Meaning - An Unexplored Path of Innovation

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Abstract

Over the last ten years, the practice and research around innovation has been dominated by one perspective: innovation is an activity of "creative problem solving". According to this perspective, users have problems or needs, and innovation implies an understanding of those problems and the creation of better ideas to solve them (Kelley, 2001, Chesbrough, 2003, Brown, 2009, Martin, 2009). There is, however, a level of innovation that has been overlooked: the level of meaning. People are continuously searching for meaning. Whenever they do something in life, there is a meaning behind that action, a purpose, and a "why". They also use products and services that support this search for meaning. For example, they use fast robots with the purpose of improving the productivity of a process. Firms often assume that meanings exist "out there" in the market. They just have to be understood, not innovated. Therefore, they search for new solutions, a new "how", to serve this existing purpose better: a faster robot, for example. However, people are not only searching for new solutions to existing problems. They are also searching for new meanings because their life keeps changing and because they are delighted by the discovery of new directions. For example, hospitals buy slow robots, such as the DaVinci system, the leading prostatectomy device, not to replace doctors and increase productivity, but to help them in complex operations. This article contends that there is a third type of innovation that is overlooked by the existing frameworks of innovation, which focus on the innovation of technologies and markets: innovation as driven by meaning. By leveraging case studies of firms in consumer and industrial markets, this article: (1) identifies and defines this third type of innovation, the innovation of meaning (2) positions it in relation to the two other main drivers of innovation (technologies and markets); (3) identifies the peculiar nature of the innovation of meaning; and (4) indicates a possible research strategy to explore the process of the innovation of meaning.

Keywords: Innovation of meaning, innovation strategy, radical innovation, understanding users, design

1. Innovation from the Outlaws

"A robot may not injure a human being or, through inaction, allow a human being to come to harm"(First Law of Robotics.)

Isaac Asimov predicted it correctly a long time ago, in 1942, when he wrote the Three Laws of Robotics. A scientist by education, he surmised that technology has immense potential and is a major driver of innovation. A humanist by heart, however, he knew that technology is not the only dimension of innovation: there are other directions of unexpected change, one of which is the *purpose* for which technology is used. The Three Laws of Robotics were incorporated into the robots in Asimov's novels to indicate what constitutes a meaningful purpose and what does not (The Three Laws of Robotics appeared in many novels of Isaac Asimov, who first intro-

duced them in the novel "Runaround", 1942). A novelist by profession, he played on the intersection between technology and meaning: what if technological innovation challenges the laws and enables it to move beyond what is currently meaningful? In particular, to move beyond the idea that robots are meant to be "as far as possible from people".

What Asimov did not expect, in his creative mind, is that there was no need to live in a futuristic imaginary scenario to challenge the first law of robotics. In 2003, the German company KUKA Roboter Gmbh, a major player in the robotic industry, released the RoboCoaster, a robot used in amusement parks to provide a totally new experience to people wishing to enjoy the thrills of a breath-taking ride. It consists of a robotic arm with two seats at its end to host people. During the ride the robotic arm lifts the passengers in the air, swirls, stops suddenly, turns them upside down and in many directions, with different speeds and dynamics, thanks to a practically unrestricted freedom of motion granted by its six axes of rotation and six degrees of freedom. The peculiarity of the RoboCoaster is not only the unique combination of movements it can allow, but also the possibility for passengers to program their 90 second ride themselves. Before sitting in the RoboCoaster, the passengers use a software application in which they can select various motion profiles and speeds, depending on their age and how brave they want to be (more than 1.4 million combinations are possible). They can design a gentle, easy-going ride, or opting for a totally wild experience, whirling them up, down and sideways through the air. From the first ten robots delivered to the Legoland amusement park in 2003, to the recent adoption in the "Harry Potter and the Forbidden Journey" ride in Universal's Islands of Adventure theme park in Orlando, KUKA has sold about 250 RoboCoasters, opening an unexpected application for an industry that has recently experienced major turmoil due to the recession that hit major automotive clients. The RoboCoaster does not require revolutionary technology, being based on an adaptation of a standard heavy-duty robot made by KUKA, the KR 500, which can lift 350 kilograms (two people plus the seat) and simultaneously have a long arm. The technology is accessible to any manufacturer of industrial robots. Yet, after more than ten years, KUKA is still the only competitor in the field. Why have other companies failed to recognize this opportunity? The point is that even if the RoboCoaster uses existing technology, it challenges the existing paradigmatic interpretation of what an industrial robot is. There seem to be two shared laws among the executives of industrial robotic products. The first one is that their firms are in the business of efficiency. Robots are serious stuff, meant to increase productivity. The second one is that robots need to keep a distance from humans, due to their potential to severely harm people. Yet, the RoboCoaster is not used for improving efficiency, but for entertainment. It does not keep a distance from humans but, instead, is the first passenger-carrying industrial robot. The RoboCoaster is a revolutionary change in what industrial robots are meant for. In other words, it is a "radical change in meaning". This new meaning was not within the dominant assumptions of incumbents in the industry. When we talk about this application with robot professionals their reaction is skeptical, sometimes ironic. KUKA is not addressing the innovation puzzles that the innovators in the industry are focused on (speed, precision, strength) to solve the "big problems" that are currently considered meaningful in the industry. The RoboCoaster is "outside of the law". Instead, it is simply a radical innovation of meanings that, by definition, are considered meaningless if looked at through the lenses of traditional paradigms.

The basis of theories of innovation, and especially of radical innovation, are not clear when relating to innovation as connected to meaning, especially in its more

radical form, when meaning changes significantly. In this paper we will first and foremost illustrate the existence of this type of innovation. We will also relate it to other types of innovation and discuss four dimensions to describe its nature. Further, we will show that radical innovations of meaning always occur, in every industry, and as a consequence, have the power to shape the competition thereafter.

2. A New Language and a New Context

2.1 The Technology - Market Discussion

Studies on innovation management typically point to two drivers of innovation: technology and market (see Figure 1 – for an extensive review see Garcia and Calantone 2002 and Calantone et al. 2010). *Technological* innovation has captured most attention, especially as far as *radical* technological change is concerned. The understanding that technology is a major driver of innovation goes back to early investigations on innovation and entrepreneurship (Schumpeter, 1934). In recent decades, this understanding has spurred a rich stream of studies that have explored the antecedents of technological breakthrough (Abernathy and Clark 1985, Henderson and Clark 1990, Utterback 1994, Christensen and Bower, 1996). Consequently, studies on technological innovation are seen as being concerned with the "how" of things, offering novel ways of solving customers' problems.

The innovation of markets has played a secondary role, and gained traction only recently, thanks to studies that have investigated firms' capabilities of addressing new market segments or uncontested markets. The studies of Kim and Mauborgne (2005) and those of McGrath and MacMillan (2009) represent the most extensive investigations in this regard. In these studies, a market innovation is seen as concerning the "who" of things, changing the subject of innovation, the customer.

These two drivers of innovation have been considered not only independently from each other, but also when acting in combination, especially if combined with a consideration for the depth of the innovation, either incremental or radical. Studies have, therefore, proposed matrix frameworks based on two dimensions: innovation can be described as taking place both in an existing market or a new market (horizontal axes). Innovation can also happen with the help of an existing or a new technology (vertical axes). This reasoning is fundamental to the seminal frameworks of innovation management, such as those proposed by Ansoff (1965) with his matrix on products and markets, Burgelman et al. (2004) on technology and market applications and Mcgrath and Mcmillian (2009) with their matrix on technologies and market segments.

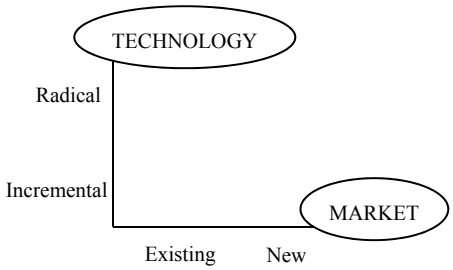

Figure 1: The Technology and Market Dimensions

Despite the combination of this range and depth, none of these theories seem to fully capture a type of innovation such as the one described in the RoboCoaster example. Indeed, on the one hand, the RoboCoaster is not a technological innovation, a new "how". Instead, it is the application of an existing technology (the adaptation of an existing product conceived for the automotive market), to a new context: the market of amusement parks. On the other hand, it is not just a market innovation. There is, indeed, an entrance into a new market but not as traditionally interpreted, using an existing approach to solve the problems of new markets. The RoboCoaster is not merely the transfer of existing technology (and user experience) from one market to another. Nor is it the "lifting capacity for efficiency" that finds a new

market to serve. The revolution is not just moving from one context (car industry) to a new one (amusement parks) and it is not just the "who" that changes. The move includes more than this. What is different is that the purpose of *why* to use this product changes as well. The purpose (and also the answer to the question "Why do we use this product") is no longer "because we are looking to raise capacity to create efficiency and control". That is, the robot is not used in the amusement park to lift and assemble ride equipment. Instead, the answer would be, "because we are looking to raise the capacity to create emotions". The movements, therefore, deliver something else: from being precise and accurate to offering the freedom of selection that makes every ride different and unique. To sum up, *the move to a new context also includes a shift in the purpose*. Innovation, in this sense, has to do with the *why* of using a product (i.e. the meaning of it), not only about *who* uses it (the market) or *how* they use it (the means, functions or technology).

The two dimensions of market and technology, therefore, struggle to explain this type of innovation. There is something that is not captured, namely the perspective of meaning. From this vantage point, a central element is how the user constructs the *purpose* for using the product. If we want to understand and fully capture this type of innovation, we would, therefore, need to introduce a third dimension in the innovation framework, concerning how the user creates their purpose, in other words, their meaning. Even more, when interested in innovation in its radical form, we would need to understand the nature of this type of innovation.

2.2 Innovation in 3D: Introducing the Dimension of Meaning

By introducing the dimension of "meaning" to the debate about innovation, we expand the scope. From a two dimensional construct of technology and market, we include an additional lens, the meaning perspective (see Figure 2). The space of innovation, therefore, becomes a three-dimensional construct.

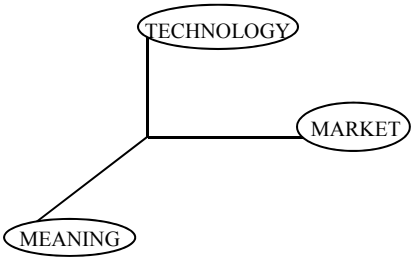

Figure 2: The Dimensions of Innovation: Technology - Market - Meaning

This partially mirrors Abell's model for business definition (Abell, 1980). However, while Abell's third dimension points to the "how" of a product by discussing different "functions" to fulfill customer needs, our proposal stresses the "why" by discussing the "meaning" searched for by users. This meaning, when translated into solutions ("how") may include not only utilitarian and functional needs, but also emotional and symbolic needs. In other words, the question "why" looks at products from a wider perspective, going beyond visible and tangible functions. Another difference to Abell's model is that our perspective is dynamic (on innovation) rather than static (on business definition). We could also call this innovation "design-driven innovation" (Verganti, 2009) as the word design (from the Latin de-signare) is etymologically related to "making sense of things" (Heskett, 1985; Krippendorff, 1989). Design, by definition, includes "to bring meaning".

Note that the innovation of meaning can be based on existing or new technologies. An example of change in meaning associated to new technology is the RobotStudio simulator introduced by ABB Robotics in the early 80s (see Figure 3). RobotStudio was developed thanks to breakthrough software technology that could better predict the movement and efficiency of the robot. Instead of designing, building and trialing a robot in real life on the factory floor, this application enabled car

manufacturers to optimize the performance of the manufacturing process in the "virtual world" of a computer screen. This simulation capacity made it possible to visualize and predict the manufacturing operations before construction of the robot. The meaning, therefore, moved from selling an efficient robotic arm (hardware) to selling the knowledge of how to use it (software). This meant, for example, that the current ideas (at that time) of robots as "fast movers", diminished a bit. Now, even a slow robot could be more valuable than a faster one, if it was used in an efficient way. Studies on radical technological change, especially in the field of socio-technical change and Actor Network Theory, have deeply explored the interactions between meaning and technologies (Latour, 1987; Bijker & Law, 1994). However, the direction of these investigations is the opposite to our purpose. They consider innovation to be driven by technology and a change in meaning as an enabler or a consequence. Here, instead, we focus on innovation driven by the search for a new meaning, with technology being an enabler.

Similarly, the innovation of meanings concerns both existing and new markets. The RobotStudio is targeted toward traditional robotic clients, such as industrial manufacturers. However, it still implies a radical change in the reason why they buy robots, from searching for speed and efficiency, to the quest for knowledge about how to use robots. Instead, the RoboCoaster introduces robotics to a totally new arena, transforming roller-coasting from a ride that is predictable and standard to an experience that is unpredictable and customizable by passengers. The coaster's visitors do not merely get on the ride and sit there, but instead take an active and creative role in the experience. Whichever the case (either an existing or new technology is applied or an existing or new market is targeted), these cases demonstrate that there is a third dimension of innovation: new meanings that are searched for and designed, as a way of providing new values to customers and to compete better, or differently (Verganti 2009; Moon 2010).

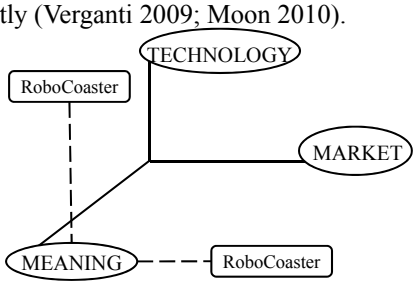

Figure 3: Different Kinds of Innovation of Meaning (The Robocoaster and the RobotStudio)

2.3 Meaning in Other Fields

Meaning, as a driver of innovation, does not make a loud voice in the field of innovation management. In other fields, however, one can find both loud, outspoken and more silent, subtle reflections on meaning. Philosophy for example, and especially the branch of hermeneutics, focuses on how people understand and interpret life, and, thereby, how people create meaning. According to hermeneutics, interpretation comes by addressing both the "parts and the whole", implying the development of new understanding by iteratively considering both the details (the parts) and the context (the whole) (Alvesson and Sköldberg, 2008). In our studies, one of the main inspirations comes from the German philosopher Gadamer, who sees a novel meaning as emerging from a blend of many minds, or as a" fusion of horizons" (Gadamer, 1975). A similar perspective is presented by the French philosopher Ricoeur from the "clash of interpretations", where several critical perspectives collide in the search for new understanding (Ricoeur, 2010). The focus on the individual and her capability to reflect upon herself is also discussed in the field of logo therapy, a branch of psychology where the strive for meaning is believed to be the strongest of human forces. According to Victor Frankl (Frankl, 1988, 1995), this awareness, connected to a person per se, is what makes it possible to understand the meaning of a

certain situation. Another close perspective comes from Mark Johnson who discusses meaning from both a cognitive and an aesthetic perspective (Lakoff and Johnson 1980; Johnson 2007). This theory stresses that meanings, (unconsciously created within us, even before we are aware of them) come to full expression through the arts.

These philosophical and psychological approaches present different ways to relate to meaning. They cover meaning and life, but are not fully applied to research within innovation management that also incorporates discussions on products (or artifact) and business. Nevertheless, product and meaning encourage much discussion, from cultural artifacts and connotations, (Buchanan 2001, Holt 2003), to active contributors in complex systems (Hirschman, 1982), "cultural industries" (Hesmondhalgh 2007) and meaning change in networks (Tuomi 2006). Further, within semiotics and branding (Karjalainen 2004) and in design (Schön 1983, Heskett 1985; Krippendorff 1989, Verganti 2009).

Close business perspectives that connect to meaning instead, are primarily those within organizational studies focused on sensemaking (Weick 1995) and sensegiving (Gioia and Chittipeddi 1991) and on the capacity to see and reflect upon changes (Ocasio 1997; Ocasio 2011; Weick and Sutcliffe 2006). But, also studies on how humans interact through conversation, through "communities of practice" or the use of a common language, also show how people create meaning (Brown and Duguid 1991, Wenger and Snyder 2000, Boland and Tenkasi 1995).

Our perspective, though, that embraces both meaning, product and innovation management, does not make a loud voice in these studies. Focus is either on product meaning, but less on innovation, or on context, and less on changes to product meaning. It seems that explicitly seeking for meaning (such as the meaning of a product and service in the context of its use) is absent from these studies. A valuable perspective though, is the one of "meaning making" (Jahnke, 2012, 2013). This approach sets designers as the catalysts of meaning change by stressing the importance of a critical, even humoristic or ironic perspective of innovation. Nevertheless, the focus is on design and product. There is no explicit framework for a third dimension of innovation.

These streams of literature all relate to meaning and have served as a valuable basis for our investigation (for a more extensive literature review see Öberg, 2012). Still, as we have identified, there is room for a more extended discussion on meaning in the context of innovation. Many theories relate to meaning independently from each other (in socio-cultural contexts, in product design, in organization theory), but none bring together the three notions of meaning, product and innovation management that are core elements in this study.

3. What Is Innovation of Meaning

… something with implied or explicit significance, with an important or worthwhile quality, a purpose…

The English Oxford Dictionaries

There are mainly two types of explanation for meaning. First, a semiotic explanation, or, more precisely, a *semantic* acceptance, where meaning indicates the relation between signs and the things to which they refer (as semantics is the meaning of words and phrases). Second, the definition also includes a philosophic, less tangible and visible function by including the words "implied, explicit, important worthwhile, quality and purpose". These terms suggest a personal involvement and judgment and could be connected to philosophy (as the study of theories about the meaning of things, such as life, knowledge, and beliefs, and as the study of general and fundamental problems, such as those connected with existence, knowledge, values, reason, mind, and language).

When talking of the "innovation of meaning" we refer to *"a user, the product and the surrounding context to interpret a product or service proposal in the way that the purpose changes*". This implies that we refer more to the second part of the definition, the philosophic perspective, rather than the semantic. More specifically, we focus on the *purpose* of a *product or a service*, on the *"why"* rather than on the "*what*". Our perspective of meaning, therefore, is rooted in a tradition that looks at the meaning of *life* (such as in philosophy, sociology and psychology), applied to *artifacts* (as in design and in product semantics) and within the dynamics of *businesses* (as in organizational sensemaking and in the management of innovation).

Therefore, by *product meaning* we relate to the *purpose* of a product or service as perceived by the user. It is connected to the user experience of the product and it comes from their interpretation of a product. It stems from both emotional and symbolic values (such as in the product language and message sent out from the product) but also from the technology and functions connected to the product, delivering a certain performance. The meaning, in the RoboCoaster case, comes both from the appearance of the unexpected movements from the robot (creating emotions and representing different ideas to every spectator) and also from the physical experience of the movements when using the ride (related to the functionality of the robot). Meaning, therefore, is created when moving from discussing the *what* (functions and messages) to the *why* (from efficiency to emotion).

Hence the *innovation of meaning* is a change in the purpose of a product or service, coming from a user's interpretation, in a given context of use. From the perspective of a business, an innovation of meaning is present when the company's message for a product changes and builds on values that express a new reason, a new meaning for why to buy and use this product. These arguments stem from the user perception and can be expressed both by a company and its clients.

4. Methodological Approach

So far we have learnt about two robot products, the RoboCoaster by KUKA and the RobotStudio by ABB Robotics. They are both examples of innovations of meaning; one uses the help of existing technology in a new market, the other with the help of new technology in an existing market. One shows the change from raising accuracy in the strive for control, to raising unpredictability in the quest to create emotions. The other example shows the changes in buying hardware and raising capacity (a robot) to buying software and knowledge (an application system). We will examine these cases closely further on. However, before that, we describe the methodological approach of this study.

The study started in 2010 with the aim of explaining the dynamics within radical innovation. To this purpose, we organized two workshops with 15 managers at ABB Robotics. These resulted in a map of revolutionary cases within the robotic industry covering the last 30 years. When classifying these cases according to traditional innovation frameworks, we realized that not all of them would fit into the existing dimensions of technology and market. Therefore, we moved to an exploratory investigation in the search for an additional dimension to explain the nature of these innovations. Rather than being explanatory, our methodology, therefore, is exploratory, aimed at identifying the nature of a novel phenomenon (a new dimension of innovation) to be further explained through more extensive, future studies. This exploratory stage of the research consisted of in-depth, semi-structured interviews with nine managers within product and project development both at ABB and KUKA, in Sweden, Germany and UK. The interviews aimed to explore how executives involved in projects perceived these innovations differently to other traditional technology and market innovations. The material was tran-

scribed, codified and analyzed in light of the literature review, especially regarding connections to the field of hermeneutics. To increase the external validity, the study also included case studies of innovations in completely different industries, such as durable goods, fast-moving consumer goods and business-to-business settings, using the same interview protocol and analysis. Early insights were then presented at conferences on innovation management and design management, and also at conferences on hermeneutics and qualitative research. The insights were then further elaborated at universities both in Sweden and Italy and discussed by scholars from both management, design and product development as well as with editors of both books and academic journals. The scientific approach would best be described as a participatory research perspective, or as an innovation action research perspective (Kaplan, 1998) where companies and researchers, together, relate to and create new knowledge.

5. Meanings Are Everywhere

Now, we turn our attention to three other examples of innovations of meaning because innovations of meaning do not only exist within the field of robotics. They can be found in any industry, shaping competition and competitive advantage.

We considered the Swedish sports gear company POC, most famous for their ski helmets that combine new technology with a strong visual appearance. By reflecting and understanding several signals, this company has developed a new meaning for downhill ski helmets. Instead of offering supportive headgear to avoid injuries, the company has added a playful, seductive touch to this life-saving equipment. When visiting the POC website, the visitor can dive into a world of protection, where helmets can be personally designed regarding color, size, connection to ski goggles, body armor, gloves and clothes. The visitor can meet the team of athletes and the special laboratory behind the new semi-hard shell technology and learn that the company works with biomimetics (the science of adapting biological structures and functions to the purposes of engineering). Visitors are also offered tips on movies, competitions and links to the partners of the company as well as a local talent program, both within ski and bicycling. This offer is not accidental. It is a result of careful listening to signals within skiing technology, life style studies and fashion. POC is clearly not offering just a product. They propose a scenario of meaning in a market that did not ask for the use of helmets (the meaning associated with ski helmets was indeed that of a device for fearful, inexperienced skiers). The founder of POC did not consult users to find out the new proposal. Instead, he worked with sports medicine experts (back specialists), brain scientists, neurologists, material specialists, experts in social media and graphic design, industrial designers, professional athletes and top gravity athletes to elaborate on these signals and create a new scenario. The result is that POC have now altered the perception of what personal protection is all about from being "a boring must" to a fashionable and attractive feature.

The innovation of meanings can also be found in service contexts (see for example Katarina Wetter Edman, discussing meaning in relation to a service design perspective, (Wetter Edman, 2014)). Let us look at one example within accountancy services. In the 60s, the accountant was the anchor of the finances in a company, keeping the overall picture in his head and not willing to release too much information. He was the bookkeeper that kept things under his wings. Similarly, with private clients, the accountant was a general consultant who provided advice on several financial schemes (pensions, savings, etc.). With the increase in technology in the 70s, the accountant became an informatics-expert, delivering masses of numbers and statistics to the company managers. With increasing speed and more complexity, the accountant

of today has gone from a local or country-specific focus to a global work environment. Analogously for private clients, the accountant has become a very specialized role, focusing mainly on bookkeeping and tax consultation. Accountants have turned a piece in a puzzle of stocks, insurances and pension funds, derivatives and mortgages. Holistic analysis and control is an extremely tough exercise, if not impossible. Therefore, the accountant has to be specialized in certain areas. The meaning has changed significantly, from a "whole-picture" Godfather delivering peace and calm to the top managers and people, to becoming a well informed and detailed expert.

Another example is the development of diapers by Kimberly Clark who, in 2007, released the "Huggies Little Mover Jeans Diapers". The blue denim design was launched as a fun and stylish fashion for babies during the summer months, allowing children (and parents) to feel relaxed, even when strolling around without any trousers. The diaper has a printed pattern that resembles blue denim jeans, with stitched seams and pockets on the back, due to new technology that allowed a clearer and less transparent print than the one normally visible on diapers. Still (but obviously), it kept the core value of leakage protection and great mobility for toddlers that crawl and scoot around their surroundings. But, more than just a fun and colorful way of dressing a child, this also connected to the life-style and preferences of parents and their interests in fashion. The diaper was not developed for the child per se. Instead, the deep blue diapers have become a way of expressing personal style, as a parent. Instead of using arguments, such as "feeling safe", giving your baby the best" and allowing free movement and fun (by taking assistance from famous Disney, or other, commercial characters), this appealed to the "needs" of parents, far away from teddy bears and children's toys. This product talked to parents in the search for self-fulfillment as a not only caring parent, encourages an "up-to date", playful and fashionable one. As a result, the meaning of diapers has changed from a practical and necessary support, one that is bulky and less glamorous to buy, to a self-expressive and prioritized fashion item. This new meaning is not to be seen as a shallow superficial statement because children with "fashionable" diapers can move around and play without the necessity of wearing clothes (trousers) on top. This allows more freedom for the child. Additionally, it is a convenient situation for the parents. In fact, it is a more open, "no frills" attitude in parent-child bonding. Due to the higher engagement among parents, the value of the brand, hereafter, has come to incorporate a more affective connection between customers and the product, similar to the engagement of a loved and attractive fashion brand. This is an example where the meaning changes from being practical-oriented to also including feelings of affection and good spirit.

6. Analyzing the Peculiar Nature of the Radical Innovation of Meaning

From the analysis of our cases, it emerges that managers perceive innovation of meaning, especially in its radical form, as considerably different in its nature than other forms of innovation, such as technology or market driven ones. In this section, we propose four identified dimensions for the nature of this type of innovation; it being dependent, un-optimized, outlandish and co-generated. We show how these dimensions differ compared to more classic approaches to innovation and why these might fail when being applied in a meaning-driven innovation search. These insights, which come from our exploratory case studies, are proposed as a basis for further extensive exploration in future studies.

6.1 Being Context Dependent

Let us start by going back to KUKA and the case of the RoboCoaster. In the robotics industry, most innovation projects imply a search for solutions that can (al-

most exclusively) be technically described. In other words, most innovation (typically driven by technology or new market applications), consists of solving problems. Research studies have typically focused on this type of cases where innovation is perceived as the result of problem solving processes. See for example, the design hierarchy model (Clark, 1985), the problem-solving cycles (Clark & Fujimoto, 1991), and the frameworks of system engineering design (Pahl & Beitz, 1988). As an innovation strategy with reference to, for example, the resource-based view of corporations (Wernerfelt, 1984) and their dynamic capabilities (Teece, 1997), innovation, in this sense, is dominantly directed to finding a solution.

Is the innovation of meaning concerned with problem solving? In other words, is an innovation of meaning defined by the technical problem it addresses, independently from the cultural context it is used in?

The managers at KUKA assert that, no, the aim of the RoboCoaster project was not to solve a technical problem (indeed, the technology of the product already existed), but rather to reframe the interpretation of what a robot may be. This robot delivers amusement and human emotions rather than precision and speed. They designed a new context around it, a new scenario, a new experience, before moving on to technical problems.

Similar findings emerge in the POC case, where a traditional product meant to provide safety (a ski helmet) is reinterpreted in the socio-cultural framework of fashion and style.

Innovation of meaning, therefore, works on a higher level and with a broader scope than when solving a technical problem. It implies to step back from a close focus on the problem at hand, and instead consider the overall user experience, beyond the specific interaction with a product. By reinterpreting the relationship between the product and the surrounding context, an innovation of meaning redefines the purpose of this product. As suggested by hermeneutics, the novel interpretations come when a company has the capability to see both parts (the individual events, one of which is the product at hand) and the whole (the overall user experience, which is the envisioned course of action).

A consequence, and very central to the interpretive process, is the role of external networks. However, differently to classic models of innovation where actors in a network are considered to be providers of the ideas or solutions to a specific problem (Chesbrough, 2003), these networks provide new, different understandings of the context. For KUKA, for example, this first included the request of an entrepreneur in the entertainment industry, later included interactions with clients and theme parks. For POC, it included interactions with doctors, fashion trends and lifestyle experts. The network is not only providing answers but brings about possible interpretations of what could be meaningful to users.

To conclude, both the KUKA and the POC cases show that radical innovations of meaning are context dependent. It is not just about designing a product, but about designing a scenario of meaning. In our cases, this scenario took the shape of a report, of mood boards (POC) or a storyboard (ABB). It can also be a physical realization, such as a concept project, shown in public by a company to indicate future aspirations (this is a strategy typically adopted by KUKA).

6.2 Being Not Optimized

Another major characteristic of dominant innovation theories is that problem-solving is seen as a process of the progressive reduction of uncertainty (the earlier in the process the better, see for example Clark & Fujimoto, 1991) and that, assuming there is an optimal solution out there, it is just necessary to find it (Terwiesch & Ulrich, 2009).

Is innovation of meanings concerned with uncertainty reduction and optimization?

Again, the managers at KUKA assert that no, they were not aiming to find an optimal solution to a problem, nor had they aimed to skim uncertainty off early in the project. Conversely, they started their work with the RoboCoaster by listening to a proposal from an entrepreneur related to the amusement park business. The first tentative product presented to the market was a standard product, adapted for the use of a private person with the help of suitable software. Over the years, the company had carefully listened to what the network looked for and had constantly refined their offer. Among other things, the seat was extended to include a top cover, equipment for laser guns (to fire at themed targets) and other special effects. Recently, the RoboCoaster has been further developed to also include a virtual rollercoaster, experience of avalanches, and the concept has been incorporated to be a part of interactive exhibits that combine math and science with sport activities for children.

Starting from an adapted assembly robot, the RoboCoaster has ended up offering a total experience. Through an iterative development process, different actors have added new knowledge and proposals along the way, and this has helped KUKA to reinterpret the meaning of the product. The strategy has been to listen and adapt the product continuously. In short, this second characteristic suggests a new theory of innovation, where focusing on convergence towards an optimal solution is based on continuous and iterative debates, which firms take an active part in.

To conclude, innovations of meanings cannot be optimized. They belong to an ever-shifting sphere of knowledge, opinions, and proposals and, therefore, can never be constant. In the process of information gathering and processing, external actors may be considered as an important source of new arguments. They express different ideas, use different voices and create different perspectives. Interpretations, therefore, are combined and can lead to new ones by stressing some and abandoning others. Or, as Gadamer would have put it, by a "fusion of horizons".

6.3 Being Outlandish

So far, we have elaborated the two themes of context dependency and non-optimization. These two themes are giving new implications to the theories of innovation as a consequence of our focus on meanings and interpretation. Our discussion, however, considers a specific type of innovation of meaning: a radical change. The next two sections will illustrate characteristics that provide a useful lens to capture the nature of this radicalism.

Recent studies on innovation have deeply analyzed the dynamics of radical change, with a focus on a major challenge: the need to develop the new capabilities required to achieve a breakthrough (see for example Christensen and Bower 1996, Teece at al. 1997). External networks, in particular, are considered crucial to providing access to new competencies (Christensen 1997, Chesbrough, 2003). The perspective is that innovation comes from the additive process of accessing, absorbing and retaining new knowledge (Cohen and Levinthal 1990).

Is the innovation of meanings concerned with the development of new capabilities deemed to be useful in the new scenario? Is this an additive knowledge generation and absorption process?

Our cases indicate a two-sided answer of both yes and no. Yes, because all cases implied the development of new knowledge (not on technical issues but especially on what makes sense to users). No, because radical new meanings are coupled with a criticism of the existing dominant socio-cultural paradigm, not alignment with it.

Considering ABB Robotics and the development of the RobotStudio, when some employees suggested they should start to work on software (instead of hardware) this was not the most popular move within the organization. This is because it meant that some of the competence of how to design robots and their movements

would be handed over to clients through this new service. Still, a group of believers, who were not just internal staff, persisted and continued working with the new software application. And they were not only internal – instead great competence joined from other external partners belonging to totally other fields than robotics, as the software industry. When the product was launched, it was so radical that even clients were not explicitly asking for it. When it came out they were actually felt threatened instead of being thrilled! For example, car manufacturers have internal experts whose expertise is to understand how to use robots. These experts within the client organization interpreted the simulator as a threat to their expertise and, therefore, to their organizational power. The whole idea looked bizarre, strange and different, almost outlandish.

A similar pattern, where a radical innovation of meaning is treated with arrogance by incumbents in the industry, emerges in the RoboCoaster case. This was not considered to be serious robotics by traditional players, but rather as a marketing exercise. Managers at competing companies laughed at this innovation instead of jumping at its imitation.

Developing a radical change in meaning implies, therefore, it is necessary to overcome dominant assumptions about what a product is meant for. It implies the necessity to question the existing socio-cultural paradigm. The importance of questioning the current picture, therefore, links to the ability to build critical capabilities, not only complementary ones. This leads to the peculiar role of outsiders in this type of innovation: rather than being a source of complementary capabilities (that have been identified and that are currently missing), outsiders are used as a source of questioning, even criticizing the current situation. In particular, as we have seen, the interpreters who enable to develop these outlandish interpretations are not customers or suppliers (who belong to the same ecosystem of a company and often share the same frame of making sense of things). Rather, the most effective interpreters are alien to a firm's environment. Software experts looked indeed strange to robotic experts in the 80s, as did experts in entertainment for KUKA or fashion experts for POC. The development of the RobotStudio application by ABB and of the RoboCoaster by KUKA have also been benefited by the contribution of executives who originally came from other industries than industrial robotics (indeed, the entrance of KUKA in new markets has been anticipated by the significant influx of an entire team of new young executives who were not experts in the industry). These executives could, to use the words of Ricouer, take a critical stance on the shared assumptions in the industry and pave the way to the development of breakthrough meanings

To conclude, a radical innovation of meaning is not additive, but is rather "outlandish". It requires the development of critical capabilities thanks to outsiders who enable a firm to make "detours" from the current dominant interpretation, to lose themselves to find themselves another, with a new perspective, as explained by Ricouer (Ricoeur, 2010, Kristensson Uggla, 2002).

6.4 Being Co-generated

Most theories of innovation advocate a closer look on users in order to realize innovation. This perspective is supported, especially within the realm of studies on user-centered innovation (Von Hippel, 1988), design thinking (Brown, 2009; Martin, 2009) and crowdsourcing (Chesbrough, 2003).

Is innovation of meaning user-driven? Does innovation of meaning emerge by getting closer to users?

Our cases show that no, innovation of meaning does not come from users but is as a result of an interactive process that starts from a vision proposed by a firm.

The RoboCoaster, for example, is not the result of market analysis (no one in the amusement park market was asking for this kind of product). Rather, it is the outcome of a clear and forward-looking strategy by

KUKA, searching for new applications by redefining what a robot is, by taking robots outside of the industrial (automotive) interpretation of efficiency and productivity, and taking them closer to humans. Perhaps the most evident proof of the strategy of KUKA is given by the visual and experiential language of their website (www.kuka-robotics.com/en/), especially as far as new applications in the field of entertainment are concerned (www.kuka-entertainment.com). The websites show catalogues of ideas for new applications; the images are playful combinations of products creating complex shapes in the style of Arcimboldo's vegetable portraits. In addition, KUKA collaborated with digital designers Clemens Weisshaar and Reed Kram to create an artistic installation in Trafalgar Square during the 2010 London Design Festival, where the festival visitors and the global Internet community could take control over eight robots via a website by sending short text messages that were then "painted" in the air by the robots using LED lights. KUKA's robots have also appeared in Hollywood movies, such as James Bond's "Die Another Day" and "Tomb Raider" and the company has been honored with a number of design awards. There is a new and entirely radical strategic vision behind the idea of the Robocoaster. It does not come from the users of amusement parks.

Whereas recent theories of innovation place the major focus on the role of users, innovation of meaning places the focus on the visionary role of a firm's executive team. Our research shows that radical innovation of meaning, being a proposal of a new radical purpose, implies the direct involvement of these top executives in the team of interpreters. Indeed, interpretations, eventually, cannot be outsourced. Executives cannot ask others to listen to outside interpreters. They have to be in the design team themselves to internalize the new interpretation. A vision is something that is never brought on a golden tray: it requires interior action. This perspective is coherent with studies on entrepreneurship and strategy that assert that new visions come from the co-construction of understanding (Santos & Eisenhardt, 2009) in a network where both entrepreneurs and stakeholders take an active part (Sarasvathy & Dew, 2005).

In conclusion: a radical change in meaning hardly ever emerges as an answer to a clear market need. Rather, it implies a step back from current needs and proposes a new vision that still does not exist in the market. This vision comes from a combined effort to see and interpret new things, involving both internal, external and "outlandish" networks. Therefore, an innovation of meaning is co-generated.

7. Conclusions

In this article we have shown that there are innovations that cannot be classified according to traditional frameworks focused on the innovation of technologies and markets. Therefore, we propose a third type of innovation dimension: innovation of meanings. On the basis of the analysis of studies in different industries (with a major focus on industrial robotics) we have explored the peculiar nature of this innovation. In particular, we have identified four interesting characteristics that make the radical innovation of meanings different to technological or market innovations. Innovation of meanings is context-dependent, not optimized, outlandish or co-generated.

The purpose of this article has been exploratory, i.e. to identify and define the nature of this type of innovation. This now enables us to set an agenda for future research.

The first direction of research is confirmatory: are the four characteristics of the nature of innovation of meaning constantly present? Do they also characterize innovation of meanings in industries other than robotics, ski helmets, consulting services and diapers?

The second direction of research is exploratory: what is the process of innova-

tion of meanings? How do firms successfully create and launch new meanings?

Both these directions require a new research design and data set, which goes beyond the purpose of this exploratory article.

The aim here has been to give a picture of what an innovation of meaning can be and what its nature looks like. We hope now to expand and give further depth to this peculiar type of innovation in our future work. But, this can only be done by a vivid and constantly ongoing discussion among peers and outlandish, in known and unknown waters, among visionaries and critics, embracing open minds as well as closed ones. For this reason, we hope that this article may inspire other outlanders to join us in this exciting research journey.

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