



Solver engagement in knowledge sharing in crowdsourcing communities: Exploring the link to creativity



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ABSTRACT

There is increasing interest in online communities as a channel of innovation for companies. However, research to date has been limited on how to create a compelling virtual experience to inspire contestants to make novel and creative contributions. This examination is critical as the online space grows more crowded. This paper draws from job engagement theory and the theory of job design to develop a framework that positions solver engagement as a key determinant of creativity in online innovation contests. In particular, we propose a multidimensional perspective of solver engagement by distinguishing the simultaneous investments of a contestant's authentic self in crowdsourcing competitions in terms of physical, cognitive and emotional energy. We argue that the more intensively and persistently engagement energies are applied the higher the creativity and quality of contributions. Further, we examine the mediating effect of solver engagement on the crowdsourcing competition design-creativity relationship. Our findings reveal that the greater the contestants' psychological involvement when performing competition tasks the higher the creativity of their solutions. Special emphasis on problem solving given the particular personality traits of knowledge communities while avoiding excessive, anxious control and respecting individuals positively impacts knowledge sharing and creativity. This article provides important implications for the organisation and sustenance of crowdsourcing communities as a vibrant source of innovations and creativity.

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1. Introduction

Crowdsourcing is defined as a type of participative activity, powered by advanced internet technologies, in which an individual or organisation proposes to a large group of individuals, with diverse knowledge, the voluntary undertaking of a task to a pre-determined goal (Estellés-Arolas and Gonzalez-Ladron-DE-Guerva, 2012; Saxton et al., 2013; Majchrzak and Malhotra, 2013). The winner(s) of the contest collects a pre-specified prize offered by the seeker upon completion of the task in exchange for the right to use and exploit that idea or solution (Mortara et al., 2013). Crowdsourcing is built on the concept that large groups of people are smarter than an elite few, no matter how brilliant the elite few may be (Surowiecki, 2005; p.1). By allowing for the incorporation of multiple perspectives across a plethora of participants with different areas of expertise, skills and experiences, crowdsourcing promotes

creativity and innovation (Majchrzak and Malhotra, 2013). Howe (2006, p.1) describes this new paradigm as 'everyday people using their spare cycles to create content, solve problems, even do corporate R&D'.

The potential transformative nature of crowdsourcing communities as a channel of organisational innovation for companies has urged both researchers as well as practitioners to understand how crowdsourcing communities can be nurtured to generate novel ideas and solutions (Poetz and Schreier, 2012; Afuah and Tucci, 2012; Kraut et al., 2012). Crowdsourcing relies on a self-identification process among participants willing and able of contributing to a task (Howe, 2008). However, participants' time and attention have become increasingly scarce resources as the online space grows more crowded with more options for users to choose from on where and how to spend their time (Wang et al., 2013). Yet sustained participation is crucial; thus, understanding the specifics of participants' voluntary behaviour to share and create knowledge is central to the overall efficiency of crowdsourcing communities (Kollock, 1999; Lakhani and Von Hippel, 2003; Sun et al., 2012; Frey et al., 2011).

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Research to date has primarily concentrated on motivational explanations and the role of incentives in knowledge sharing and innovation in online communities (Fuller, 2006, 2010; Frey et al., 2011; Roberts et al., 2006; Leimeister et al., 2009). However, ‘engagement’ as a concept ‘to describe the nature of participants’ specific interactions and/or interactive experience’ in online communities (Brodie et al., 2013; p.105) is proposed in the literature as a superior predictor of behaviour outcomes as it more fully reflects the nature of interactivity in digital environments. Advances in Internet, collaboration tools, and new Web2.0 technologies support and facilitate new and extended forms of interactive experience (Majchrzak and Malhotra, 2013), enabling participants to engage in knowledge sharing and creativity (Majchrzak et al., 2004; Jung et al., 2010). Creativity describes the production of new and useful ideas (Amabile, 1996; Oldham, 2002) and is regarded as the starting point for innovation (Amabile et al., 1996). Research indicates that creativity is enhanced when workers are fully engaged in their work (Oldham and Baer, 2012). When engaged, individuals should be attentive, emotionally connected and fully concentrated on their job performance (Kahn, 1990; May et al., 2004; Rich et al., 2010). In the context of crowdsourcing communities, when solvers’ perceived competence is high, they are more highly engaged, and more likely to initiate and continuously put more effort to generate creative ideas and solutions.

This paper explores the role of engagement in inspiring crowdsourcing communities to generate novel and creative solutions. A solution is regarded as creative if it goes beyond previous solutions in the domain (Csikszentmihalyi, 2002). We draw from job engagement theory (Kahn, 1990; Saks, 2006) and the theory of job design (Hackman and Oldham, 1980) to develop a framework that positions solver engagement as a key determinant of creativity in crowdsourcing competitions. In particular, we build on Kahn’s theory of engagement (1990) to describe how solver engagement incorporates a tripartite taxonomy of cognitive, emotional and physical engagement aspects. Our hypothesising suggests that creativity in crowdsourcing communities is ultimately rooted in individual behaviour and their drivers, in this case solver engagement, to share and create knowledge represented by the simultaneous investment of cognitive, emotional and physical energy (Kahn, 1990). The more intensively and persistently engagement energies are applied the higher the creativity and quality of contributions. This conceptualisation proposes an inclusive perspective of the contestant’s agentic self, and thereby offers a more comprehensive explanation of participant’s creativity compared to constructs that depict the self more narrowly (Rich et al., 2010). Additionally, we consider the role of solver engagement as the mechanism for explaining the effect of crowdsourcing competition design (tasks and knowledge) on solver’s creativity. We argue that the way virtual co-creation experiences are designed have the potential to ignite a sense of enthusiasm in contestants and propel them to their peak levels of creativity.

Specifically, the paper considers the potential of crowdsourcing to solve predictive modelling problems, a particular form of crowdsourcing competitions featuring distinct personality traits in terms of participants’ knowledge and motivation, that until now have received little attention in the literature despite their potential to address the increasing problems faced by companies in trying to deal with Big Data (Manyika et al., 2011). Organisations are increasingly resorting to statistical/analytical outsourcing as a strategy to extract value from a gradually more turbulent, unstructured digital data environment. Crowd solving contests seek non-emergent solutions that derived directly from the isolated solutions of their heterogeneous contributions (Geiger and Schader, 2014). By exposing the problem to a large number of participants proficient in different techniques, data modelling competitions can very quickly advance the technical frontier of what is possible using a given

dataset (Boudreau and Lakhani, 2013; Garcia Martinez and Walton, 2014; Bentzien et al., 2013; Xintong et al., 2014). Our study focuses on Kaggle, the world’s leading online platform of data modelling competitions, which operates as a knowledge broker between companies and a network of over 100,000 data scientist that compete to produce the model with the best accuracy for a given problem.

This paper contributes to the literature in several distinct ways. First, we contribute to engagement theory by considering a multidimensional conceptualisation of solver engagement by distinguishing the simultaneous investments of a contestant’s authentic self in crowdsourcing contests in terms of physical, cognitive and emotional energy. Kahn’s (1990) work and subsequent research by May et al. (2004) and Saks (2006) combine engagement into a single measure. However, although unidimensional approaches have the merit of simplicity, they fail to capture the rich conceptual scope of engagement (Brodie et al., 2011). Similarly, Rich et al. (2010) recent three-factor measure of engagement suggests a balanced model; that is, a concept with three relatively equally balanced components. However, employees’ perception of their level of engagement may be influenced by the nature of the task or job in which their work (Foss et al., 2009); in other words, the relative importance of the cognitive, emotional and physical engagement facets may differ in terms of the particular situational circumstances under which solver engagement is studied (Brodie et al., 2011). Thus, by capturing each engagement dimension separately, we are adding to the construct domain as a whole, clarifying the existence of each component and revealing their relative weights of influence on creativity. This will enable online crowdsourcing platforms as well as innovation seeking companies to develop specific, actionable strategies to foster knowledge sharing behaviour within crowdsourcing communities to generate novel and creative contributions.

Second, we expand knowledge on customer engagement in online brand communities to communities of knowledge. Contrary to customer engagement in online brand communities, the concept of ‘direct brand interaction’ to denote a direct, physical contact based interaction with a focal brand (Hollebeek, 2011; Jeppesen and Molin, 2003) is less recognizable in knowledge communities. Cognitive activity in solution seeking communities denotes for instance the contestant’s level of concentration in the competition as opposed to the consumer’s level of engrossment in the brand as R&D contests are largely run by knowledge brokers acting between companies and solvers crowds. The emotional activity represented by a customer’s level of brand-related inspiration and/or pride (Hollebeek, 2011) becomes abstract to capture a competition participation desire. Further, customers’ physical brand-related activity is replaced by a contestant’s level of energy and mental resilience exerted while participating in crowd solving competitions.

The paper proceeds as follows. Following the introduction, in section two we draw from the literature on psychology and organisation behaviour and job design to develop our theoretical model and research hypotheses. Section three details the empirical study and section four presents the results of the empirical test. In section five, we discuss the findings and conclude in section six with theoretical and practical implications of our findings, and a future research agenda, which takes into account the study’s limitations.

2. Theoretical framework and hypotheses

2.1. Conceptualising engagement

The concept of engagement has been examined in the domains of organisational psychology for some time. Kahn (1990) formally defined employee engagement as ‘the harnessing of organisation members’ selves to their work roles; in engagement people employ

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