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# TOWARDS AN EVOLUTIONARY UNDERSTANDING ON THE SUCCESS OF PARTICIPATORY DESIGN

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## ABSTRACT

The notion of 'participation, and the democratization of design' is not just a movement for social innovation but it is also a powerful methodology for the innovation of products and services. However, the complicated nature of participatory design may result in the failure of projects. The concept of participatory design is similar to climb "mount improbable". Mount improbable is the metaphor developed by Dawkins to support Darwin's Theory of Natural Selection [1]. He uses the term "mount improbable" to explain the development of natural objects or events, and how unlikely it is that these natural phenomena are simply a result of coincidence. The concept of climbing mount improbable could be devised to understand the innovation process in participatory design. How do innovations evolve when using participatory methods? This paper examines the user involvement in participatory design with evolutionary understanding of success of products "selection" phenomenon either natural or artificial, which is explored through the perspective of design.

*Keywords: Participatory design, user involvement, evolutionary understanding*

## 1 INTRODUCTION

The competitive market environment demands that any organizations strive to innovate. However organizations such as small and medium sized enterprises (SMEs) have limited time and budget to invest on innovation. Participatory design (PD) is a useful approach for developing products, which can make the innovation process realistic, feasible and efficient for companies, and decrease the cost of innovation investment, although companies generally underestimate PD processes. There are various reasons for this view. There is an ambiguity how to devise the PD methods and companies assume participation as a demanding process, and they do not perceive products developed using PD as necessarily innovative. PD tends to target small, incremental innovations. Business firms underestimate incremental innovation, as novelty is considered synonymous with radical innovation. To the contrary, Rothwell and Gardner states that 90% of innovation in the market is based on small design steps [2]. In addition, the definition of innovation is an evolving one. Nussbaum, the former editor of Business Week states, "When people talked about innovation in the '90s, they really meant technology. When people talk about innovation in this decade, they really mean design"[3]. Another reason is participatory design is considered as low quality design. Brown states, "The idea of participation is attractive but not sufficient. No one wants to use a poorly designed mobile application or deposit their paycheck in an insecure bank, no matter how participatory it feels [...] Android applications will have to be as engaging and intuitive as those from Apple and Nokia or they will remain the preserve of open source technology geeks." [4] In reality, applications of Nokia or Apple are rarely better than android ones [5].

In this paper, we use the "mount improbable" analogy to describe the PD process. "Climbing mount improbable" is an analogy used by Richard Dawkins in a book by the same name, about the evolutionary process. From one side of the mount it may seem steep and impossible to climb, but the mount has another side with a gradual slope on which it is possible to climb to the top making use of small, cautious steps. Dawkins uses the metaphor for describing evolution. Creationists, pointing at the steep side tell us that it is impossible for a creature to climb to the top with a single step, thus evolution is impossible. But the evolutionary process climbs the mountain from another angle, where the slope is gentle. Obviously, the human eye with all its complexity did not evolve in one step; it was preceded by various eyes in various other species [1]. Similarly, a result of PD does not climb to a mountaintop in

one step. Rather, it is an incremental process in which the participants take part in its development at various stages.

PD includes the involvement of all stakeholders such as employees, partners, customers, and citizens in the design process. In this paper, we examine "user participation", an aspect of innovation that could be considered most critical. The gap between the user and the designer is closing each day, and the trend is for the separation to fade away. This transition in the role of user signifies the importance of user involvement. User involvement is also a complex issue, which covers many methods, and concepts some of which seem ill defined and unclear [6]. Users can participate in the new product development (NPD) process at different stages of the innovation process; at the beginning for problem definition, in the middle for ideation, or in the third stage for product testing before bringing new products to market. Regarding each stage, there are tools and methods to guide these uncertain processes. These methods can be considered as the equivalent of the essential equipment required climbing the innovation mountain.

Organizations need to rethink design and innovation with an evolutionary perspective. Using tools and methods that enable users to be actively involved in the NPD process will lead to bringing successful products to market. The mount improbable metaphor is a helpful device for explaining PD in a simple way, and how it can be applied to the design process. It also helps to illuminate what its strengths and weaknesses may be. The purpose of this paper is to understand the role of user participation in the design process and the benefits to business. Examples are given of specific methods used to encourage user involvement in the design process.

### **1.1 Participatory design (PD)**

PD or co-operative design is an approach of that originated in Scandinavia. It involves the active engagement of all stakeholders including employees, partners, customers, the general public, and end users in the design process [7]. These stakeholders collaborate on understanding user needs; developing and evaluating novel ideas that are technologically feasible and applicable to the market in order to ensure that the product, service, and interface design meet the target user needs [8]. Participatory methods are used widely in social sciences that "aim to change the role of the outsider. Instead of being a lecturer who transfers technology, the outsider is perceived as a facilitator who encourages and enables local people to express their own reality" [9]. The literature covers terms such as empathic design, user-centered design, user innovation, co-creation, permaculture, and crowd-sourcing (formally known as distributed participatory design). These terms are beyond the scope of this paper, which focuses on participatory design.

### **1.2 The changing role of the consumer in the marketplace**

The term used to describe consumers is evolving from 'user' to 'stakeholder' and 'co-creator'. Norman states that labeling such as 'users', 'consumers', or 'customers' is a way of putting a distance between designers and people, which is also similar to how psychologists depersonalize people by referring to them as subjects. He suggests that using terms such as 'users' degrades people, and even worse is the term 'end user', suggesting the person who pushes the buttons, clicks the mouse, and who keeps getting confused"[10]. Putting to one side the confusion of names and labels, this change in the relationship shows us that the concept of participation is becoming central to design and innovation. PD blurs the boundaries between creators and users. Users are becoming a critical component in the design process. PD advocates "power to the people", and considers ways in which we can get greater benefits from new co-designing relationships within a network of participants (designers, practitioners, users and other stakeholders) whose roles have been evolving. General involvement in the design process cannot be considered as participation. Users can be involved in the process at different levels, which can be direct or indirect. For example, users can have passive roles in ethnographic studies or empathic design in which their contribution may consist of being the subject of an observation. However the user's role in PD is mostly active. People want to express themselves and take a more engaged role in the development process, including defining the problem, co-creating, evaluating and testing.

## 2 CLIMBING THE MOUNTAIN: THE MESSAGE FROM THE MOUNTAIN

### 2.1 The Analogy Framework

PD is an ambiguous subject and open to interpretation. Building an analogy framework is a powerful way to bring clarity to ambiguity and to simplify a complex problem. However, it is also important to use the analogy carefully and to know where the limits are. In this paper, we relate “Climbing Mount Improbable” to ‘achieving a market success’ based on user participation. Dawkins uses the analogy of mount improbable to describe evolution [1]. There are also parallels between PD and evolution as analogy is reflexive. Products might be taken as species, market space as the ecosystem while drawing an analogy from evolution [11]. Users have a leading role in the “natural selection” process i.e. determining the success of a product in the market.

### 2.2 Innovation and participatory design

Dawkins suggests, “The message from the mountain is threefold. First is the message: there can be no sudden leaps upward—no precipitous increases in the ordered complexity. Second, there can be no going downhill—species can't get worse as a prelude to getting better. Thirdly, there may be more than one peak or more than one way of solving the same problem, all-flourishing in the world” [1].

Businesses may expect product development that makes use of PD to be a single big step, however it is gradual. PD methods are based on incremental innovation. User involvement in PD processes requires an open mind regarding ideas suggested by stakeholders. Design development builds on others’ ideas. It progressively gets better and better in small increments. These continual incremental improvements rarely get worse. It is also easy and quick to recover mistakes resulting from small changes. These incremental changes cumulatively create a powerful effect. Innovation is novelty and moving forward, climbing the gentle slope of the mountain should be regarded as incremental (See figure 1) innovation. The vertical slope, on the other hand, might be regarded as radical innovation. Transformational design depends on radical innovations, which may incorporate new technologies, shift market structures, require intensive user learning and induce significant behavior changes.

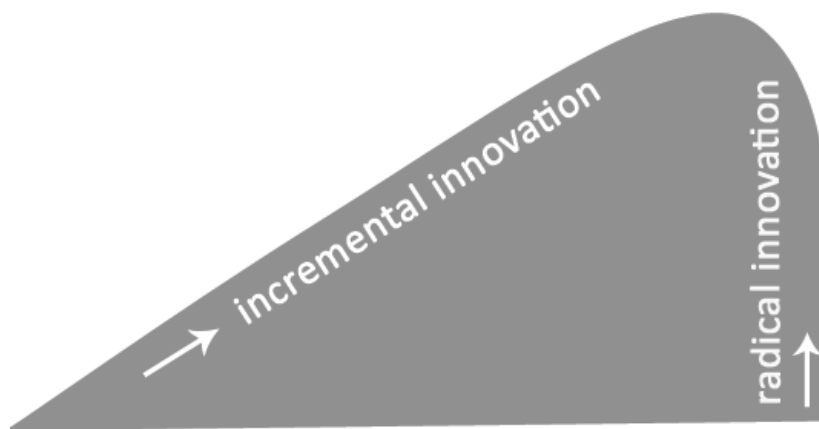


Figure 1. Mount improbable-innovation mountain

### 2.3 User participation at different stages

Users can participate at different stages of NPD; concept generation, defining the problem, design generation and pre-launch processes. Tools, and methods guiding user participation may increase efficiency of NPD. These can be applied at different stages of the innovation process, and aim to encourage idea generation, association of thought or make help the user to be more active in NPD. The tools and methods which are used to support a PD sessions are prepared and facilitated by mostly designers.

#### 2.3.1 Initial stage: need identification

Understanding the needs of consumers is a complex process due to the rapid pace of change and evolving consumer preferences. At the initial stage, users help to identify the problem which will be

addressed by the incremental improvement by identifying the need. Consumer reflection can go beyond ethnographic methods by getting direct insights about the real needs and experiences of people. Existing market research techniques such as focus groups and surveys provide information that only deal with superficial issues. Ethnographic studies provide more in-depth and relevant information contributing to inspiration and problem definition, although ethnographic methods are costly due to the time required to undertake a thorough study. User involvement at this stage can save companies money and time which can be lost because of a misreading of the customer needs. Leading firms such as Cisco systems, Procter and Gamble and Colman Sachs share information, discuss and collaborate their key customers at an early stage [12]. There are some enablers that can be utilized at this stage, most significantly the Zaltman metaphor elicitation technique (ZMET) is a projective technique designed to identify the mental models that drive consumer thinking. Consumers create collages characteristic of their interpretations feelings and experiences about a product or a research topic [13].

### **2.3.2 Second stage: Product/Service Development**

At the second stage, the user is involved directly with to the collaboration process, which is referred to as co-creation [14]. There are several methods used in this co-creation process. In this section of the paper we will consider the most common and prominent methods, lead user technique, role-playing and open innovation.

Kleef defines 'lead user' as selected users who have advanced knowledge about the product and its use [16]. In this process lead users are linked to the design process by defining the problems and by creating solutions for defined problems [16]. Von Hippel states that lead users are useful in market research, for helping to estimate the needs and demands related to the product, since they are acquainted with possible conditions, which might occur in the future. This feature of lead users could also make them useful in the "concept generation' and 'product development' process as well [17]. Role-play is used as a co-creation method in service design, IDEO calls this technique 'prototyping the wild' and includes users for the purpose of simulating an experience. Open innovation is another notable co-creation method. The technique involves including the stakeholders in the co-creation process without a prior selection. Adopting a no selection procedure for including users and encouraging a large number of people to be involved in the process has led to this being a key method. Open innovation is more common in software development as exemplified by the development of Linux operating system. Linux provides the basic software program as a main operating system of computer and shares the codes through their Internet site with people and encourages developers who have an interest to build on new properties/ functionality of the software. This facilitates direct feedback from users and improves the knowledge transfer within the organization. Bhalla states that before the open source movement, value created in the software world was mainly through ownership of the software [18].

Even though the benefits of open-innovation are clearer and appreciated more in some sectors like software development, it is also used in product design, service design and innovation for organizations. An example for product design is the first development of the mountain bikes, which started as an open innovation by some adventurous users who think their current bike is not enough to climb mountains and it created a totally new industry worth \$100 billion [18].

The Internet is proving to be very valuable medium for encouraging contributions to the open innovation process. In 2005, around 40,000 individuals joined an online-open innovation event called Habitat Jam, to share their ideas on global issues like sustainability, governance, safety, poverty, and the future of cities. During a 72-hour online event there were over 70 actionable ideas created. Bhalla states that the success of open innovation is proved by having approximately one actionable idea per hour from people who had never met before [18].

In general, for companies it might be more difficult to understand the business benefits of involving users, particularly in the process of new product development. Product design and development is a highly complex procedure which requires a lot of specialized skills and technical background, some counter arguments might rise like 'users have no information on the process of product design or on the technology behind the product. However, Stappers et. al states; "users are the masters of their own experiences when it comes to their involvement and interaction with products" process. [19].

### **2.3.3 Final Stage: Product testing**

At this stage users are involved in the process after the prototype or product is produced. The most common methods applied at this stage are ‘usability testing’; which involves testing the prototype for usability, employing purchase decision surveys’. Conducting surveys with customers/prospective customers at this stage is helpful to define the market segmentation of the product, the launching strategies or even deciding the price of the product.

One of the main benefits of involving the user at this stage is that it enhances the sales. Karat states that sales might increase as much as twenty- five percent if the information gathered from ‘buy decision’ data is employed [20]. The other benefit is the collaboration might save reduce some after sale costs including user support and user training costs. Kujala states that Microsoft achieved a reduction in the average time per call from 45 minutes to 10 minutes by revising the design after usability testing [6].

In conclusion, this stage is perceived as the most beneficial one since the benefits are more transparent and it is advisable since it is nearly impossible to guess the results or achieve the required information without help from the users.

## **3 CONCLUSION**

This paper contributes to the theory of random, non-random cumulative natural selection, and underlines the importance of collective, incremental innovation. The analogy of Mount Improbable helps to counter the perspective of PD skeptics whose eyes are fixed on the vertical ascent and its dramatic height. Achieving market success by moving up the mount in small steps is possible with incremental innovations supported by user involvement.

Critiques of this view claim that product design and development is a highly complex procedure, which requires a lot of special skills and technical background. Users do not necessarily have the required knowledge. Leaving consumers to define their needs could be problematic; mostly consumers are not fully aware of the underlying need of their choices and put forward ill-defined needs [21] [22]. Henry Ford was quite suspicious about user involvement when developing his car. “If I’d asked people what they wanted, they would have said a faster horse”. For companies it might be more difficult to understand the business benefits of involving users in the NPD process. However, user involvement PD does not aim to replace users with product developers but aims to assist them with the NPD process. The role of designer as facilitator gains importance to solve these conflicts during the process. Designer and project managers are responsible for retaining ownership of the final design. The notion of PD is also parallel to sociological change of the consumer relationship with products and services. Experiencing a product or service has replaced the concept of simply using them. Emotional considerations have gained in importance.

Damodaran suggests several benefits of efficient user involvement in the design process these include; improvement in the quality of designs resulting from understanding user requirements more precisely and accurately, improvement in the judgment of design costs by avoiding unnecessary features resulting from overestimating the user demand, and improvement in the user adaptation to designs [23]. Companies may expect more loyal consumers with participatory approaches. Additionally, user participation helps to create/design a more diverse ecosystem of objects, machines and solutions.

Successful products are the ones, which target the right consumer to his/her right need in the right way. According to participatory design, the best way to get this information is collaborating with the user during the design process.

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