgotten, thus bringing additional confusion into the invention process. Hence, this phase is often called the fuzzy-front-end of innovation which is the focus of the paper. Firstly, the obstacles in solving innovation – entrepreneurial problems will be presented, e.g. incorrect assessment of circumstances. We will also present one of the crucial starting points concepts related to the importance of focusing on the future challenges. The aforementioned obstacles and concepts served as guidance for the one of the first monographs which systematically addresses the fuzziness of the problem phase which will also be briefly presented. Last but not least - we will try to explain our attitude towards problems. We strongly believe that if we “catch” and understand a problem at its roots, solutions can often prove to be easier to create. In other words, a well-defined problem often hides the solution as an inherent part of itself. Therefore, the art of managing innovation problems and opportunities enables a person to get rid of the “fuzzy-front-end of innovation” fear. Hence, problems are turned into opportunities and fear becomes a game; a game of inspiration.

**Keywords:** Innovation, Inspiration, Inspiration Economy, Creativity, Fuzziness.

[ **E-mail:** [borut.likar1@guest.arnes.si](mailto:borut.likar1@guest.arnes.si) [katarina.kosmrlj@fm-kp.si](mailto:katarina.kosmrlj@fm-kp.si), [klemen.sirok@fm-kp.si](mailto:klemen.sirok@fm-kp.si) ]

## **WHAT AFFECTS INNOVATION?**

To innovate or not to innovate is no longer a question for companies in today's global and competitive environment - it is a necessity. In this regard, companies and other organizations concentrate on deciding how much assets and other necessary resources they are ready to or need to invest in the invention-innovation-diffusion process (IIDP). Investing in innovations has proven to award economic benefits to firms (Likar, Križaj and Fatur 2006, Likar 2002, Antončič, Hisrich, Petrin and Vahčič, 2002). Innovation followers earn just over one euro from each euro invested in innovation, while the innovative ones earn as much as a tenfold. The benefits are even higher when investing in the management of the innovation process. However, companies often fail to find additional time, resources and energy needed for the above-average innovation acceleration in their daily battle for survival. In spite of the aforementioned, the studies have shown that money is not the key driver of innovativeness. Liao, Fei and Chen (2007) investigated the influence of knowledge sharing and absorptive capacity on innovation capability in Taiwan's knowledge-intensive industries. They found out that motivation, especially intrinsic, proves to be one of the most important factors affecting knowledge sharing in a company. Companies with higher levels of knowledge sharing and consequently absorptive capacity, i.e. "employees' ability and motivation to obtain external knowledge and the willingness to use said knowledge in the firm's innovation capability" (ibid. 341) demonstrated higher levels of innovativeness. Intrinsic motivation proved to be an important factor in knowledge transfer to practice in a study by Arzenšek, Košmrlj and Trunk Širca (2014), as well. Doctoral students and doctorands with higher levels of intrinsic motivation were more inclined towards sharing their knowledge in practice (projects with companies and working in companies) than those with low levels of intrinsic motivation. Knowledge sharing is one of the milestones for innovativeness, even more so when it is fresh, specialised knowledge as with a newly acquired Ph.D. In addition, innovation may also be affected by space, as well. Google's examples of creativity rooms are well-known, yet space may be observed also in a broader sense - as virtual, as well. Consumer-Consumer interactions in virtual brand communities affect the generating of new ideas and incremental innovations, which is additionally amplified by higher human capital (Wu and Feng, 2010). This type of innovation is successful due to several untypical characteristics: "democratisation of innovation" (Gruner and Homburg 2000, von Hippel 2005 and Wu and Fang 2010, 572), "collective wisdom of crowds - creative consumers and underground innovators" who "pursue their own 'do-it-yourself' solutions and share their strategies in solving problems" (ibid). Even in this respect, motivation, especially intrinsic one - enjoyment for contribution, proves to be one of the key-affecting factors in individuals' activity in innovation platforms on the internet. Extrinsic motivation - desire for monetary rewards is an important factor, yet proves to have a lower impact on contribution in virtual communities than intrinsic motivation (Frey, Lüthje and Haag 2011).

We realised that intrinsic motivation is one of the cornerstones of innovation. In addition, a comprehensive innovation culture is essential for achieving appropriate innovation and business results yet not trivial to achieve. In practice, companies often focus on the "idea-creation" phase and less on the perception of problems and opportunities, which results in most companies running a risk of missing the global innovation train. In some cases it works, e.g. the discovery of the steam machine was a pure idea which triggered the industrial revolution, yet usually, innovating is merely hard work. On the other side, specific business problems are a crucial starting point for the "ideation" phase. Since the problem



is often unclear or hidden, this starting point is usually forgotten, thus bringing additional confusion into the invention process. Hence, this phase is often called the fuzzy-front-end of innovation.

### **Focusing on the problem**

We strongly believe companies can navigate the fuzzy-front-end of innovation better and reach higher levels of motivation if the problem phase is managed in an appropriate and well-structured way. How? By starting at the beginning and focusing on the problem. This is not a revolutionary approach: the problem phase has only been neglected for somewhat a while. Even Einstein has pointed out the importance of working on the problem. When asked how he would approach the saving the world from the total destruction if given only an hour time, he answered: "I would dedicate 55 minutes to discovering what the cause of destruction is and the last 5 minutes to finding a solution." With merely focusing on an idea, a company or organisation may miss some key opportunities or may not detect many undetected or hidden issues that may later become a real problem. This is not just a case with new market products, yet also with the organisation, processes, strategy and other "soft" aspects of the operations. All of these are sources of problems and eventually innovation opportunities.

To innovate means to carry out the entire process from the defining the problem in the pre-invention phase, i.e. the "fuzzy-front-end" to the successful implementation of innovations in practice by applying it ourselves or sell it to others. However, rare authors or studies pay due attention to the fuzzy-front-end despite its vital role in the innovation process. Frequently, the judgment about the pre-invention phase begins with the element of idea (see e.g. Wu and Feng 2010, Sperry and Jetter 2009; Breuer, Hewing, and Steinhoff 2009; Verworn, Herstatt, and Nagahira 2008; Hüsigg and Kohn 2003; Deppe et al. 2002;). Sources which include an element of opportunity in the pre-invention phase may also be observed (see e.g. Paasi et al. 2007; Kim and Wilemon 2002), yet only Paasi et al. 2007 explicitly talk about the problem in connection with the opportunity. In the aforementioned literature an opportunity relates primarily to pursuing new technologies, discovering niche markets and potentials, identifying consumer needs, and rarely to pursuing a specific problem in relation to the existing product, process, business activity, or as a starting point for the creation of an entirely new product.

### **Obstacles in Solving Innovation – Entrepreneurial Problems**

The cornerstone of the innovative process is the correct understanding of a problem or a challenge. Sometimes, problems are clearly visible, yet often having the general knowledge on a problem does not necessarily mean that the underlying causes are really understood. To wit, a correct definition of a problem substantially facilitates its proper solution. The reasons for the failure to adequately solve the problem prove to be multiple (Košmrlj, Širok, Likar 2015; Pompe 2011).

### **Incorrect assessment of circumstances**

The assessment of a manager, entrepreneur, executive head or other persons arises from the previously generated conception and experiences that led to a partial or incorrect assessment. This is the basis for further activities, which consequently prove as incorrect. In doing so, the causes of incorrect assessment may be two:

- inadequate understanding of the problem.

- incorrect specification of the problem.

We primarily address the perception in connection with the subjective assessments based on incorrect assumptions and old mind-set, while we talk about the incorrect specification when we failed to obtain the necessary objective information.

Example: On a long trip a bicycle's tyre proves to be flat. Since the said tyre has had several punctures in the same season. We make a stop in a store and buy a puncture repair kit. When examining the tube, we discover there is no hole and the actual problem is in the leaking valve. Since we failed to investigate the problem and we relied on previous experience, we lost time and money. This example depicts an inappropriate perception and inadequate analysis and, consequently, erroneous specification of the problem.

#### **Insufficient data, information and analyses**

Intuition may be one of the most common reasons for managers' incorrect decisions. In this respect there are a variety of forms. The first is related to insufficient information, which leads to incorrect conclusions, since the crucial scenarios are designed without the necessary professional broadness. Another type of problem is a result of incorrectly processed data improper methods of analysis or inadequately applied results of analyses of other cases. The third problem is linked to the "information era", where we fail to select the most relevant for a particular case from an abundance of information.

Example: A publishing company launches a new magazine onto the market. Based on an analysis of the readership of an existing magazine with similar content, an expectation of 300,000 readers is established. However, the company failed to consider that each copy of the magazine is read by three readers on average, and hence, there are only 100,000 potential customers on the market.

#### **The importance of focusing on the future**

Modern innovation strategy must also ensure that the research and development work and innovation are not always subject to the pressure of business needs. Simply said, great innovators do not permit any pressures to reverse their look into the future. Thus according to the AT Kearney study (2014), innovative leaders create separate "engines" for the management of current business processes and future development, and shall thus be able to take advantage of the long-term benefits of the growth. As an example, to ensure the focus on the present and future priorities, IBM builds its business opportunities on three different time frames: short-term fundamental business opportunities, medium-term growth prospects and long-term upcoming opportunities. IBM has consciously decided to allocate a relatively large part of its funds (10 to 15 percent) for the development of long-term opportunities and they do not 'sacrifice' those funds for any immediate priorities or "fighting fires" in the company (AT Kearney 2014).

This is only one of the examples where successful operations include addressing a problem. In fact, all organisations face problems that may be visible or concealed, known or yet to be identified on a daily basis, notwithstanding the relevance and the potential of idea in the innovation process. "Recognition of the problem is half-way to a solution" is a popular saying. In our case, this means that a company or organisation that regularly detects and solves its problems and difficulties (at all levels) is half-way to becoming innovative and operate more successfully.



The aforementioned obstacles and concepts served as guidance for the one of the first monographs which systematically addresses the fuzziness of the problem phase: “The Art of Managing Innovation Problems and Opportunities” (Košmrlj, Širok, Likar 2015).

#### **For the frame**

*The book is intended for both those who wish to include elements of innovation in their academic work processes as well as people who wish to use it in practice and who would like to structure and improve their existing processes of innovation. It focuses primarily on the management of the pre-invention phase or so-called fuzzy front end of innovation, i.e. the identification of problems and innovation opportunities. The Book brings together a selection of some well and less known methods, together with a number of newly deliberated techniques and complex web supported approaches. It should be noted that some of the methods are original. Not only in the Slovenian area, but also in the wider international scientific community the pre-invention phase proves to be somewhat neglected. Accordingly, this Book should serve as an original approach aimed at systemising the fuzziness of the front end of innovation. It is a useful accompanying tool in the realisation of processes facilitated by curiosity, imagination and the desire to succeed.*



#### **INSPIRATION FOR INNOVATION**

Innovation is a playful game. However, there are only a very small percentage of people who have appropriate motivation, knowledge and competencies to ‘play the game’. For others, even though they would like to be innovative, the said may present a nightmare. One of the reasons is its fuzziness, especially in the first phases. People do not know where to begin, how to create ideas, as they often do not see a problem. If we help them “catch” and understand a problem at its roots, solutions can often prove to be easier to create. In other words, a well-defined problem often hides the solution as an inherent part of itself. Therefore, the art of managing innovation problems and opportunities enables a person to get rid of the “fuzzy-front-end of innovation” fear. Hence, problems are turned into opportunities and fear becomes a game.

However, a prerequisite, i.e.– a wish for improvement, remains. Yet in the next moment, we require specific tools. Firstly, we need time to recognise the situation as a problem, analyse it and get an insight into the problem and its circumstances. In the next step, we have to bring together the right people and a simulative environment to pave the way for an effective generation of ideas. It is crucially important to set up necessary conditions for



inspiration to do the work and generate numerous problems' solutions that we call ideas. Ideas generation is also an essential topic, yet it is another story and a lot of high-quality material is available about it.

### **A game of inspiration**

An inspiring case comes from a 6-year-old Slovenian girl Pia Alina, who invented an attractive education game. She derived it from a problem, which she intuitively sensed in learning mathematics at school. She was good at maths and the teacher asked her to coach her schoolmates with study problems. As Pia Alina was very sympathetic to the problems of others, she started thinking about the problem. For years, her parents stimulated her to be creative and often persuaded her that problems are not a reason for sadness yet an opportunity for improvement. Based on these starting points, she came up with a surprising and inspiring solution: a combination of a well-known "Memory" game and a game of basic maths operations - addition and subtraction. Helped by her parents, she designed a very simple prototype. In less than one hour after her idea appeared, children started playing and the potential of the funny and haunting game was discovered.

Later on, the family together developed also a game for learning multiplication and learning about countries/capitals of the EU. With the help of her parents and a team of professionals, Pia Alina designed and prepared a formal prototype of the game to test in her school. The responses of her classmates, their parents, teachers and other experts were very positive as the game strengthens complex thinking processes as well as the social component of cooperation. In addition, it is a '2 in1' concept game - a memory game and an innovative pedagogical learning tool. Her efforts being awarded with a bronze medal at one of the international invention exhibitions (ARCA), her family decided to file a patent and Pia Alina became one of the youngest inventors in the world. The family also decided to market the game. Pia Alina's success in this endeavour is paved by her brilliant inspiration, yet it is important to stress that one of the key moments within the invention-innovation process was a well-defined problem and her personal motivation to produce a solution.

### **CONCLUSION**

Nowadays, the global economy makes innovation a necessity, thus enabling companies to adapt to the accelerating internationally marked dynamics and fierce global competition. However, mastering some of the well-known innovation methods or buying the more-or-less sophisticated innovation support tools innovations is not a guarantee for success, yet. Firstly, a clear and well-structured problem enables entry to the ideation phase with clear goals. Thus, the fuzziness is diminished and a playful ideation phase may begin. However, when applying those tools in a way to enable, stimulate, and cross-fertilise the inspiration, the whole innovation process comes alive, vibrant and proliferate. The inspiration thus presents the fundamental and simultaneously essential moment of the innovation game.

### **REFERENCES**

- Antončič, B., R. D. Hisrich, T. Petrin and A. Vahčić. 2002. *Podjetništvo [Entrepreneurship]*, 1. print. Ljubljana: GV založba.
- Arzenšek, A., K. Košmrlj and N. T. Širca. 2014. Slovenian young researchers' motivation for knowledge transfer. *Higher education*, 68(2), 185-206.
- At Kearney 2014. *Great Innovation Starts with the Fundamentals: At Kearney innovation study 2012*. [http://www.atkearney.com/innovation/ideas-insights/article/-/asset\\_publisher/](http://www.atkearney.com/innovation/ideas-insights/article/-/asset_publisher/)



VHe1Q1yQRpCb/content/great-innovation-starts-withthe-fundamentals/10192.

Breuer, H., M. Hewing and F. Steinhoff. 2009. Divergent Innovation: Fostering and Managing the Fuzzy Front End of Innovation. PICMET 2009 – Portland International Conference on Management of Engineering & Technology, 2009. [http://ieeexplore.ieee.org/xpls/abs\\_all.jsp?arnumber=5262066](http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5262066)

Deppe, L., S. Kohn, F. Paoletti and A. Levermann. 2002. The Holistic View of the Front End of Innovation. Conference on IMTs and New Product Development, 49:1–18. Mantova , Italy 17-18 October 2002: Fraunhofer Technologie-Entwicklungsgruppe

Dornberger, U. and A. Suvelza, eds. 2012. Managing the Fuzzy Front-End of Innovation. Leipzig: SEPT at Leipzig University.

Frey, K., C. Lüthje and S. Haag. 2011. Whom should firms attract to open innovation platforms? The role of knowledge diversity and motivation. Long Range Planning, 44(5), 397-420.

Griffin, A, L. N. Hoffmann, R. L. Price and B. A. Vojak. 2007. How Serial Innovators Navigate the Fuzzy Front End of New Product Development. ISBM report 3, Vol. 3603. University Park (PA).

Hüsig, S. and S. Kohn. 2003. Factors Influencing the Front End of the Innovation Process: A Comprehensive Review of Selected Empirical NPD and Explorative FFE Studies. 10th International Product Development Management Conference. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.195.2919&rep=rep1&type=pdf>.

Kim, J. and D. Wilemon. 2002. Focusing the Fuzzy Front–end in New Product Development. R&D Management 32(4), 269–279. <http://onlinelibrary.wiley.com/doi/10.1111/1467-9310.00259/full>

Košmrlj, K., K. Širok and B. Likar, 2015. The Art of Managing Innovation Problems and Opportunities. Koper: Faculty of Management.

Liao, S. H., W. C. Fei and C. C. Chen. 2007. Knowledge sharing, absorptive capacity, and innovation capability: an empirical study of Taiwan's knowledge-intensive industries. Journal of Information Science, 33(3), 340-359.

Likar, B. 2002. Uspeti z idejo!: tehnike in metode ustvarjanja, razvoja in trženja idej. [To Succeed with an Idea!: techniques and methods of creating, developing nad marketing ideas] Ljubljana: Korona plus, Pospeševalni center za malo gospodarstvo.

Likar, B., D. Križaj and P. Fatur. 2006. Management inoviranja [Management of Innovation]. Koper: Fakulteta za management.

Paasi, J, P. Valkokari, P. Majjala, T. Luoma and S. Toivonen. 2007. Managing Uncertainty in the Front End of Radical Innovation Development. Proceedings of the 16th IAMOT Conference. Miami, 13–17 May: International Association for Management of Technology. [http://virtual.vtt.fi/innorisk/iamot\\_2007\\_paasi\\_paper.pdf](http://virtual.vtt.fi/innorisk/iamot_2007_paasi_paper.pdf).

Pompe, A. 2011. Ustvarjalnost in inovativnost : nujnost sodobnega podjetništva Ljubljana: Gea College.

Sperry, R. in A.Jetter. 2009. Theoretical Framework for Managing the Front End of Innovation



Under Uncertainty. PICMET 09 2009 Portland International Conference on Management of Engineering Technology, 2021–2028. Portland (OR), August 2-6: PICMET <http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=5261940>.

Verworn, B., C. Herstatt, and A. Nagahira. 2008. The Fuzzy Front End of Japanese New Product Development Projects: Impact on Success and Differences Between Incremental and Radical Projects. *R&D Management* 38(1): 1–19. <http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9310.2007.00492.x/full>

Wu, S. C., and W. Fang. 2010. The effect of consumer-to-consumer interactions on idea generation in virtual brand community relationships. *Technovation*, 30(11), 570-581.