

Exploring Neglected Aspects of Innovation Function: Public Motivation and Non-pecuniary Values

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The traditional innovation function, focusing on extrinsic motivations such as economic benefits and returns, has neglected the side of intrinsic values and public motivations for innovation function. Recent innovation examples in an era of mobile network and web-based information environment pursue open connected innovations such as open source movement and crowding source. Such open, collective and social innovations result from strong public motivation and trust network. Although previous studies argue the potential effects of intrinsic values on innovative attitude, research has not yet provided a comprehensive empirical evidence on how innovative attitude is associated with intrinsic and public motivations. Little empirical research remains for the impact of public motivations and intrinsic values on innovative attitudes. This study, relying on nationally represented survey (n = 3,188) in South Korea, explores an empirical link between public motivations and innovative attitudes to explore and allow new ideas. We found that public interest, empathy, altruism and job involvement facilitate innovative attitude to pursue and accept new ideas and suggestions. This implies that both intrinsic values (job enjoyment and satisfaction) and public motivations (public interests, empathy and altruism) are crucial factors to promote innovative attitudes. We also found strong non-linear relationships between satisfaction, trust and innovative attitude. We discuss implications for future innovation function of intrinsic and public motivations in terms of the process of social construction.

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Introduction

NUMEROUS STUDIES have examined the topic of innovation since Roger's famous diffusion of innovation model (e.g., Bikhchandani, Hirshleifer, & Welch, 1992; Meyer & Goes, 1988; Roger, 2003; Valente & Rogers, 1995). Both theoretical research and an applied approach have identified innovation function regarding what factors influence innovation and how. Some micro theories have focused on individual characteristics including creative skills, flexibility and various social psychological elements (Glor, 1998) while some organisational studies have paid attention to organisational process and structure (Hage, 1999). Recent network-based innovation research has touched social innovation and open innovation beyond the traditional innovation model based on both self-interest and utility maximisation from a rational choice approach. Most research has explored innovation function in order to maximise productivity and to promote economic growth. The bottom line is that various rewards can promote innovation (Byron & Khazanchi, 2012; Eisenberger & Byron, 2011; Eisenberger & Rhoades, 2003; Lerner & Tirole, 2000; 2005). This conventional innovation function, while dealing with opinion leaders, technology, organisational factors and social environments to encourage new ideas (see Patterson, Kerrin, & Gatto-Roissard, 2009 for a good review), is mainly based on a rational choice model with a principle that every innovation results in private returns, not public benefits. The conventional model neglects collective benefits derived from the collective dimension and overlooks various types of open, social and collective innovations. It has largely neglected the question of whether and how public motivations can promote innovative attitudes.

However, many recent innovations come from the open complex web world comprised of network, connectedness and sharing (Benkler, 2004, 2006; Chesbrough, 2003; Easley & Kleinberg, 2010; Khosropour, Feizi, Tabaeian, & Taheri, 2015; Weber, 2000, 2004). These open innovations come from web-based connected worlds, rather than from individually separated worlds. Recent popular ICT based innovations such as open source governance (e.g., Linux and Wikipedia) and crowding collective behaviours (e.g., NASA Innovation Pavilion on InnoCentive) come from public motivation such as empathy, altruism, cooperation and trust (Lee, 2014; Mulgan, Tucker, Ali & Sanders, 2007; Tournay, Louvel, & Granjou, 2013; Weber, 2004). Many current ICT based innovations involve massive globalisation and connect local communities within countries to those across countries (Krishna, Patra, & Bhattacharya, 2012). A web-based environment generates smart collective actions (Callon, 1999; Johnson, 2002; Tapscott & Williams, 2008), and a public mind with empathy and trust facilitates various types of open innovations. Both public motivation and the web world simultaneously promote open and social innovations involving collective intelligence, wisdom of crowds (Surowiecki, 2004) and open source governance (Berry & Moss, 2006; Landemore, 2012; Rushkoff, 2003). In sum, these recent open innovations arise from intrinsic values and public motivations such as volunteering, empathy and sacrifice.

The context and contribution of this article is to illustrate the empirical factors associated with open, social and collective innovation that provide important implications. Recent studies have suggested various open innovation cases, but not provided empirical systematic evidence. Relying on 3,188 individual respondent data, we explore individual factors that influence innovative behaviours such as pursuing and accepting newness. Recent research on open innovation has provided how various elements of public motivations can facilitate collective innovation. Previous studies have suggested a potential link between creativity and intrinsic values (e.g., self-efficacy and satisfaction). Yet, little empirical research exists on the relationship between creativity and public motivations. We attempt to empirically test whether there is a link between public motivations (e.g., public interest, empathy and altruism) and innovative attitudes, and how job involvement, satisfaction and trust are associated with the innovative behaviours.

The data are collected through a web-based online survey (Gallup Korea) among South Korean citizens who were 19 years old or older from 15 to 30 January 2013. Of the 5,000 sampled, 3,188 respondents completed the survey for a response rate of 63.78 per cent. The sample is nationally representative in terms of gender (male = 51.2 per cent and female = 48.8 per cent), age (range = 19 to 81 and mean age = 43.41) and regions (including seven metropolitan cities and nine provinces). The questionnaire included items such as innovative behaviours, public motivation, satisfaction, trust, job involvement and various types of social demographic factors.

This article is organised as follows: first, the theoretical background about collective and creative innovation function will be outlined in terms of public motivation (e.g., public interest, empathy and altruism), job involvement, satisfaction and trust. Second, data, method and empirical models will be addressed. Third, empirical findings about open innovation function will be summarised and discussed. Finally, implications for open innovation and further research will be discussed.

Literature Review: Factors Involving Innovation Function

An Overview of Innovation Function: Rational Choice, Relations, Public Motivations and Intrinsic Values

Previous studies have explored various factors that influence innovative attitudes to promote creativity and innovation (Amabile, Hennessey, & Grossman, 1986; Amabile, Conti, Coon, Lazenby, & Herron, 1996; Amabile, Barsade, Mueller, & Staw, 2005; Bidault & Castello, 2009; Bitzer, Schrettl, & Schröder, 2007; Byron & Khazanchi, 2012; Dewett, 2007; Eisenberg & Byron, 2011; Eisenberg & James, 2005; Eisenberger & Rhoades, 2003; Hertel et al., 2003; Lerner & Tirole, 2000, 2005; Oreg & Nov, 2008; Patterson et al., 2009; Perry-Smith, 2006; Roy, Chua, Roth, & Lemoine, 2015; Uzzi & Spiro, 2005; von Hippel, 2001; Zhou & George, 2001). Conventional economic approach has emphasised pecuniary incentives to develop new ideas and technology (e.g., Lerner & Tirole, 2000, 2005). This is based on the rational choice theory of innovation. It is mainly expected that open

source participants develop software when the net benefits from pecuniary to non-pecuniary benefits are greater than the cost. On the other hand, traditional and current sociological studies have more focus on socialisation process, social structure and network for innovative process (e.g., Moody & White, 2003; Newman, 2001; Perry-Smith, 2006; Uzzi & Spiro, 2005) and new paradigm with far less emphasis on individual incentives.

This sociological innovation perspective suggests that social capital, network and bridging interactions across different groups and areas are essential to social innovations. Various interaction between (tight) culture and (weak) tie may facilitate or impede innovative attitude (Roy et al., 2015). However, both economic and sociological approaches have not systematically examined how non-pecuniary incentives are related to innovative attitude. Thus, little knowledge and evidence still exists about what individual factors promote various recent open innovations beyond economic mind.

A large neglected side of individual innovation function is directly associated with limitations and critic on monetary incentive based approach. Numerous non-pecuniary motivations from affect, emotion, satisfaction and intrinsic values can stimulate imaginative, creative and innovative mindset and ideas (Amabile, Barsade, Mueller & Staw, 2005; Bitzer, Schrettl & Schröder, 2007; Dewett, 2007; Rank & Frese, 2008; Zhang & Bartol, 2010; Zhou & George, 2001). This article explores how non-monetary incentives such as public motivation and intrinsic values are associated with innovative attitudes from a nationally representative sample survey in South Korea. More specifically, we attempt to examine a variety of non-pecuniary motivations including public interest, empathy, altruism, satisfaction and trust.

Table 1 illustrates selected previous research discussing the various non-pecuniary factors for creativity and innovation as well as several studies with economic and sociological approaches. However, even these studies have discussed those non-monetary factors separately. For instance, some studies discuss only the relationship between affect and creativity (e.g., Amabile et al., 2005; Rank & Frese, 2008). In addition, others examine only the relationship between intrinsic motivation and creativity (e.g., Dewett, 2007), or between trust and creativity (e.g., Bidault & Castello, 2009; Brattström, Löfsten, & Richtnér, 2012; Shamah & Elsayaby, 2014), or between satisfaction and creativity (Zhou & George, 2001; See more details at Table 1). It appears that various competing motivations work for open innovation process. For instance, open source software (OSS) developers simultaneously experience a high level of altruism and satisfaction from their participations along with economic incentives (Wu, Gerlach, & Young, 2007). It is necessary to test all these motivations together. We try to integrate key non-monetary motivations from public motivations to satisfaction and to trust and test all simultaneously to estimate their relative effects on innovation function within our empirical regression models.

TABLE 1
Selected Relevant Literature on Innovative Attitude Function

<i>Authors & Title</i>	<i>Innovation (Creativity) Facilitators</i>
Amabile et al. (2005). Affect and creativity at work.	Affect and Creativity
Bidault and Castello. (2009). Trust and creativity: Understanding the role of trust in creativity-oriented joint developments.	Trust and Creativity
Bitzer et al. (2007). Intrinsic motivation in open source software development.	Intrinsic Motivation and Creativity
Byron and Khazanchi. (2012). Rewards and creative performance: A meta-analytic test of theoretically derived hypotheses.	Rewards and Creative Performance
Dewett. (2007). Linking intrinsic motivation, risk taking, and employee creativity.	Intrinsic Motivation & Creativity
Eisenberg and James. (2005). The relationship between affect and creativity in organisations: The role of affect characteristics, neuro-cognitive mechanisms and task type.	Affect & Creativity
Eisenberger and Byron. (2011). Rewards and Creativity.	Rewards & Creativity
George and Zhou (2001). When openness to experience and conscientiousness are related to creative behavior: An interactional approach.	Open mind and Conscientiousness & Creativity
Grant and Berry. (2011). The necessity of others is the mother of innovation: intrinsic, and prosocial motivations, perspective taking, and creativity.	Intrinsic Motivation & Creativity
Gryskiewicz, Taylor, and Fleener . (1995). Job satisfaction and creativity style: An unexpected empirical finding.	Public Service Motivation & Innovative Behaviour
Hatmaker, Hassan, and Wright . (2014). Encouraging innovative behavior: The effects of leader-member exchange and public service motivation.	Job Involvement & Innovative Behaviour
Janssen. (2003). Innovative behaviour and job involvement at the price of conflict and less satisfactory relations with co-workers.	Economic Rational Choice & Open Innovation
Lerner and Tirole. (2000). The simple economics of open source.	Empathy & Innovation
Patnaik and Mortensen. (2009). Wired To care: How companies prosper when they create widespread empathy.	

(Table 1 continued)

(Table 1 continued)

<i>Authors & Title</i>	<i>Innovation (Creativity) Facilitators</i>
Perry-Smith. (2006). Social yet creative: The role of social relationships in facilitating individual creativity.	Social Relationship & Creativity
Perry-Smith, and Shalley. (2003). The social side of creativity: A static and dynamic social network perspective.	Social Network Aspect & Creativity
Putnam, Leonardi, and Nanetti. (1993). Making democracy work: Civic traditions in modern Italy.	Social Capital & Innovation
Rank and Frese. (2008). The impact of emotion, moods, and other related variables on creativity, innovation and initiative in organizations.	Emotion & Creativity
Rifkin. (2010). The empathic civilization: The race to global consciousness in a world in crisis.	Empathy & Creativity
Shah. (2006). Motivation, governance, and the viability of hybrid forms in open source software development.	Motivation & Innovation
Shamah and Elswaby. (2014). Trust as a nucleus key for open innovation.	Trust & Innovation
Uzzi and Spiro. (2005). Collaboration and creativity: The small world problem.	Small World Networks, Collaboration & Creativity
Zhang and Bartol. (2010). Linking empowering leadership and employee creativity: The influence of psychological empowerment, intrinsic motivation, and creative process engagement.	Empowerment, Intrinsic Motivation & Creativity
Zhou and George. (2001). When job satisfaction leads to creativity: Encouraging the expression of voice.	Satisfaction & Creativity

Source: Authors' own based on relevant literature review.

Public Motivation and Innovative Attitude

The concept of public motivation has been discussed within various fields including public management and psychology (Perry & Wise, 1990; Perry, Hondeghem, & Wise, 2010). However, innovation studies have not significantly noted how public motivation is related to innovation function. Recent open innovation movements like OSS and Wikipedia are mainly based on public motivation like altruism and empathy (David & Shapiro, 2008; Dewett, 2007; Tapscott & Williams, 2008; Weber, 2004; Xu, Jones, & Shao, 2009). Recent studies suggest how intrinsic and public motivations can promote new innovations. For instance, OSS cases result from community-based production with public motivations such as empathy and altruism. OSS developers with strong intrinsic motivations like job involvement and satisfaction participate in the co-production. Numerous open innovations are creative products among citizen volunteerism, crowdsourcing and democratic governance (Lukensmeyer & Torres, 2008; Seltzer & Mahmoudi, 2013; Weber, 2004). However, there is still a lack of systematic evidence on a strong link between public motivation and open innovation. We will review how public interest, empathy and altruism can contribute to promoting collective and creative innovations.

Public Interest Orientation

Despite its ambiguity or multiplicity in concept or component, public interest is usually defined as the universal well-being or common interest of people (Bozeman, 2002, 2007). Its concept also involves normative definitions about the scope of the rights and benefits to which citizen should be entitled and the obligations of citizens to society (Bozeman, 2007). Following the aforementioned definitions, public interest orientation is projected to pursue common interest for community, to expand human rights and benefits and to perform civic duty. Public interest derived from civic culture and public service motivation is supposed to encourage innovation and good government (Putnam, 1993; Rosenblatt, 2011). In particular, digital technologies connect people closely and construct opportunities to work together. Citizen crowd sourcing and open source movements are good examples to link between technology and civic life (Gilman, 2014). Open source movements such as Linux and Apache are good examples of collective innovation. This public behaviour comes from public motivation to contribute to designing and expanding free software programs for everyone (Raymond, 1998; von Hippel, 2001; Weber, 2004). Public interest from open source projects is more likely to nurture new collective innovations through pursuing and diffusing new ideas for society. A theory of public good suggests that the good is under-provided to the optimal level for society due to free ride perception, but public interest can reduce or eliminate this problem through creating social responsibility and a common good. Public interest orientation engages public values and public service motivation which leads to stimulating and facilitating social innovations to tackle social dilemma. It is therefore expected:

H1–1: The more level of public interest, the more likely to pursue, suggest and accept new ideas.

Empathy

Empathy is by itself a whole constellation of emotion in social relations including concern, sympathy, compassion and grief. Empathy generates solidarity with mutual compassion which leads to prospering human civilisations (Rifkin, 2010). High empathy inspires strong commitment to and deep sacrifice for community problems regardless of costs and benefits. It appears that every open innovation is originated from an empathic concern about community issues. For example, Rifkin (2010) illustrates how empathy has shaped our past development with many innovative ideas. Patnaik and Mortensen (2009) provide many examples to show how open empathy for customers can drive an intrinsic innovation from leading companies like Nike, IBM, Harley Davidson and Apple.

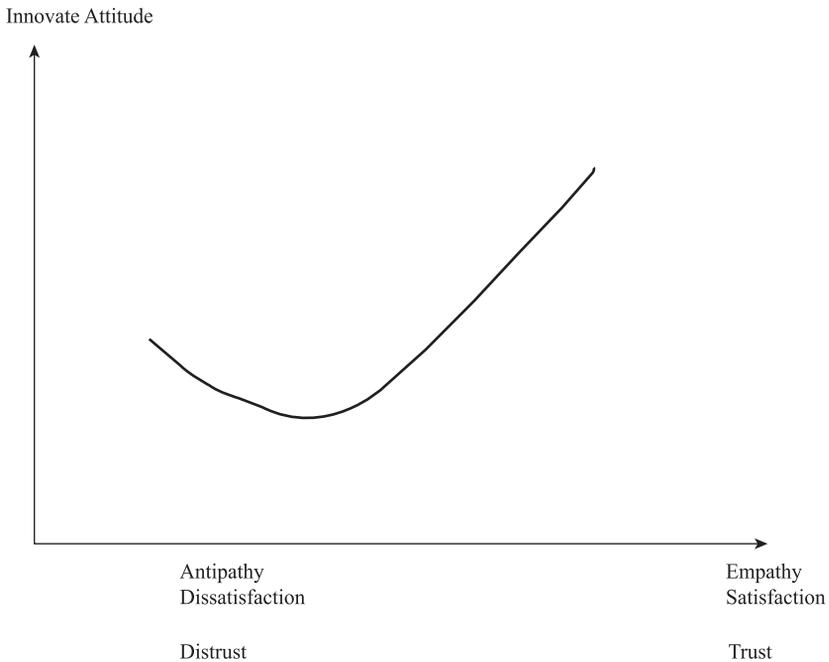
The impact of empathy on innovation is socially constructed through various interactions among people, organisations and networks. Empathy is a key social mechanism to promote sustainable innovations through sharing many ideas with common feelings. Empathy generates the power of pull that provides cooperative collaboration for various risky innovations in an era of the emergence of the relationship economy (Earls, 2007; Hagel, Brown, & Davison, 2012). Empathy constructs positive networks that make heterogeneous individuals experience more togetherness. Empathy, through a shared sense of compassion, can drive open and social innovations (Hagel et al., 2012; Patnaik & Mortensen, 2009). Many people with a higher level of empathy tend to diffuse prosocial behaviours such as sharing and compassion, thereby facilitating open and social innovations. Higher empathy is more likely to generate constructive innovative practice involving careful listening, appropriate feedback and critical reflection. Those with a higher level of empathy are more likely to commitment to solving community problems than those with a lower level of empathy. A strong empathy stimulates a strong altruism (Batson, 2011). On the other hand, antipathy can generate innovativeness attitudes to overcome rival business companies (see Figure 1). Thus, we can hypothesise the following curvilinear relationship between empathy and innovative attitude:

H1–2: The higher level of empathy, the more frequency of exploring and accepting new ideas and suggestions. In addition, the higher level of antipathy can also facilitate such innovative attitudes. The combined relationship between them from antipathy to empathy is likely to be curvilinear, rather than linear.

Altruism

Altruism as principled self-sacrifice is likely to introduce new ideas and suggestions because it generates benevolence and collaboration. Altruism is socially constructed through socialisation and learning processes. Moral education and gift relationship can stimulate altruism for social innovations to solve various community problems. Altruism can contribute more to promoting open innovation than market or

FIGURE 1
The Nonlinear between Empathy, Satisfaction, Trust and Innovative Attitude



Source: Authors' own.

self-interest model. For instance, altruism is sometimes more influential than self-interest because altruism involves more self-sacrifice necessary for open innovation. Open source movements and crowd source are based on altruistic based innovation. Although the open source development process relies on voluntary action, altruism can consistently provide open source participants (Benkler, 2004; Weber, 2000, 2004). Another altruistic collaboration also comes from Wikipedia.org and Kiva.org. In today's web world, networked altruism has become an increasingly common innovative source (Hartley, 2009). Based on these arguments about the positive impact of altruism on open innovation, we can hypothesise:

H1-3: Altruism is more likely to generate and accept new ideas and suggestions.

Non-pecuniary Values and Innovative Attitude

It is common that rewards promote performance including innovation and creativity. It appears to be natural that innovative processes and ideas can be enhanced by rewards. Standard economic theory suggests that pecuniary incentives have a positive impact on performance including innovative ideas (Lerner & Tirole, 2000, 2005). However, extrinsic incentives including financial rewards and reputation

gains are not the only way of triggering people's innovative attitudes. It is a largely neglected question of whether non-pecuniary incentives can stimulate innovative attitudes. It still remains the question of whether pecuniary rewards may restrict nurturing innovative attitudes or creative ideas. Considerable controversy still remains for the topic of whether rewards promote or hinder creativity (Byron & Khazanchi, 2012; Eisenberger & Byron, 2011; Eisenberger & Rhoades, 2003). Thus, we attempt to explore whether intrinsic values like non-pecuniary incentives can stimulate innovative attitudes. Intrinsic values are associated with the process of work that reflects the inherent interest in the work, job autonomy and the learning potential (Lindsay & Knox, 1979; Ryan & Deci, 2001). The overall hypothesis is that the more people focus on intrinsic (relative to materialistic) values, the more sustainable are their willingness in innovative attitudes. To sum it all, non-pecuniary values are conducive to innovative attitudes. While conventional innovation function focuses on extrinsic values including financial incentives, status and reputation mainly from competition based outcomes, we focus on intrinsic values such as self-acceptance, personal growth, satisfaction, affiliation and community trust. A primarily intrinsic motivation is more encouraging to innovative attitudes than a primarily extrinsic motivation. In this article, intrinsic values are measured by job enjoyment, satisfaction and trust.

Job Enjoyment as a Catalyst for Innovation

People are more likely to be creative when they are more motivated by the interest, enjoyment and satisfaction. Intrinsic task motivations driven by sincere interest, involvement and enjoyment are likely to promote innovative ideas and creativity (Amabile, Conti, et al., 1996; Amabile, Hennessey, & Grossman, 1986; Eisenberger & Rhoades, 2003). A highly intrinsically motivated person is likely to explore and accept innovative ideas. Innovation and creativity are significantly related to enjoyment and satisfaction (Amabile et al., 1986). Job enjoyment is a key component of intrinsic task motivation. Job enjoyment can positively influence creative thinking. Innovative attitudes are fostered through a considerable degree of job enjoyment. Job enjoyment is likely to produce more innovative ideas. Artists, musicians and professionals who enjoy their jobs are conducive to innovative attitudes and ideas. Thus, we try to explore a relationship between job involvement on innovative attitudes, based on the following hypothesis:

H2-1: The more deeply embedded the job involvement, the more innovative someone will be in innovation process.

Satisfaction as a Positive Drive for Innovation

Satisfaction has been discussed as a potential factor to influence innovation and creativity. However, recent studies have mixed findings about a relationship between satisfaction and innovation. The first finding is the positive relationship between them. Both emotion (Clore, Schwarz, & Conway, 1994) and intrinsic motivation (Grant & Berry, 2011; Zhang & Bartol, 2010) can stimulate innovation. Positive

affect such as satisfaction and happiness stimulates newness and creativity.¹ If people are more satisfied with the workplace, innovation would be more likely to occur. Job satisfaction and involvement can facilitate problem-solving (Bussing, Bissels, Fuchs & Perrar, 1999).

The second finding is no or negative relationship between satisfaction and innovation. Some research reports no linear relationship between satisfaction and creative behaviours (Goffa, 1993; Ludwig, 1992). Others studies address a significant relationship between dissatisfaction and innovative attitude like creativity (Eisenberg & James, 2005; Russ, 1999).

The third finding suggests a curvilinear relationship between (dis)satisfaction and innovation (Talarico, LaBar, & Rubin, 2004). While satisfaction is positively related to innovative attitude, a U-shape relationship might exist. In other words, both strong dissatisfaction and satisfaction can breed an innovative attitude, but moderate level of (dis)satisfaction or gray zone between dissatisfaction and satisfaction is not sufficient to stimulate an innovative enthusiasm (see Figure 1). In this curvilinear frame, even negative satisfaction may lead to innovative eagerness (Gryskiewicz, Taylor, & Fleenor, 1995).

Thus, we attempt to empirically test whether a relationship between satisfaction and innovative attitude exists and whether the relationship is non-linear, based on the following hypothesis:

H2-2: Higher satisfaction is more likely to generate the more innovative attitude to explore and accept new ideas and suggestions. In addition, higher dissatisfaction is more likely to produce the more innovative attitude than the less dissatisfaction.

Trust as an Essential Source for Open Innovation

Trust is a fundamental critical factor that is present in all aspects of open innovation. Trust can be regarded as a nucleus key for every innovation. Trust is an essential precondition of cooperation (Hardin, 2002, 2006). Innovation is socially co-created and shaped through various reliable interactions among heterogeneous groups and communities, rather than generated exclusively within an organisation or a company (Chesbrough, 2003). Social proximity and close interactions facilitate sharing information and knowledge and fabricate an atmosphere of trust. In particular, bridging activities and weak ties between or among various innovative networks can generate a nucleus of innovation. All these sustainable interactions and bonds are based on trust (Fukuyama, 1995; Putnam et al., 1993). Trust generates commitment to one another and openness. Fukuyama (1995) suggests that trust facilitates information and knowledge exchange. Trust makes it possible to build networks of collaboration and innovation. For instance, the open source collaboration comes from within a trusted network. Many studies have suggested that trust is a significant factor to promote economy and prosperity (e.g., Fukuyama, 1995; Putnam et al., 1993). Recent research on open source movements also reminds the importance of trust in a complex connected world. However, these discussions neglect the possibility that strong distrust can generate new innovations. Rational choice model based on distrust frame, rather than trust, suggests that people can

more strongly facilitate innovation for themselves due to lack of cooperation or potential risk within distrusted world. Collaborative model based on trust also suggests that people can create new innovation due to their cooperation and volunteering. These contrasting phenomena implies that the sufficient intensity of both distrust and trust can generate innovation, while insufficient (dis)trust located at the middle zone between distrust and trust has limitation to create innovative enthusiasm. These relationships between them are expected to generate a U-shape between trust and innovation (see Figure 1). However, little empirical research exists to identify a non-linear relationship between the degree to trust people and society and the degree to pursue and accept new ideas. Thus we can hypothesise:

H2-3: The greater the level of (dis)trust, the greater will be the commitment and innovativeness for new ideas and suggestions, which may lead to a U-shape relationship between them.

Data, Measurement and Empirical Models

Data from Korean Gallup Survey

A web-based online survey (Gallup Korea) was conducted with South Korean citizens who were 19 years old or older from 15 to 30 January 2013. Of the 5,000 sampled, 3,189 respondents completed the survey for a response rate of 63.78 per cent. The sample is nationally representative in terms of gender (male = 51 per cent and female = 49 per cent), age (range = 19 to 81 and mean age = 43.41) and regions (including seven metropolitan cities and nine provinces). We use survey data from 3,188 respondents after deleting one missing case.

Measurements

Innovative Attitude

This study measured two components of innovative attitude: (a) the degree to explore new ideas and methods to solve problems (INV1) and (b) the degree to accept new ideas and suggestions (INV2). Both items use a five-point Likert scale from one (strongly disagree) to five (strongly agree). The sum of these two items times 10 are also used as a dependent variable (INV12) ranging from 20 to 100 score (see more details on descriptive statistics about these dependent variables in Appendix 1). Ordered logistic model is used to identify factors to influence both the INV1 variable and the INV2 variable. Ordinary Least Square (OLS) method is used to explore factors associated with the INV12 variable.

Public Motivation, Job Involvement, Satisfaction and Trust

This study introduces three key factors associated with innovative attitude. First, independent variables to represent public motivation are public interest, empathy and altruism. The variable of public interest is measured as a five-point Likert scale

of the degree of importance of pursuing public interest. The variable of empathy is also measured as a five-point Likert scale of the degree to feel sympathy for the disadvantaged. The variable of altruism consists of three sub-items including contribution to society, volunteering and donation which are measured using a five-point Likert scale.

These three items are summed as the measure of the altruism variable (Cronbach Alpha = 0.64). Second, the variable of satisfaction is composed of two items including ‘How much are you satisfied with your job?’ and ‘How much are you satisfied with your life?’ (Cronbach Alpha = 0.71). We measure the variable of satisfaction to sum these two items with a five-point Likert scale. Third, the trust variable is also composed of two items including the degree to trust people and society with a five-point Likert scale from one (strongly distrust) to five (strongly trust) (Cronbach Alpha = 0.75).

Control Variables

We control for job involvement and individual socio-demographic factors to be associated with both innovative attitude and key independent variables such as public motivation, satisfaction and trust.

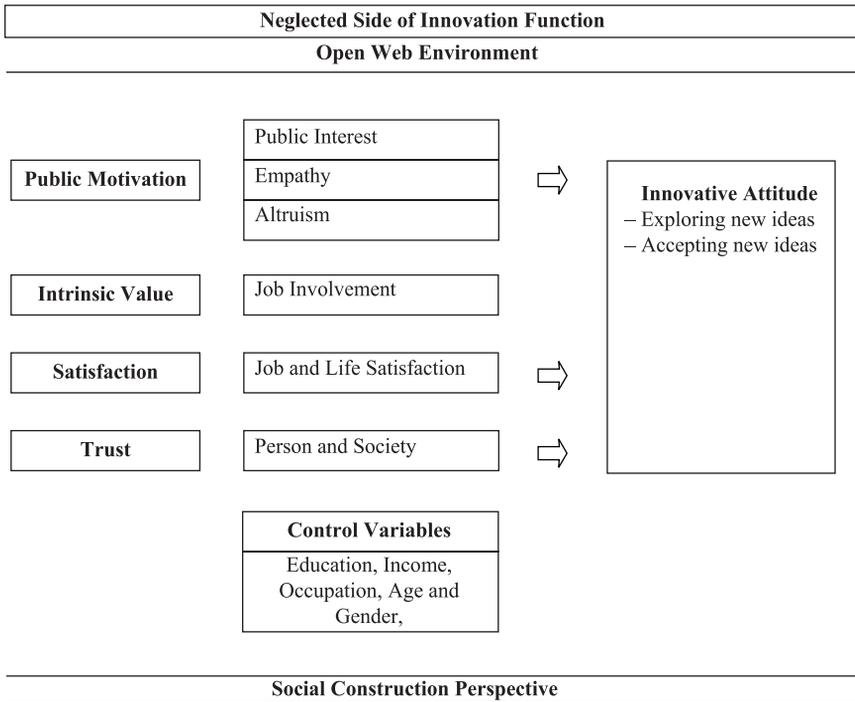
The questionnaire included job involvement and socio-demographic items. Job involvement is measured as a five-point Likert scale of the degree to like and enjoy her or his job. Gender (female = 1 and else = 0) and occupation (managerial or professional job = 1 and else = 0) is measured as a dummy variable. Age is measured as a continuous variable to represent the respondent’s age. Income is measured as eleven monthly income scale and education as six ordered scale from elementary school to graduate school. Significant contribution to the variance in the dependent variable was found by these control variables.

Research Framework and Empirical Models

Figure 2 shows a whole framework to represent our research hypotheses. This figure suggests that innovative attitude is a function of public motivation, satisfaction and trust. In addition, this function works under open web environment through social construction process. Innovation related activities are socially constructed through an interaction among various actors and institutions within the social context (Krishna, 2014; MacKenzie & Wacjman, 1999; Oudshoorn & Pinch, 2003). To put it simply, various open innovations can result from the process of social construction among public interest, empathy, altruism and trust. Thus, public motivations and intrinsic self-motivations such as satisfaction and self-efficacy are expected to influence innovation function within open innovation environment and social construction process.

Data analysis included descriptive statistics, frequency distribution and means table, and regression analyses such as OLS and ordered logistic regression. In order to explore relevant factors associated with innovative attitude, we introduce the following regression models.

FIGURE 2
Research Framework



Source: Author's own drawing based on relevant literature.

Ordered Logistic Regression Eq. (1-1) $INV1_i = \alpha_{11} + \beta_{11} \text{Public Interest}_i + \beta_{21} \text{Empathy}_i + \beta_{31} \text{Altruism}_i + \beta_{41} \text{Satisfaction}_i + \beta_{51} \text{Satisfaction}^2_i + \beta_{61} \text{Trust}_i + \beta_{71} \text{Trust}^2_i + \gamma_{k1} * X_k + \epsilon_{11i}$

Ordered Logistic Regression Eq. (1-2) $INV2_i = \alpha_{12} + \beta_{12} \text{Public Interest}_i + \beta_{22} \text{Empathy}_i + \beta_{32} \text{Altruism}_i + \beta_{42} \text{Satisfaction}_i + \beta_{52} \text{Satisfaction}^2_i + \beta_{62} \text{Trust}_i + \beta_{72} \text{Trust}^2_i + \gamma_{k2} * X_k + \epsilon_{12i}$

Ordinary Least Square Eq. (1-3) $INV12_i = \alpha_2 + \beta_{13} \text{Public Interest}_i + \beta_{23} \text{Empathy}_i + \beta_{33} \text{Altruism}_i + \beta_{43} \text{Satisfaction}_i + \beta_{53} \text{Satisfaction}^2_i + \beta_{63} \text{Trust}_i + \beta_{73} \text{Trust}^2_i + \gamma_{k3} * X_k + \epsilon_{2i}$

Dependent Variables: Innovative Attitude (INV1, INV2 and INV12)

Key Explanatory Variables: Public motivation (public interest, empathy and altruism), satisfaction and trust

Control Variables (X_k): Job Involvement, occupation, income, education, gender and Age

Empirical Results and Discussions

Descriptive Statistics for Preliminary Results

Table 2 presents descriptive statistics including mean, standard deviation, minimum value and maximum value for all variables in our empirical models. Average value of two innovative attitudes is respectively 3.22 (INV1) and 3.51 (INV2), where the value of INV2 (the degree to tolerate or accept new ideas) is higher than that of INV1 (the degree to explore new ideas). It implies that Korean citizens are more likely to accept new ideas than to explore them. The average values of key independent variables vary from the lowest value (satisfaction = 3.06) to the highest value (empathy = 3.92) within the recalculation of the five-point Likert scale. This implies that citizens' job or life satisfaction in South Korea is relatively low, but the level of empathy for others is relatively high among key independent variables. It would be interesting to compare the relative impacts between satisfaction and empathy on innovative attitude. For example, if there would be a strong

TABLE 2
Descriptive Statistics (N = 3,188)

<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Minimum</i>	<i>Maximum</i>
INV1	3.22	0.89	1	5
INV2	3.51	0.82	1	5
INV12	67.39	14.68	20	100
Public interest	3.26	0.79	1	5
Empathy	3.92	0.77	1	5
Empathy ²	15.93	5.77	1	25
Altruism	9.9	1.79	3	15
Satisfaction	6.12	1.6	2	10
Satisfaction ²	40	19.43	4	100
Trust	6.3	1.52	2	10
Trust ²	42.05	18.89	4	100
Job involvement	3.29	0.79	1	5
Education	4.23	0.99	1	6
Income	4.72	2.31	0	11
Manager	0.15	0.35	0	1
Female	0.49	0.5	0	1
Age	43.41	13.63	19	81
Age ²	2,070.11	1,215	361	6,561
Age ³	106,214.68	88,290.98	6,859	531,441

Source: Authors' own table based on statistical analysis of the Gallup online survey data.

relationship between empathy and innovative attitude (INV2) to accept new ideas, rather than to explore them (INV1), then the nature of innovation characteristics in South Korea would be likely to accepting new ideas rather than exploring them.

Table 3 shows the distribution of average values between higher and lower levels within key independent variables. Table 3 provides three preliminary findings about various potential relationships between key independent variables and innovative attitude. First among them is whether these relationships exist. As shown in Table 3, it appears there might be a positive relationship between them in all of independent variables, that is, an overall increase in all these factors and an overall increase in innovative attitude. A second point is to identify whether there is a curvilinear relationship between them. All average values of the lowest category for empathy, satisfaction and trust are respectively higher than those of the next lower. This suggests potential strong curvilinear relationships between empathy, satisfaction and trust, and innovative attitude. Figures 3, 4 and 5 may support these curvilinear relationships between them.

Empirical Findings from Ordered Probit Regressions

Estimation Model

Tables 4.1 and 4.2 provide an analysis of maximum likelihood estimates from the ordered logistic model (Eq. 1.1 and Eq. 1.2) including coefficients, their standard errors, the Wald chi-square test and p-values. We use the statistical procedure of

TABLE 3
Mean Distribution of Innovative Attitude by Key Independent Variables

	N	INV1	INV3
		Mean	Mean
Public Interest (Linear Distribution)			
1	55	2.85	3.13
2	381	2.96	3.2
3	1,570	3.16	3.4
4	1,050	3.38	3.75
5	132	3.68	4.06
Empathy (Curvilinear Distribution)			
1	20	3.30	3.20
2	92	3.11	3.38
3	695	3.11	3.27
4	1,711	3.20	3.50
5	670	3.43	3.84
Altruism (A1) (Linear Distribution)			
1	108	2.95	3.29
2	804	3.02	3.36
3	1,685	3.22	3.49
4	533	3.53	3.80
5	58	3.86	4.03

	N	INV1	INV3
		Mean	Mean
Altruism (A2) (Linear Distribution)			
1	24	3.04	3.17
2	131	2.91	3.15
3	1,092	3.10	3.27
4	1,574	3.27	3.62
5	367	3.50	3.92
Altruism (A3) (Linear Distribution)			
1	46	3.07	3.30
2	312	3.02	3.27
3	1,536	3.14	3.38
4	1,079	3.34	3.69
5	215	3.59	3.97
Satisfaction (Curvilinear Distribution)			
2	59	3.29	3.41
3	110	3.01	3.41
4	340	3.14	3.35
5	520	3.09	3.40
6	906	3.16	3.42
7	545	3.26	3.54
8	573	3.41	3.75
9	87	3.48	3.87
10	48	3.85	4.23
Trust (Curvilinear Distribution)			
2	34	3.21	3.35
3	85	3.19	3.28
4	286	3.11	3.23
5	392	3.10	3.40
6	1,056	3.19	3.40
7	527	3.24	3.62
8	677	3.30	3.71
9	78	3.71	4.22
10	53	3.72	4.13

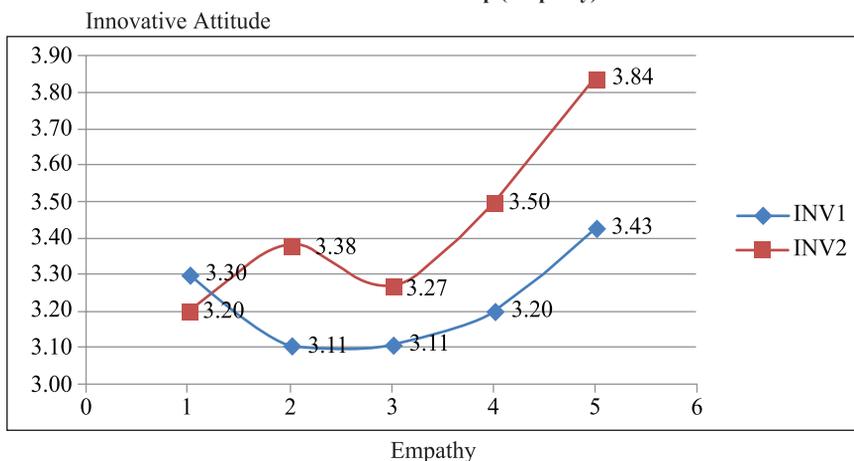
Source: Authors' own table based on statistical analysis of the Gallup online survey.

'Proc Genmod' at Statistical Analysis System SAS in order to estimate the ordered logistic regression. In Table 4.3, we additionally report OLS estimates for an easier interpretation at these ordered logistic regression results. The positive or significant signs from all estimates at the OLS model are almost the same as those from the ordered logistic regression models.

Pursuing New Ideas and Suggestions (INV1)

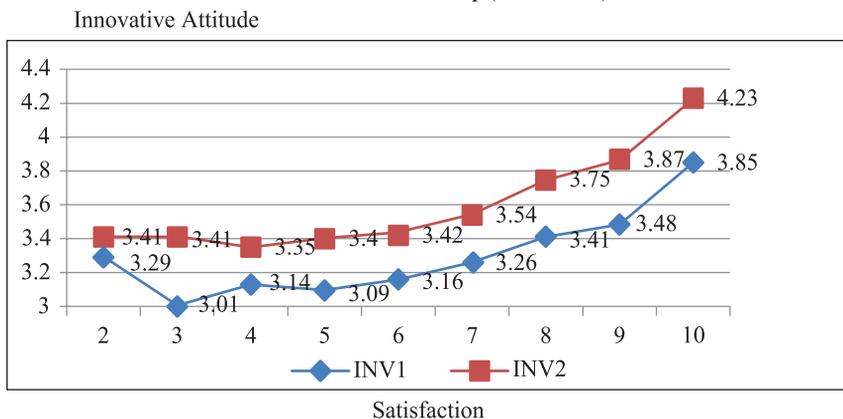
Table 4.1 shows what factors contribute to stimulating innovative attitude to explore new ideas and suggestions. Based on the sign for each coefficient, public interest and altruism have strong positive effects on the innovative attitude. We also find strong curvilinear effects of empathy and satisfaction on the innovative attitude, where both empathy and satisfaction have stronger effects than trust.

FIGURE 3
Curvilinear Relationship (Empathy)



Source: Authors' own graph based on Table 3.

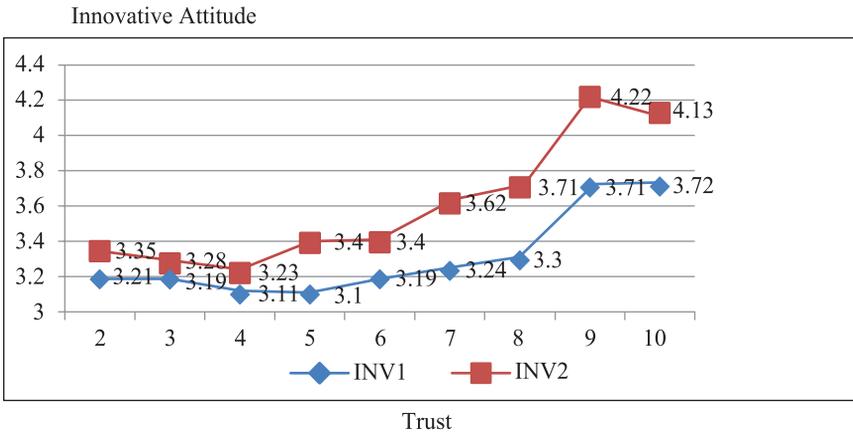
FIGURE 4
Curvilinear Relationship (Satisfaction)



Source: Authors' own graph based on Table 3.

These non-linear estimates imply that although strong empathy and satisfaction increases the possibility of innovative attitude to explore new ideas, strong antipathy and dissatisfaction can also facilitate the innovative attitude. In the same vein, while higher satisfaction involves a more innovative attitude to explore new ideas, a gray zone between satisfaction and dissatisfaction is less likely to generate the innovative attitude. In other words, even those with a strong dissatisfaction level are more likely to have innovative attitudes than those with a weak dissatisfaction level.

FIGURE 5
Curvilinear Relationship (Trust)



Source: Authors' own graph based on Table 3.

TABLE 4.1
Eq. 1–1 (Ordered Logistic Regression Model), N = 3,188

<i>Dependent Variable = INV1</i>	<i>Estimate</i>	<i>SE</i>	<i>Wald Chi-Square</i>	<i>Pr. > Chi-Square</i>
Intercept1	-2.514	0.767	10.76	0.001
Intercept2	0.015	0.766	0.00	0.984
Intercept3	2.007	0.766	6.86	0.009
Intercept4	4.230	0.771	30.13	< 0.0001
Public interest	0.193	0.054	12.68	0.000
Empathy	-0.818	0.300	7.47	0.006
Empathy ²	0.113	0.040	8.10	0.004
Altruism	0.159	0.026	37.23	< 0.0001
Satisfaction	-0.330	0.126	6.88	0.009
Satisfaction ²	0.030	0.010	8.52	0.004
Trust	-0.256	0.142	3.25	0.072
Trust ²	0.020	0.011	3.18	0.074
Job involvement	0.286	0.054	27.74	< 0.0001
Education	0.114	0.037	9.39	0.002
Income	0.050	0.016	10.45	0.001
Manager	0.171	0.099	2.96	0.085
Female	-0.064	0.069	0.85	0.358
Age	-0.046	0.016	8.19	0.004
Age ²	0.0003	0.0002	2.79	0.095

Statistical Package: SAS proc genmod
 Estimation Method = Multinomial Distribution and Cumulative Logit
 Log Likelihood -3,947.44

Source: Authors' own table based on statistical analysis of the Gallup online survey data.

TABLE 4.2
Eq. 1.2 (Ordered Probit Regression Model), N = 3,188

<i>Dependent Variable = INV2</i>	<i>Estimate</i>	<i>SE</i>	<i>Wald Chi-Square</i>	<i>Pr. > Chi-Square</i>
Intercept1	-3.457	0.744	21.6	< 0.0001
Intercept2	-0.694	0.743	0.87	0.3503
Intercept3	1.576	0.742	4.51	0.0337
Intercept4	4.367	0.765	32.59	< 0.0001
Public interest	0.253	0.056	20.57	< 0.0001
Empathy	-1.140	0.316	12.97	0.0003
Empathy ²	0.191	0.042	20.7	< 0.0001
Altruism	0.141	0.027	27.42	< 0.0001
Satisfaction	-0.514	0.125	17.01	< 0.0001
Satisfaction ²	0.047	0.010	20.56	< 0.0001
Trust	0.121	0.026	21.03	< 0.0001
Job involvement	0.271	0.056	23.75	< 0.0001
Education	0.126	0.039	10.69	0.0011
Income	0.055	0.016	12.16	0.0005
Manager	0.192	0.102	3.58	0.0585
Female	-0.244	0.071	11.84	0.0006
Age	-0.044	0.017	7.14	0.0075
Age ²	0.0004	0.0002	5.55	0.0184

Statistical Package: SAS proc genmod

Estimation Method = Multinomial Distribution and Cumulative Logit

Log Likelihood -3,554.47

Source: Authors' own table based on statistical analysis of the Gallup online survey data.

Among control variables, job involvement has a strong positive impact on promoting the innovative attitude. Socio-economic variables such as education and income have positive effects on the innovative attitude. There is no statistical difference in the degree of the innovative attitude between male and female.

Tolerating and Accepting New Ideas and Suggestions (INV2)

Table 4.2 presents statistical estimates from the ordered logistic regression for an innovative attitude to accept new ideas as ordered dependent variable. The empirical results in Table 2 are almost similar to those in Table 1. Both public interest and altruism variables are statistically strong to stimulate the innovative attitude to accept new ideas. Also, both empathy and satisfaction variables have strong curvilinear effects on the innovative attitude. It is expected that both stronger antipathy and dissatisfaction can generate more innovative attitude to tolerate new ideas in order to survive within a very competitive environment. Control variables such as job involvement, education and income are statistically significant with a positive sign. Female respondents in South Korea have lower willingness to accept new ideas than male respondents.

Table 4.3 presents statistical results from OLS estimates for an easy interpretation. The dependent variable is a sum of INV1 and INV2, representing the overall

TABLE 4.3
OLS [Dependent Variable = (INV12 = INV1 + INV2)]

	<i>Estimate</i>	<i>SE</i>	<i>t-value</i>	<i>Pr > t </i>	<i>STB</i>
Intercept	63.263	4.809	13.15	< 0.0001	
Public_Interest	1.744	0.380	4.59	< 0.0001	0.09
Empathy	-7.294	1.979	-3.69	0.000	-0.38
Empathy ²	1.138	0.264	4.31	< 0.0001	0.45
Altruism	1.220	0.181	6.73	< 0.0001	0.15
Satisfaction	-3.385	0.849	-3.99	< 0.0001	-0.37
Satisfaction ²	0.307	0.070	4.41	< 0.0001	0.41
Trust	0.409	0.178	2.30	0.022	0.04
Job_Involvement	2.193	0.379	5.79	< 0.0001	0.12
Income	1.013	0.269	3.76	0.000	0.07
Education	0.437	0.111	3.94	< 0.0001	0.07
Manager	1.538	0.701	2.19	0.028	0.04
Female	-1.281	0.496	-2.58	0.010	-0.04
Age	-0.394	0.116	-3.40	0.001	-0.37
Age ²	0.003	0.001	2.43	0.015	0.26
R-square = 0.175					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	14	120,198	8,5586	48.07	< 0.0001
Error	3,173	566,736	178.6		
Corrected Total	3,187	686,934			

Source: Authors' own table based on statistical analysis of the Gallup online survey data.

Notes: STB = Standardized Coefficients (Beta).

innovative attitude ranging from 20 point to 100 point. Public interest and altruism have strong linear effects on the overall innovative attitude. For instance, an increase in one unit of public Interest generates more 1.744 point of the innovation score. Empathy and satisfaction variables have strong curvilinear effects on the innovation propensity but trust variable does not. Among other control variables, job involvement variable increases the largest score for innovation score. One unit increase in job involvement leads to 2.193 points more for the innovation score. The innovation score for female respondents is lower than for male respondents by 1.281 point.

Public Motivation and Open Innovation

Our findings suggest that public motivations including public interest, empathy and altruism appear to be a crucial fundamental factor for open innovation. While economic and other various rewards are an important factor to stimulate innovative efforts, public interest, empathy and altruism are increasingly vital factors for open innovation within and around numerous web-based network environments (Antikainen, Makipaa, & Ahonen, 2010). Rational choice model is still a powerful theory to explain as to why people attempt to innovate business process and

products (Lerner & Tirole, 2000, 2005). For example, open source contributors participation in the community business with future expected returns found in the Wikinomics model (Tapscott & Williams, 2008). However, despite the self-interest based investment in open innovation, there are still social motivations for a collective good without returns. Public motivation model is now widely present as a new model for open innovation across market, non-profit sector and government. Public motivation can contribute to facilitating and prolonging open innovations through its several inherent components. Three noteworthy things among them are: (a) reducing market failure problems such as externality and free ride, (b) transaction costs and coordination problems at various innovation processes and (c) reducing risk and uncertainty through civic participation and altruistic commitment.

First, open innovation is usually free with a positive externality where most people don't have to create innovation and just enjoy it without cost. This leads to less investment in open innovation that is a highly valuable to society (von Hippel, DeMonaco, & de Jong, 2014). However, altruistic innovative groups can solve this market failure and beat self-interested groups (Wilson, 2015). As a good collaborator, an altruistic innovative citizen can co-create and co-produce socially valuable things through new ideas. The altruistic people may get a long-term reputation from their altruistic contribution in a society with inclusive institutions and cultures where open innovations persistently generate.

Second, public motivation can reduce transaction costs involved in the innovation process. Public collective intelligence can diminish such costs through tackling agency problems such as moral hazard and opportunistic behaviour. Public motivation can alleviate the transaction costs through public mission orientation and altruistic collaboration.

Third, public motivation facilitates civic participation that breeds community cooperation through suggesting and exchanging new ideas for community problems. Civic participation plays a key role of promoting various types of democratising innovations including open source movement and citizensourcing. Many open innovations result from community-based civic participation with a high level of public motivation.

Implications and Future Research

Implications for Civic Participation and Social Innovation

This article shows that public motivation such as public interest, empathy and altruism have strong effects on innovative attitudes to explore and accept new ideas. This finding supports the idea that recent open and social innovations come from prosocial motivations. Public motivation will be expected to contribute to providing sustainable open innovations. In other words, the factor of public motivation is crucial to open innovation function and creative economy. It is necessary to explore when and how public motivation can significantly facilitate civic participation for social innovations ignored by the market and business world.

In addition, satisfaction for job or life is a significant factor to stimulate such innovative attitudes. Self-motivations such as job satisfaction and engagement can contribute to stimulating innovative ideas and attitudes. Another finding about the curvilinear effects of empathy and satisfaction imply that both antipathy and dissatisfaction can generate innovative enthusiasm. It is still unclear whether these nonlinear effects are robust across different creative performance scales and why the non-linear effects occur. Overall, the higher level of empathy and satisfaction can stimulate much more innovative attitude than antipathy and dissatisfaction. Future innovation research is needed to tackle how intrinsic aspirations, comparing with extrinsic aspirations, can effectively contribute to designing and implementing social innovations.

Further Research for Open Innovation Function in Collaborative Economy

We find that such variables as public motivation, satisfaction and trust are significantly associated with innovative attitudes. These factors are intrinsic motivations, rather than extrinsic motivations, promoting creativity. Recent case studies have suggested the importance of open innovations across various issues including innovative and open knowledge cities (Inkinen, 2015; Yun, 2015), green governance (Cooke, 2015), platform business model (Han & Cho, 2015), public design (Pancholi, Yigitcanlar, & Guaralda, 2015) and demand-side open innovation (Kodama & Shibata, 2015). It is expected that such intrinsic motivations as public interest, altruism, empathy, satisfaction and trust have strong effects on the emergence of the collaborative and sharing economy. However, more research on a relationship between intrinsic motivation and open innovation still remains untouched.

First, there are various extrinsic and intrinsic motivations involved in open innovations. The potential factors include from long-term extrinsic rewards such as reputation gains and future career opportunities to self-intrinsic motivations such as job satisfaction, self-efficacy and professional competence (Shapiro & Varian, 2004). All these factors are socially constructed and differently interacted with innovative processes across cultures and societies. We need a more systematic evidence about how extrinsic, intrinsic and public motivations are socially related to innovative process and ideas. There is also little empirical evidence on whether extrinsic motivations are crowding in or crowding out intrinsic motivations. In addition, further research is required to explore not only how public motivations are linearly or non-linearly related to open innovation function, but also whether there is a simultaneous relationship or causal mechanism between them.

Second, there is a need for research on how interactions between institutions, cultures and individual innovators can influence open and social innovations. In terms of different institutional environments and cultures, comparing different innovation models across societies and countries can contribute to developing a new theory of the relationship between open innovation and governance (Jeon, Kim, & Koh, 2015; Roy et al., 2015). Those with a higher level of public motivations are likely to build strong social institutions that can stimulate community-based innovations for citizens and common goods. Good social institutions

based on strong public motivations can generate strong reputation and legitimacy for sustainable social innovations. We need to explore what intrinsic and extrinsic motivations are effective to build strong social institutions for social innovations across countries, multinational firms, universities and globalised human resources (Andújar, Cañibano, & Fernandez-Zubieta, 2015; Kahn, 2015; Patra & Krishna, 2015; Yoon & Jeong, 2015; Wong, Hu, & Shiu, 2015). Gilman (2015) suggests that participatory governance can induce inclusive environment to bring civic society, industry and government together and facilitate new social innovations overcoming bureaucratic barriers.

Third, new digital technologies are increasingly expected to create a variety of open innovations. For instance, radio frequency identification (RFID) can provide radical open innovation opportunities at both public organisations and business world in terms of interactive network effects, information sharing and demand side participation (Jung & Lee, 2015). Future research about an interaction between digital technologies, co-construction and public motivations will provide a new picture for open innovation. In addition, it is required to do further research on how intrinsic values and trust, compared to extrinsic values and incentives, can influence the process of social construction between technology and society. Little empirical research has yet explored whether relational motivations can perform better to promote innovative attitudes than rational incentives.

Appendix 1

Definitions and Measurements

<i>Variable</i>	<i>Definition and Measurement</i>
INV1	How much do you agree that you want to explore new ideas and suggestions? ① Strongly disagree ② Disagree ③ Neutral ④ Agree ⑤ Strongly agree
INV2	How much do you agree that you want to accept new ideas and suggestions? ① Strongly disagree ② Disagree ③ Neutral ④ Agree ⑤ Strongly agree
INV12	$(INV1 + INV2) \times 10$ (Cronbach Alpha = 0.63)
Job Involvement	How much do you agree that you enjoy doing your job? ① Strongly disagree ② Disagree ③ Neutral ④ Agree ⑤ Strongly agree
Public Interest	It is important for me to contribute to promoting public interest? ① Strongly disagree ② Disagree ③ Neutral ④ Agree ⑤ Strongly agree
Empathy	I feel sympathetic to the plight of the underprivileged. ① Strongly disagree ② Disagree ③ Neutral ④ Agree ⑤ Strongly agree
Empathy ²	Empathy \times Empathy
Altruism (A1 + A2 + A3)	(A1) Making a difference to society means more to me than personal achievements. (A2) Serving other citizens would give me a good feeling even if no one paid me for it. (A3) People should give back to society more than they get from it. Each item is measured by a five-point Likert scale from strongly disagree to strongly agree. Cronbach Alpha = 0.64

<i>Variable</i>	<i>Definition and Measurement</i>
Satisfaction (S1 + S2)	(S1) How much are you satisfied with your job? (S2) How much are you satisfied with your life? ① Very dissatisfied ② Dissatisfied ③ Neutral ④ Satisfied ⑤ Very Satisfied (Cronbach Alpha = 0.71)
Satisfaction ²	Satisfaction × Satisfaction
Trust	(T1) How much do you trust others? (T2) How much do you trust your society? ① Strongly distrust ② Distrust ③ Neutral ④ Trust ⑤ Strongly trust (Cronbach Alpha = 0.75)
Trust ²	Trust × Trust
Education	1 = elementary school; 2 = middle school; 3 = high school; 4 = two-year college; 5 = four year college and 6 = graduate school
Income	Respondents' household income (Unit = 10,000 Korean won) from zero to eleven scale
Manager	If respondents are managerial or professional position, then Manager = 1; otherwise Manager = 0
Female	If respondents are female, then Female = 1; otherwise Female = 0
Age	Respondents' age (continuous variable)
Age ²	Age × Age

Appendix 2

Frequency Distribution of Innovative Attitudes

	<i>INV1</i>		<i>INV2</i>	
	<i>Frequency</i>	<i>%</i>	<i>Frequency</i>	<i>%</i>
1 = Strongly disagree	89	2.79	24	0.75
2 = Disagree	545	17.1	305	9.57
3 = Neutral	1301	40.81	1166	36.57
4 = Agree	1067	33.47	1394	43.73
5 = Strongly agree	186	5.83	299	9.38

NOTE

1. For instance, positive affect relates positively to creativity in organisations (Amabile, Barsade, Mueller, & Staw, 2005). Happy moods can expand memory capacity that facilitates new connections and insightful innovations (Isen, 1987). Satisfied individuals normally outperform sad or neutral-mood individuals on creative problem-solving.

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