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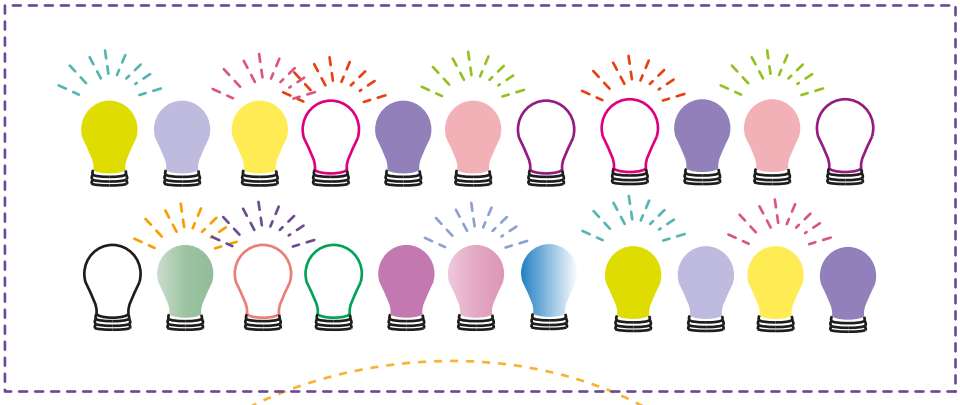
lecture*

Stoyan Tanev



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## Stoyan Tanev

Associate Professor Department of Technology and Innovation
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Dr. Stoyan Tanev is an Associate Professor of Technology Entrepreneurship and Business Innovation in the Department of Technology and Innovation, Faculty of Engineering, University of Southern Denmark (SDU), Odense, Denmark. He is also Adjunct Research Professor associated with the Technology Innovation Management (TIM) Program at the Department of Systems and Computer Engineering, Carleton University, Ottawa, Canada. Before joining SDU in August 2009, Dr. Tanev was Assistant Professor in the TIM Program at Carleton University. At SDU Dr. Tanev had been associated with the Center for Integrative Innovation Management - a research unit operating across the Faculties of Engineering, Business and Social Sciences and focusing on studying emerging technology innovation, marketing and business practices. Since 2014 he is leading the emergence of a new Technology Entrepreneurship stream of the Product Development and Innovation Program at SDU. He is also part of the Management Council of the Lead-to-Win Start-up program at Carleton University, being responsible for its global expansion.

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Video: https://vimeo.com/121377464

# Generative Innovation Practices, Customer Creativity, and the Adoption of New Technology Products

Stoyan Tanev and Marianne Harbo Frederiksen

> *"It is absurd to claim that our customers are missing! So say surprised skeptics seeing our claim of missing customers. What if our problem with value is rooted in a misconception of our customers, the people we are creating value for?"*
>
> Peter J. Denning & Robert P. Dunham
> "The Missing Customer" (2003; tinyurl.com/kl7y2wp)

We offer a critical reflection on one of the key reasons for the startlingly low success rate of innovation initiatives worldwide – the fact that the interactive environment surrounding the customer is a critical part of the adoption process; it can and should be designed in a way that enables customer creativity, and thus adoption. In this article, we embrace a definition of innovation as "the adoption of a new practice by a community" where the innovator is the one who does not only sense and move into new opportunities but also mobilizes all the necessary resources needed by customers to adopt a new practice. The emphasis on adoption merges together innovation and entrepreneurship by shifting the focus from the inventor and the designer, through the entrepreneur, to the ultimate recipient of the innovative outcomes. Looking at customers as co-creators is critically important for technological product adoption; missing the chance to enable their creativity is equivalent to missing the opportunity of seeing them for who they really are. The result is a distorted vision that is ultimately rooted in the misconception of the dynamics of customer value. We particularly emphasize two points: i) the increasing degree of complexity of everyday technological products requires a higher degree of creativity by customers to adopt; and ii) customer creativity is not only a function of user-technology interaction, it is a function of the various actors in the interactive environment surrounding the customer such as other customers, other technologies, local distributors, customer/technical support providers, and competitors.

## Introduction

According to a 2005 *Business Week* article, the success rate of innovation initiatives in terms of meeting their financial objectives is less than 4%, with the innovation success rates within specific industries ranging from a mere 1% in the toy industry to only 7.5% in the pharmaceutical industry (Nussbaum, 2005; tinyurl.com/krb6oyv). In a more recent study, Strategyn (2010; tinyurl.com/olgqvtp) used 12 different sources to evaluate the success rate of traditional innovation methods. The study reports success rates between 1% and 86%, with an average success rate of 17%. After removing the low and high outliers from the analysis, the average rate goes down to 8.5% – exactly half of the initially reported 17%. A most recent study by Accenture (2013; tinyurl.com/n7hdyb4) found that 93% of executives regard their company's long-term success to be dependent on its ability to innovate; but, at the same time, less than one out of five (18%) believe that their strategic investments in innovation are paying off. According to the study, such a poor track record discourages companies from taking

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the risk of initiating more radical innovation projects. There is no doubt that the specific success rates reported by the different studies depend on the methodology, the purpose of the study, and the particular context of their key messages. However, they seem to consistently indicate that, at the beginning of the 21st century, human involvement in dedicated innovation activities has not been as successful as we have been expecting it to be. Many companies are simply struggling with it – a fact that has been borne out in numerous other studies as well as in the marketplace, where new product introductions quite often fail to meet expectations even as others soar beyond expectations. What is the reason for such discouraging performance? Should we just lower our expectations by admitting that innovation is a risky game and silently agree to waste more than 80% of our investments? Or, should we try to locate the roots of the cause and work towards improving the success rate? What can innovators and entrepreneurs do to improve it?

In this article, we argue that one of the reasons for such failure could be associated with narrow or fluffy definitions of innovation that are impossible to translate into actionable insights. The problem with inadequate definitions is that: i) they misinterpret the job of the innovator and the entrepreneur; and ii) they misplace the focus of company efforts into activities that do not enable potential customers to become actual customers thus making the companies "miss the customer." We start by considering innovation as "the adoption of a new practice by a community", which emphasizes the critical roles of both innovators/entrepreneurs and customers as the two active poles of the dynamic adoption process. The entrepreneurial aspects are addressed by describing a generative approach to managing innovation, including several personal practices focusing on adoption. The customer aspects are addressed by conceptualizing customer creativity as an important factor in the adoption process. The article concludes by emphasizing the relevance of the topic with respect to the ever-increasing complexity of everyday technological products and summarizing the key insights of the analysis.

## Innovation as the Adoption of a New Practice by a Community

The particular working definition of innovation appears to be of critical importance for companies. Baregheh, Rowley, and Sambrook (2009; tinyurl.com/ko9r7h4) emphasize the fundamental difficulties in defining innovation by referring to its multidisciplinary nature. They have analyzed 60 definitions from eight fields including: business and management; economics; organization studies; innovation and entrepreneurship; technology, science and engineering; knowledge management; and marketing. Building on these diverse definitions, they propose a general and integrative definition that could be applied to the majority of contexts: "Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, services, or processes, in order to advance, compete, and differentiate themselves successfully in their marketplace."

In this article, we embrace a definition suggested by Denning and Dunham (2010; innovators-way.com) who stress that successful innovation cannot be completed until the community of the intended users has actually adopted a new practice. For them, innovation is "the adoption of a new practice by a community". With such a definition, the focus of innovation shifts from invention to adoption practices and emphasizes the fact that there are millions of inventions that have never found their way to the marketplace. Interestingly, Accenture's (2013; tinyurl.com/n7hdyb4) study mentioned earlier found that one of the key reasons for the low efficiency of companies' innovation activities is the so-called "invention trap" – the "overreliance on the invention process itself to produce success and relative lack of systematic, enterprise-wide processes capable of commercializing inventions into products or services at scale, bringing them to market in a sufficiently timely fashion and reaping the expected returns."

The key benefit of the definition provided by Denning and Dunham is that it decouples the practices of invention from the practice of innovation which focuses on enabling adoption. This decoupling has two main effects. First, it merges together innovation and entrepreneurship, because they both could now be considered as managing and implementing change as part of the adoption of new practices. Second, it opens the opportunity to account for the value co-creation role of customers during the adoption process – a point that needs to be strongly emphasized. The two effects should be considered in a self-consistent manner because they are dialectally interrelated.

## A Generative Approach to Managing Innovation as Adoption

Denning and Dunham (2010; innovators-way.com) have developed a generative approach to managing innovation, which consists of eight practices within three

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categories: i) *the work of invention*, including the practices of sensing and envisioning; ii) *the work of adoption*, including the practices of offering, adopting, and sustaining; and iii) *the three practices providing the environment for all the other practices*, including executing, leading, and embodying. One of the key messages of this classification is that the major work of innovation is not related to invention but rather to the personal practices of innovators and entrepreneurs aiming at getting others to adopt a new practice enabled by a new product, process, or service. *Offering* is the first such practice including the presentation of a proposed new practice and its benefits to the community and its leaders so that they commit to considering it. *Adopting* is getting the community members to commit to adopting the practice for the first time, while reserving the option of dropping it if not satisfied after a trial period. *Sustaining* consists of getting the community members to commit to the practice for an extended period, integrating it into their other practices, standards, incentives, and processes, and making it productive for its useful life.

Denning and Dunham (2010; innovators-way.com) identify the following key activities associated with the offering practice:

- drawing listeners into a discussion about the ways of producing the new outcome
- modifying the proposal to fit listeners' concerns
- establishing trust in your expertise to fulfill the offer

They identify the following key activities associated with the adopting practice:

- achieving initial commitment to the new practice
- continuously demonstrating the value of the new practice
- showing how to manage risks and deal with resistance
- aligning action plans for coherence with existing practices, concerns, and interests
- addressing different community member adoption rates
- recruiting allies
- developing marketing strategies for the different groups in the community
- continuously look for ways to overcome resistance

And finally, they identify the following key activities associated with the sustaining practice:

- achieving commitment to stick with new practice
- developing supporting mechanisms, tools, and infrastructure
- integrating the new practice with the surrounding environment, standards, and incentive systems
- continuously assessing for negative consequences
- carefully abandoning bad or obsolete innovations

Denning and Dunham point out that the key activities associated with the three adoption practices should be considered at the personal level as conversational or rather discursive expressions of human behaviour. According to such a discursive perspective, the personality of the innovator or the entrepreneur should be considered in terms of the specific personal practices and their outcomes – "the streams of human actions and interactions, which can be understood in terms of their meanings for the actors and interactors and the norms and the traditions that are generally accepted by the people involved and which shape their actions" (Harré and Moghaddam, 2012; tinyurl.com/mq42vad).

It is true that conversation is very useful, but it is not the only model for analyzing such streams of action. However, it allows for treating all that people do collectively and individually, as well as privately and publicly, as if it were a kind of conversation or discourse – in other words, as consisting of meaningful exchanges constrained by a specific normative framework (Harré and Moghaddam, 2012; tinyurl.com/mq42vad). The entrepreneurial discursive skills and dispositions are a subset of human personal knowledge that most people possess to a certain extent but might not have been able to express, grow, or master. This realization has great implications for the study of entrepreneurship and innovation because it points out that the role of the learning process is to help all interested in entrepreneurship to discover the depths of their entrepreneurial self and nurture it in a consistent way.

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## Customer Creativity as a Key Factor in Technology Adoption

Denning and Dunham's approach has a great value in articulating the job of both innovators and entrepreneurs in terms of the specific practices that could be learned and perfected. Their approach, however, does not seem to sufficiently emphasize another important aspect – the fact that customers' activities are an equally important component of the adoption equation. We believe that the second major reason for the failure of the majority of innovation initiatives in the technology domain is the lack of proper understanding of the creativity needed by the ultimate users who are struggling to adopt the newly developed products. Our emphasis on customer creativity in the adoption of new products does not intend to undermine the efforts of designers, innovators, or entrepreneurs; it is just an attempt to locate another major source of the problem and suggest a way out of it. The solution includes the repositioning of the creativity concept within the context of customers' adoption efforts.

The widely acknowledged definition of creativity refers to the novelty, usefulness, and appropriateness of a new product (Duxbury, 2012; timreview.ca/article/594). However, this definition misses the important element of appropriation, which can be seen as a result of the creative efforts of the ultimate recipients of the new product. The increasing complexity of new technological products enlarges the difference between the total value built in as part of the design, development, and manufacturing process and the customer's perspective of that value. The difference allows us to emphasize two points. First, potential customers make purchase and adoption decisions on the basis of the relative benefit Δ1, which is the difference between the total value (reflecting the entrepreneurial perspective) and the value of whatever their currently existing solution is (Figure 1). Second, the estimation of the relative benefit Δ1 is based on the assumption that customers know in advance what the total value of a product is. It assumes that the total value is an objectively existing property that could be easily appreciated by potential customers. This last assumption is not true, especially in the case of more complex technology-based products. What customers really know is the perceived value of the product and, unfortunately, this perceived value could be lower than the value of their existing solution, leading to a negative relative benefit Δ2. In such situations, customers have two options: either neglect the new product or make the effort to further appreciate the total value of the new product.

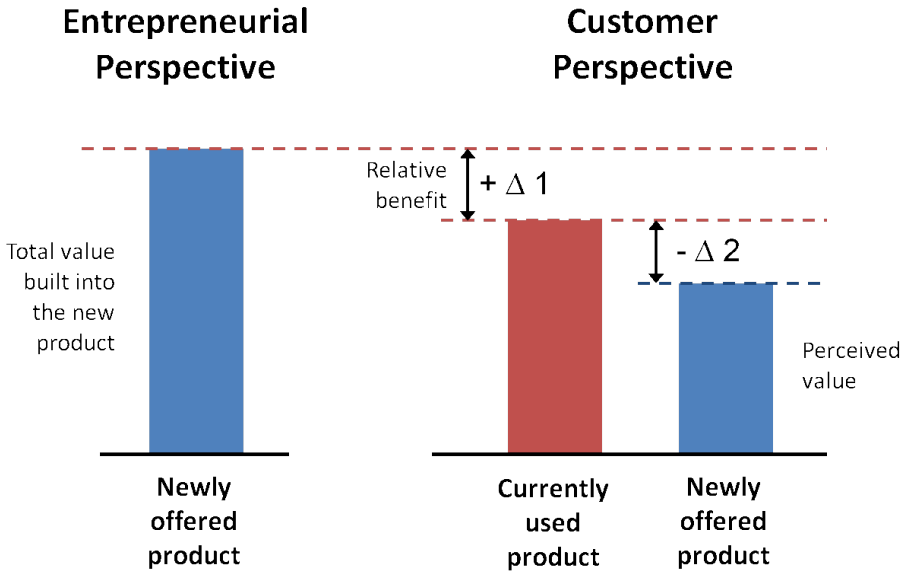


**Figure 1.** Visualization of the difference between the total value of a new product and its perceived customer value. Modified from Adner (2012; thewidelensbook.com).

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The reason for us to focus in greater detail on the difference between the total and the perceived value of a new product is to emphasize that: i) an adoption decision does not happen before there is a positive difference between the perceived value of a newly offered product and the value of the existing solution used by the potential adopters of the new product, and ii) this process takes time and effort on the side of the potential customers. In this sense, the perception that will make a specific potential customer buy and adopt is to a great extent the result of this customer's own activities and creative efforts – in other words, it should be conceptualized as customer creativity.

Product attributes are manifested within the context of specific circumstances. For example, two different customers may associate an original technological product with completely different perceptions depending on the degree of their actual involvement and creative efforts in actively appreciating its use value. One could actually speak of this association as a process of "product co-creation" given that the evolution of the perception of a particular product makes sense only within the specific context of a particular customer. In other words, every customer co-creates the product for him or herself using accessible resources. In this sense, customer creativity is always co-creativity; it is dialogical and relational. The dialogue and the relations go far beyond the activities emerging within the context of the dyad formed by the user and the technology to include all possible insights from a variety of actors in the interactive environment surrounding the customer, such as other customers, other technologies, local distributors, customer/technical support providers, and competitors. This realization suggests that activity-based approaches such as actor-network theory (Latour, 2005; tinyurl.com/m99un78) and activity theory (Kaptelinin and Nardi, 2006; tinyurl.com/m4qp8s3) could be highly appropriate in studying the dynamics and the outcomes of product adoption.

## The Increasing Complexity of Everyday Technological Products

The discussion of customer creativity suggested here is justified by the realization that there is an increased degree of complexity in most of the technological products used in everyday human lives. The higher degree of complexity generates both societal and personal pressures that are in the process of changing many aspects of the human condition. Scale is one of the critical concepts that could help in understanding how societal pressures are resulting in a significantly increased degree of technological complexity. It refers to the unprecedented increase of human population, the increasing intensity of the globalization processes, and the increasing relevance of technology in everyday human life. The increasing scale of society is forcing a shift from trust and trustworthiness based on personal relationships to impersonal trust, predictability, and compliance in both people and systems, which leads to different societal pressures from a number of different directions (Schneider, 2012; tinyurl.com/mcj8xwf):

1. Having more people in society changes the effectiveness of different reputational pressures driven by the necessity for the majority of people to follow dominant group norms due to fear from bad reputation.

2. There is a visible tendency for an increased degree of complexity of everyday technological products, given that having more people in society means more interactions among people. More interactions among people cause both the emergence of new societal dilemmas and interdependencies among them. The interdependency of newly emerging dilemmas requires new and more complex social management systems that need to rely on technology even more. Uncertainty is a key component of new technology development and more technology means that the new systems may have more flaws as well as a higher risk of failing in surprising and unexpected ways, which additionally complicates the entire socio-technological environment.

3. There is a growing variety of new technological systems. As more and different technology permeates human lives and society in general, there will be new areas of concern that will need to be addressed, new societal dilemmas, and newly emerging technological challenges. In this context, the concept of scale in society becomes even more important because more aspects of our society are going to be controlled not by people but by technologically automated systems. Unfortunately, the ongoing automation of social systems is paralleled by a process of depersonalization of the interaction between people, which additionally increases social pressures due to the inability to efficiently clarify problems associated with communication ambiguities.

4. Globalization has brought the opportunity for people to move much greater distances across national borders, across nations, and across continents. Greater

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distances create the potential for more people, with weaker social ties, to be involved in mutual accidental interactions, which may weaken their moral and reputational pressures and diminish the strength of their home-based institutional pressures. This situation creates a necessity for more control and more monitoring, not only of people, but also of unprecedented amounts of goods and services, which additionally enhances the need for more complex technological solutions based on wireless, sensing, information and communication technologies.

## Conclusion

In this article, we embraced a definition of innovation as "the adoption of a new practice by a community" where the innovator is the one who mobilizes all the necessary resources to enable customers to adopt the new practice. One of the benefits of such a definition is that it merges together innovation and entrepreneurship and shifts the focus from the inventor and the designer to the entrepreneur and the ultimate adopters of the innovative outcomes. The entrepreneurial aspects of technology adoption were discussed by summarizing the generative practices adoption framework suggested by Denning and Dunham (2010; innovators-way.com). We have, however, also emphasized the relevance of customers' creative efforts and activities as a key factor in the adoption process and suggested conceptualizing these efforts as part of customer creativity. The point of this emphasis is to underline the fact that customer creativity is another key prerequisite for the success of innovation initiatives. Failing to integrate the mastership of the personal innovation practices to the design and development of a commercialization environment that enables the co-creativity of customers will always result in missing the customers as the ultimate destination of the firm's offerings.

## About the Authors

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**Marianne Harbo Frederiksen** is an Associate Professor in the Department of Technology and Innovation and a member of the Centre for Integrative Innovation Management at the University of Southern Denmark. Currently, she is also a PhD student focusing on creative processes and outcomes in connection with new product development and adoption and therefore the linkages between creativity and innovation. She has an MSc in Architecture from the Aarhus School of Architecture, Denmark, with a specialization within industrial design and product development. She has been co-owner of a design company and has worked in and together with several industries as a designer and R&D Manager as well as an adviser in public-private research projects focusing on user experience, experience designing, and other aspects of product development.

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**Keywords:** entrepreneurship, innovation, technology adoption, customer creativity, co-creation, customer value

# Consumer Creativity as a Prerequisite for the Adoption of New Technological Products:
## Looking for Insights from Actor-Network Theory

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## ABSTRACT

*Creativity is often conceptualized as actions and outcomes related to the creation of novel and useful ideas within the context of the development of new products. It is usually positioned in the activities of designers who play the role of "the creator". In this paper the authors suggest "changing the subject" to consumers by claiming that creativity plays a key role in the adoption phase when they attempt to address their needs and preferences by appropriating the use value of everyday technological products. They emphasize that the product value perception which makes a potential consumer buy is the result of this consumer's own activities and efforts. Thus, the intensity of consumers' creative activities becomes a critical adoption factor. The authors suggest that activity-based approaches such as actor-network theory and activity theory could be quite appropriate in studying the dynamics and the design of new product adoption, and offer a comparative analysis indicating that actor-network theory has a greater potential to contribute to the interplay between consumer creativity and technology adoption research.*

*Keywords:* *Activity Theory, Actor-Network Theory, Broadening the Perspective, Consumers, Creativity, Innovation, Product Adoption, Technology Adoption, Users*

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## 1. BROADENING THE PERSPECTIVE

Innovation has been defined as the successful commercialization of an invention (Schumpeter, 1934), which can be seen at the point in time when an outcome of new product development has been launched on the market and the first transactions have begun (Akrich, Callon & Latour, 2002a), i.e. when consumers have started buying it. Denning & Dunham (2010), however, stress that successful innovation cannot be concluded until the intended users have actually adopted the product and made it part of their lives. They suggest a definition of innovation as the adoption of a new practice by a community. With such a definition the focus of innovation shifts from invention to adoption making consumers a key factor in the innovation process.

As pointed out by Cropley and Cropley (2012), the innovation associated with a new product or process "needs to be accepted by customers, regardless of any other virtues it has, before it can be regarded as successful" (p. 37). From a managerial perspective, this would imply that, when working with new product development and innovation, the process of adoption needs to be adequately taken into consideration. There is a need of a new paradigm in managing innovation since organizations invest millions in programs focusing on fostering creativity and innovation but the vast majority of innovation initiatives fail (Denning & Dunham, 2006), i.e. they do not meet their financial objectives or simply do not reach their target audience. Our hypothesis about one of the major reasons for this failure is the lack of proper understanding of the relevance of adoption practices as part of the innovation process and the extent of the struggle and creativity on the part of the ultimate users in adopting new products. Our emphasis on consumer creativity in the adoption of new products does not intend to undermine the efforts of designers, innovators, or entrepreneurs; it is just an attempt to locate one of the major sources of the problem and point out a solution. The solution includes the repositioning of the creativity concept with a focus on consumers' adoption efforts.

Creativity in relation to new product development has been studied extensively. The dominant understanding of creativity focuses on novelty and usefulness or appropriateness of a given product (George & Zhou, 2001; Klausen, 2010; Sullivan & Ford, 2010). Such understanding misses the important aspect of *appropriation as a creative effort* made by the ultimate recipients of a product, an aspect that is becoming increasingly relevant within the context of the increasingly complex technology-driven everyday life. In this paper we emphasize the gap between the total value built in a product as the absolute benefit that could be potentially delivered to consumers as a result of designers' creative actions and intentions, and the consumer's perspective of that value which would require taking into account the extent to which their creative efforts have allowed them to appropriate it. This potential difference between the *total value* of a product and its *real (perceived or use) value* will become apparent especially when an intended user interacts with a product in a real life setting.

Creativity within firms is often viewed as a first step in the process of innovation (Amabile, 1997), and therefore creative

ideas of individual employees are considered as a "key precursor to innovation" (George, 2007, p. 441). It should be emphasized however, that creativity is highly relevant throughout the entire innovation span including (i) the initial idea and the translation of an invention into a product, where the designers' creativity has a direct influence on the final outcome, (ii) the commercialization of the product where the consumers' creative efforts influence whether or not a transaction will take place, and finally (iii) the actual use of the product where users' creativity influences the adoption of the product. The point of this emphasis is to underline that, *first*, there is a change of place, time, and creative agent when moving from the fuzzy front to the messy back end of the innovation span and, *second*, consumer adoption is a key component of the innovation process. Thus, the main contribution of this paper is the articulation of the need for the emergence of a new paradigm; one that conceptualizes the dialogical struggle in the encounter between a product and its individual recipients during the adoption process as consumer creativity.

A broader perspective of the links between creativity and innovation would be highly relevant to both academics and innovation managers since the focus on the encounter and the interactions between consumers and products allows for grasping how human information processing, imagination, and actions influence the adoption of a new product. In the following we explain how consumer creativity can be seen as pivotal to the adoption process by considering three different approaches – innovation diffusion, consumer innovativeness and activity theory. Next, we reflect on how actor-network theory can contribute to the conceptualization of consumer creativity within the context of adoption of new technological products. Finally, we suggest some future research avenues that could lead to more insights about the relationship between consumer creativity and new product adoption.

## 2. CONSUMER CREATIVITY AND PRODUCT ADOPTION

To be able to cope with unstoppable introductions of increasingly complex everyday technological products, consumers need to constantly update their knowledge in order to understand what is in front of them – especially if a product is not designed to perfectly or sufficiently meet users' needs. We posit that quite often consumers experience real challenges when trying to understand and adapt to what is being introduced to them, and that the likelihood of adoption depends on their prior knowledge, their learning efforts, and the specific design or fit of the product, e.g. whether it provides intuitive guidance to actions.

The encounter with a hitherto unknown product without previously learned skills for using it requires consumers' efforts and creativity (Glaveanu, 2011); they will have to try out the product, process accessible information, discuss or listen to others, selectively decide what is understandable and valuable, and whether it is worth conforming to the conventionally intended use or creating something new, i.e. redesigning the meaning and the ways of use of the product. Sometimes, of course, consumers can rely on routine assumptions when approaching

a new product, but in order to effectuate the attributes of the product, a more proactive, innovative approach may be needed (Runco, 2007). It goes without saying that different consumers will have different perspectives on a specific new product and the corresponding adoption process. Some of the existing frameworks address these differences by classifying the consumers in terms of their willingness and ability to try and adopt new innovation outcomes. Two examples of such frameworks are *diffusion of innovation* and *consumer innovativeness* which could both quite naturally relate to the concept of consumer creativity. Other frameworks such as *activity theory* emphasize the asymmetry and dynamics of the interaction between users and technology and focus on the developmental aspects of this interaction over time. The next sections will provide a summary of the main insights of these three approaches by focusing on their potential for the conceptualization of consumer creativity. The purpose of this summary is to provide a proper background that would enable the articulation of the advantages of the *actor-network theory* approach.

## 3. DIFFUSION OF INNOVATION

The diffusion of innovation (Rogers, 1983) is one of the most popular process models emphasizing the role of specific customer characteristics during product adoption. It explains how newly created products, i.e. proposed innovations, are communicated and adopted by the different members of a community. Diffusion is defined as the gradual adoption of an innovation which is "communicated through certain channels over time among the members of a social system" (Rogers, 1983, p. 5), some of whom decide to adopt. The diffusion rate of a proposed innovation depends on five factors: (i) perceived relative advantage with respect to other alternative options, (ii) compatibility to the circumstances of specific groups of individuals, (iii) degree of complexity, (iv) ability to be tried out, and (v) ability to be observed and judged by others (Rogers, 1983). The model has two key aspects: first, it suggests that ideas are the source of innovation and, second, it assumes that the stages of progress toward adoption are well-defined.

Time plays a critical role in the diffusion process since (i) the overall speed of adoption depends on the perceived advantage of a new product, and (ii) individuals adopt an innovation at different rates according to their disposition to trying it out. Rogers (1983) classified the potential adopters of an innovation in five groups according to their adoption response time following a Gaussian (normal) distribution: (i) *Innovators* (2,5%) love new ideas, they are venturesome and are usually the first to adopt; (ii) *Early adopters* (13,5%) are visionaries who grasp the future implications of a new idea, they are opinion leaders in the community and help in persuading others to join; (iii) *Early majority* (34%) consists of people who value the products based on the new idea, but want assurances of performance and quality before adopting; (iv) *Late majority* (34%) includes individuals who are skeptics and want to be sure that the idea is well tested by others before they adopt; (v) *Laggards* (16%) are traditionalists, who often see no value in the new product and prefer the old ways – they may never adopt.

Rogers' model focuses on the role of new ideas as a source of innovation as well as of language and information in communicating the value of new innovations, showing that adoption is a social phenomenon. Despite its popularity however it has become the subject of some constructive criticism since: (i) innovations do not always start as new ideas; (ii) they do not always flow from a source to the community, i.e. from a firm to the consumers; (iii) communication is not necessarily the best mechanism to explain the adoption of new practices; (iv) social inertia is not the only way to explain a specific response to change (Denning & Dunham, 2010). Last but not least, the model assumes that the attributes of a newly created product are well known in advance and could be objectively communicated and evaluated. These limitations have become even more pronounced as the complexity of everyday technological products has significantly increased.

Rogers' classification of the different types of adopters has been further developed into a comprehensive marketing model which is particularly relevant to technological products (Moore, 2001; Wiefels, 2002). The classification could be also incorporated into a consumer creativity model by attributing earlier adopters with a higher degree of creativity and ranking all potential consumers in terms of their personal ability to appreciate the value of the new products. The value of such a model could be found in its ability to predict who the first adopters might be as well as to identify the specific ways of addressing their personal characteristics in enhancing the efficiency of the adoption process. Such a model would, however, have some inherent limitations since it would predominantly rely on a systemic view of the adoption process. Although it may appear to be able of capturing very well the key factors affecting the adoption rate of newly introduced products, these factors are not considered at the micro or personal level. This is a typical problem of segmentation methods which tend to group people in terms of their attributes and not in terms of their specific contextual circumstances. In such approaches consumers are considered as statistical units and not as unique persons who struggle to make their decisions in a particular context.

Rogers' model possesses an explicit time dimension, but its classification of the different types of consumers ends up being static; it misses the dynamics of the complexities and the contingency characterizing the personal encounter between consumers and newly introduced products. This is an important point since the dramatic nature of this encounter is manifested *across* and *within* each of the five adoption groups. But more importantly, the success of product adoption is driven by one of the largest groups in the classification – the Early majority which constitutes approximately a third of all adopters. Thus, there is a need for adoption models which possess a finer granularity in their ability to study consumer creativity and adoption. The focus on communication as the main adoption mechanism oversimplifies the nature of the adoption phenomena by ignoring the personal embodiment aspects of human activities and adoption practices. A new practice is embodied by performing it repeatedly until it becomes natural. This

process involves coordination, engagement, imitation, repetition, education, and eventual modification of the rules of interaction (Denning & Dunham, 2010). It involves personal struggle and endurance. Once a potential consumer has faced the challenges associated with handling the complexity of a given product, it is the synergetic coupling between the consumer and the product that provides the context for conceptualizing consumer creativity as part of the adoption process.

## 4. CONSUMER INNOVATIVENESS

C*onsumer innovativeness* has been defined as the tendency of people to embrace and try out new products as well as buy them more often and quicker than other consumers (Hirunyawipada & Paswan, 2006). The construct has a vital link to the adoption aspects of innovation and could be considered as another adoption framework. According to Roehrich (2004), a predisposition to the consumption of newness manifests itself by the need for stimulation by acquiring novel things, novelty seeking, independence from others' communicated experience, and the need for personal uniqueness. The focus on predisposition is in tune with the definition of innovativeness suggested by Steenkamp, Hofstede and Wedel (1999, p. 56), i.e. *"the predisposition to buy new and different products and brands rather than remain with previous choices and consumption patterns"*.

The *actualized innovativeness* of a consumer encompasses a three-part definition, including: i) the acquisition of new product information, ii) the acquisition of the product itself, and iii) the use of the product which may be the one intended by the designers or not intended by them, depending on the consumer's needs, prior knowledge, understanding, imagining, and reflection (Roehrich, 2004). There are various factors that could affect the degree of actualized innovativeness such as higher income, higher educational level, lower age, more favorable attitudes toward risk, and greater social mobility (Im, Bayus & Mason, 2003). Cultural differences could be identified as an additional factor since consumers from collectivistic cultures are conformity-oriented and concerned with the opinion of others, while consumers from individualistic, masculine cultures are emotionally more detached from the opinion of others and tend to be more innovative (Steenkamp et al., 1999). Thus, the study of individual dispositions and behavior should take into account both micro-level (individual) and macro-level (cultural) antecedents. Consumption of products can be seen as a means of self-expression and *"a way of communicating individual taste, status, aspiration or even protest"* (Izberk-Bilgin, 2010, p. 307), or as a way of conforming to the values and standards of the social environment. At the micro-level, personal values would be central to the consumer's cognitive structure, as they may guide the consumer's selections based on on a specific desirable end state or mode of conduct (Steenkamp et al., 1999). Consumers can be open to change, driven by values such as stimulation, creativity, curiosity, and motivation to challenge the status quo. Culture, i.e. the macro-level, can be regarded at different levels, including both national and

subculture-level, where consumers can be seen as members of certain cultures that will influence their attitudes and behavior, because a culture preserves *"unique patterns of dispositions and behavior through a specific set of shared norms and beliefs"* (Steenkamp et al., 1999, p. 67).

To summarize, some consumers are high on innovativeness, others are low(er): innovativeness is positively correlated with *"optimum stimulation level, independence, extraversion, impulsivity, risk taking, tolerance of ambiguity, inner-directed (versus other-directed) social character, capacity for status, and flexibility"*, but negatively correlated with *"dogmatism, conservatism, need for structure, and need for clarity"* (Steenkamp et al., 1999, p. 56). Interestingly, the degrees of consumer innovativeness presented here could be related to Rogers' (1983) distinction between different types of adopters, together with the critical comments regarding some of its inherent limitations. However, individuals who are high on innovativeness are not necessarily the first to buy or adopt a new product. It is therefore necessary to distinguish between innovativeness and adoption behavior. Furthermore, the dispositions and behaviors of an individual are also affected by the norms and beliefs of the individual's cultural environment (Steenkamp et al., 1999).

The managerial implications of the degrees of consumer innovativeness should not only emphasize the fact that a new product should be designed according to its target group(s) but also offered to the most appropriate first adopters in a way that they could enable further adoption by other (late) adopters. Such emphasis has already been made in some of the most comprehensive technology adoption life cycle frameworks based on Rogers' innovation diffusion model (Wiefels, 2002). More importantly, seeing consumers as co-creative partners on a path to self-development and identity creation should become part of the adoption picture.

## 5. ACTIVITY THEORY AND USER CREATIVITY

The summary of activity theory (AT) provided here is based on a framework that was developed within the context of conceptualizing human activity as it is expressed in the design and use of technology (Kaptelinin & Nardi, 2006). In this framework *activity* is the most fundamental concept and involves not only human activity, but the activity of any object involved in a purposeful interaction of a human subject with the world (Leontiev, 1978). Activities have a primacy over the subject and the object and should be considered as the way of properly studying both subjects and objects (Kaptelinin & Nardi, 2006). On the other hand, however, according to AT scholars, the notion of activity cannot be extended to all types of interactions. For them, any activity is bound to a subject and not every entity is a subject. Subjects have needs that can be met only by being and acting in the world. Consumer electronics products, for example, do not have needs in the same way we have and cannot be considered subjects. The interaction between the subject and the object therefore is considered to be an *asymmetrical* relationship between two components of a larger system (Kaptelinin & Nardi, 2006).

For AT the properties (qualities, attributes, or characteristics) of the subject and the object do not exist before and beyond activities. Not only do these properties manifest themselves in various circumstances; they actually emerge and truly exist only in activities. Activities are also considered as a source of development of both subjects and objects (Kaptelinin & Nardi, 2006). For example, the activities of a subject may cause substantial changes in the subject's properties (home owners' skills of using air conditioning systems improve over time in a way that minimizes energy consumption and maximizes the home comfort). An important element of every activity system is that its activities are constantly developing as a result of contradictions, tensions, and instability. Examining the tensions and contradictions that exist in an activity system provides a lens to understanding (i) the development and change taking place within activities, (ii) the need for creative efforts of both subjects and communities in trying to deal with the tensions and contradictions, and (iii) the dynamic nature of the circumstances enacting the emergence of the specific attributes of both human subjects and non-human objects (Korpela, Soriyan & Olufokunbi, 2001). This is why, for AT, defining activities in a static way and merely through their components should be considered as inadequate.

The way a specific combination of product attributes is manifested depends critically on the specific circumstances of the situation at hand. In this way two different consumers may evolve an original technological product into completely different objects depending on the degree of their actual involvement and creative efforts in actively appreciating its use value. One could actually speak of this evolution as a process of "product co-creation" since the evolution of the perception of a particular product makes sense only within the specific context of a particular consumer. The contingency of the outcomes of human-technology interaction could explain how the interaction of two different consumers with a particular new product may result in completely opposite adoption decisions because of the different personal backgrounds, skills, preferences, and former experience in interacting with technology. Consumers are not condemned to adopt new products; they have a free will and personal intentions which make them unique in the world. The difference in the outcomes of the adoption process could be related to the classifications of consumers suggested by the diffusion of innovation and consumer innovativeness frameworks. For example, they could be used to explain why some of the more innovative consumers might be in a better position to become early adopters of specific new products. AT, however, has the advantage of operating at a more fundamental level that is able to take into account the dynamics of human-technology interaction as well as the emergent properties of both subjects and objects. This ability allows conceptualizing the emergent nature of the novelty and usefulness of new technological products.

The term *emergence* is used here in order to emphasize three important points. *First*, it is to take into account the dynamic nature of the gap or the epistemological distance between the total value built in a product and the value perceived by a specific potential consumer. It is the per-

ceived value that could transform a potential consumer into a real user and to a great extent this transformation is the result of this consumer's own activities and efforts. One can say therefore that the consumer's own activities transform him or her from a potential into a real consumer. This process can be seen not only as product co-creation but also as customer co- or self-creation. *Second*, it is to take into account the developmental aspects of the interaction between technologically new products and their potential consumers. Potential consumers do not initially possess the knowledge and the skills that would allow them to enjoy the full benefits of a new product; they emerge within the context of the dialogical interaction between the consumer and the product as well as within the context of the relational activities involving all relevant actors through the mediation of other tools that could help the adoption process. *Third*, it is to emphasize the fact that consumers may choose to use a new product by inventing new ways of use that was not intended by its designers. This possibility introduces a special type of contingency which provides an important dimension of consumer creativity. It indicates the need to take into account the intentionality of users and illustrates another potential gap – between the intentions of designers and the intentions of users. This gap is an expression of another aspect of asymmetry which is not usually emphasized: on the one hand, there could be a change of the source of agency from the designer to the user; on the other hand, there might be contradictory intentions between designers and users. The benefit of AT with its emphasis on intentionality, asymmetry, and development is that it can frame discussions of users' continuing frustrations:

*We do not have to go far to find users who are stymied in realizing their intentions because the technologies offered them are neither usable nor useful. And users often feel daunted by the rapid pace of technological change, which makes it ever more difficult to become skilled with a given technology. (Kaptelinin & Nardi, 2006, p. 12)*

AT's ability to deal with user frustrations and resistance provides an important link to creativity research. AT distinguishes between the processes of internalization and externalization which are considered to operate continuously at every level of human activity. *Internalization* is related to the reproduction of culture (Engeström & Miettinen, 1999) or to the internal reasoning leading to the reconstruction of external objects. For example, a new user observes a mobile phone being used by others and "re-constructs" it personally by learning how to use it (Xu, 2007). *Externalization* is the process of the creation of new artifacts (Engeström, & Miettinen, 1999). Human beings internalize existing standards and rules of activity by appropriating the intended use value of newly created products but also externalize them by inventing new ways of use.

Studies using AT to investigate the adoption of technology in a dynamic user environment have developed and validated the concept of *user readiness* – how prepared and willing an individual is to interact with a technological product or system that was made available to him or her for a certain purpose (Sun & Poole,

2010). The concept could be related to the characteristics that were already discussed – the degrees of consumer innovativeness or the adopter categories in the innovation diffusion model. In the innovation diffusion model technology use characteristics such as perceived ease-of-use and perceived usefulness are usually conceptualized as part of its objective properties. From an AT perspective, however, the user's perceptions related to a particular technological product and its attributes are not considered to be objective in the same way for all users but rather reflect their actual personal experiences with it in their very specific personal contexts (Sun, 2012). In addition, the user-related and technology-related factors are just one part of the adoption equation. The third factor – task situations or context – could be also associated with the concept of user creativity. In AT creativity is understood as "imaginative activity directed toward an object in which an original product emerges" (Kaptelinin & Nardi, 2006, p. 208). This definition appears to have been developed within the context of design. It applies however equally to the user context. The specific user characteristics and technology use circumstances of every specific user should be considered within the context of the specific task situation since they jointly enable the emergence of specific product value attributes which are user dependent, i.e., in a certain way, every user creates a uniquely specific product for his or her personal use. This is how every specific user could be considered as co-creator of the ultimate value in use which is the result of his or her (co-)creative efforts. In addition, AT associates the concept of creativity with the concepts of reflexivity and resistance. *Reflexivity* refers to user's reflections leading to a change in practice. *Resistance* refers to the opposition to a technology, or the opposition to a practice associated with a technology, that is perceived as unacceptable. AT is therefore able to

*... account for the varied responses to the deployment of a technology: a technology may be embraced, rejected, or altered by its users to better meet their needs as they reflect on its use. Finally, the theory must acknowledge that people may resist technology; having reflected on its uses and consequences, the dialogue may even become hostile. (Kaptelinin & Nardi, 2006, p. 208)*

## 6. INSIGHTS FROM CREATIVITY RESEARCH

### 6.1. Novelty and Usefulness

Existing literature widely acknowledges that a creative outcome of e.g. new product development should be deemed as both *novel* and *useful* (e.g., Amabile, 1997; George & Zhou, 2001). Novelty is often labeled as *originality* (Glaveanu, 2011); usefulness could alternatively be labeled as *effectiveness, utility,* or *appropriateness*, having to do with how a product helps a user to achieve something. However, a within-firm definition of usefulness would mainly focus on an estimated value in terms of the potential profitability from releasing a new product. George (2007) suggests taking a closer look at "what is meant by 'useful'" (p. 4), e.g., to whom is it useful? Another important question would refer to the spe-

cific nature of the usefulness construct – is it an objective property of the product or a quality that emerges within the context of the interaction between the product and the consumer. One of the points we would like to emphasize here is the need of taking into account the emerging nature of usefulness, a point that would make it depend on consumers' prior knowledge, creative efforts, and evolving skills, and acknowledging that a firm's profitability is contingent on the perceived and actual usefulness of its products.

Creativity research indicates that there is a difference between creativity and problem solving (Runco, 2004), so "in order for problem solving to be creative, generated solutions must be novel" (George, 2007, p. 442). At the same time Boden (1994) points out that an idea which is fundamentally novel to a specific person is still of great significance even though it may not necessarily be new to the world. Kaufman and Beghetto (2009) suggest a so-called Four C model of creativity which can be seen as a kind of taxonomy indicating four different types of creativity: i) *Big-C*, which is eminent creativity of e.g. artists, and where both novelty and usefulness are automatically present, ii) *Pro-C*, i.e. professional creativity where novelty and usefulness are criteria for evaluating the creative outcomes of e.g. product development, iii) *Little-C*, meaning everyday creativity or readily recognizable expressions of creativity, and iv) *Mini-C*, which can be seen as the creative processes involved in the construction of personal knowledge and understanding. Consumer creativity can be classified as Little-C, e.g. when the consumer makes physical alterations of a product to make it suit needs and wishes, and Mini-C, as an expression of creativity in connection with the consumer's information processing and idea generation towards product adoption or rejection.

To sum up, we suggest that the process of assigning meaning and imagining the potential use and fitness of novel products, before deciding whether or not to buy them, could be conceptualized as an expression of consumer creativity. After buying the product, the creative process continues, depending on whether or not the consumer conforms to the intended use of the product, or discovers new ways of use by assigning new meanings to its emerging attributes. Both novelty and usefulness could be related to the existing adoption frameworks. As an example, the degree of novelty is important for Innovators and Early adopters (Rogers, 1983) to take an interest in a new product. On the other hand, the usefulness or the desired fit of a product to a consumer depend on the degree of his or her innovativeness.

### 6.2. Flow or Struggle

When interacting with a new product, consumers may sometimes experience an intuitive and inspiring process but at other times go through a frustrating and discontinuous experience when the challenges of handling the product appear to be overwhelming. Thus, we suggest a dichotomous view of the process of product adoption – or rather, two poles and the continuum in between. With a right balance of skills and challenges, consumers would experience a state of *flow* (Csikszentmihalyi, 1996), independently of whether the product is accepted as it is or there is a wish to alter it

for a better fit. But if the challenges exceed qualifications, a specific threshold level exists beyond which a state of consumer *struggle* is being triggered. The product will either be rejected or an effort will have to be made to reimagine and embody its modified use. Thus, flow and struggle can be regarded as two ends of a single scale where both states will potentially require creative thinking and actions. Flow and struggle have an impact on what happens before and after purchasing the product. The state of flow will likely be a positive experience reinforcing the sense of good design (Norman, 2004) that may also include room for alteration. It may lead to a feeling of trust and loyalty that increases the likelihood of advocacy towards other, potential consumers. On the other hand, if the adoption process involves struggle, it may lead to post-purchase dissonance (Kotler, 2003) caused by the difference between anticipated and actualized experience, as well as to the communication of negative conclusions to other, potential consumers.

The process of interacting with a new product and how consumer creativity comes into play during this process can be conceptualized by zooming into the consumer creativity context which allows the identification of three distinct phases.

*First*, a consumer gets interested in a new product based on its immediately perceived value which leads to a first assignment of meaning to "the new thing." A meaning-making process would include: (i) an attempt to fit the product into existing categories, i.e. whether it is an archetype or not; (ii) decoding of the meanings inscribed by the designers, i.e. the intended value of the product; (iii) assigning of new symbolic meanings to the product dependent on its first appeal; and (iv) evaluation of the potential fit of the product into an intended context, i.e. the consumer's environment. Thus, the consumer always starts by making an immediate evaluation based on the initial appeal of the product and questions such as "will it fit me" and "will it fit into my world". Already in this early phase of the adoption process, a state of flow or struggle actualizes itself, and the preliminary perceived value of a new product will depend on the outlined meaning-making process.

*Second*, after (or if) the consumer takes an interest in the new product, an interaction begins. The consumer starts engaging with the product in an attempt to uncover its attributes and use value based on whether: (i) it is easy or at least possible to get the product to work, i.e. an assessment of its functionality; (ii) the product can be used as intended by the designer or there is a need for the consumer's imagination to come up with alternative approaches or ways of use; and (iii) it will (still) fit the intended context. During this consumer-product interaction it becomes apparent whether the new product supports the personal needs and wishes of the consumer, and also if it can be approached intuitively or quite some imagination is required. The outcome of this process depends also on the extent to which the product can be used according to the consumer's inherent abilities (e.g. left or right handed), cultural background (e.g. reading from left to right), upbringing, experience, and education/training (previously acquired knowledge and skills).

*Third*, in the case where the consumer decides to buy the product, brings it home and starts using it in an everyday context,

a need for altering or even disposing of the product may appear if it does not immediately fit in.

The high degree of complexity of many new technological products quite often makes consumers struggle during the adoption process. A state of flow is possible only if consumers already have the right level of relevant qualifications or if they gradually acquire the relevant knowledge and skills during the process of adoption. If consumers give up along the way, it may be because they cannot sufficiently imagine how to deal with the new product – or it may be because it does not live up to their expectations.

The adoption process should not be regarded as solely individualistic; consumers engage with others, i.e. relatives, friends, colleagues, sales personnel, etc., and build also on their associations and knowledge. Thus, there is a collective or relational aspect of adoption as well as consumer creativity since the involvement and influence of others can impact the degree of flow or struggle during the adoption process.

Using the discussion above we could suggest that: (i) balancing of novelty and usefulness is quite vital to successful commercialization, because a product may be too unfamiliar to the intended recipients to the extent that its usefulness cannot sufficiently compensate its novelty; ii) consumer creativity is a prerequisite for innovation; (iii) the creative process goes on even after market introduction of a new product, moving into the after-purchase period; iv) creators are both the ones designing and delivering a creative outcome and the ones appropriating its total or modified (co-created) value; (v) consumer creativity should be considered as an ingredient of both states of flow and struggle; (v) the process of product adoption can be influenced by others than the individual consumer.

The concepts of flow and struggle open the opportunity for looking at consumer creativity in new and unexpected ways apart of its natural association with human intentions by focusing on its contingent, dialogical, and relational aspects. It helps in repositioning the creativity concept by focusing on the specificity of human activities and practices aiming at the appropriation of new products. Such change of perspective should be also associated with a methodological shift building on the principles of more sophisticated activity-based approaches such as actor-network theory.

## 7. LOOKING FOR INSIGHTS FROM ACTOR-NETWORK THEORY

This section will focus on looking for insights from actor-network theory (ANT) in conceptualizing consumer creativity as an important factor in technological product adoption. We provide an analysis that refers back to activity theory in a way that could emphasize the advantages of ANT. The analysis does not aim at providing a systematic comparison of the two approaches but rather employing some of their key insights and points of difference in elucidating the concept of creativity within the context of technology adoption.

It has been already pointed out that ANT and AT have in common several methodological viewpoints (Miettinen, 1999; Kaptelinin & Nardi, 2006). For example, they both avoid the use of mono-causal

explanations and attempt to transcend the dualism between subject and object, nature and society (Miettinen, 1999). They both underline the relevance of agency for material artifacts and emphasize the independent activity of objects. Both theories focus on studying the concrete networks of actors (instead of the interrelations between macro- and micro-scale phenomena) by stressing that the resources for doing and acting are distributed and redistributed among human beings, artifacts, and the environment. However, the two approaches have a different disciplinary and philosophical background which results into some key differences. For example, they have a different focus in their interpretation of the concept of mediation – ANT emphasizes a *symmetrical* approach to the interaction between human actors and non-human objects while AT has adopted an *asymmetrical* attitude leading to a privileged role for human intentionality (Kaptelinin & Nardi, 2006). The unit of analysis of AT is the activity itself, while ANT has focused on tracing the actors and following their attempt to transform existing links as they seek to recreate their own context, thus raising the question of the emergence of both new actors and new objects as fundamental issues in the analysis (Miettinen, 1999).

### 7.1. The Symmetry Principle

John Law (2007) has referred to ANT as:

*a set of tools, sensibilities and methods of analysis that treat everything in the social and natural worlds as a continuously generated effect of the webs of relations within which they are located. It assumes that nothing has reality or form outside the enactment of those relations. (p. 595)*

ANT analyzes how all things - natural, conceptual, textual, social, or technical, could be more adequately considered as equally present and symmetrically relevant in the web of relations defining the reality around us. The *symmetry principle* between humans and non-human artifacts promoted by ANT scholars has become the subject of multiple discussions, critics and misunderstandings. It should be considered as a reaction against any *a priori* assumptions about the sources and the nature of agency within any specific context. For ANT scholars it is particularly important to annihilate any *a priori* difference between social and non-social factors or agents. In every specific situation the identification of all relevant actors is continuously and dynamically performed and the agencies are ceaselessly being debated. Non-human objects are considered to be autonomous and active. The ultimate conclusion is that "the type of actors at work should be increased" (Latour, 2005, p. 64) and that objects should be made "participants in the course of action" (p. 70). This is one of the key aspects of the ANT symmetry principle – objects should be included as equally present and equally relevant in the course of action; they have equal rights with respect to the relevance of the subjects.

Including non-human objects in the course of action shifts the focus away from the identity and the nature of the actors to the interactions, the associations, and the relationships between them. At the same time, ANT is very subtle about the nature of the symmetry it promotes since it admits

the existence of two sets of inverse relationships. The first one reveals *the strange symmetry* among all actors since "the more active the actors, the less they differ from one another" (Strum & Latour, 1987, p. 785). The second set of relationships reveals *a new asymmetry* since "the more actors are seen to be equal, in principle, the more the *practical* differences between them become apparent in the means available to them to achieve society." This is a point that has not been paid enough attention by critics (see for example Kaptelinin & Nardi, 2006, p. 202). It just illustrates the kind of misunderstandings that could emerge in social science studies without some preliminary agreement about the ontological grounding of the sources of personal agency as well as without a proper definition of personality in a way that it could embrace non-human or composite agents. ANT appears to make a greater contribution in this direction than AT (Kapriev, Roussel & Tchalakov, 2014).

### 7.2. Actants as Positions within Networks of Relations

For ANT, the social:

*... doesn't designate a domain of reality or some particular item, but rather is the name of a movement, a displacement, a transformation, a translation, an enrollment. It is an association between entities which are in no way recognizable as being social in the ordinary manner, except during the brief moment when they are reshuffled together. (Latour, 2005, p. 65)*

*The main advantage of dissolving the notion of social force and replacing it either by short-lived interactions or by new associations is that it's now possible to distinguish in the composite notion of society what pertains to its durability and what pertains to its substance. (Latour, 2005, p. 66)*

The distinction between durability and substance allows to "un-substantiate" all entities and subjects in order to focus on those aspects of agency that could lead to the emergence of durable relationships. This shift was made possible by the introduction of the concept of actant. An actant

*... is any agent, collective or individual, that can associate or disassociate with other agents. Actants enter into networked associations, which in turn define them, name them, and provide them with substance, action, intention, and subjectivity. In other words, actants are considered foundationally indeterminate, with no a priori substance or essence, and it is via the networks in which they associate that actants derive their nature. (Crawford, 2004, p. 1)*

An actant, therefore,

*... is not so much a person or an object as it is a position within a network of relations. That is why conjunctions and disjunctions transform the involved actants and provide them with different subjective statuses with respect to the actions in question. (Bartels & Bencherki, 2013, p. 32)*

The introduction of actants helps emphasizing the fact that nothing lies outside the network of relations and that there is no difference in the ability of technology, humans, animals, or other non-humans to

act leading to change. For example, in a heavy traffic mountain road a stone on the road has the potential to entirely change human lives and not just to disturb the traffic flow. A consumer in a user newsgroup of a specific product may emerge in a new role as a product marketer – it is still the same actor but emerging in a completely new role as a new actant having the ability to influence the purchase decisions of many other potential consumers.

ANT's sophisticated understating of activity and agency has some similarities with the concept of activity in AT. We can see how both theories elucidate a notion of agency which avoids the need of simplistic causal explanations, transcends the dualism between subject and object, and emphasizes the independent activity of objects. Action is not understood as springing from the intentional will or the desire of an already-constituted subject, but rather as the effect of the hybrid association of entities of various ontologies. In ANT's version of action, humans and non-humans coalesce to achieve a kind of delocalized and distributed synergetic interaction that cannot be reduced to the intention or design of either party (Bartels & Bencherki, 2013; Latour, 2005).

They both focus on the concreteness of the networks of actors by stressing that the resources for doing and acting are distributed and redistributed among human beings and non-human objects. ANT however seems to go far beyond AT by following the actors themselves in deciding what the nature and relevance of the agency or activity is.

*When a force manipulates another, it does not mean that it is a cause generating effects; it can also be an occasion for other things to start acting. ... [T]he interesting question at this point is not to decide who is acting and how but to shift from a certainty about action to an uncertainty about action. ... The only important differences to keep for now are the following: Which agencies are invoked? Which figurations are they endowed with? Through which mode of action are they engaged? (Latour, 2005, p. 60)*

### 7.3. Intermediaries and Mediators

The difference between intermediaries and mediators is another important distinction in ANT (Latour, 2005, p. 37). *Intermediaries* are entities which do not make any difference to a given state of affairs to the extent that they can be ignored; they simply transport the force of some other entity more or less without transformation and by so doing become invisible. *Mediators* are entities or actants which enhance or reduce differences. They are the ones that potentially lead to change, thus becoming the main object of study since their outputs cannot be predicted by looking at their inputs. The source of change therefore lies in the unpredictability of the mediators. Imagine, for example, a frustrated consumer who takes action to initiate a Facebook campaign against a specific product or company attitude so that it leads to a change in the way it interacts with its customers (an example of a similar scenario can be found on Youtube.com after searching for "United Breaks Guitars"). In these examples both Facebook/Youtube and the specific consumers initiating the action play a mediating

role. The consumers take on a new role by undertaking an action that is not typical of a regular consumer. Facebook and Youtube become the source of corporate change as a public communication platform through the power of their popularity, accessibility, and openness. In a way, individual consumers become powerful by means of Facebook/Youtube communication power. Thus, the value of ANT's insights "does not come from choosing some figuration over some other ones in the place of the actors, but from the increase, in the accounts, of the relative share of mediators over intermediaries." (Latour, 2005, p. 61)

### 7.4. Actor-Network Theory and Creativity

The practical insights of ANT have been elaborated within the context of technological product adoption. The model of technology adoption inspired by ANT has been known as Innovation Translation (Tatnall, 2011; Latour, 1986, 1996; Law & Callon, 1988). One of the key starting points of this model is the concept that e.g. new products are very often not adopted in their original entirety but only after "translation" into a form that is more appropriate for use by the potential adopter. According to Callon, Courtial, Turner & Bauin (1983) translation involves all the strategies through which an actor identifies other actors and arranges them in relation to each other. Latour (1986), on the other hand, suggests that in an innovation translation model the movement of e.g. a new product through time and space is in the hands of actors, each of whom may react to it in different ways: they may modify it, deflect it, betray it, add to it, appropriate it, or let it drop. Thus, the adoption of a new product comes as a consequence of the actions of everyone in the chain of actors who has anything to do with it. Latour (1986) points out that each of the actors shape the new product in their own way, but if no one takes up the product then its adoption simply ceases. In such a way the immediate acceptance of a new product without any changes is a kind of exception requiring explanation. New products do not exist as mere objects waiting to be discovered; each actor translates and contributes some resources to the final result. A translation model requires the focus to be on understanding how actor-networks are created, strengthened, and weakened, rather than on cause and effect.

In addition to translation, ANT has other relevant constructs that have been used in discovering new ways of analyzing technology adoption. Examples of such ANT concepts are inscription, framing, and stabilization (Faraj, Kwon & Watts, 2004). *Inscription* is a process by which actors form values towards the technology or the extent to which the innovators determine or formulate what the technology or its functionalities are or should be. Inscription is often influenced by people's beliefs, previous patterns of technology use, and expectations over what the technology is about and can do (Callon, 1991). *Framing* refers to situations when actors do not only inscribe beliefs, interests, and values regarding technology, but also end up with values that may be dissimilar and detached from one another (Orlikowski & Gash, 1994). Such situations open the possibility for new products to undergo alteration or change because they either require ad-

vanced features or improvement upon their existing features, especially when adopted by advanced users (lead users, Innovators, Early adopters - i.e. users with a high degree of innovativeness). This often allows new or different ways of using these technologies to emerge. Alternatively, such technologies may not be successful if users do not accept the way they are designed and used (Faraj et al., 2004). *Stabilization* happens when all technology related problems have been solved (Bijker, Hughes & Pinch, 1989). Stabilization of technology does not mean that the new product is not still adaptable; it might change or get adjusted over time reaching a closure by the redefinition of the initial problems which may lead to inscription again.

The question now is how ANT would help in conceptualizing consumer creativity as an important factor in the adoption of technological products. It should be pointed out that this is an emerging area of research with a great potential for technology innovation management and technology adoption studies. The starting point in such endeavour should be the focus on exploring the relevance of ANT's unique features – the principle of symmetry in the way it treats non-human objects with their ability to circumscribe, stabilize, and translate interactions, and the masterful way it handles the contingency and the emergence of new relevant actants. Latour and Woolgar (1979) emphasize that the act of creation is not a solitary endeavor and that the invention is not the product of the inventor, but rather an outcome of the stabilization of the relationships between the interests of many actants, humans, and non-humans. The key concept here is that of translation since "the invention works because it is able to translate the wants of those actants" (Bartels & Bencherki, 2013, p. 30). According to Bartels and Bencherki (2013) such understanding offers a radically different way of studying creativity which is based on the notion of configuration:

*ANT does not locate action within an individual – be it a human or not. Action is never the product of a singular will, but rather the outcome of the relationship between several entities – the actor network. ... Making new things possible is, hence, not only the effort of a mind that strives to have new ideas but also the outcome of the ways in which we interact with other people and with the artifacts that surround us. (p. 32)*

The value of ANT for creativity research lies in the fact that its specific approach to studying newly created products applies to both their designers and their potential adopters. This approach opens the opportunity to position creativity not only in the individual minds and practices of designers but to displace it in the effectuation of the consumer practices including the struggles and the efforts through which particular relationships emerge and through which a consumer is constituted as such. The association of these struggles and creative efforts to the emergence of new products is just one of the interesting aspects here (this aspect is well covered by AT). What is really new and even more interesting is how the consumer's struggles and efforts lead to the invention of new configurations (including new actants and new relationships) which make the adoption possible.

Such an understanding of creativity reminds about the definition of creation suggested by Deleuze (1998) – the act of making of configurations. From this perspective, studying creativity can be only understood as the study of the way new relations or connections are established between different elements in order to make up new things, beings or bodies (Bartels & Bencherki, 2013). Thus, to be a creative consumer is not an optional activity but a necessity because the configurations that a consumer builds entangle and constitute him or her as a subject (Deleuze, 1998). This is an aspect that is fundamental for our understanding of consumer creativity – consumers are forced to be creative and their creativity is manifested within the context of the dialogical co-creation of the use value of the technological products they adopt. The study of creativity, therefore, should not focus only on following the actors hoping for a creative moment to emerge or on the systematic observation of such creative moments when people come up with new ideas, for example, new products. It should rather focus on "the study of ongoing practices by which participants continuously establish relations with each other and with artifacts and thus create new configurations and constitute themselves as acting subjects" (Bartels & Bencherki, 2013, p. 29).

Bartels and Bencherki (2013) explicitly relate ANT to creativity research suggesting a number of directions for future research. One of their suggestions is to focus on studying banal or everyday creativity which does not suppose that creativity is limited to specific people with rare qualities such as artists or entrepreneurs, but define it as the establishment of relations that allow for the emergence of new creative activities for the rest of us. Such a research direction would be an opportunity to explore the "multitude of small revolutions that are occurring on a daily basis and that change both the way we look at the world and the way in which we interact with it" (Bartels & Bencherki, 2013, p. 34).

## 8. CONCLUSION

In this paper we focused on four different approaches that could help in conceptualizing consumer creativity as a factor in the adoption of new technological products. The diffusion of innovation and consumer innovativeness approaches provide consumer classifications that may help the identification of who has a greater chance to be the first to adopt as well as the preliminary estimation of the overall adoption rate. The consumer innovativeness approach focuses on individual as well as cultural differences. The innovation diffusion model encompasses all kinds of consumers, and its focus on both consumer characteristics and the temporal dynamic of consumers' adoption preferences makes it a worthy candidate to the macro analysis of the developmental aspects of product adoption. However, a predominant focus on innovatively more advanced consumers such as Innovators and Early adopters (Rogers, 1983) could become problematic since they represent only a small percent of the total number of potential consumers. The AT and ANT approaches both possess a great potential in terms of the resources that could be used to elaborate the concept of consumer creativity. In many cases the benefits of

using them appear to be complementary in terms of their explanatory power. They both promote an anti-realistic perspective on new product adoption. The perspective is based on the understanding that a newly created product should not be considered as a thing endowed with objectively existing and testable properties but rather as something which acquires its value attributes only within the context of the interaction with all potential actors enabling the adoption process. In this sense, the value attributes of a product may acquire different meanings depending on who the ultimate adopter is and how exactly his or her interaction with the product is being contextualized. The anti-realistic perspective on product adoption has a double emphasis: *first*, it shifts the traditional focus of innovators from product design, discussion of new product features, and product innovation to the actual effectuation of the product value attributes which could happen only on the side of the ultimate recipients of newly created products; *second*, it emphasizes the contextual aspects of new product adoption by focusing on the multiple interactions between all relevant actors (both human and non-human) involved in the adoption process. Both points suggest an understanding of innovation as the adoption of a new practice by a community in which the main focus is on mobilizing people to adopt the new practice (Denning & Dunham, 2010).

The article articulates the need for the emergence of a new paradigm conceptualizing consumers' dialogical struggle and creative efforts in the adoption of new technological products as part of consumer creativity. The emergence of the new paradigm helps in uncovering new dimensions of creativity that are of practical relevance to designers, innovators, entrepreneurs, and the rest of us – consumers who represent the final and ultimate destination of the newly created products. The new paradigm considers the recipients of new products as active co-creators of the value built in those products. It implies a research framework emphasizing two different methodological points. *First*, it offers a new way of looking into innovation practices by focusing on the consequences of firm's decisions on the willingness of consumers to adopt a product. *Second*, it questions the prerequisites of the historical focus on the design process, thus concealing many collateral design-relevant phenomena emerging in the use and adoption of new products. Without any doubt, the development of such a framework suggests the adoption of a multi-disciplinary perspective including research insights from the fields of design theory and practice, creativity research, technology innovation and adoption, the psychology of personhood, philosophy of action, and the sociology of human activity. With this paper, we believe to have taken one step further in bringing together some of their distinctive insights and in pointing out the potential of actor-network theory as a tool for designing better technological product adoption and, thus, fostering innovation.

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