Creative participation in construction firms: bridging creativity and innovation

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Research paper

AN INTRICATE EVOLUTION OF MAINSTREAM THEORIES FOLLOWS THE GROWING NEED TO EXPLAIN EMPLOYEES' COMMITMENT AND ENGAGEMENT. Our understanding of these work-related phenomena and behaviour has improved but creativity and innovation as desired indicators are still often treated as coexisting constructs with very little attention given to a state of willingness of an individual to even consider contributing ideas. In this research we investigate the influence of knowledge and understanding, perceived radicality, personality dimensions, and favouring of ideas on employee willingness to creatively participate in order to trace its existence in propagation of ideas. A total of 76 construction and non-construction professionals participated in between-subject quasi-experiments. We also proposed IPO-based radicality of ideas construct from the viewpoint of employees involved in the processes of transformation. The research findings show that experts with deep understanding of the work are more likely to contribute highly radical ideas to decision-makers than less knowledgeable employees. Furthermore, personal factors that impact employee willingness to creatively participate have been valued higher than organisational factors. Personality dimensions by The Big-Five Inventory have shown no effect on willingness to contribute ideas, while favouring of ideas showed a significant effect. In general, the findings show similarities with some studies of consumer willingness to participate in co-creation processes and thus indicate that firms may be studied as dynamic internal markets of ideas.

Keywords

creative participation, ideas, personality, radicality, creativity, innovation creative participation, ideas, personality, radicality, creativity, innovation

INTRODUCTION

Committed and highly engaged employees that are passionate about their work represent the backbone of successful companies (Bakker and Schaufeli, 2008; Ho et al., 2011). Many scholars have argued for decades that successful companies rely on entrepreneurial innovations of their teams and individual employees (Chadwick and Dabu, 2009; Hitt et al., 1997). It has also long ago been established that such employees are devoted to a task and generate more ideas or solutions to potential problems (Simon, 1955). However, a creative idea can only become an innovation or a solution to a problem if it is transformed from a concept into reality (Roffe, 1999). By providing ideas, an individual is, therefore, clearly at the crux of this transformation (Mumford, 2000). Whilst creativity in this form is recognized as an important underpinning of innovation (Oldham and Cummings, 1996; Zhou, 2003), most of the research on the subject has focused on the outcomes of creative processes (Zhou and George, 2003). Scholars that conceptualize creativity as a process are still forming an emerging field of enquiry (Gilson, 2008; Lubart, 2001). However, even in these studies the question whether an individual is willing to contribute the generated ideas before their implementation has rarely received deserved attention. In response to this gap, it is not surprising that Zhang and Bartol (2010) call for future research to focus on studying how employee involvement in the implementation phase competes with creative process engagement. One might get closer to answer the question by looking at behavioural facets of intrinsic motivation and domain-relevant skills that have been extensively studied within the arena of creativity research (Amabile, 1996; Amabile et al., 1994). These past investigations show that intrinsically motivated employees dedicated more time to task completion and were also far more committed, but it remains unclear whether they would also demonstrate greater in-task willingness to contribute creative ideas in general. Complementary studies reveal that motivational orientation can change depending on the social contexts in which individuals interact (Amabile, 1979; Lepper et al., 1973), as well as their individual differences in responding to these contextual differences (Deci and Ryan, 1985; Hirst et al., 2009). The extant literature on creativity clearly recognizes the importance of individual differences, but they focus on their impact on behaviour, and there is a dearth of scientific investigations on the individual state of willingness to creatively participate.

The above question has received some attention in studies on consumer creativity, where willingness-driven creative participation is defined as consumers' co-creation (Lan, 2007). In this particular inquiry findings show that consumers are unwilling to engage in creative participation if they perceive the creative process as unnecessary. Looking at this phenomenon from an interactionist perspective, businesses and consumers thus engage in mutually adaptive systems of actions (Anderson et al, 1998). Although contextually different, this dynamic mutuality relates back to intrinsic motivation, pointing at a possibility that even engaged and intrinsically motivated employees may not be willing to contribute ideas at some point in time if they, for one reason or another, perceive this as unnecessary or even undesirable. Perception may significantly influence an individual's willingness to creatively participate regardless of whether one is investigating a consumer or an employee. It has been suggested that in groups with diverse levels of talent and salient characteristics willingness to creatively participate may be an important mediating variable that gives strength to work groups' acceptance and shapes their subsequent cognitive processes (Milliken et al., 2003). Historically, creative personality and creative talent have been given a lot of attention (Isaksen and Puccio, 1988; MacKinnon, 1965), but surprisingly little is known about employees' willingness to creatively participate from their own individual perspective.

To address the above gaps in research on employee willingness to creatively participate, this study aims to contribute to extant literature in three ways. First, we build on previous related research to progress the conceptualization of factors that potentially affect willingness to creatively participate with either positive or negative outcomes.

Second, relating to previous research we progress the conceptualization of radicality and investigate whether different levels of radicality of generated ideas influence employees' willingness to creatively participate with more or less work-related groups of people.

Third, we investigate the relationship between knowledge and understanding, perceived radicality, personality dimensions by the Big Five Inventory (BFI), and favouring of ideas on one hand and employee willingness to creatively participate on the other, by administering between-subject quasi-experiments involving 76 participants. A more detailed overview of the research design is provided later in the text.

The above contributions are valuable because individuals often work in groups and teams where effective utilization of individual resources determines group/team success (e.g. Taggar, 2002). Furthermore, to our knowledge, this is the first study to investigate willingness to creatively participate as defined above from the viewpoint of employees who are involved in the processes of transformation.

Relevant theories

Motivation Theories

Interest in the interplay between work environment, personality, and employees' engagement can be traced back through various employee motivation

theories to the early works of Taylor (1917), Maslow (1943), Weber (1947), Fayol (1949), Hertzberg (1964), Mintzberg (2004) and many others. Taylor's (1917) and Weber's (1947) immediate concern with work standardization is restricted by their mechanistic interpretation of what we now understand as a socially complex work environment, but even they recognize the need for employee engagement. Fayol (1949) is not dissimilar in highlighting the inefficiency of employee dissatisfaction and high turnover. Maslow (1943) then clearly moves away from the mechanistic view of the scientific management theorists by expressing innate interest in motivation. Maslow (1947) recognized the existence of the hierarchy of needs that are exerted differently by individuals, but his later work, and even the whole body of literature around his principles, did not profoundly address the issue of inherent willingness to contribute new ideas and is purely directed towards work motivation. Mintzberg (2004) is also less of a conformist, and believes managers are the ones who create the work atmosphere through often informal communication, but is far less clear about an individual as a dynamic source of new ideas. Hertzberg's (1964) motivators and hygiene factors come perhaps even closer by recognizing achievement, recognition, responsibility and advancement as some of the most important motivators, but again he was concerned purely with motivation for work, with little attention to possible new ideas in everyday problem-solving situations.

More recently, and in addition to related literature on human resource management (e.g. Binyamin and Carmeli, 2010; Snell and Dean, 1992) and social psychology (e.g. Bakker et al., 2008; Langelaan et al., 2006), several arenas of inquiry have been developed that delve into the specifics of mainstream management theories directly related to creative participation.

Organizational Citizenship Behaviour

Organizational citizenship behaviour (OCB) begins with Katz's (1964) identification of three basic types of behaviour, one of which is particularly relevant to the current understanding of OCB and the proposed view on the willingness to creatively participate. However, OCB's definitive beginnings are associated with Smith et al. (1983), Organ and Konovsky (1989). According to the former, much of OCB has an altruistic character culminating in prosocial behaviour, and as they suggest this is something other than productivity. Although indirectly, they recognize that individual differences affect OCB in a similar way as suggested here, but their focus is on generic altruistic behaviour rather than specific circumstances that require ideas generation and contribution (e.g. problem solving situations). Later Podsakoff et al. (2000) reach much further by recognizing induced change from voluntary acts of creativity and innovation directed towards improvement of tasks and organizational performance. Choi (2007) then shows that such change-oriented OCB is significantly influenced by strong corporate vision and innovative climate, but acknowledges that: "The present study, however, did not include individual characteristics that might interact with contextual variables to influence employees' inclination to suggest constructive changes" (Choi, 2007, p.482). Although Bettencourt (2004) investigates situational influencers and individual disposition variables, and finds that they are both significant positive antecedents of change-oriented OCB, the study itself relates to a very narrow context of retail associates recognizing that work-role innovative behaviours are not yet fully considered. Perhaps LePine and Dyne (2001) are the closest to understanding willingness to creatively participate by showing that some individual characteristics lead employees to be more willing to either engage in conversations about improvement ideas or speak up and be counted.

Creativity and Innovation

Whilst OCB scholars study behavioural constructs and recognize that they are underpinned by individual commitment to behave in a particular way, they do not investigate creative participation as such. On the other hand, there are theoretical and empirical reasons to seek relevance in studies of creativity and innovation to better understand the role and the nature of willingness to contribute ideas.

Drivers for employees' intrinsic willingness to contribute and not just generate ideas have gained increased attention by those who recognize their importance for innovation (Morgan and Wang, 2010; Stüer et al., 2010). Furthermore, Van de Ven et al. (2008) and West (2001) consider ideas generation and their implementation as two distinct stages. Scott and Bruce (1994), Van Dijk and Van den Ende (2002) are even more specific by acknowledging that ideas need to be developed and shared with individuals and teams responsible for their implementation before they are implemented. They further find that ideas could be lost and innovation, regardless of its manifestation, would never even be born if employees are unwilling to make their contribution. This kind of an internal brain-drain is difficult to measure and is often unaccounted for, inevitably resulting in reduced competitiveness against organizations that manage to align themselves more closely with their employees' individual approaches (Chell and Athayde, 2009). All of this indicates that willingness/unwillingness to creatively participate is a construct that is well embedded in the literature, but lacks explicit recognition. Most studies provide implicit evidence that willingness to creatively participate is a fundamental requirement for an idea to become a constitutive component of innovation. This interface between ideas generation and their implementation has been recognized in some of the more recent studies. Martínez-Sánchez et al. (2011),

Howell and Boies (2004) and Janssen (2003) have distinguished "ideas promotion", "championing individuals", "ideas development" and so on as a separate stage. However, the role and the nature of these phases in relation to creativity or innovation are still somewhat unclear. For instance, one of the key unanswered questions is what stimulates willingness to creatively participate. There is clearly an agreement in the literature that contextual, as well as personal factors should be taken into consideration, whether one studies OCB, creativity or innovation.

positive correlation between all of these factors and innovativeness (Adair, 1990; Glynn, 1996; Kanter, 1983; Quinn, 1985; West, 2001).

Willingness to creatively participate may well be influenced by similar factors, but there might also be other factors that would otherwise have no effect on one's ability to generate or implement ideas. This study examines the existence of the impact of various factors on willingness to contribute ideas from the viewpoint of employees who are involved in the processes of transformation.

ganisation can represent an enabler by helping to recognise, develop and implement individual contributions. Figure 1 illustrates a proposed framework of the presented antecedents of willingness to creatively participate as a dynamic interface between creativity and innovation.

Knowledge and Understanding

Although it is not the purpose here to study knowledge per se, it can be defined from the cognitive perspective as a collection of facts where knowing is a self-referential state, whilst understanding is a human ability to gain the meaning

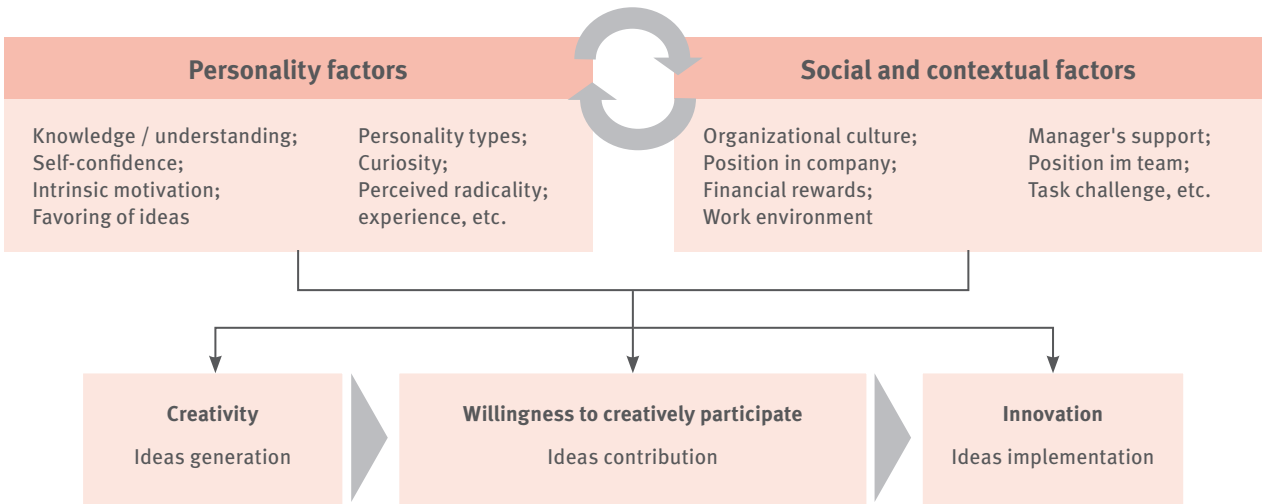

Figure 1 **Willingness to creatively participate as an interface between idea generation and idea implementation**

Human creativity and innovativeness are necessarily based on intrinsic personality characteristics where organizational settings help or hinder further development and transformation of ideas into meaningful solutions. Barron and Harrington (1981), Csikszentmihalyi (1992), Feist (1998), Furnham et al. (2009) and Weisberg (1999) all found a positive correlation between creativity and personal factors like knowledge, intrinsic motivation, curiosity, intelligence, self-confidence and personality types. These findings were also reaffirmed by Amabile (1996), Oldham and Cummings (1996), and Shalley et al. (2004). Although they include flexibility, innovation scholars have also found

Antecedents of Creative Participation and Hypotheses

Following from the aforementioned literature, willingness to creatively participate could be dependent upon employees' personal characteristics and contextual influences. On one hand environmental factors at the team and organizational levels, including organizational culture and climate, support and encouragement, are the ones that influence willingness to make creative contributions, but personal characteristics should also be taken into consideration (Delbridge and Whitfield, 2001; Woodman et al., 1993). Being "willing" could, therefore, be based on intrinsic personal characteristics, whilst an or-

of acquired knowledge by interconnecting seemingly disconnected knowing through experience (Luhmann, 1990; Newton, 1996). Creative ideas can be generated regardless of the level of knowledge, but it can be tremendously difficult if not impossible to independently contrast their value in a particular problem-solving situation (Glover et al., 1989). This is supported by Sternberg et al. (1997) who found a positive correlation between knowledge and creativity. Knowledge has also been emphasized as a necessary component for effective group interactions and exchange of ideas (Ahmed, 1998). The influence of knowledge on one's willingness to creatively participate is, therefore, expected in the following manner:

Hypothesis 1a: Employees with greater knowledge and understanding of a particular activity will be significantly more willing to generate and contribute ideas that relate to this activity than employees with less knowledge and understanding of the activity.

Perceived Radicality of Ideas

If the above hypothesis is confirmed, we would further expect that knowledge will play a role when it comes to a question of how radical a particular idea is from a viewpoint of an employee involved in an activity with all of its inputs, processes of transformation and outputs. The notion that ideas can be more or less radical is not new. Radicality in some instances (Bessant and Tidd, 2007) and radicalness in many others (Damanpour, 1988) are defined, but only from an external observer's viewpoint. There are even some who intentionally evade providing a unified definition to avoid further confusion that exists in the literature (Ehrnberg, 1995; Silverberg, 2002). In most cases changes are viewed either as radical or incremental, whether they focus on technical content or outputs of a production process. However, individuals involved in a particular production process may have views on such changes that significantly differ from those of external observers. Despite its inherent limitations, the objectivist description of production processes through Input-Process-Output (IPO) models was widely applied in scientific management spilling over to modeling team effectiveness and innovation processes (e.g. Barrick et al., 1998; Curral et al, 2001). Nevertheless, whilst recognizing that viewing changes as more or less radical is inherently subjective, no attempt has been identified that would look at creative changes within the IPO-defined production processes from a viewpoint of an employee involved in the processes of transformation.

From an employees' viewpoint, some ideas may well yield much more profound changes, whilst others may result in incremental and hardly visible adjustments, none of which could be visible to an external observer. In essence, they can vary in terms of a degree to which the idea reflects an incremental versus radical change and can relate to problems, products, organizational structures and services (Halinen et al., 1999; Mumford and Gustafson, 1988). Such on the go ideas may not yield any visible change in the outcome, nor substantiate new information or knowledge, and may pose very limited risk with little or no additional costs. So far differentiation in the form of radicalness has mostly been made in relation to an end product of the innovation process (Damanpour, 1988; Rice et al., 2001). Radicalness has been defined in various different ways (i.e. degree of change, novelty, requirements of new information and knowledge, and in terms of risk and cost). However, creative participation does not necessarily relate just to an end result of innovation in its purest sense and can also represent responses to every day problem solving situations that may not even be recognized as innovations. It is for this reason that radicality of ideas construct could be utilized when changes materialize within processes of transformation without any visible differences in outputs from the perspective of those involved in the processes of transformation. By constituting processes of transformation, employees may have very different perceptions of the radicality of ideas compared to external observers, and that could represent a barrier to creative participation. Some employees may have little reservation in contributing highly radical ideas, whilst others could find even a prospect of sharing a perceived highly radical idea with work colleagues or line managers unimaginable. We therefore suggest that the IPO models can be applied to investigate perceived radicality of ideas from a viewpoint of individuals involved in the processes of transformation in the following way:

Hypothesis 1b: Employees with greater knowledge and understanding of a particular activity will be significantly more willing to generate and contribute higher radical ideas that relate to this activity than employees with less knowledge and understanding of the activity.

The Big Five Inventory

It needs to be acknowledged that personality traits, assessments and more specifically the BFI have historically received a lot of criticism (e.g. Block, 1995; Gentry et al., 2007). However, more recent support and evidence show that the BFI has emerged as the paradigm for studying personality traits and their wider influence (John and Naumann, 2010). In addition and against the prevailing skepticism (e.g. Low and MacMillan, 1988), numerous recent entrepreneurship studies reveal that personality traits play a role when it comes to entrepreneurs' ingenuity (Marcati et al, 2008; Rauch and Frese, 2007). Similar findings span across innovation and creativity related research as well (Barron & Harrington, 1981; Gough, 1957; Sternberg, 1999). Furnham et al. (2009), for instance, found creativity to be positively correlated with Extraversion, Openness to Experience and negatively to Agreeableness. Batey et al. (2009), on the other hand, have found that only Openness to Experience is positively correlated with creativity, whilst there is a negative correlation between Neuroticism and creativity. Nevertheless, there is evidence that sometimes certain behaviours are misinterpreted as personality traits (Morris et al, 1999). The limitations of personality assessments on one hand and recent support on the other have led us to include the BFI as it may show personality differences in relation to willingness to creatively participate:

Hypothesis 2: Taking into account the BFI, employees who are of a particular personality dimension generate and contribute significantly different numbers of ideas than employees of other personality dimensions.

Favouring of Ideas

Favouritism to the sources decision-makers trust is well documented, particularly in the entrepreneurship literature. Zahra et al. (2006), for instance, show that whilst trust is recognized as conducive to entrepreneurial activities, excessive relational trust often leads to favouritism where ideas are only accepted from trusted sources. This is seen as particularly detrimental to new venture development where promoters of often radical ideas have to work hard to win recognition from the management (Kanter, 1983). Zahra et al. (2006) further suggest that in order to maintain trust champions of new ideas may themselves become biased favouring those ideas that their managers like. Favouritism of this kind is not limited just to entrepreneurs and has been reported in groups where members of a particular group would favour their own ideas over ideas suggested by members of other groups (Moscovici and Zavalloni, 1969; Nishii and Goncalo, 2008). Burgelman and Grove (1996) provide an even deeper insight by showing that high-influence parts of an organization benefit from such favouritism at the expense of units at the periphery, a form of intra-organizational provincialism.

The protective behaviour expressed through favouring may be a result of value-claiming as reported by Edmondson et al. (2003), but it could also stem from different personal characteristics. An individual may have an optimal idea that would solve a particular problem, but for some reason favours a less optimal one. In addition, the other team members may be similarly restrained favouring potentially less disruptive and also suboptimal ideas. Contributions of a series of sub-optimal ideas may thus result in a sub-optimal solution. All of this indicates that favouring of ideas could potentially influence willingness to creatively participate in the following way:

Hypothesis 3: When employees generate several alternative ideas they would be more willing to contribute their favourite ideas depending on whom these ideas would be contributed to within and outside of the organization.

Methods and Experimental Design

Overview of Methods and Design

To test the abovementioned hypotheses, a nonrandomized between-participants quasi-experimental design that involved several experimental tasks and a series of questionnaires is applied. The independent variables that were manipulated through the experimental tasks were knowledge and understanding (low, medium, high), perceived radicality (low, medium, high), five personality dimensions by the BFI (Extraversion, Consciousness, Openness to Experience, Agreeableness and Neuroticism) and favouring of ideas (5-point Likert-type scale from "do not like very much" to "like very much"). On one hand, experiment was necessary because no data on willingness to creatively participate currently exists. In addition, an experiment offers an opportunity to manipulate a set of variables in controlled conditions and could also include questionnaires and/or interviews (McGuigan, 1978). Unfortunately, not many studies on creativity and innovation include any form of experiments (Sternberg, 1999). Although providing a greater amount of analyzable data, the exclusive use of surveys and interviews is overly subjective. They depend on snapshot style self-reports of human behaviour and provide the researcher less control over the situation under investigation (De Vaus, 2002; Furnham, 2005). Similarly, lack of control and a time scale are the two major drawbacks of purely ethnographic observations, although they may provide a qualitative insight rarely available through other methods.

The crux of the experiment was to trigger a creative process and then evaluate employees' willingness to contribute ideas. It involved images of three different, but equivalent structures and participants were asked to generate as many creative changes or improvements as possible. "Taipei 101" (building structure), "The Great Belt East Bridge" (bridge structure) and "Queen Mary II" (ship structure) are the three structures representing three different industrial sectors that were selected according to a set of equivalence criteria which were necessary to ensure comparable depiction of the three structures.

Because the distribution of the population is unknown the data needed to be analyzed using a suitable nonparametric method. Friedman ANOVA test was used in the investigation of knowledge/understanding differentiation. Box plots have been used to visually present the factors that drive participants to contribute ideas showing range, median, mean and quartiles.

Sample

We invited construction professionals with experience limited to building construction and non-construction professionals with no construction or any other engineering experience. The non-random sample was composed of the 76 individuals to participate in the experiment, 38 were from construction companies (experimental group) and 38 were from non-construction companies (control group). They come from a number of different countries (UK 29%, Continental Europe 16%, China 15 % and other countries 40%). The age of the participants across two groups ranged from 21 to 54 years (average 31 years). At the time of the experiment, 32% of participants were senior managers, 27% junior/middle managers and the other 41% holding non-managerial positions with average company tenure of 5 years.

The groups were deliberately diverse to minimize confinement to a particular social or cultural background and whilst none of these age and cultural parameters was taken into consideration, they represent substantial diversity that could potentially lead to generalization through further non-randomized and randomized investigations beyond the scope of this study.

Dependent and Independent Variables

Manipulation of independent variables is based on differentiation within each of the factors representing an individual variable (see Figure 2). The differentiation of this kind improves the ability to manipulate variables, but even more importantly it enables investigating effects of such manipulations on the observable dependent variable.

Although the procedure itself is presented later in the paper, some reference to procedural reasoning and approaches have to be revealed earlier for better illustration of included variables.

Willingness to creatively participate. Participants' willingness to creatively participate represents a dependent variable to be measured as the number of contributed ideas to different groups of people, and depending on their knowledge/understanding, perceived radicality, favouring and personality dimensions by the BFI. Implicit measures are used because they are less prone to conscious control and they have been widely used in psychology literature (Dunn, 2009). For instance, participants were unaware that there were expert and non-expert groups in the experiment. They were also unaware that ideas prepared in advance were presented in a random order in terms of their radicality.

Knowledge and understanding. To manipulate this independent variable, the experiment involved equal sized construction and non-construction groups (equivalence criterion I in Figure 2) who were asked to use equivalent images and technical descriptions of "Taipei 101", "The Great Belt East Bridge" and "Queen Mary II" (equivalence criteria II in Figure 2). The selection of the two groups and their knowledge in relation to the three equivalent structures were the two knowledge/understanding differentiations. In essence, construction participants are assumed to have profound knowledge of buildings, some knowledge of bridge structures, but have very little expert knowledge of ship construction. Selected non-construction participants formed a control group with equivalently very little expert knowledge of all three structures.

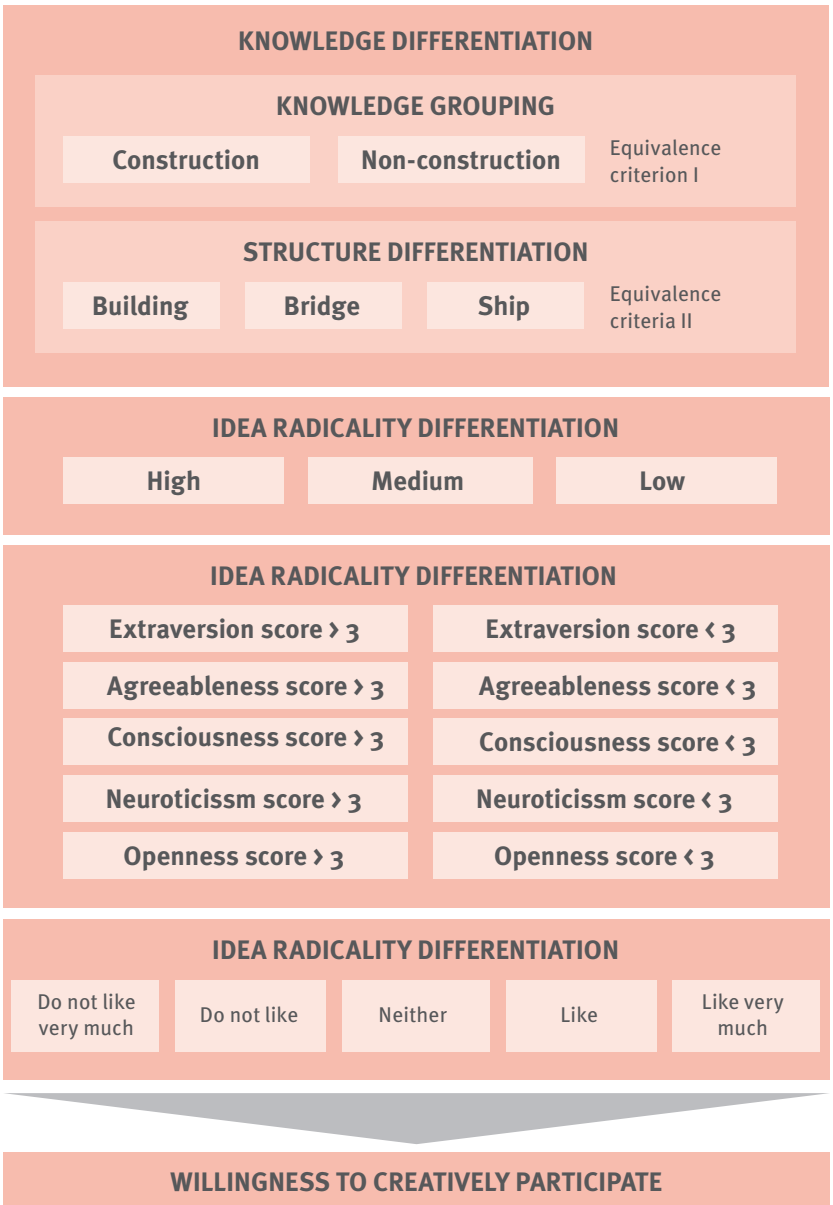

Figure 2 **The differentiation within each of the identified variable**

Failure to achieve the equivalence results in confounding and is a situation in which something other than independent variable may be responsible for differences in dependent variable (Axelrod, 1999), so the structures were selected according to the following equivalence criteria:

- Status equivalence: status equivalence ensures that representation of structures does not bias the experimental task performance; the three structures are well known for their superlatives when built, but all of them have since been superseded by other structures making their status equivalent; "Taipei 101" is one of the tallest buildings in the world, "The Great Belt East Bridge" is one of the longest bridges in the world and "Queen Mary II" is one of the biggest ships in the world.
- Orientation and distance equivalence: images of the three structures

are all shown to participants from an angle of no more than 45 degrees (front view, front view from a distance and lateral view). Three same-size colour images of the three structures are given to participants to ensure visual equivalence.

- Description equivalence: each structure is also supported with a brief description of equivalent length and detail; the major components for each of the three structures are general characteristics, technical information, construction technology including support structure, superstructure, construction methods and exterior design.

Perceived radicality of ideas. The simple IPO model of a production process has been adopted to suggest and test the three levels of radicality (low, medium, high). Highly radical ideas as opposed to those of lower radicality may result in changes to one or more IPO stages. For instance, some changes in inputs may or may not require changes in the processes of transformation, but may also not result in a visibly changed output. Using mathematical analogy, radicality can be assigned *n* levels, but for simplicity only low, medium and high levels of radicality are proposed. It is suggested here that in relation to the IPO model and employees involved in the processes of transformation, a low level of radicality would represent only a change in inputs or in the visual appearance of an output. Highly radical ideas, on the other hand, would include changes to inputs, processes of transformation and a change in visual appearance of an output. In addition, it has to be emphasised again that radicality is here defined as a measure of change as seen by employees that are involved in the processes of transformation.

To test the suggested levels, six ideas were prepared in advance for each of the three structures, two of which correspond to each of the proposed levels of radicality. Ideas were presented in a random order to ensure that participants were unaware of this pre-categorisation.

Personality dimensions by the Big Five Inventory. Participants are differentiated by the BFI personality dimensions (John et al., 2008). Using the BFI enables an investigation of the differences in the numbers of contributed ideas by employees of different personality dimensions and their effect on the willingness to creatively participate. In this particular case the main role of the BFI is not to distinguish various personalities per se, but rather to elicit personality based categorisation in order to determine differences in willingness to creatively participate.

Perceived favouring of ideas. Favouring of ideas surfaces when an individual has more than one idea for a particular problem, but favours one or more ideas over the set of available alternatives. It may not only relate to employees' own generated ideas, but also to the ones contributed by work colleagues. Participants need to reveal their favouring preferences by ranking prepared ideas in advance using the 5-point Likert-type scale to establish a link between their willingness to creatively participate and favouring preferences.

Procedure, Sequencing and Timing

Sequencing is a factor that can affect the nature of participants' responses (Goodwin, 2009). Their earlier reactions to some issues, especially ones that are directly related to the research topic, can alter the responses and performance that follow later in the experiment. Participants were intentionally not informed about the details of the research in order to achieve a higher level of objectivity.

The sequence starts with instructions about the whole session specifying settings for experimental tasks, ensuring that the sequence remains procedurally intact. Avoiding fatigue and giving all participants the same amount of time were two major criteria for allocating fixed time intervals (Barnes and Seymour, 1980). The 5-minute introduction is followed by the background questionnaire stage with basic sampling-specific questions, which is then followed by the first experimental task. The tasks involving the three structures were intentionally interspersed by short breaks allowing participants to relax from a particular task and minimize potential inter-task influencing. The second experimental task is followed by questionnaire on willingness to creatively participate that aims to evaluate factors perceived to be significant for ideas contribution. The BFI personality inventory is the final stage. These last two sets of questionnaires were intentionally placed after experimental tasks at the end of the whole procedure because they, to a certain extent, reveal the nature of the study and could influence behaviour if introduced earlier.

Experimental tasks. The first experimental task required participants to generate as many creative ideas that would either change or improve the three structures as possible. The participants were asked to make improvements as if they are about to start building a structure shown on a series of equivalent images and accompanying descriptions. Such a visual representation is particularly useful in the experiment for better understanding of given information (LeGrand, 1990).

The second experimental task required participants to (1) evaluate ideas by their radicality and (2) self-report their willingness to contribute these ideas to different groups of people. First, they were asked to examine their own generated ideas from the first task and ideas that were prepared in advance in order to categorize these by their level of radicality (low, medium and high). Ideas were randomly distributed, so that the experimenter could not tell which ideas selected by participants were low, medium or highly radical. Second, participants were asked to select people or groups to whom they would be willing to contribute their own gen-

	Line managers' support	My overall skills	Team culture	Financial rewards	Intrinsic motivation	Curiosity	Knowledge	Self-confidence	Experience	Position in the company Construction problems	Position in the team	Level of radciality
Line managers' support	1.000											
My overall skills	0.120	1.000										
Team culture	0.273	0.402	1.000									
Financial rewards	0.187	0.059	0.194	1.000								
Intrinsic motivation	0.248	0.353	0.441	0.294	1.000							
Curiosity	0.092	0.546	0.315	-0.048	0.627	1.000						
Knowledge	-0.013	0.591	0.339	0.020	0.632	0.739	1.000					
Self-confidence	0.067	0.525	0.239	0.295	0.512	0.454	0.544	1.000				
Experience	-0.009	0.439	0.135	0.267	0.503	0.397	0.472	0.700	1.000			
Position in the company Construction problems	0.191	0.196	0.262	0.524	0.301	0.081	0.018	0.416	0.540	1.000		
Position in the team	0.279	0.090	0.183	0.364	0.208	0.057	-0.060	0.311	0.259	0.678	1.000	
Level of radciality	0.094	0.217	0.371	0.412	0.493	0.286	0.315	0.316	0.356	0.531	0.440	1.000

Table 1 Inter-item correlation matrix for Cronbach's Alpha reliability for personal and organizational factors as drivers for employee willingness to creatively participate

erated ideas. Immediate superior, team leader, work colleagues, potential investors and business partner have been selected because they are related to employee's work and often make decisions about contributed ideas (Van de Ven et al., 2008). This was contrasted with friends and relatives groups because they may not be directly involved in any decision making processes. In the final stage of the second task participants were asked to indicate their favouring preference for ideas prepared in advance.

Series of questionnaires. Questionnaires were used in conjunction with experimental tasks in order to allow the researcher to formulate personality dimensions, ideas contribution and evaluation very specifically (Furnham, 2005). Questionnaires formed a three-part series to be completed at different stages during the experiment. The first part includes general information about participants and their working experience and introduced before experimental tasks. The second part was introduced after the experimental tasks and directly relates to willingness to creatively participate and evaluation of personal and organizational factors perceived as important ideas contribution. The third part is the BFI personality inventory introduced at the very end.

Results

Reliability

The Cronbach's α has been used for the purpose of identifying the reliability of adopted scales in the questionnaires. The value of Cronbach's α of 0.7 to 0.8 is acceptable value indicating internal consistency (Field, 2009). Kline (1999) stated that when studying psychological constructs values below 0.7 can be expected because of the diversity of the constructs being measured. The result for Cronbach's α for the subscales in the questionnaire for factors perceived as important for employees' willingness to creatively participate is 0.831 indicating adequate reliability (see Table I).

Personal or Organizational Factors?

Figure 3 shows box plots for participants' evaluation of factors that could impact employees' willingness to contribute ideas based on a 5-point Likert-type scale, obtained from the second part questionnaire. In general, personal factors (dark grey) are evaluated as more important than organizational ones (light grey). Intrinsic motivation,

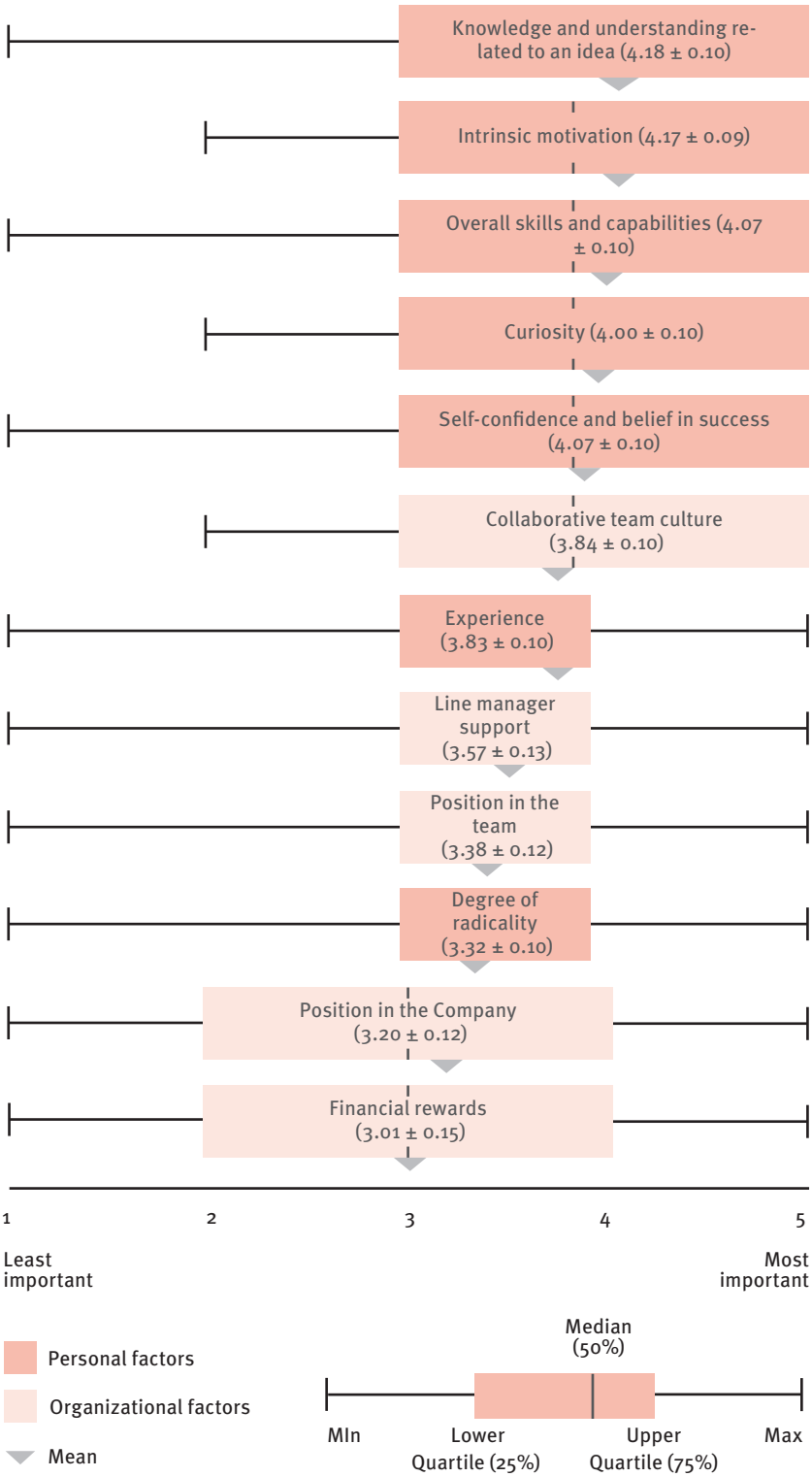

Figure 3 **Box plots of data including participants' mean values, standard error values for drivers considered for employees' willingness to contribute ideas**

knowledge/understanding and curiosity have been found to be more important for participants' willingness to contribute ideas than position in the company and financial rewards.

Knowledge/Understanding, Radicality and Willingness to Creatively Participate

Table II shows the number of generated ideas in the first experimental task for the three given structures. Each structure corresponds to a different level of knowledge in relation to a group of construction participants.

In regards to creativity the results show that construction participants generated more ideas for the structure they are assumed to be most knowledgeable about (building), less ideas for the structure they are somewhat familiar with (bridge) and the lowest number of ideas where they have no experience and comparatively low level of knowledge (ship). In contrast, non-construction participants show greater uniformity in their creative output supporting the assumption that they have very little technical knowledge of all three presented structures. In total, they generated fewer ideas for all structures and, unlike construction participants, with no significant differences between the numbers of ideas for each of the structures.

Second, in relation to their willingness to creatively participate, participants were asked to identify groups of people with whom they would be willing to share the generated ideas. Closer examination, particularly in relation to levels of radicality for the building structure, shows a clear difference between construction and non-construction participants. Figure 4 presents the distribution of ideas from construction and non-construction participants to different groups of people by levels of radicality. Construction participants showed greater willingness to contributing ideas of high radicality to all groups of people. Non-construction partici-

	Building (high knowledge)	Bridge (medium knowledge)	Ship (low knowledge)
Construction participants	111	83	67
Non-construction participants	50	79	70

Table 2 **The numbers of generated ideas for three structures with different levels of knowledge by construction and non-construction participants**

pants principally resorted to contributing ideas of low and medium radicality, with an exception of business partners where they show greater willingness to creatively participate although this large difference is difficult to explain. The results for the bridge structure show that construction participants are more cautious regarding their willingness to creatively participate with highly radical ideas. They are more willing to contribute ideas of medium radicality and to people within their working environment. In this particular case non-construction participants shy away from business partners, but the distribution in regards to idea radicality levels is still in favour of low radicality. The results for ship structure show that construction participants are even less willing to creatively participate with highly radical ideas and predominantly stand by those of low or medium radicality. Interestingly, non-construction participants are slightly more radical in this particular case, but overall looking at results willingness to contribute ideas increases with knowledge, and so does the willingness to contribute ideas of higher radicality levels that support Hypotheses 1a and 1b.

To strengthen this visual observation a statistical analysis has been conducted comparing the three structures. Friedman's ANOVA was used to assess the overall variability in the number of contributed ideas under differing levels of knowledge/understanding. The mean values and maximum numbers of contributed ideas are statistically higher for construction participants (2.92 - building, 2.18 - bridge and 1.76 - ship) than for non-construction (1.78 - building, 2.08 - bridge and 1.84 - ship). In particular, they are significantly higher for building structure where there is the highest level of knowledge/understanding differentiation. The weight of participants in experimental group significantly changed over the three experimental conditions $X^2(2)=24.843$, $p < .05$, whilst it did not change for the control group $X^2(2)=5.621$, $p > .05$. Overall, knowledge/understanding in respect to an idea has a statistically significant effect on participants' willingness to creatively participate.

The BFI Personality Dimensions and Willingness to Creatively Participate

Figure 5 contrasts the BFI personality dimensions, i.e. Extraversion, Consciousness, Openness to Experience, Agreeableness and Neuroticism. The BFI was used to categorize participants by identified personality dimensions and the responses were distributed according to the willingness to generate and contribute ideas to different groups of people. This approach allows contrasting the numbers of generated and contributed ideas by each personality dimension regardless of their reliability as statistically significant differences would demand greater attention in the future. On average, participants with high extraversion, neuroticism and openness scores, and low agreeableness and conscientiousness scores created more ideas than their counterparts with low extraversion, neuroticism and openness scores, and high agreeableness and conscientiousness scores. However, results show no significant differences between participants' personality dimensions and their willingness to contribute the generated ideas to different groups of people and, therefore, Hypothesis 2 is rejected.

As a general rule, statistical difference could be established through correlation analysis for the BFI investigation, but the number of participants was too small, so the results are of informative nature only. Nevertheless, this could potentially lead to a separate longitudinal study involving far larger groups.

Favouring of Ideas and Willingness to Creatively Participate

Table III presents descriptive statistics for favouring of level 1&2 (below average) and 4&5 (above average) ideas based on the 5-point Likert-type scale (1-don't like very much and 5-like very much). In support of Hypothesis 3, on average, participants were more willing to contribute their favourite ideas (level 4&5) to team leader, immediate superior, professionals, work colleagues, potential investors who are most likely involved in ideas implementation process. In the case of least favourite ideas (level 1&2) they were more willing to contribute them to friends/relatives, work colleagues who are not responsible for any decision making, and much less to people directly responsible for ideas implementation.

Limitations and Future Research Directions

The limited number of participants is the most obvious limitation of this study. The small sample size is due to a selected quasi-experimental design engaging each individual for a considerable amount of time. Since most experimental studies on human behaviour, personality and social psychology use a minimum of thirty participants to get stable measures (Field, 2009; Ramachandran, 1994), the selected sample is of appropriate size to provide embryonic evidence of the factors that impact employees' willingness to creatively participate.

From a methodological standpoint, the study adopts a nonrandomized quasi-experimental research design which brings increased threats to valid-

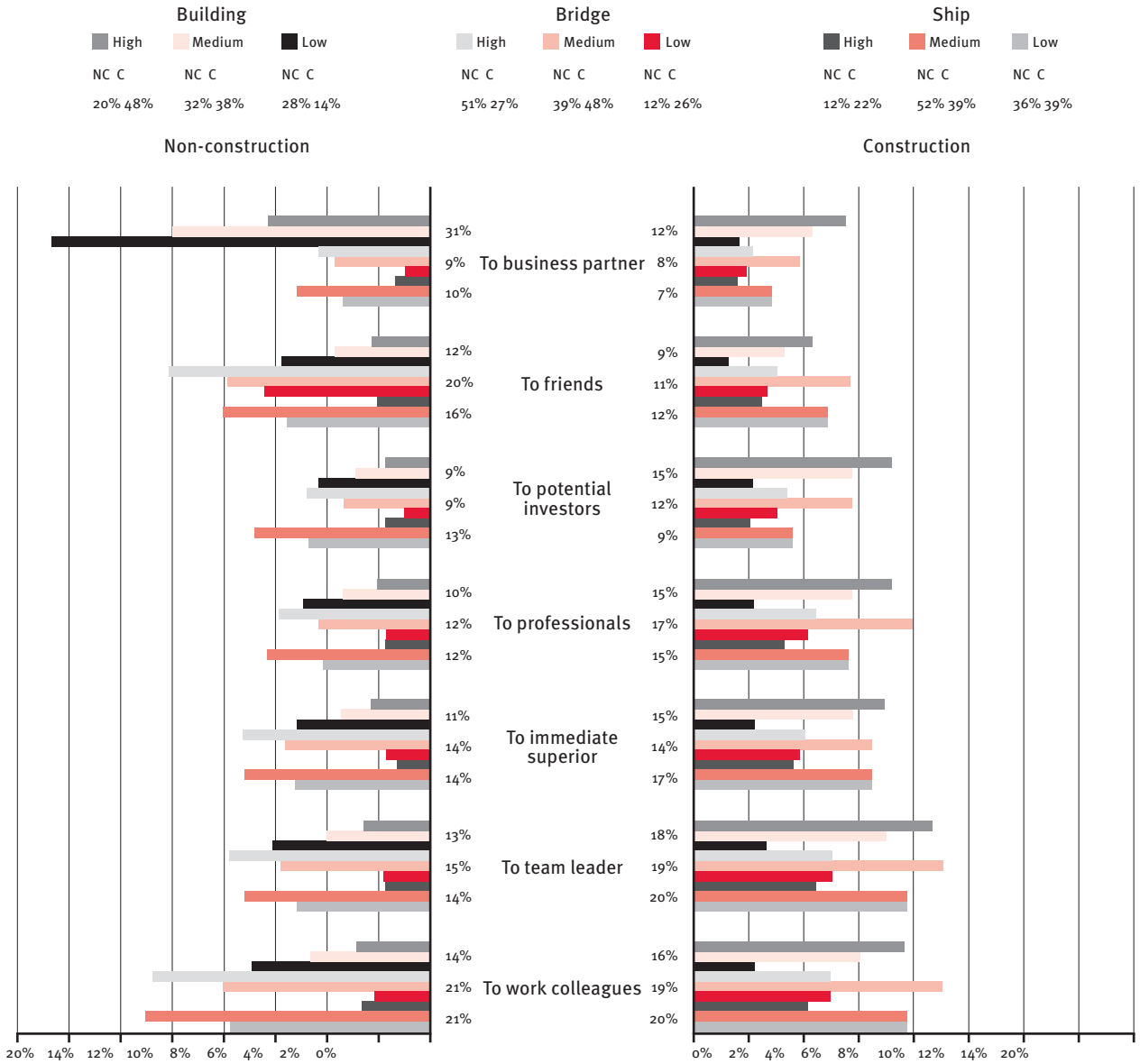

Figure 4 The numbers of contributed ideas to different groups of people by construction and non-construction participants for three structures by radicality (high, medium and low); one idea can be contributed to several groups of people

ity in comparison to true experiments. The quasi-experimentation was conducted over a period of several weeks because it was not possible to complete it with all 76 participants at the same time. This again may be viewed as a limitation that was diminished by ensuring that all experiments were conducted at the same time of the day and in almost identical conditions (e.g. room, location, temperature). To improve external validity the investigation will need to be repeated in different contexts and include factors beyond the ones presented here. For instance, cultural differences at team and organizational levels could also be considered. There is plenty of evidence in the studies of team dynamics that overall team effectiveness depends on individual performance and team configuration (see for example Gilson and Shalley, 2004; Payne et al., 2009). Nevertheless, the impact of the inherent dynamism in the willingness of individual team members to creatively participate on the overall effectiveness is still not entirely understood, and even a slight change of a team configuration may profoundly affect it.

Another limitation is that only the BFI was used which did not reveal any significant effects of personality dimensions on employees' willingness to contribute ideas. Future research may investigate these further using larger samples, and potentially a greater number of complementary personality inventories (e.g. Kirton Adaption-Innovation Inventory, Myers-Briggs Type Indi-

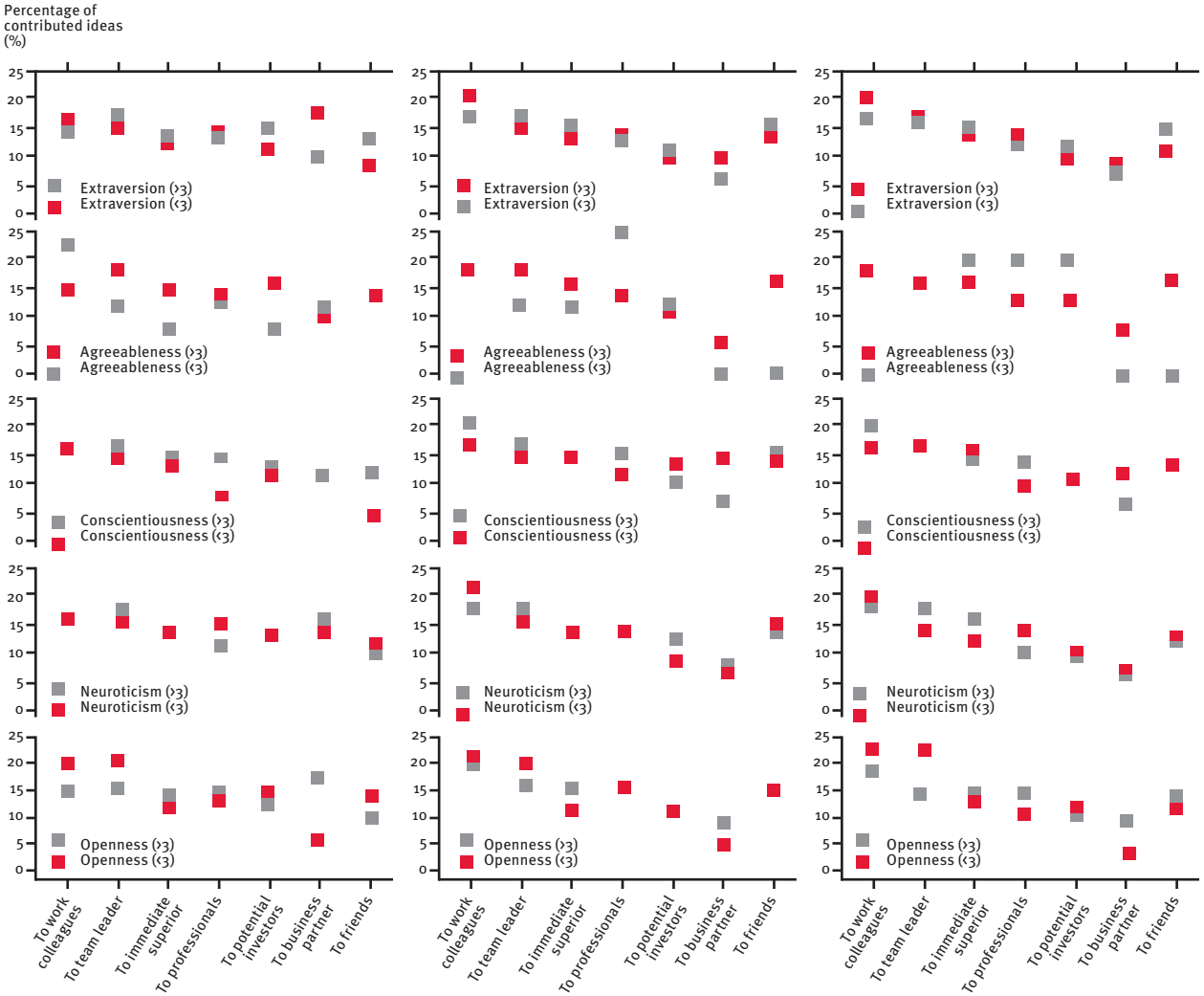

Figure 5 **The relationship between the BFI personality dimensions (E score ›3/E score ‹3, A score ›3/A score ‹3, C score ›3/C score ‹3, N score ›3/N score ‹3, O score ›3/O score ‹3) and participants' willingness to contribute ideas for building (left image), bridge (middle image) and ship (right image) structures; each dot shows the percentage of contributed ideas to each group of people; groups of people are sorted by required knowledge for ideas contribution from higher to lower; numbers in brackets represent the average number of generated ideas per participant; one created idea could be contributed to several groups of people**

cator, NEO Five-Factor Inventory etc.) Similarly, radicality construct should receive greater attention in the future and, perhaps, more than three levels of radicality would be needed. In addition, the proposed IPO-based model could well be too simplistic for a more detailed classification.

The above suggested directions are neither exhaustive nor prescriptive, but they may lead to a more adequate portrayal of willingness to creatively participate and how it emerges and evolves in various organizational settings.

Discussion and Conclusions

This study shows that even if organizations provide supportive work environments, employees might not be willing to contribute ideas because of personality-induced mismatches. The higher value of personality-related factors for willingness to creatively participate over organisational factors is consistent with findings by Bunce and West (1995) who show that individual innovativeness depends more on personality factors than on employees' perceptions of social environment. Although from a different standpoint, Latham and Locke (1979) confirm that culturally disadvantaged employees who lack self-confidence may struggle in some organizational cultures. In the same way, a highly educated and proactive employee may struggle in an overly conservative risk-averse environment. Perhaps this indicates that companies should be thinking about the mass-customization of the work environment along the lines of flexible arrangements as discussed by Segars and Hendrickson (2000). Such arrangements would enable better utilization of individual

Ideas favouring levels (1&2-least favourite; 4&5 most favourite)			Building structure						
			Friends / relatives	Work colleagues	Team leader	Immediate superior	Business partner	Professionals	Investors
	Level 1&2	Mean	51.48	52.29	33.87	28.76	19.36	31.18	21.10
		St. Dev.	41.91	41.60	42.33	40.37	34.40	41.68	35.76
		St. E.	4.81	4.77	4.86	4.63	3.95	4.78	4.10
	Level 4&5	Mean	44.80	63.85	68.92	54.53	37.60	52.33	40.63
		St. Dev.	47.21	44.18	39.64	43.20	45.70	45.15	44.78
		St. E.	5.41	5.07	4.55	4.96	5.24	5.18	5.14
	Bridge structure								
	Level 1&2	Mean	49.06	51.45	32.82	25.54	15.56	30.46	18.95
		St. Dev.	41.74	44.55	43.04	40.88	33.94	42.66	36.97
		St. E.	4.79	5.11	4.94	4.69	3.89	4.89	4.24
	Level 4&5	Mean	49.08	66.79	70.82	59.03	42.22	60.51	50.05
		St. Dev.	46.33	42.46	39.84	43.58	46.80	43.43	44.17
		St. E.	5.31	4.87	4.57	5.00	5.37	4.98	5.07
	Ship structure								
	Level 1&2	Mean	53.60	49.97	31.21	25.99	13.63	22.63	19.78
		St. Dev.	43.06	41.50	41.66	40.31	32.52	38.62	34.96
		St. E.	4.94	4.76	4.78	4.62	3.73	4.43	4.01
	Level 4&5	Mean	54.15	64.55	66.98	59.37	44.89	62.09	50.50
		St. Dev.	46.86	44.32	41.95	43.80	47.64	45.22	47.14
		St. E.	5.37	5.08	4.81	5.02	5.46	5.19	5.41

Table 3 Descriptive statistics showing mean, standard deviation and standard error in terms of a proportion of contributed ideas to the seven groups of people by their levels of favouring. Favouring of ideas is measured based on a 5-point scale (1-don't like very much to 5-like very much)

capabilities and prevent the perils of one-size-fits-all initiatives.

From the perspective of employees involved in the processes of transformation, we investigate the relationships between personal factors and employee willingness to creatively participate. We also proposed radicality of ideas construct and test the predetermined IPO-based radicality levels (low, medium high).

In a between-subject quasi-experiments involving 76 participants, we manipulated knowledge and understanding (low, medium, high), perceived radicality (low, medium high), personality dimensions by the BFI, and favouring of ideas (levels 4 and 5). In relation to individual independent variables, the results show that willingness to contribute ideas depends on relevant knowledge/understanding (Hypothesis 1a). In particular and in relation to the building structure where construction participants are assumed to be experts, they were also more willing to contribute highly radical as opposed to medium or ideas of low radicality (Hypothesis 1b). The picture is less recognizable for non-construction participants who were approximately equally willing to contribute ideas of all levels of radicality for all given structures. Organizations clearly require participation of highly knowledgeable employees to increase contribution of more radical ideas with an ultimate goal of achieving radical innovation (Leifer et al., 2001). Perhaps surprisingly, we did not find any effects of personality dimensions on the willingness to creatively participate (Hypothesis 2), which is clearly different to previous studies of creativity (Furnham et al., 2009). It is difficult to generalize the results from 76 participants, but nevertheless, this shows that people of all personality dimensions are more or less equally willing to contribute generated ideas. More creative people are perhaps found to be independent and with high aspirations as shown by Helson (1996), but they are not necessarily more willing to contribute their ideas. The results also show that although employees may generate several ideas

for the same problem or situation, they might favour some ideas over everything else. In effect, favouring shows a profound effect on employee willingness to creatively participate, particularly in respect to decision-makers (Hypothesis 3).

Our results have important implications for the extant theories by revealing that employees' willingness to creatively participate depends on a number of personal factors. The results indicate that it is vital to study willingness to creatively participate separately from employees' creativity and innovativeness. These findings are in line with some studies of consumer willingness to participate in co-creation processes. We also find that radicality of ideas from the viewpoint of employees involved in processes of transformation significantly impact their willingness to creatively paprticipate. This finding is of particular importance for future research on radical innovation. More radical ideas are likely to come from directly involved and knowledgeable employees who have more profound understanding of the processes of transformation. Favouring of generated alternative ideas is a form of self protection that may have significant implications for future research of creative expression and innovativeness. Perhaps all these findings also indicate that managers should pay more attention to individual employees and steer away from one-size-fits-all initiatives. This could consequently lead to a better understanding of the impact the work environment has on employees' willingness to contribute ideas. Openness to all ideas, even when they are in the form of simple suggestions, could well path the way to an improved overall innovative capacity since this could open doors to willingness to contribute further ideas in the future and greater probability of generating successful innovations (Enkel et al., 2009; Lichtenthaler and Lichtenthaler, 2009).

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