

Abstract

Co-creation with consumers is increasingly attracting the interest of Companies, as a rich source of innovation and value creation. However, the drivers of consumer's interest toward co-creation and how they change among different segments are still unclear. This article explores these questions, by investigating the triggers of consumer's interest in terms of (i) product-related drivers, namely product industry, product knowledge and prior co-creation experience, and (ii) personal motivations and inhibitors. Further, the work investigates the way personality traits of the consumer affect perceived motivations and inhibitors and co-creation tools preference. Findings from 509 participants in a survey study reveal that both personal and product-related drivers affect the interest toward co-creation projects: monetary and personal benefits have a positive impact on co-creation interest as well as prior co-creation experience and high product knowledge. Further, motivations, inhibitors and co-creation tools preferences vary according to the consumer typology. Hence, this work underlines the importance of delivering tangible benefits to attract consumers in co-creation projects and to design the activity according to the consumer typology the firm wants to attract.

Introduction

The involvement of consumers, as not merely passive audience but as co-inventors and co-developers with firms, is an emerging phenomenon in the market (Prahalad & Ramaswamy, 2004b) and firms need to know how to and which consumers involve in this conjoint process. The more firms know about the needs of consumers, the more they can involve them in firm activities, the more they can offer sustainable goods and services which would be easier embraced by the market. The value offer, once entirely developed by the firm, is going to be increasingly defined by the experience of customers and their interactions with Companies (Prahalad & Ramaswamy, 2004b). This implies that firms need to know which consumers are more interested, but also more efficient and effective, in co-creation activities. In other words, which consumers can provide most value to the firm. Different subjects may be interested in co-creation activities: from consumers with very knowledgeable background within a specific industry theme (von Hippel, 2005, 2007), to ordinary users trying to satisfy a need for specific products, passing through loyal customers who have strong relationships with a company and like to help in product development (Füller, Matzler, & Hoppe, 2008). Some of these consumers seem to have a tendency toward co-creation activities more than others: lead users, innovators, emergent nature, market mavens, technology optimistic consumers shown a greater inclination toward innovation and co-creation participation than ordinary users (Hoyer, Chandy, Dorotic, Krafft, & Singh, 2010). These segments provide better outcomes in terms of innovative ideas, product development and even innovation diffusion among other consumers. Thus, their targeting can results in a source of opportunities and efficiency for Companies. A wrong choice can, indeed, be detrimental and potentially lead to Company image and fame decline, as some unsuccessful cases of co-creation shown, such as the complaints and dissatisfaction generated by the “SPAR bag design contest” (Gebauer, Füller,

& Pezzeri, 2013) or by the Henkel packaging design contest, resulted in negative ideas gathering. Thus, it seems desirable for firms to attract consumer segments able to provide real value in the co-creation process. How can firms involve these consumers?

Prior research have individuated some universal motivations and inhibitors to co-creation participation. Some individuals participate in the co-creation activity to satisfy their own internal needs (Heidenreich & Handrich, 2015) such as lead users who invest time and energy in co-creation in order to benefit from the maximum usage satisfaction in future (Schuhmacher & Kuester, 2012; von Hippel, 1986). Some others engage in co-creation activities due to external benefits they might get, as those consumers who seek monetary rewards or fame (Füller, 2010). On the other hand, there are some inhibitors that need to be minimized, such as the cost of time spent in learning, logistic costs but even the psychological cost of project failure or the risk of idea appropriation by other consumers or by the firm. However, even if it has been proved that an accurate combination of these motivators and a proper reduction of inhibitors would stimulate consumers to involve in co-creation (Hoyer et al., 2010), one “design” does not fit all consumers. A lack of research is evident on how motivations and constraints differ among these segments of consumers and which ones, if any, are more critical in fire up interest in consumers. A clear understanding of these relationships is a clear need for firms, in order to develop successful and well-tailored co-creation activities. Thus, the first aim of our research is to investigate the impact of different personality traits, characterizing critical consumer segments, on motivations and inhibitors to co-create.

Secondly, different segments can have different preferences toward co-creation tools. Some tools, such as workshops (von Hippel, 2005, 2007) need more time and energy, some are technically complex and require people to own the related technical knowledge for performing the tasks (Aarikka-Stenroos & Jaakkola, 2012), such as ideation contests (Piller

& Walcher, 2006). Firms need to provide an attractive environment to enable easy and efficient co-creation participation by consumers, thus the understanding of the right co-creation tool to provide is critical for the success of such initiatives. Prior research did not analyze this topic, thus our second aim is to shed lights on the relationships between consumer personality traits and co-creation tool preferences.

Finally, product category matters, especially for co-creators. Consumers co-create in product categories in which they feel expert and for brands they trust (Fuller et al., 2011). Nonetheless, strong brands could disincentive co-creation, due to the loss of psychological and social benefits embedded in the brand own personality (Etgar, 2008). However, consumers could also be interested in co-creation activities for products of the same category, independently from the brand (Fuller et al., 2011). For instance, cars lovers are more interested in the development of car parts than other products. Co-creation is more suitable in product categories in which differentiation plays an important role and represents a source of value for consumers (Etgar, 2008). For some products, such as software, co-creation is a synonym of high quality because consumers often possess high technical skills and are experts of the specific product category (Füller, Mühlbacher, Matzler, & Jawecki, 2009). The importance of the product category is affected by the levels of perceived empowerment and enjoyment as well (Füller et al., 2009), which are the determinants of consumers participation in new product development projects and vary according to the participants' product involvement and creativity. Prior research focuses on a specific industry or product category, such as sports industry (Fredberg & Piller, 2011) or computer games (Prugl & Schreier, 2006). However, with the growth of the phenomenon across industries, there is a need to understand how different domains affect the consumer involvement. Prior research did not investigate the impact of product related drivers on co-creation interest. Hence, our third aim

is to assess if product specific factors, namely product typology, product specific knowledge and prior co-creation affect consumer interest in co-creation.

Several implications could be derived by this research. From an academic point of view, we deepen the understanding of the factors that affect consumer interest, by analyzing the motivators, inhibitors and preferred tools of different consumers segments. Above personality related factors we investigate product related factors as well, thus providing a comprehensive view of the drivers of co-creation interest and the relationships among them. From a managerial point of view, this research can help marketing and product managers in designing the co-creation tools that best suit for their industry and their targeted users and to identify and shape motivators and obstacles to participate in co-creation activities. Further, we give hints of the impact of product related levers on the overall interest in co-creation.

The article is organized as follow: the following section analyzes prior research on the topic and presents our hypotheses as well as the research model to be investigated; next methodology and results are presented; the paper follows with a discussion of research and managerial implications. Finally, it presents conclusions and give suggestions for future research.

Literature review and hypotheses development

Motivations

Diverse types of motivations and inhibitors stimulate or hinder consumers to participate in co-creation activities. A combination of different motivations is needed to stimulate consumers for participating in co-creation activities (Füller, 2010; Hoyer et al., 2010).

Learning motivations. Learning motivations refer to the extent a consumer expects to learn about products or services and their underlying technology, by participating in co-creation

activities (Blumler & Katz, 1974; Nambisan & Baron, 2007). The knowledge generated by consumers and by the co-creation process itself could be shared among participants and with the firm. The exchange of information, the deriving skills improvement and new solutions to unanswered topics are all example of learning (Füller, 2010; Nambisan & Baron, 2007; Wasko & Faraj, 2000). Thus, we assume that learning motivations are a relevant trigger of interest in co-creation:

HP1.1: Learning motivations have a positive influence on interest to co-create

Social motivations. As exchange of knowledge, also the development of social relationships occurs between the community of participants and the firm during co-creation activities, enabling strengthening ties between firm and consumers or among consumers and the creation of personal and social networks (Hoyer et al., 2010; Nambisan & Baron, 2007). Social benefits, such as strong social identity and sense of belongingness to the community can strengthen participation in co-creation activities (Muniz & O’guinn, 2001; Nambisan & Baron, 2007). Thus:

HP1.2: Social motivations have a positive influence on interest to co-create

Personal motivations. Consumer can derive personal benefits such as fame, reputation in network of participants, status and authority while participating in co-creation activities. Some companies incentivize consumers to participate in co-creation by offering them status credibility benefits for their prospective rich ideas or suggestions, such as “Amazon’s top 100 reviewer” recognition (Hoyer et al., 2010). Pride of authorship and getting recognition for product success are kinds of incentives that motivate consumers to engage in these activities (Muniz & O’guinn, 2001; Nambisan & Baron, 2007). Following:

HP1.3: Personal motivations have a positive influence on interest to co-create

Hedonic motivations. Hedonic motivations refer to the enjoyment, fun and pleasure that a consumer perceives for participating in co-creation. Talking about beloved product brings fun and enjoyment by itself, but participating in a problem solving task related to this beloved product derives much more hedonic experiences to the consumers (Muniz & O’guinn, 2001; Nambisan & Baron, 2007). The mere co-creation activity, regardless the product, could be stimulating as well. The consumer can engage in product and service development for its own sake because he finds the activity playful and entertaining (Füller, 2010). Consequently:

HP1.4: Hedonic motivations have a positive influence on interest to co-create

Monetary motivations. Firms may give some monetary incentives to the consumers for participating in the co-creation activity centered on their business. Monetary incentives could be in the form of financial reward, product giveaways, lotteries and coupons. The dark side of proposing monetary incentives is that some consumers might engage in the activity just because of benefits they might receive while they do not have any underlying knowledge (Füller, 2010). Thus:

HP1.5: Monetary motivations have a positive influence on interest to co-create

Inhibitors

Despite literature on inhibitors is less developed than the one investigating motivations, some studies tried to shed lights on constraints to co-creation participation. (Aarikka-Stenroos & Jaakkola, 2012; Etgar, 2008; Hoyer et al., 2010; Kankanhalli, Tan, & Wei, 2005).

Time and energy inhibitor. Co-creators need to spend their time and energy to participate in co-creation activities while the result of their participation is ambiguous. The more a co-creation process gets complex or technical, the higher effort consumers need to deliver in order to perform the task. These costs can prevent consumers to involve in co-creation.

Companies need to minimize these foregone opportunities if they want to increase the chance to attract consumers in their co-creation projects (Aarikka-Stenroos & Jaakkola, 2012; Hoyer et al., 2010; Kankanhalli et al., 2005). Hence:

HP1.6: Time and energy inhibitors have a negative influence on interest to co-create

Risk of discredit. The ambiguity of results translates co-creation in a social risky activity. The major hinders from this side are the risks of losing intellectual property rights, being deceived by the firms or even getting mocked by other people for own ideas and comments. Consumers can also be afraid of losing power and their unique status within the community (Aarikka-Stenroos & Jaakkola, 2012; Kankanhalli et al., 2005). As these risks can prevent consumers for participating in co-creation activities, firms need to minimize them and create a trustworthy environment. Following:

HP1.7: Risks of discredit have a negative influence on interest to co-create

Co-creator personality traits

Each consumer's singularity affects the way co-creation happens (Prahalad & Ramaswamy, 2004a). Some consumers have more knowledge related to a particular product and its related technology while others are more knowledgeable about the market environment. Prior research has identified, based on a specific set of personality traits, some desirable typologies of consumers to be included in co-creation activity: innovators, market mavens and emergent nature consumers proven to provide higher contribution to the co-creation activity outcome (Hoyer et al., 2010). Consumers with a positive orientation to new technologies (Parasuraman, 2000; Tsikriktsis, 2004) seem able to positively contribute to co-creation activity. Lead users, consumers operating in a given market and for a given product, (Magnusson, 2009; Schreier & Prüggl, 2008; von Hippel, 2005) have been identified as a

successful typology of co-creators as well. This typology, however, does not identified in a specific personality trait, but is identifiable within a specific field of interest. As the aim of this work is to study the effect of personality traits on universal co-creation levers, we focus our attention on innovators, market mavens, emergent nature and technology enthusiastic users, not investigating lead users.

Innovators. Scholars have remarked different definition for innovativeness. On a behavioral perspective it has been studied on the basis of new product adoption behavior as “actualized innovativeness” (Hirschman, 1980) or through the number and timing of adoptions (Schreier & Prügl, 2008). On a personality perspective, the innate consumer innovativeness has been used as a proxy of consumer’s innovativeness level (Kirton, 1976). This definition reflects the general innovativeness of a consumer and does not cover the “domain specific innovativeness” which is related to an individual’s innovativeness regarding a product or category of a product (Moore, 1991). Innovative consumers are the ones that try new products on the market (Rogers, 2010) out of curiosity, dissatisfaction with the current offer or for status enhancement. The most proactive innovators can be individuated in the few early and active participants in a new field who build innovative products for themselves or for other closed people, and eventually create a lifestyle around them (Shah, 2000). Innovators are dynamic consumers, bringing periodic revolutionary change in the market and having low self-doubt when generating ideas (Kirton, 1976). Thus, we assume that innovators have stronger learning and hedonic motivations derived from their curiosity and willingness to try new products and social and personal motivations connected to their social status and imagine of pioneers in their community. Monetary motivations seem a peculiar trigger as well, as innovators have the tendency to create business around their own innovations (Shah, 2000). For what concern inhibitors, we assume that innovators perceive lower risk and effort

constraints, thanks to their confidence and risk-taking approach to new technologies. Thus, we assume that:

HP2.1: Innovators perceive higher motivations to co-create

HP2.1: Innovators perceive lower risk and effort inhibitors to co-create

Market Mavens. Market Maven are those individuals with market expertise that share their knowledge by initiating discussions with other consumers and are influential on their buying decisions (Feick & Price, 1987). Differently from opinion leaders, market mavens' expertise and knowledge are not product-centric but related to the market. They have a tendency to acquire and transmit information about the marketplace (Feick & Price, 1987) due to their self-obligation to stay informed and knowledgeable (Kassarjian, 1981), to their interest into purchasing goods (Slama & Tashchian, 1985) or with the aim to build relationship with other people within their social groups (Atkin, 1972; Levy, 1978) Furthermore, some individuals grasp information about the marketplace and share it with other consumers with the hope of receiving rewards or information they have no access to, making the exchange fruitful for both parts (Sieber, 1974). The pleasure of shopping is another peculiar characteristic of market mavens, explaining their high interest in general marketplace (Feick & Price, 1987). Therefore, we assume that learning and social motivations have higher relevance to this consumers' typology because of their information seeking and sharing attitude. Pleasurable experiences of shopping bespeak about the importance of hedonic motivations to these consumers, while monetary and personal motivations seem to born from the likelihood to exchange information with other people or entities and seeking monetary rewards. As a result of their time-consuming activity of collecting and sharing information, we assume that time and effort constraints will be less relevant for this consumer typology. Sharing some

characteristics of early adopters, such as high self-confidence, we assume that market mavens also perceive a lower risk of discredit compared to ordinary consumers. Thus:

HP3.1: Market mavens perceive higher motivations to co-create

HP3.2: Market mavens perceive lower risk and effort inhibitors to co-create

Emergent nature. Emergent nature are those consumers who are able to imagine and visualize the concepts and ideas, which might be useful and prospering for the marketplace in the future. The consumers high in emergent nature traits are supposed to be more influential in improving an idea (for example proposing a nifty concept) rather than other consumers such as lead users or innovators (Hoffman, Kopalle, & Novak, 2009). In their empirical study, Hoffman et al. (2009) concluded that product concepts developed by users high in emergent nature have higher purchase probability and tend to be better on the utilitarian features. These users are described as optimistic, creative, with a high ability of rational thinking and visualization and open to experience new products (Hoffman et al., 2009). We assume that the self-confidence characterizing this consumer typology, their openness to new experiences and products, similar to market mavens, make them less concerned by risk of discredit in co-creation. The high ability of rational thinking, making let us assume they are less concerned about participation effort as well (Hoffman et al., 2009). Thus:

H4.1: Emergent nature consumers perceive higher motivations to co-create

H4.2: Emergent nature consumers perceive lower risk and effort inhibitors to co-create

Technology enthusiast consumers. We define Technology enthusiast consumers as those individuals with a high level of optimism and innovativeness toward new technologies. Optimism is connected with a positive view of technology, including individual beliefs of control, flexibility and efficiency, while innovativeness is the tendency to keep up-to-date on

new technologies (Parasuraman, 2000). This tendency requires seeking new information and updating one's knowledge on a regular basis (Parasuraman, 2000). We can thus assume that learning benefits and personal ones are highly associated with this consumer category. The hedonic side of technology usage is also important. Being optimist in technology triggers the belief of having an increased control, efficiency and flexibility in daily lives (Parasuraman, 2000) and can be related to a lower perception of discredit risk. Time and effort inhibitors could have lower importance as well for this typology of consumers, due to their perceived efficiency and flexibility in performing tasks (Parasuraman, 2000; Tsikriktsis, 2004). Consequently:

HP5.1: Technology enthusiastic consumers perceive higher motivations to co-create.

HP5.2: Technology enthusiastic consumers perceive lower risk and effort inhibitors to co-create

Co-creation tools

Firms provide different instruments to enable consumer participation: community for customer co-creation (Füller et al., 2008), toolkits for user innovation (Von Hippel & Katz, 2002), ideation contest (Piller & Walcher, 2006) and lead user workshop (von Hippel, 2005, 2007). Mass customization, user generated content, mass collaboration and open source are other mechanisms that consumers can use for co-creating value with companies (Coates, 2009).

Virtual communities. A virtual community is a network of people who have common interests, initiate discussions about a topic and help each other by participating in the discussion. The community is not restricted to any geographical area and enables the development of social relations among users (Muniz & O'guinn, 2001). Shared

consciousness, common rituals and sense of a moral responsibility characterize a virtual community (McAlexander, Schouten, & Koenig, 2002). Benefits of participating in a community can be the enjoyment, fun and satisfaction emerging through involvement in the “discussing and responding” stream (Lerner & Tirole, 2001). Blackberry, Lenovo Thinkpad, Starbucks and many other brands hold a virtual community to involve their customers into the co-creation process, sharing their knowledge, helping each other to experience the utmost satisfaction usage of the product or services (Hoyer et al., 2010). Market mavens, due to their willingness to share knowledge and information by initiating discussions with other consumers can find virtual communities an optimal ecosystem for co-creation. Technology enthusiastic, being up-to-date and willing to try the newest technologies, seem to have a tendency toward participating in virtual communities and to be moderators or administrators of those communities. Generalizing, all consumers with a tendency toward social relations can be attracted by virtual communities for co-creation.

Toolkits for user innovation. The aim of toolkits is to outsource innovation and design activities, which are traditionally in the hands of the firms, to the consumers. Toolkits or configurators derive benefits both for the consumer and the firms. Instead of transmitting information on knowledge and needs between the two sides in traditional (and time-consuming) ways, toolkits are designed to save time by enabling innovation through trial-and-error activities in a cost-efficient way (Thomke & von Hippel, 2002; Von Hippel & Katz, 2002; Von Hippel, 2001). They give the consumers the ability to promote their product on the basis of their unique needs (Thomke & von Hippel, 2002; Von Hippel & Katz, 2002). Toolkits connect two information flows: solution information provided by the firm for the product development process and need information hold by the consumers (Von Hippel, 2001). Some toolkits are appropriate for the users who have technical field knowledge while some other toolkits are easy to handle for the majority of consumers in a marketplace. For

instance, Cocomyles (www.cocomyles.com) is providing a toolkit for designing tailored dresses which need user designing knowledge but provide also the possibility to develop simplistic designs for users without high design knowledge. Toolkits for user innovation can be more attractive for individuals, such as innovators, that already perform trial and error activities to improve a product or a service feature (Von Hippel, 2001) in response to a dissatisfaction with the current offer or a desire for personalization. Emergent nature consumers could be willing to use this tool as well, having a propensity to verbal processing and visual processing. The positive attitude toward computer and IT of technology enthusiastic consumers, can spur them in using toolkits in order to reach the maximum satisfaction from their products.

Ideation contests. The main purpose of ideation contests is to produce novel ideas. Firms that are seeking a solution to a problem can ask final consumers to propose ideas to solve that problem. Best ideas usually receive prizes or rewards (Piller, Vossen, & Ihl, 2012; Piller & Walcher, 2006). Firms adopt different strategies to allocate prizes to the best solutions: they can offer monetary rewards or personal benefits such as pride of authorship, participation in product success and recognition (Franke & Shah, 2001; Füller, 2010; Piller et al., 2012). Participants are not only competitors. They eventually read each other's ideas, give comments and evaluations, thus developing social relationships. Ideation contest work better when participants are accommodating and helping each other but also, conversely, when there is no cooperative relationship at all (Bullinger, Neyer, Rass, & Moeslein, 2010; Hutter, Hautz, Füller, Mueller, & Matzler, 2011; Piller et al., 2012). BMW, Boeing and InnoCentive are examples of Companies using ideation contests (Piller et al., 2012; Piller & Walcher, 2006). Ideation contests can be particularly attractive for innovators, individuals with the ability to make a revolutionary change in a product concept and perceiving low self-doubt while generating ideas and concepts (Kirton, 1976). Also technology enthusiastic can be attracted

by this form of participation, thanks to their leadership and pioneer attitude that may spur them in competing with other consumers.

Workshops. Through workshops, consumers are invited to join a group of people working together with Company representatives on product or service development. The company seeks to extract innovative ideas from these subjects. Participants usually work in small groups primarily and then they gather together to design final concepts which suit company needs, finally assessing the concepts and ideas in terms of feasibility, attractiveness to the market and management priorities (Lilien, Morrison, Searls, Sonnack, & von Hippel, 2002). Usually workshop lasts for two or three days, consists of around 15 people by which third of them are generally the company's representatives (Hienerth, Potz, & von Hippel, 2007). LEGO and 3M are adopting this method for product and service development (Hienerth, Lettl, & Keinz, 2013; Hienerth et al., 2007). Consumers with social attitude, willingness to share knowledge and interact with group of consumers, such as market mavens, can be particularly apt to participate in workshops. Also consumer with a high product-centric knowledge or technical capabilities, as technology optimistic can find workshop a favorable environment. Emergent nature consumers, apt to experientially explore and rationally investigate alternatives in product and service development fields can be or great help in workshops, due to their analytical capabilities (Hoffman et al., 2009).

According to the distinctive personal traits of each co-creator typology and the inherent characteristics of co-creation tools we assume:

HP6.1: Innovators have a preference for toolkits for user innovation and ideation contests

HP6.2: Market maven have a preference for co-creation community and user workshops

HP6.3: Emergent nature have a positive inclination toward all co-creation tools

HP6.4: Technology enthusiasts have a positive inclination toward to all co-creation tools

Product-related drivers

Product typology. Different industries have been subjects of research on co-creation. For instance, Fredberg and Piller (2011) investigated the effect of tie strength on innovation in the sports industry. Prügl and Schreier (2006) studied the process of using toolkits for user innovation by lead users and ordinary users in computer games industry. Barilla Company has been used as a case study of customer co-creation at the front end innovation (Martini & Massa, 2014). Knowledge intensive business services have been analyzed by Aarikka-Stenroos & Jaakkola, (2012). However, these studies have observed co-creation activities in specific industries not analyzing the impact of industry context on co-creation activities design and effectiveness. Thus, we investigated how the product typology affects co-creation interest among consumers. We selected three industries, which differ in underlying product characteristics: music industry, health & fitness industry and additive manufacturing industry. We hypothesize that:

HP7. Product typology affects co-creation interest

Product knowledge. Consumer's product related knowledge is traditionally studied in terms of the extent of knowledge an individual possess (i.e. expertise vs familiarity) and the locus of knowledge evaluation occurring. The latter classifies into two sub-categories of objective knowledge and subjective knowledge (Alba & Hutchinson, 1987). Objective knowledge occurs when an impartial third party evaluates the information that an individual carries with himself while the subjective knowledge implies the self-evaluation of knowledge regarding a product usage (Cordell, 1997). What is more relevant in spurring co-creation interest is subjective knowledge, thus capabilities and information a consumer believes to hold. However, an increasing level of objective product knowledge will result to better

acquiring, visualizing, processing and developing of those information into reality while comprehending more complex product-related challenges (Schreier & Prügler, 2008), thus delivering a better co-creation outcome. Therefore, we hypothesize that:

HP8. Product knowledge has a positive impact on co-creation interest

Prior co-creation experience. Co-creation activities and their related “benefit-cost” outcomes shape an individual’s decision toward engagement in such initiatives. Meanwhile, individual decisions are shaped by prior experiences as well and their related outcome. Prior experience has been shown to be an important indicator for the future intention and behavior of an individual (Bagozzi, 1981) as the ambiguity and risks of approaching a task are reduced if the task has already been performed in the past. We thus hypothesize that:

HP9. Prior co-creation experience has a positive impact on co-creation interest

An overview of the research model of consumer interest in co-creation is below (Figure 1).

[Figure 1 about here]

Method

Data collection

We conducted a survey among final consumers. We studied co-creation activities in three different industries: sport industry, music industry and manufacturing industry. While most of the scholars have observed co-creation activities in some traditional industries such as automotive, food, fashion and semiconductors, we selected these industries as they are fast growing ones, which an increasing number of passionate consumers. Hence, we believed these industries can benefit from co-creation strategies development. Moreover, we decided to

investigate three industries with distinct underlying characteristics, to discern potential differences in co-creation levers. We proposed a specific product in each industry, namely fitness tracker for the sport industry, MP3 player for the music industry and 3D printing for the manufacturing industry. In the first section of the survey, subjects were asked to answer to questions related to their personality traits, which helped us to classify them in co-creator typologies, as defined by prior literature. In the second section, consumer knowledge and prior co-creation activity in the field have been assessed, together with motivations and the inhibitors for participating in co-creation. Finally, consumer interest and inclination toward using co-creation tools have been investigated. The surveys have been distributed to the general public, through virtual communities' websites, social networks, Universities and International Company websites (www.fitnessmagazine.ir; www.ebee.ir; www.anjammidam.com). We received 563 responses in the first half of 2015. After deletion of missing, incomplete and invalid responses, we obtain a valid dataset of 509 answers. Demographic statistics are provided in Table 1.

Table 1- Demographic statistics^a

		%
Industry	Additive manufacturing	34.8
	Sport	34
	Music	31.2
Gender	Female	71.5
	Male	28.5
Age	<30 years old	78.6
	>30 years old	21.4
Education	High School	3.7
	Bachelor degree	23.4
	Master degree	61.1
	Ph.D./MBA	11.8

Co-creation experience	No	82.3
	Yes	17.7
Willingness to co-create	No	21.4
	Yes	78.6

^aN=509

Measurements

All constructs were adapted from prior literature. We measured motivations, inhibitors and personality traits using 7 point Likert scales, anchored by 7 as strongly agree and 1 as strongly disagree. Product knowledge items were following a 5 point Likert scale where 5 is anchored to strongly agree and 1 to strongly disagree. Interest in co-creation, co-creation tool preference and prior co-creation experience consisted of a yes/no question. Appendix 1 presents descriptive statistics, reliability and correlation for all measures included in the study.

Personal traits. Personal traits, reflecting the individual personality, are cross-section. Thus, they can not be affected by other variables in our study. To measure the innovator personal traits the scale of Agarwal & Prasad (1998), measuring innovativeness of individuals, has been employed. Market maven traits were measured adopting Feick & Price, (1987) scale, assessing the consumers' attitudes toward market knowledge. Emergent nature traits, implying the ability to process ideas both rationally and visually, being creative and having an openness attitude, has been measured through Hoffman et al., (2009) scale. The first two constructs of Technology Readiness Index, namely technology optimism and technology innovativeness, have been employed to capture the technology enthusiastic consumers (Magnusson, 2009).

Motivations. Monetary motivations were measured through Sun, Fang, & Lim (2012) scale, to discover the extent that a consumer perceives monetary benefits (i.e. direct and indirect) as encouraging to involve in co-creation. All other motivation scales were adapted

from Nambisan & Baron (2007). Learning motivations scale investigates the extent that consumers believe information and knowledge related benefits will be derived from co-creation activities. Social motivations scale analyzes the extent that consumers believe co-creation can provide social interactions and relationships benefits. Personal motivation scale measures the extent that an individual get motivated to engage in co-creation by personal benefits such as obtaining reputation, fame and other personal achievements. Hedonic motivations represent the fun, pleasure and entertainment derived by co-creation activities.

Inhibitors. Both discredit and effort inhibitors were measured through (Kankanhalli et al., 2005) scales. Discredit inhibitor risk measures the perceived risk of losing fame, status or power among a community of consumers, while effort inhibitor bespeaks the time and energy expenses users perceive preventive to join co-creation.

Product knowledge. Product knowledge consists of three items which evaluate the self-assessment of consumers' knowledge about the products and has been measure using Schreier & Prügl (2008) scale.

Results

The research model for this study required three steps of analyses, following constructs reliability assessment. First of all, we conducted several t-test of independence to analyze the extent to which motivations and inhibitors are affected by consumers' personal traits. Secondly, we assessed the association between a peculiar personal trait and preference for a specific co-creation tool through a Chi-square test of independence. Finally, we performed a binary logistic regression to analyze the impact of motivations and inhibitors and of product related drivers on interest to co-create.

Reliability assessment

First, scale reliability measured by Cronbach's alpha for personality traits, motivations, inhibitors and product knowledge constructs was examined. A satisfactory alpha value was obtained for all the constructs (see Appendix 1), supporting their internal consistency.

T-test of independence

To examine the impact of the co-creator typology (innovator, market maven, emergent nature and technology enthusiast consumer) on perceived motivations and inhibitors to co-create we performed a series of T-tests. We averaged across items obtaining a single value for each construct and divide consumer in two groups, high versus low in the specific personality trait, based on the sample mean.

Innovators. Results of t-test show that innovators have significantly higher learning motivations (M= 5.49, SD =0.96) than individuals low in innovation traits (M= 5.18, SD= 0.99), $t(3.55) = 0.30$, $p < 0.001$. They also have significantly higher social motivations (M= 5.13, SD =1.08) than low innovative individuals (M= 4.75, SD= 1.13), $t(3.83) = 0.38$, $p < 0.001$, higher personal motivations (M= 4.88, SD = 1.02) compared to low innovative consumers (M= 4.54, SD= 1.04), $t(3.65) = 0.33$, $p < 0.001$ and significantly higher hedonic motivations (M= 5.04, SD = 1.07) than did who had low innovative traits (M= 4.65, SD= 1.27), $t(3.75) = 0.39$, $p < 0.001$.

Market mavens. These consumers have significantly higher learning motivations (M= 5.52, SD=0.93) than did who are low in this personal trait (M= 5.10, SD= 1.00), $t(4.09) = 0.42$, $p < 0.001$, stronger social motivations (M= 5.15, SD=1.10) than other individuals (M= 4.69, SD= 1.09), $t(4.70) = 0.46$, $p < 0.001$, higher personal motivations (M= 4.92, SD = 1.00) than who is low in this trait (M= 4.45, SD= 1.04), $t(5.16) = 0.47$, $p < 0.001$ and significantly higher hedonic motivations (M= 5.05, SD = 1.10) than other consumers (M= 4.59, SD= 1.24),

$t(4.34) = 0.45$, $p < 0.001$. Market maven also show higher monetary motivations ($M = 4.50$, $SD = 1.36$) than who is low in this personality trait ($M = 4.25$, $SD = 1.24$), $t(2.12) = 0.25$, $p < 0.05$.

Emergent nature. This consumer category shows significantly higher learning motivations ($M = 5.60$, $SD = 0.92$) than who is low on this personality traits ($M = 5.05$, $SD = 0.98$), $t(6.52) = 0.55$, $p < 0.001$, stronger social motivations ($M = 5.22$, $SD = 1.10$) compared to other individuals ($M = 4.64$, $SD = 1.07$), $t(6.02) = 0.60$, $p < 0.001$, higher personal motivations ($M = 5.00$, $SD = 0.99$) than other consumers ($M = 4.40$, $SD = 1.02$), $t(6.60) = 0.60$, $p < 0.001$ and stronger hedonic motivations ($M = 5.08$, $SD = 1.15$) than individuals low in this trait ($M = 4.60$, $SD = 1.17$), $t(4.66) = 0.48$, $p < 0.001$. As market mavens they perceive significantly higher monetary motivations ($M = 4.51$, $SD = 1.42$) than other individuals ($M = 4.26$, $SD = 1.18$), $t(2.14) = 0.25$, $p < 0.05$. Additionally, results show that emergent nature consumers perceive significantly lower risk of discredit ($M = 2.86$, $SD = 1.42$) than did who had low product knowledge ($M = 3.07$, $SD = 1.18$), $t(-2.00) = -0.21$, $p < 0.05$.

Technology enthusiastic. Results show that these consumers show significantly higher learning motivations ($M = 5.52$, $SD = 0.97$) than did who are low in this personality trait ($M = 5.13$, $SD = 1.00$), $t(4.65) = 0.40$, $p < 0.001$. They have significantly higher social motivations ($M = 5.19$, $SD = 1.10$) than low technology confident consumers ($M = 4.67$, $SD = 1.08$), $t(5.38) = 0.52$, $p < 0.001$, higher personal motivations ($M = 4.97$, $SD = 0.95$) than other consumers ($M = 4.43$, $SD = 1.07$), $t(6.04) = 0.54$, $p < 0.001$, stronger hedonic motivations ($M = 5.09$, $SD = 1.12$) than did who has a low confidence in technology ($M = 4.58$, $SD = 1.20$), $t(4.99) = 0.51$, $p < 0.001$ and significantly higher monetary motivations ($M = 4.52$, $SD = 1.34$) than others ($M = 4.25$, $SD = 1.28$), $t(2.32) = 0.27$, $p < 0.05$.

Overall results. Results supported most of our hypotheses. Regarding innovators, they showed significantly higher motivations to co-create, except for monetary motivation, thus partially confirming HP2.1. Innovators did not show a significantly lower level of perceived constraints thus not confirming HP2.2. Market mavens, emergent nature consumers and technology enthusiastic consumers perceived higher motivations than consumers low in the respective traits thus confirming HP3.1, HP4.1 and HP5.1. However risk and energy inhibitors were not significantly lower for market mavens and technology enthusiastic consumers, thus not confirming HP3.2 and HP5.2. Emergent nature consumers were the only consumer typology showing to be significantly lower in risk inhibitors but not on effort inhibitor, thus only partially confirming H4.2.

Chi-Square test of association

A Chi-square test for association has been conducted to assess the relation between personality traits and preference for a specific co-creation tool. Table 2 reports the result of the test. We observed a strong association between emergent nature consumers and co-creation communities preference ($\chi^2(1) = 11,648$, $p < .001$) and between technology enthusiasm ($\chi^2(1) = 4,427$, $p < .05$) and communities preference. Regarding toolkits for user innovation, innovators ($\chi^2(1) = 4,775$, $p < .05$), emergent nature consumers ($\chi^2(1) = 11,19$, $p < .001$) and technology enthusiasm ($\chi^2(1) = 4,934$, $p < .05$) showed a preference for this tool. Ideation contest emerged as positively associated with emergent nature traits ($\chi^2(1) = 9,488$, $p < .01$) and technology enthusiastic personality ($\chi^2(1) = 4,589$, $p < .05$) while workshops preference is associated with market mavens ($\chi^2(1) = 8,062$, $p < .01$), emergent nature ($\chi^2(1) = 14,408$, $p < .001$) and technology enthusiastic traits ($\chi^2(1) = 4,129$, $p < .05$).

%	57,9%	39,3%	60,7%		37,6%	62,4%	40,4%	59,6%
%	48,6%	44,9%	55,1%	n.s	53,0%	47,0%	50,8%	49,2%
%	55,9%	41,0%	59,0%		38,8%	61,2%	41,0%	59,0%
%	49,6%	47,2%	52,8%	8,062**	52,8%	47,2%	49,9%	50,1%
%	55,9%	33,1%	66,9%		33,8%	66,2%	39,7%	60,3%
					408**			
								4,589*
								4,129*

Results supported most of our hypotheses. HP6.1 has been partially confirmed as innovators showed a preference toward toolkits for user innovation but did not show a significant association to ideation contest. Results confirmed that market mavens have a preference for workshops but no significant association has been found for co-creator communities (this partially confirming HP6.2). HP6.3 and HP6.4 are confirmed: emergent nature and technology enthusiastic consumers showed a positive association to all co-creation tools, namely co-creation communities, toolkits for user innovation, ideation contests and workshops.

Binary logistic regression

A binary logistic regression was used to test the relationship between interest to participate in co-creation activity, personality related drivers (motivations and inhibitors) and product related drivers (product typology, product knowledge and prior co-creation experience with the product). Table 3 shows the results of the regression analysis.

Table 3. Binary logistic regression results

Independent variable	B	SE	Wald	df	p-value	Exp(B)
Learning motivations	.236	.142	2.774	1	.096	1.267
Social motivations	-.165	.138	1.442	1	.230	.848
Personal motivations	.374	.146	6.577	1	.010	1.454
Hedonic motivations	.137	.106	1.663	1	.197	1.146
Monetary motivations	.206	.103	3.991	1	.046	1.229
Risk of discredit	-.050	.118	.182	1	.670	.951
Effort and time inhibitor	-.090	.129	.490	1	.484	.914
Cocreation experience	1.899	.540	12.381	1	.000	6.678
Product knowledge	.274	.101	7.332	1	.007	1.316
industry			9.051	2	.011	
industry(sport)	-.870	.315	7.605	1	.006	.419
industry(music)	-.809	.310	6.816	1	.009	.445
Overall model evaluation						
	X	df	p-value			

Model χ^2	82.862	11	.000
Hosmer & Lemeshow	9.609	8	.294
Pseudo R²			
Cox and Snell	.150		
Nagelkerke R square	.228		
N	509		

The model shown a good fit to the data ($\chi^2= 81.08$ $df= 11$ $p<.001$). Regarding motivations, we found monetary and personal motivations to have a significant positive effect on interest to co-create in the future. Specifically, for a unit change in personal motivations, we expect the logit to increase by .374 ($p<0.01$) holding all other variables constant. For monetary motivation, we have a positive effect of .206 ($p<0.05$). When the individuals has already co-created in the past we expect the logit to increase by 1,889 ($p<.001$). Product knowledge has a positive effect, with a logit of .274 ($p<.01$). Industry affects the interest as well: both music and sport industries generate a significantly lower interest than additive manufacturing one, with respectively a logit of -.870 ($p<.01$) and -.809 ($p<01$). Results confirmed that product related drivers are strong and significant predictors of co-creation interest. Co-creation experience, product knowledge and industry have a direct impact on the willingness to co-create of the consumers, thus supporting HP7, HP8 and HP9. Regarding personality drivers, results show that personal and monetary motivations are the main drivers of consumer interest in co-creation, confirming HP1.3 and HP1.5. However, we did not find any significant relationships between learning, hedonic and social motivations and for inhibitors thus not confirming HP1.1, HP1.2, HP1.4, HP1.6 and HP1.7.

Research and managerial implications

The findings of this study confirm our assumptions and prior research individualizing in innovators, market mavens, emergent nature and technology enthusiast consumers proactive targets, willing to involve in co-creation. These consumer segments show higher learning, personal, social and hedonic benefits compared to ordinary consumers, aligned to what has been explored in prior research (Lüthje, 2004). Except innovators, monetary motivations appear to be relevant as well. Neither losing power, fame and knowledge in a community of participants, nor the effort and time consuming process of co-creation however have been shown as significantly lower than ordinary consumers, except for emergent nature consumers. This typology showed significantly lower perceived risk of discredit, confirming the creativity and openness of this segment (Hoffman et al., 2009). Thus, results confirmed that the consumer segments investigated perceive higher motivations than ordinary consumers, above providing better ideas and innovative outcomes to firms when they are involved (Hoyer et al., 2010) but did not show lower sensibility to inhibitors as we expected. This is a relevant result for firms that should, above improving consumer benefits, also reduce inhibitors that seem to affect consumer segments more apt to co-create. The finding that monetary motivations are higher for these segments also suggest that, contrary to prior research (Füller, 2010), not only consumers with lower intrinsic motivations are attracted by monetary rewards but also the ones who are motivated by intrinsic benefits.

Secondly, our analyses show that, regardless the typology of consumers, personal and monetary motivations are the ones that significantly determine interest to participate in co-creation. Hence, even if a consumer seems to finally perceive other intrinsic motivations from this activity, what spur them to initially involve in co-creation are tangible benefits, such as personal and financial rewards. We believe this is an extremely interesting result for firms as it shows that the way to initially attract co-creators is to provide them clear incentives, a tangible added value for their effort and time. Together with these motivations, the product

typology, consumer knowledge and prior co-creation experience with it, have been shown as relevant drivers of interest confirming prior research (Etgar, 2008; Fuller et al. 2011) that sustain consumers co-create in product categories they love and in which they feel expert. In this respect, we found that users of 3D printing get stimulated to join co-creation more than the two other industries investigated. We can speculate that the additive manufacturing field, being new and fast growing, is more attractive and rewarding than music and sport industries and thus attracts more potential co-creators. After motivating consumers to initially join co-creation activities, firms should provide them the tools they are more apt to use. Our findings suggest that different consumer segments have different preferences regarding co-creation tools. Consumers characterized by relevant social attitudes, such as market mavens, are more willing to participate in workshops, while innovators have a preference for toolkits for user innovation, better answering to their creativity needs. Emergent nature, being defined as eclectic consumers, show a generalized predisposition to all co-creation methods compared to ordinary consumers. The same is true for technology enthusiast consumers that showed a generalized openness to all co-creation tools.

To summarize, four steps are suggested to Companies that want to effectively and efficiently develop co-creation activities: (1) find consumers who are active promoter of the product/brand or at least that show to like it (e.g. on social media); (2) attract these consumers by providing them clear incentives, especially monetary and personal rewards that demonstrate to be effective in attracting co-creators; (3) tailor following communication with multiple appeals. For instance, a fun innovation contest can elicit different motivations: hedonic (fun), monetary and personal (possibility to win the contest), social (community involvement) and learning (access to new information and knowledge enhancement); (4) tailor co-creation tools to the consumer segments the product attracts.

Conclusions and future research

The aim of this research was to deepen our knowledge on consumer co-creation levers by investigating the personal and the product related drivers of interest. Further, we wanted to shed lights on the influence of personality traits on both preferred co-creation tools and motivations and inhibitors. We investigated five kinds of motivations, founded in extant literature: monetary motivations, namely financial rewards to participation, hedonic motivations, representing the fun and enjoyment derived from the co-creation activity, learning motivations deriving from knowledge seeking behaviors and consumer curiosity and social motivations, defined as the desire to be in contact with like-minded people and enhance one's social status. Two were the inhibitors analyzed: effort, in terms of time and energy, required to participate in co-creation and risk of discredit. We analyzed four consumer segments: innovators, emergent nature, market mavens and technology enthusiast consumers. Finally, four co-creation tools were explored: workshops, communities, toolkits for user innovation and contests. Results showed that personality traits affect preferred co-creation tools and motivations but exert few influence on inhibitors to co-create. Further, personal and monetary motivations, together with product related drivers have been confirmed as significant predictor of interest to co-create.

These findings extend existing research by providing guidelines on how to effectively integrate consumers into co-creation activities. Despite the importance of such integration (Lettl, Hiennerth, & Gemuenden, 2008; Prugl & Schreier, 2006) there is few research that investigate how to involve market mavens, emergent nature and technology enthusiast consumers, being prior research mostly focus on lead users. We provide suggestions on the right tools each consumer segment needs to effectively co-create and on the influence of personality traits on motivations and inhibitors, a topic that has been explored again only for

lead users (Hienerth et al., 2007; Hoyer et al., 2010; Piller & Walcher, 2006; von Hippel, 1986). Future research is needed to deepen the understanding of interactions among personality traits, motivations, inhibitors and product drivers and their impact on interest to co-create and on tools preference. In particular, different industries and tools can be analyzed. The change in predominant motivations along the co-creation process is an interesting area of research as well, that can help Companies in modulating benefits along the new product development process, providing the most relevant ones for each stage. Complementary to such analysis, it would be interesting to investigate the potential change in co-creator segments along the NPD process. This would help firms in providing the right tools I each stage of the process.

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