



Article

Effects of Intrinsic and Extrinsic Motivational Factors on Employee Participation in Internal Crowdsourcing Initiatives in China

Ted Y. T. Suen ^{1,2}, Simon K. S. Cheung ^{3,*}, Fu Lee Wang ²  and John Y. K. Hui ⁴ 

¹ Department of Computer Science, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong; ytsuen4@cityu.edu.hk

² School of Science and Technology, Hong Kong Metropolitan University, Good Shepherd Street, Kowloon, Hong Kong; ytsuen@hkmu.edu.hk (T.Y.T.S.); pwang@hkmu.edu.hk (F.L.W.)

³ Information Technology Office, Hong Kong Metropolitan University, Good Shepherd Street, Kowloon, Hong Kong

⁴ Office of the Chief Information Officer, Education University of Hong Kong, Lo Ping Road, Tai Po, Hong Kong; johnhui@eduhk.hk

* Correspondence: kscheung@hkmu.edu.hk

Abstract: The concept of crowdsourcing, categorized into internal and external crowdsourcing, emerged relatively recently. Internal crowdsourcing gained increasing popularity in Chinese organizations. Based on the self-determination theory (SDT), this study advances the theoretical understanding of the effects of employee motivation antecedents (the three basic psychological needs: autonomy, competence, and relatedness) on participation effort in internal crowdsourcing activities. Through an online survey, 435 employees in information technology organizations in southern China completed the questionnaires which used for statistical analysis and hypotheses testing. It was found that the three basic psychological needs significantly positively impacted employees' intrinsic motivation, with autonomy having the most significant effect. Furthermore, only the needs for autonomy and competence were significantly positively associated with extrinsic motivation. A positive relation was observed between intrinsic motivation and employee participation effort in internal crowdsourcing. Although no direct relationship was revealed between extrinsic motivation and employee participation effort, an indirect effect of extrinsic motivation on employee participation via intrinsic motivation was observed, which aligned with one of the main concepts of SDT, the internalization process of extrinsic to intrinsic motivation. Accordingly, the SDT model is applicable to information technology organizations in China based on the findings of this study.

Keywords: internal crowdsourcing; basic psychological needs; intrinsic motivation; extrinsic motivation; participation effort; self-determination theory



Citation: Suen, T.Y.T.; Cheung, S.K.S.; Wang, F.L.; Hui, J.Y.K. Effects of Intrinsic and Extrinsic Motivational Factors on Employee Participation in Internal Crowdsourcing Initiatives in China. *Sustainability* **2022**, *14*, 8878. <https://doi.org/10.3390/su14148878>

Academic Editors: Angelo Natalicchio, Francesco Cappa, Riccardo Maiolini, Jakob Pohlisch and Erica Mazzola

Received: 7 June 2022

Accepted: 18 July 2022

Published: 20 July 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Organizations face intense competition, and the continuous improvement of operational efficiency and service quality through innovative ideas is a critical success factor for organizations to stay ahead of their competitors [1]. However, due to resource constraints or lack of innovative ideas for new products for the market, it is vital for organizations to explore new ways of solving business problems [2,3]. Organizations realized they could leverage external crowd wisdom (commonly named as “crowdsourcing”) for innovative ideation [4] rather than only relying on internal research and development resources [5].

The concept of crowdsourcing was first introduced and defined in 2006 as “the act of an organization or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call” [6]. This concept of crowdsourcing is now generally known as external crowdsourcing (ExtSC) and was widely adopted by organizations to engage external individuals from disparate

areas across the internet in generating the broadest range of innovative ideas [7]. By using the ExtCS, organizations obtained different benefits such as the reduction in operation cost, higher output quality, and better solutions or services for customers [8]. The success of crowdsourcing depends on the level of participation and the number of contributions from external crowd wisdom [9].

Organizations can obtain benefits by using ExtCS to achieve better operational efficiency and effectiveness for repetitive tasks and improve organization business performance through open innovation. These benefits not only apply to profit organizations, but also to not-for-profit or hybrid organizations [10,11]. However, limitations and disadvantages, such as sensitive information leakage, intellectual rights dispute [12], and inappropriate recommendations for internal operation improvement [13] were gradually being identified, though dispute on intellectual property rights may not necessarily happen [9]. Organizations started looking into another type of crowdsourcing, namely internal crowdsourcing (IntCS).

The major difference between IntCS and ExtCS is that participants of IntCS are issued from a diverse pool of employees across different business units and different levels in the same organization [13]. IntCS provides similar benefits as what ExtCS can achieve, but with a lower risk [7]. Palin and Kaartemo argued that the level of employee participation in IntCS is the most crucial factor affecting the success of IntCS activity [14]. Although there are empirical studies on understanding the reasons or motivations for employee participation in crowdsourcing activities [15], these studies mainly focused on ExtCS activities [16]. Only a few studies have examined ways to evaluate the motivational factors determining employee participation in IntCS. However, contradictory views exist on the effect of the motivational factors, and the results are non-conclusive.

The success of any IntCS depends on the methods chosen to motivate individuals to participate and the contribution from employees, which is mostly determined by their motivation [14]. Different motivation definitions are suggested by different scholars, and the definitions essentially focus on the factors that influence an individual to perform a task [17]. Furthermore, studies focused on motivational factors impelling participants to engage in crowdsourcing activities, and those motivational theories employed for the studies seek to understand and explain the factors determining individuals to act [18]. However, these theories overlook the reasons for the motivation [19].

To better understand the underlying determiners of the motivation of employee participation in IntCS, this research develops a conceptual framework using self-determination theory (SDT) [20,21] as the base theory. SDT offers a macro-psychological framework for studying human motivation and, in particular, why motivation drives individuals to engage in particular behaviors [22]. The SDT model assumes that social-contextual variables are essential in examining the functioning, growth, and well-being of humans, expressed in self-determined behavior, curiosity, and growth. The context in which an individual operates directly influences the degree to which the basic psychological needs autonomy, competence, and relatedness are satisfied and the type of motivation they experience [20,21]. Self-determined behavior of individuals results from the satisfaction of these three basic psychological needs.

The application of SDT to different areas of practice has been studied in Western countries. SDT holds that Maslow's three basic needs are required in all cultural contexts [23]. However, applying SDT to other cultures has proven to be controversial [24]. This could be due to the significant differences existing in the cultural values between Western countries and China. Research on the applicability of SDT to non-Western cultures such as China remains scarce (Liu, Chung, and Si, 2013). Although some studies have considered the effect of the interaction between intrinsic and extrinsic motivation on organizational activity, few studies have focused on IntCS and this represents important gaps in the literature [25].

Deloitte reported that China, the second-largest global manufacturing economy, leads the world in innovation in e-commerce [26]. Alibaba, Tencent, and other large Chinese e-commerce firms leverage state-of-the-art information technology systems to maintain, develop, and incorporate innovative solutions in their business models underpinning their

success. Moreover, such companies have devised and implemented a range of approaches to ensure employees' active involvement in generating innovative ideas and approaches using IntCS [27]. However, there is insufficient analysis of the impact of Chinese generational differences in the Chinese workplace [28]. Therefore, an understanding of the difference between Chinese generations and their attitudes towards work is necessary for a better understanding of Chinese employees' attitudes towards IntCS. Gaining a better understanding of this interactive effect may benefit both researchers and practitioners.

Previous studies focused on the motivation of employees on participating in ExtCS activities with only a few studies on motivational factors determining employees' participation IntCS, and yet the effect of motivational factors is non-conclusive. Previous studies have left a gap in the effect of the interaction between intrinsic and extrinsic motivation on IntCS [25]. Furthermore, there is insufficient understanding of the difference between Chinese generations and their attitudes towards IntCS. Gaining a better understanding of the abovementioned gaps provide benefits for both researchers and practitioners.

This study principally aims to understand the significance of SDT in the information technology (IT) industry in the Chinese context to better understand the motivational factors determining Chinese employees' motivation to participate in IntCS activities. This research fills the research gaps identified in two areas. First, the relationship between motivation and the three basic psychological needs as well as between motivation and employee participation in IntCS. Second, the impact of generational differences on how different forms of motivation influence participatory behaviors.

2. Background

2.1. Crowdsourcing

Howe first introduced the concept of crowdsourcing [6]. Crowdsourcing is now widely adopted by organizations to engage internal or external individuals for innovative ideas [7,10]. Crowdsourcing researchers have proposed different definitions of crowdsourcing, with common expressions such as 'open call', 'online communities', 'innovation', 'problem-solving', and 'collective intelligence'. Estellés-Arolas and González-Ladrón-De-Guevara formulated a generalized definition by integrating 40 versions from the literature [29]. They emphasized the combination of root words crowd, people participating in an activity, sourcing, and the practice of procuring goods and services. This study adopts the comprehensive definition by Estellés-Arolas and González-Ladrón-De-Guevara as it considers all the components referred to by other researchers and has been applied to external and IntCS studies [29].

Crowdsourcing, which can be of enormous value to organizations, leverages the principle of 'collective intelligence' or 'the wisdom of the crowd' [30,31]. For external crowdsourcing, the definition involves outsourcing a given task via the internet to participants with different backgrounds and skills [32].

On the other hand, the definition of IntCS is specific to a given organization and is undertaken to solve problems through the engagement of employees from diverse backgrounds, including geographical location, job type, and position within the organizational hierarchy, instead of engaging external non-employees as participants [13].

The success of IntCS relies on employees' voluntary participation, and individuals may not have sufficient motivation to participate even though financial incentives are offered [33]. Pedersen et al. indicated that attracting and retaining crowdsourcing participants via an effective incentive mechanism is a crucial success factor in ensuring the sustainability of IntCS [34]. The employees' willingness to contribute to IntCS is determined by an individual's motivations and contextual factors at the workplace, such as support from management and the degree of autonomy allowed to employees [35]. However, few studies in the literature have examined internal employees' motivation to participate [36].

Knop, Durward and Blohm identified four key benefits of crowdsourcing, including access to specialist knowledge, more agile hiring, shorter product development cycles, and cost reduction [36]. Furthermore, ExtCS offers organizations a means to listen to their

customers directly [37]. On the other hand, IntCS provides further benefits to organizations by calling on expert opinions outside a department or team by bringing in employees from different locations or departments or levels of seniority [32]. IntCS provides employees opportunities to get involved in policy formulation and knowledge generation [38].

Both types of crowdsourcing come with different limitations and disadvantages, such as information leakage, inappropriate ideation generation, and intellectual property rights dispute between participants and organizations for ExtCS. There are controversial views on whether there will be issues or disputes on intellectual property rights [9,12]. For IntCS, a continuous flow of ideas from employees and participation in IntCS initiatives on an ongoing basis is a major challenge, and the lack of contribution may be due to effective incentive mechanisms [31] or the lack of trust between the organizations and employees [39]. Another major challenge is removing the protection of hierarchical status and resistance from affected stakeholders because of the changes proposed by the IntCS initiatives [36].

2.2. The Concept of Motivation

Parashar defined motivation as the underlying reason that an individual behaves in a certain way [40]. A motivated person is inspired or activated to take specific actions, whereas an unmotivated one lacks the energy to engage [20]. An individual can act under either autonomous or controlled motivation. Under autonomous motivation, individuals act for the pleasure of the task or because they are aware that the task is relevant and valuable. Under controlled motivation, an individual acts to gain a reward or is influenced by a power relationship. In this case, the individual may make less efforts and may expect to achieve specific short-term outcomes [22].

According to Ryan and Deci, motivation can be categorized into two distinct categories: intrinsic and extrinsic [20]. Intrinsic and extrinsic motivations influence an individual's intention to participate and their participatory behavior to varying degrees [20]. The difference is that intrinsic motivation is driven by inducement, whereas extrinsic motivation is driven by external factors [41].

A range of motivational theories has been applied to understand motivational behavior in the context of online community activities such as social cognitive and expectation theory [42]. However, these theories have not examined motivation's underlying determiners [19]. Ryan and Deci developed a macro-psychological framework, SDT, to better understand human motivation and why motivation drives individuals to engage in particular behaviors [20–22].

2.3. Self-Determination Theory

Unlike other motivational theories, SDT suggested individual motivation is neither a single nor a bipolar concept; instead, it smoothly moves along the continuum from extrinsic to intrinsic [20]. The three basic regulatory styles of motivation under SDT are amotivation, extrinsic motivation, and intrinsic motivation [24]. Moreover, the social conditions in which humans live result in proactive or passive behavior; accordingly, social conditions impact self-motivation behaviors. Varied types of motivation affect behavioral outcomes differently. Furthermore, an individual's environment influences the satisfaction of an individual's three basic psychological needs and their type of motivation [20,21].

The organismic integration theory, a sub-theory of SDT, describes a process in which internalization and integration can transform extrinsically motivated behaviors into more self-determined, intrinsically motivated ones [24]. Internalization is the process of taking an externally regulated activity (e.g., driven by reward or punishment) and internally regulating it [24]. The level of autonomy depends on the degree of internalization of externally regulated activity, and different motivational types differently impact behavior and performance, with all types occupying a continuum along low to high self-determination. Furthermore, autonomous and controlled motivation are differentiated under SDT [20].

The basic needs theory, another sub-theory of SDT, suggests that contextual factors, such as leadership style and compensation of the job, influence employee motivation. This

sub-theory states that human experience is mediated through the three basic psychological needs of autonomy, competence, and relatedness [22]. Autonomy refers to the extent to which an individual may freely choose to undertake a task, indicating the absence of pressure, control, or reinforcement [43]. According to Deci and Ryan, competence refers to confidence in having the sufficient capability to interact with the social environment to accomplish tasks [24]. Deci and Ryan defined relatedness as an individual's desire to forge meaningful relationships with the people around them and be appreciated and valued by others. Moreover, motivation can be fostered only when these three basic psychological needs have been met.

The cognitive evaluation theory, the third sub-theory, posits that positive or negative environmental factors impact intrinsic motivation and the satisfaction of the three basic psychological needs, which may impact individual motivational behaviors [44].

2.4. Chinese Culture

Traditional Chinese culture rests on an indigenous philosophy developed over millennia [45]. Among the different traditions, Confucianism is the most influential, emphasizing the need to build a harmonious society under a system of governance, characterized by hierarchical relationships underpinned by consideration, benevolence, and reciprocity [46]. Furthermore, mastering the concept of *guanxi* is essential to understanding the interpersonal and inter-organizational behaviors of Chinese and Chinese business culture [47]. No direct Western equivalent of *guanxi* exists; sometimes, it can be loosely translated as a relationship. Cheung, Wu, Chan, and Wong stated that inter-colleague *guanxi* positively relates to employee engagement in organizational activities and job satisfaction [48].

Cultures influence attitudes, behaviors, and performance in the workplace [49]. Although China has recently become the second-largest economy globally, traditional social-cultural values continue to be important [50]. Few would disagree that Chinese culture significantly differs from Western culture. The latter is characterized by high individualism, whereby individuals are primarily interested in meeting their goals and attaining self-achievement. Under the influence of Confucianism, traditional Chinese culture emphasizes collectivism [51].

2.4.1. Chinese Generation Differences

In Chinese, four principal groups are recognized according to the period in which they are born: Cultural Revolution, born in 1960s; Social Reform (SR), born in 1970s; millennial (also known as Gen Y), born between 1981 and 1995; and Gen Z, born between 1996 and 2015. Apparent differences exist among these groups regarding their attitudes toward careers and the effect of the three basic needs on the different generational groups on their participation in organizational activity. As suggested by Jaw, Ling and Chang, Gen Y and Gen Z have a more individualistic cultural orientation [52].

2.4.2. Chinese Employee Motivation in IntCS

Local Chinese academic researchers have conducted some studies to explore the motives for Chinese people to participate in crowdsourcing activities. However, these studies have not been able to develop adequate knowledge and provide sufficient insights regarding Chinese employees' motivational factors [48]. The lack of sufficient insights may be due to the research models based on prior models developed in Western countries. Cultural differences may have a role in determining Chinese employee motivation in participating in IntCS.

Huang stated that in countries with more collectivistic characteristics and large power distance, employees focus more on harmony and respect of their leader's authority; thus, intrinsic motivation may be less effective to motivate employees to participate in IntCS [53]. On the other hand, Wright, Berrell, and Gloet argued that even with larger power distance and intra-culture variances, Chinese employees do not necessarily internalize the value of respecting seniors' authority [54]. Furthermore, self-interest characteristics are common for

young Chinese employees, and they emphasize personal achievements more. They also suggested that Chinese employees need autonomy and competence for the motivation to participate in workplace activities. This suggestion is aligned with SDT's proposition: the satisfaction of basic psychological needs is essential for an individual's well-being.

2.5. Research Model

Several research theories have confirmed that intrinsic motivation impacts employee participation in organizational activities considerably more than extrinsic motivation [41]. Furthermore, previous studies demonstrate a link between these variables and suggest significant differences across generational groups considering the influence of traditional Chinese culture.

This research's conceptual model comprises the interaction effects among the satisfaction of three basic needs, the extrinsic and intrinsic motivations, and employee participation effort in IntCS. The hypotheses of this research focused on the questions of which basic needs and motivational factors are more important for the engagement of Chinese IT employees in IntCS activities. This research aims to fill the gap in the literature, and the following reasons justify the research's necessity.

First, whether the individuals' basic psychological needs must be satisfied if they are to participate in IntCS is viewed as a discretionary behavior. Second, SDT has been commonly criticized for its possible lack of applicability to non-Western countries [25]. A widespread assumption exists that SDT applies only to Western countries as it emphasizes the need for autonomy, which springs more from individualistic cultures than from collectivistic ones. Numerous studies have populated their samples with Westerners, which has failed to understand the impact of cultural differences on the three basic psychological needs [55].

The dependent variable of this research model is employee participation effort in IntCS. Ke and Zhang mentioned that participation effort on IntCS is the persistence and intensity exerted by employees in activities [56]. In essence, motivation reflects individual participation in activities, and the persistence exerted in activity over time [24].

This research model's independent construct comprises the satisfaction of the three basic psychological needs: need for autonomy, need for competence, and need for relatedness.

Satisfaction of need for autonomy—researchers have suggested that the need for autonomy among Chinese employees in a workplace environment might not be significant when compared with that among Westerners. The suggested reasons are attributable to the collectivist culture in China [57] and the large power distance nature of the Chinese environment [53]. Triandis argued that the need for autonomy would be less significant in countries where interpersonal harmony is more valued [57]. Deci et al. argued that this criticism is based on the view that autonomy is the same as independence and individualism instead of having the option and the free choice to participate [22]. Hence, this research aims to understand the relationship between the satisfaction of the need for autonomy for employees in China and their participation in IntCS.

Satisfaction of need for competence—according to Deci and Ryan, competence refers to the feeling of confidence in having an effective capability to interact with the social environment to accomplish tasks [24]. It should not be viewed as an objective skill or an individual's capabilities in performing a task. The perceived competence by individuals is the degree to which they believe that participating in a workplace activity will enable them to demonstrate their capabilities [24]. It is the opportunity to achieve success by spending effort on a task and the pride of taking personal responsibility and credit for the outcome [56].

Ke and Zhang suggested that responsive feedback on the quality of a finished task provided by peers promotes the satisfaction of the need for competence of an individual [56]. Consequently, an individual will perform more effectively through autonomous motivation [22]. This research aims to understand the relationship between satisfaction of need for competence and participation in IntCS activities of employees.

Satisfaction of need for relatedness—Deci and Ryan defined relatedness as an individual's desire to forge meaningful relationships with the people around them and be appreciated and valued by others [24]. Deci and Ryan believed that it is less important to satisfy the need for relatedness than that for autonomy and competence. Cerasoli and Ford suggested that relatedness is a modest predictor of an effect compared with autonomy and competence [58]. However, the need for relatedness remains strong in countries characterized by a collectivist culture [57]. This research aims to understand how Chinese employees' perception of relatedness affects their motivation to participate in workplace initiatives.

Mediating variables—the mediating variables of this research are intrinsic and extrinsic motivation. Whether the satisfaction of psychological needs positively relates to Chinese employees' engagement in the Chinese workplace environment remains unclear. Only a few studies have used the Chinese population to understand the functional importance of psychological needs in Chinese culture related to workplace engagement [25]. This research aims to understand the mediating effect of intrinsic and extrinsic motivation on employees' participation in IntCS activities.

Chinese employees require their three basic psychological needs to be satisfied if they are to be motivated to participate in workplace activities. However, whether this finding equally applies to IntCS activities and whether SDT can be applied to such activities in Chinese IT organizations remains unknown. Moreover, the relative importance of each need for intrinsic and extrinsic motivations and their effect on employee participation in IntCS remains unclear. Thus, this research considers the three basic psychological needs as separate constructs to better understand their relations with intrinsic motivation, extrinsic motivation, and employee participation effort. Hence, the first group of hypotheses relates to the relationship between the three basic psychological needs and intrinsic motivation:

Hypothesis 1 (H1). *The satisfaction of Chinese employees' perceived autonomy positively relates to employees' intrinsic motivation to participate in IntCS activities.*

Hypothesis 2 (H2). *The satisfaction of Chinese employees' perceived competence positively relates to employees' intrinsic motivation to participate in IntCS.*

Hypothesis 3 (H3). *The satisfaction of Chinese employees' perceived relatedness positively relates to employees' intrinsic motivation to participate in IntCS.*

Individuals may be extrinsically motivated to engage in activities when they earn value from their participation. Individuals engage in an activity to obtain positive benefits or prevent negativity [21]. This extrinsic motivation may be an autonomous form or a controlled form depending on the individuals' perception of the participation value [21]. Ke and Zhang revealed that satisfying these needs differently affects the forms of extrinsic motivation [56]. Hence, the second group of hypotheses relates to the relationship between the three basic psychological needs and extrinsic motivation:

Hypothesis 4 (H4). *The satisfaction of Chinese employees' perceived autonomy positively relates to employees' extrinsic motivation to participate in IntCS.*

Hypothesis 5 (H5). *The satisfaction of Chinese employees' perceived competence positively relates to employees' extrinsic motivation to participate in IntCS.*

Hypothesis 6 (H6). *The satisfaction of Chinese employees' perceived relatedness positively relates to employees' extrinsic motivation to participate in IntCS.*

Brabham suggested that intrinsic motivation fosters employee engagement in workplace activities because of the perceived benefits [59]. Strong intrinsic motivation fosters participation effort because intrinsically motivated people perceive a greater degree of meaningfulness in a given task [60]. In essence, autonomous motivation is a mediating

factor in the relation between the satisfaction of the three basic needs and the participation effort [61]. Hence, the following hypothesis is formed:

Hypothesis 7 (H7). *The intrinsic motivation of Chinese employees positively relates to participation effort expended in IntCS activities.*

Individuals are often motivated to participate in IntCS by internal and external factors; external factors may be the prospect of a monetary reward or career development [31]. Participation in IntCS can be incentivized by offering a little financial reward, drawing managerial recognition, or the prospect of gaining new knowledge or improving opportunities at work, all of which have been frequently used and shown to boost participation effort [62]. Hence, the following hypothesis is formed:

Hypothesis 8 (H8). *The extrinsic motivation of Chinese employees positively relates to participation effort expended in IntCS activities.*

Figure 1 shows the overall research conceptual model of this research.

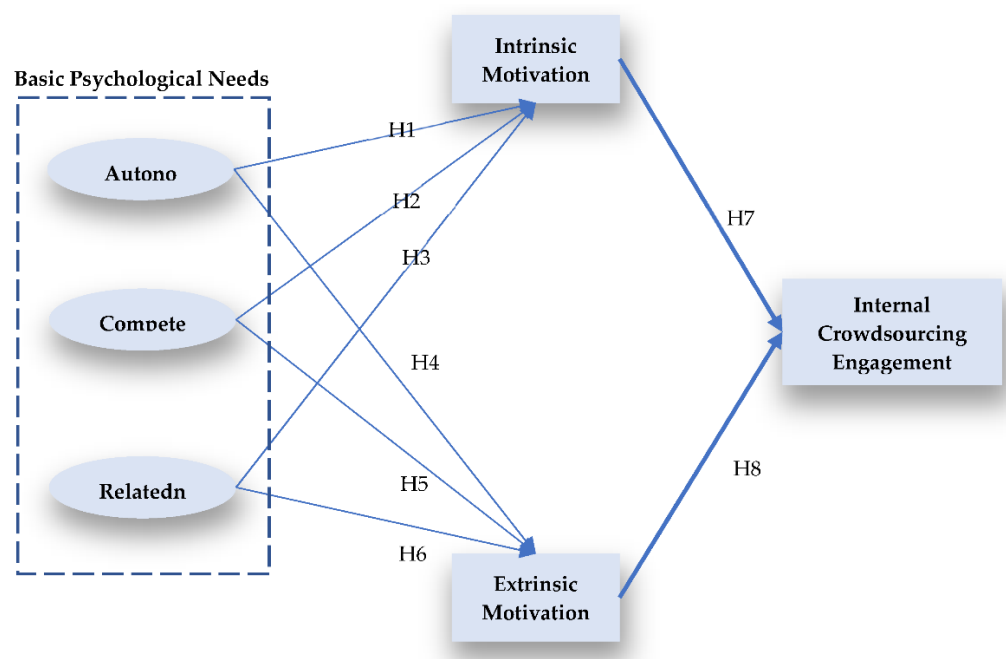


Figure 1. Conceptual Model.

3. Research Methodology

3.1. Research Instrument Data Collection

Previous studies of employee motivation using SDT [31] and studies on crowdsourcing activities [63] were conducted using the positivism paradigm. This research followed previous studies as it is conducted in the context of IT organizations in China. It is justified to adopt the positivism research paradigm as this provides benefits in enabling result comparison between Western and Chinese populations.

China is a world leader in e-commerce, with many innovative services and practices operated by start-ups or small-medium IT organizations throughout China. The research focus is on IT organizations and the population of interest in this study is Chinese employees in IT organizations. The inclusion criterion of sample selection includes employees working in IT organizations which use internal crowdsourcing for the generation of innovative ideas.

This research adopted a quantitative approach with an online survey questionnaire to collect data from respondents. Through an online questionnaire survey, questionnaires were sent to 540 employees in information technology organizations in Tsinghua Science

and Technology Park in Zhuhai, China, and 464 were returned. Of the 464 returned questionnaires, 435 completed and valid questionnaires were used for statistical analysis and hypotheses testing. The measurement items used in the survey questionnaire were adapted from previous studies, which demonstrated good validity and reliability. The higher-order construct and the measured items of work-related satisfaction of basic-psychological needs were adapted from Deci and Ryan [55]. For the two mediating variables, the measuring items of intrinsic motivation were adapted from Amabile [64] and Roberts, Hann, and Slaughter [65]. The measuring items of extrinsic motivation were adapted from Amabile [64] and Kankanhalli, Tan, and Wei [66]. Intrinsic motivation, extrinsic motivation, the satisfaction of the three basic psychological needs, and participation effort were treated as reflective variables. Participants were asked to rank their responses to questions on a seven-point Likert scale (where 1 = 'strongly disagree' and 7 = 'strongly agree').

3.2. Research Questionnaire

The questionnaire comprised two parts. The first part consisted of questions gathering basic demographic information. The second part consisted of questions designed to assess intrinsic and external motivation, the satisfaction of the three basic needs, and participation engagement effort (intensity and persistency).

The questionnaire was translated from English into Chinese to ensure respondents could understand the meanings of the questions. The translated text was proofread to ensure the original meaning was retained. The translated text was then reverse translated into English by a person who did not know the original English questionnaire. A final comparison was made between the original and the re-translated questionnaire to ensure no meanings had been lost or changed in translation.

3.3. Data Analysis

Descriptive statistics encompassing graphics such as charts, graphs, and frequency tables were used to show the general findings. Inferential statistics were used to analyze the data gathered during this research as they enable the researcher to identify relationships or patterns in a sample that is generalizable to a broader population. Most inferential statistics techniques derive from the general linear model and include linear regression analysis and analysis of variance (ANOVA).

The conceptual model was verified using structural equation modeling (SEM), a second-generation method frequently applied to multivariate data analysis as it can test and support both linear and additive causal models [67]. The research model developed to measure a particular concept must be checked to ensure it accurately measures the correct variables, otherwise known as the goodness of measure [68]. The goodness of measure requires that the reliability, convergent validity, and discriminant validity of the measuring instrument are all examined. It was decided to apply all these tests because all the measured items in the current study are reflective; that is, they share a common cause [69]. PLS is an SEM technique that efficiently analyses latent variables and indicators and was chosen for this research for two principal reasons. First, it assesses the construct validity of the model by examining the loadings of each indicator of the constructs and the causal relationship between constructs [70]. Second, it is regarded as suitable for relatively small samples [71].

The PLS method uses a two-step evaluation process to validate the survey instrument of the research model. First, the measurement model assessment verifies the reliability and validity of the constructs in the research model. Second, the structural model assessment evaluates the strengths of path coefficients between independent variables and the dependent variable [71]. SmartPLS software version 3.2.9 by SmartPLS GmbH, Oststeinbek, Germany (<https://www.smartpls.com>) was the chosen statistical analysis tool used for statistical analysis and hypotheses testing. After coding the data from the completed questionnaires, descriptive statistics analysis was conducted based on the demographic data of the respondents using Microsoft Excel (version 2019) by Microsoft.

4. Findings

4.1. Research Questionnaire

Saunders, Lewis, and Thornhill indicated that descriptive statistics provide a useful methodological complement to inferential statistical analysis [72]. Moreover, they indicate the research facts and offer an initial view regarding the research's exploratory aspect.

Table 1 presents the descriptive statistical analysis result of the demographic variables of the questionnaires.

Table 1. Demographic variables of respondents.

Category	Total Sample	Social Reform Generation (Age 40+)	Generation Y & Generation Z (Age 20–40)
Variable: Gender			
Male	328 (75%)	19 (79%)	309 (75%)
Female	107 (25%)	5 (21%)	102 (25%)
Variable: Age			
20–25	178 (41%)		
26–30	104 (24%)		
31–35	78 (18%)		411 (94%)
36–40	51 (12%)		
41–45	19 (4%)		
≥46	5 (1%)	24 (6%)	
Variable: Home Province			
Southern China	394 (91%)	19 (79%)	375 (91%)
Northern China	11 (3%)	1 (4%)	10 (2%)
Eastern China	15 (3%)	1 (4%)	14 (3%)
Southwestern China	8 (2%)	2 (8%)	6 (1%)
Northwestern China	7 (2%)	1 (4%)	6 (1%)
Variable: Education Level			
Below College	5 (1%)	1 (4%)	4 (1%)
College	188 (43%)	8 (33%)	180 (44%)
Bachelor	233 (54%)	14 (58%)	219 (53%)
Master of above	9 (2%)	1 (4%)	8 (2%)
Variable: Seniority			
Junior Engineer	203 (47%)	1 (4%)	202 (49%)
Senior Engineer	95 (22%)	1 (4%)	94 (23%)
Team Leader	56 (13%)	9 (38%)	47 (11%)
Manager	60 (14%)	4 (17%)	56 (14%)
Senior Manager	21 (5%)	9 (38%)	12 (3%)
Variable: Year of Experiences			
1–3	186 (43%)	0 (0%)	186 (45%)
4–5	64 (15%)	1 (4%)	63 (15%)
6–10	92 (21%)	1 (4%)	91 (22%)
11–15	64 (15%)	3 (13%)	61 (15%)
≥16	29 (7%)	19 (79%)	10 (2%)
Variable: Company Size			
≤50	9 (2%)	1 (4%)	8 (2%)
51–100	58 (13%)	1 (4%)	57 (14%)
101–200	0 (0%)	0 (0%)	0 (0%)
201–300	286 (66%)	18 (75%)	268 (65%)
≥301	82 (19%)	4 (17%)	78 (19%)
Variable: Salary level per month (RMB)			
≤8000	204 (47%)	3 (13%)	201 (49%)
8001–12,000	130 (30%)	8 (33%)	122 (30%)
12,001–20,000	88 (20%)	8 (33%)	80 (19%)
20,001–30,000	11 (3%)	4 (17%)	7 (2%)
≥30,001	2 (0%)	1 (4%)	1 (0%)

4.2. Analysis of Variance

ANOVA analysis with post-hoc tests was conducted to understand the statistical differences among the means of different generation groups (SR, Gen Y, and Gen Z) in terms of the impact of the three basic psychological needs. Table 2 presents the comparison results for the two groups: (A) Between Gen Z, Gen Y, and Social Reform groups; and (B) Within Gen Z, Gen Y, and Social Reform groups.

Table 2. One-way ANOVA results by generation groups.

	SS	Df	MS	F	<i>p</i> -Value	F Crit
Autonomy						
A	4.4626	2.0000	2.2313	3.0915	0.0464	3.0166
B	311.7909	432.0000	0.7217			
Competence						
A	20.8517	2.0000	10.4259	13.2886	0.0000	3.0166
B	338.9344	432.0000	0.7846			
Relatedness						
A	1.9457	2.0000	0.9729	1.6506	0.1931	3.0166
B	254.6172	432.0000	0.5894			

The effect of the need for autonomy and the need for competence on the different generation groups was significant at the $p < 0.05$ level. However, the need for relatedness had an insignificant effect on the different generation groups at the $p > 0.05$ level. Considering the statistically ANOVA results for the needs of autonomy and competence, a post-hoc test using the Bonferroni approach was conducted to determine the difference in means for different generation groups in terms of the impact of the needs for autonomy and competence.

The ANOVA result for autonomy indicates that the need for autonomy significantly impacted different generation groups, with F-value (3.0915) being slightly higher than F-critical (3.0166) and p -value ($0.0464 \leq 0.05$). This result suggests that the mean values of one or two generation groups significantly differed from those of other generation groups and that at least one of the generation groups belonged to another population.

Table 3 presents the post-hoc test result of the effect of the need for autonomy on the different generation groups. From Table 3, the t-statistics results indicate that the p -value of Gen Z vs. Gen Y was 0.0695 (>0.05). Similarly, the p -value of Gen Y vs. SR was 0.2034 (>0.05). These results indicate that the need for autonomy has no significantly different effect on Gen Z vs. Gen Y, and Gen Y vs. SR. On the other hand, the p -value of Gen Z vs. SR was 0.026 (≤ 0.05), indicating the need for autonomy has a significantly different effect on Gen Z vs. SR.

Table 3. Post-hoc test on need for autonomy in different generations.

	Gen Z and Y	Gen Z and SR	Gen Y and SR
Df	286.0000	29.0000	33.0000
<i>t</i> stat	−1.8217	−2.3457	−1.2977
<i>p</i> -value	0.0695	0.0260	0.2034
<i>t</i> Critical	1.9683	2.0452	2.0345

The ANOVA result for competence indicates that the need for competence significantly impacted different generation groups, with an F-value (13.2886) being higher than F-critical (3.0166) and a p -value ($0 \leq 0.05$). This result suggests that the mean values of one or two generation groups significantly differed from those of other generation groups and that at least one of the generation groups belonged to another population. Table 4 presents the post-hoc test result of the effect of the need for competence on the different generation groups. The t-statistics results indicate that the p -value of Gen Z vs. Gen Y, Gen Z vs. SR were 0 (≤ 0.05) and 0.0001 (≤ 0.05), respectively. However, the p -value of Gen Y vs. SR was 0.1512 (>0.05). These indicate that competence has a significantly different effect on Gen Z compared to Gen Y and SR.

Table 4. Post-hoc test on need for competence in different generations.

	Gen Z and Y	Gen Z and Social Reform	Gen Y and Social Reform
df	320.0000	32.0000	35.0000
<i>t</i> stat	−4.8046	−4.3781	−1.4673
<i>p</i> value	0.0000	0.0001	0.1512
<i>t</i> Critical	1.9674	2.0369	2.0301

4.3. Measurement Model Assessment

In the measurement model assessment, the absolute importance of each variable to its corresponding construct was first measured by its corresponding outer loadings (OL) value for verifying the item reliability [73]. Then, Cronbach's alpha (CA), composite reliability (CR), and average variance extracted (AVE) of all constructs were used for assessing the construct reliability. Then, the convergent validity of each construct was assessed by the OL and *t*-values of each of its corresponding measurement variables [74]. Finally, the square roots of AVE [71] and cross-loadings of the measurement variables [75] were measured to evaluate the discriminant validity of each measurement variable.

4.3.1. Item Reliability

After the first round of measurement model assessment, the OL values of six measurement variables were lower than the threshold value (0.708). A low OL value suggested that those six measurement variables did not fit into the corresponding constructs of the research model. A second-round assessment using the same collected dataset was conducted by dropping those six measurement variables. The results of the second round indicated positive results. Table 5 depicts OLs of the measurement variables ranging from 0.7625 to 0.9233.

Table 5. Outer loadings and *t*-value of measurement variables in each construct.

Measurement Variables						
Autonomy	AU01	AU03	AU04	AU06		
OL	0.7625	0.8187	0.8046	0.8174		
<i>t</i> -value	23.520	34.220	22.655	32.681		
Competence	COM1	COM3	COM4	COM5	COM6	
OL	0.7998	0.8805	0.7893	0.9042	0.8769	
<i>t</i> -value	23.873	53.183	23.820	73.071	75.171	
Relatedness	RE01	RE02	RE05			
OL	0.8515	0.851	0.7932			
<i>t</i> -value	30.815	32.733	22.301			
Extrinsic motivation	EXT01	EXT02	EXT03	EXT04		
OL	0.7874	0.8672	0.9033	0.8836		
<i>t</i> -value	25.361	53.401	82.555	37.537		
Intrinsic motivation	INT01	INT02	INT03	INT04	INT05	INT06
OL	0.8913	0.9051	0.9233	0.9035	0.9023	0.8835
<i>t</i> -value	61.978	70.790	89.841	71.273	74.837	51.938
Participation effort	PE01	PE02	PE03	PE04	PE05	
OL	0.9112	0.8758	0.8947	0.9048	0.8678	
<i>t</i> -value	87.923	52.761	46.906	62.826	58.082	

4.3.2. Construction Reliability

Table 6 indicates that all CA values are greater than 0.708 (ranging from 0.7786 to 0.9539), CR values are greater than 0.708 (ranging from 0.8711 to 0.9630), and AVE values are greater than 0.5 (ranging from 0.6418 to 0.8129), indicating sufficient internal consistency reliability for all constructs.

Table 6. Cronbach's alpha, composite reliability, and average value of measurement variables.

	AVE	CR	R2	CA
AU	0.6418	0.8774		0.8136
COM	0.7250	0.9293		0.9047
RE	0.6928	0.8711		0.7786
EXT	0.7422	0.9199	0.2196	0.8855
INT	0.8129	0.9630	0.3398	0.9539
PE	0.7939	0.9506	0.6503	0.9351

4.3.3. Convergent Validity

Fornell and Larcker mentioned that the OL value and *t*-value of measurement variables measure their convergent validity [74]. Table 5 indicates that the OLs of all measurement variables are higher than the recommended value (0.5) and that the *t*-values of all constructs are high, suggesting convergent validity of all constructs.

4.3.4. Discriminant Validity

Table 7 indicates that the square root of the AVE of each construct (highlighted in bold) is higher than the correlation coefficients associated with all other constructs (the correlation coefficients between constructs are the off-diagonal numbers). These results suggest discriminant validity between constructs [74].

Table 7. Discriminant validity coefficients and square root of AVE of measurement variables.

	AVE	AU	COM	EXT	INT	PE	RE
AU	0.6418	0.8011					
COM	0.7250	0.5496	0.8514				
EXT	0.7422	0.4089	0.4155	0.8615			
INT	0.8129	0.5254	0.4880	0.7874	0.9016		
PE	0.7939	0.4910	0.4807	0.6573	0.8055	0.8910	
RE	0.6928	0.5380	0.4774	0.2816	0.4020	0.4142	0.8323

Furthermore, Table 8 indicates that the loading of all measurement items of their corresponding constructs is higher than their cross-factor loadings. This result satisfied the criteria of satisfactory discriminant validity as suggested by Chin [75]. The aforementioned results reveal that all measurement variables of the research model satisfied the different measurement model tests. The questionnaire is well designed for the measurement of the objective of the research model. Therefore, the structural model assessment step proceeded to evaluate the strengths of path coefficients between independent variables and the dependent variable.

Table 8. Cross loading of measurement items to latent variables. The bold is required to highlight those cross loadings belongs to each measurable items.

	AU	COM	EXT	INT	PE	RE
AU01	0.7625	0.5559	0.2948	0.4281	0.4222	0.5014
AU03	0.8187	0.4074	0.3411	0.4494	0.4391	0.4726
AU04	0.8046	0.4218	0.3331	0.3843	0.3462	0.3284
AU06	0.8174	0.3812	0.3400	0.4189	0.3626	0.4168
COM01	0.4229	0.7998	0.3451	0.3859	0.3571	0.3676
COM03	0.4406	0.8805	0.3141	0.3777	0.3836	0.4250
COM04	0.4324	0.7893	0.2965	0.3479	0.3275	0.4122
COM05	0.4958	0.9042	0.3440	0.4246	0.4441	0.4396
COM06	0.5284	0.8769	0.4397	0.5083	0.4994	0.3959

Table 8. Cont.

	AU	COM	EXT	INT	PE	RE
EXT01	0.2752	0.2867	0.7874	0.4898	0.4061	0.1076
EXT02	0.3062	0.3508	0.8672	0.5965	0.5110	0.2073
EXT03	0.4011	0.4018	0.9033	0.7943	0.6738	0.2996
EXT04	0.3992	0.3742	0.8836	0.7667	0.6197	0.3083
INT01	0.4710	0.4802	0.7644	0.8913	0.7081	0.3178
INT02	0.4659	0.3940	0.7303	0.9051	0.7405	0.3690
INT03	0.4459	0.4434	0.7215	0.9233	0.7332	0.3494
INT04	0.5013	0.4812	0.6960	0.9035	0.6930	0.3914
INT05	0.4850	0.4039	0.7194	0.9023	0.7616	0.3716
INT06	0.4723	0.4385	0.6273	0.8835	0.7195	0.3746
PE01	0.4155	0.3736	0.5904	0.7086	0.9112	0.3693
PE02	0.4345	0.4183	0.5899	0.7161	0.8758	0.3666
PE03	0.4246	0.4424	0.5709	0.6803	0.8947	0.3738
PE04	0.4583	0.4610	0.5685	0.6885	0.9048	0.4057
PE05	0.4516	0.4446	0.6033	0.7832	0.8678	0.3333
RE01	0.4126	0.4046	0.2601	0.3290	0.3438	0.8515
RE02	0.4560	0.3781	0.2184	0.2829	0.3029	0.8510
RE05	0.4718	0.4036	0.2213	0.3798	0.3776	0.7932

4.4. Structural Model Assessment

The structural model assessment comprises two evaluation steps. The first step examines the strength and direction of path coefficients between constructs. The second step examines the coefficients of determination (R^2) [76]. Figure 2 summarizes the path coefficient of each hypothesis, the significance of each path coefficient, and the level of R^2 of the research model.

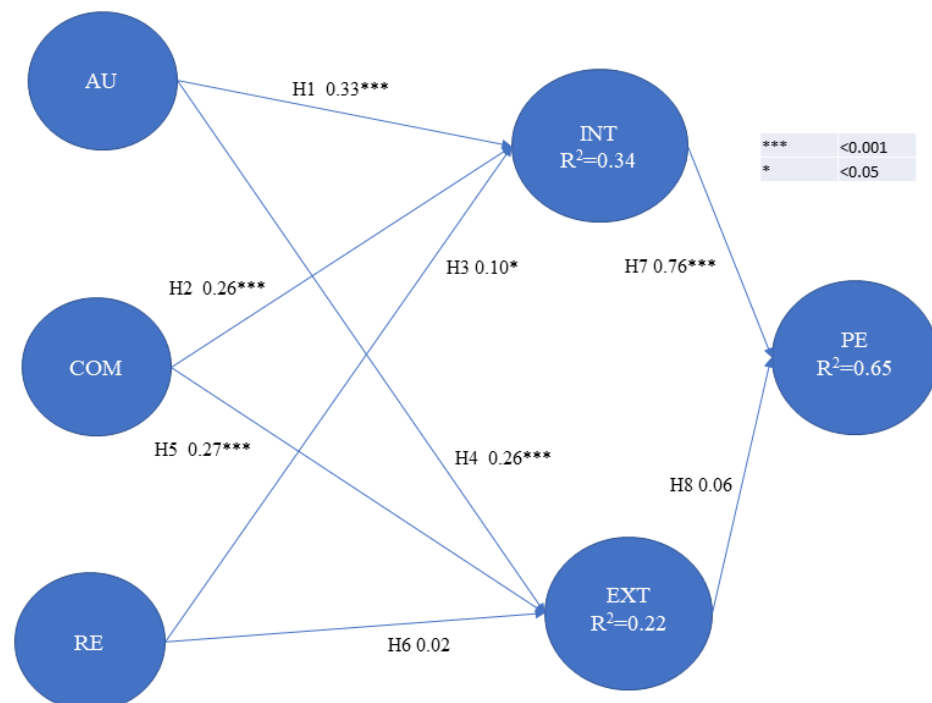


Figure 2. Path coefficients and R^2 of the research model.

4.4.1. Path Coefficients of Hypotheses H1 and H4—Perceived Autonomy

The path coefficients of H1 and H2 were 0.33 ($p = 0.000 < 0.001$) and 0.26 ($p = 0.000 < 0.001$), respectively. Therefore, perceived autonomy is significantly positively related to both intrinsic

and extrinsic motivation. This means the higher autonomy an employee perceives, the higher his/her intrinsic and extrinsic motivation in participating in IntCS activities will be.

4.4.2. Path Coefficients of Hypotheses H2 and H5—Perceived Competence

The path coefficients of H2 and H5 were 0.26 ($p = 0.000 < 0.001$) and 0.27 ($p = 0.000 < 0.001$), respectively. Therefore, perceived competence is significantly positively related to both intrinsic and extrinsic motivation. This means the higher perceived competence for an employee, the higher his/her intrinsic and extrinsic motivation in participating in IntCS activities will be.

4.4.3. Path Coefficients of Hypotheses H3 and H6—Perceived Relatedness

The path coefficients of H3 and H6 were 0.10 ($p = 0.031 < 0.05$) and 0.02 ($p = 0.719 > 0.05$), respectively. Therefore, perceived relatedness is significantly positively related to intrinsic motivation but not in the case of extrinsic motivation. This means the higher relatedness an employee perceives, the higher his/her intrinsic motivation in participating in IntCS activities will be.

4.4.4. Path Coefficients of Hypotheses H7 and H8—Intrinsic and Extrinsic Motivation

The path coefficient of H7 and H8 were 0.76 ($p = 0.000 < 0.001$) and 0.06 ($p = 0.241 > 0.05$), respectively. Therefore, intrinsic motivation is significantly positively related to the participation effort in IntCS activities while extrinsic motivation is not. This means the higher the intrinsic motivation an employee has, the higher participating effort will be spent in IntCS activities. Similar effects cannot be found in extrinsic motivation.

4.4.5. R^2 Measurements

In this research, the R^2 of PE explained by the three basic psychological needs, INT and EXT, was 0.65, suggesting that the final model can explain 65% of the variability, which is a moderately strong result [71,75]. The R^2 of intrinsic motivation and extrinsic motivation were 0.34 and 0.22, respectively. These results indicate that the satisfaction of the three basic psychological needs can explain 34% and 22% of the variation in intrinsic motivation and extrinsic motivation, respectively.

4.4.6. Mediating Effect of Intrinsic Motivation

Since the result does not support any direct effect of employees' EXT on PE in IntCS, additional analyses were conducted to understand whether employees' intrinsic motivation mediates the relation between employees' extrinsic motivation and employees' participation effort in IntCS activities.

Based on the path coefficients depicted in Figure 3, the direct effect of EXT on PE was 0.06 ($p = 0.271 > 0.05$), which was insignificant. By looking at the direct effect of EXT on INT, a relatively high coefficient value of 0.79 ($p = 0.000 < 0.001$) was observed. Furthermore, the value of the coefficient of the direct effect of INT on PE was 0.76 ($p = 0.000 < 0.001$). Thus, the indirect effect of EXT on PE was computed as follows: $0.79 \times 0.76 = 0.6$ [71]. This result indicates a significant indirect effect with a p -value = 0.000 < 0.001. This result also suggests that the total effect of EXT on PE should be the total of the direct effect plus the indirect effect, which was 0.66 ($0.06 + 0.6$) with a p -value = 0.000 < 0.001. This reflects an indirect-only mediation (full mediation) [71,77] by INIT on EXT to the PE. Furthermore, Figure 3 indicates that EXT explains 62% of the variability in INT. These results provide an insight into the internalization process of EXT to INT, as suggested by the SDT [24].

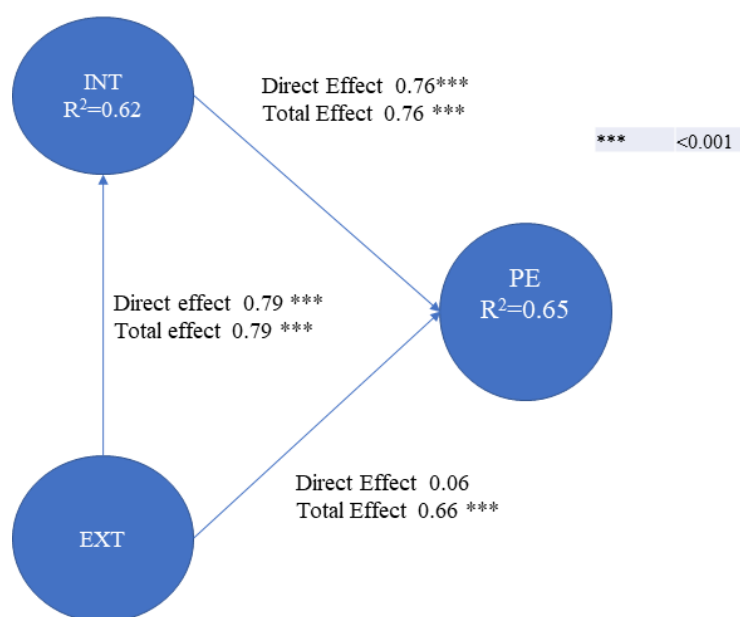


Figure 3. Path coefficients and R^2 on mediation effect of intrinsic motivation.

5. Discussions

Four important findings are observed: (1) the antecedents and motivation for participation in IntCS; (2) the motivation for IntCS; (3) the effect of internalizing EXT to INT; and (4) the impact of generation on the effect of different forms of motivation on PE. There are similarities and differences between the findings of this study from previous studies on the relationships between the three basic needs and intrinsic motivation as well as extrinsic motivation. Similarities and differences of each finding will be discussed separately in the sub-sections below. There is an interesting finding on the indirect effect of extrinsic motivation on participation in IntCS which will be discussed in Section 5.3.

5.1. Antecedents of Motivation

The results of this study support several findings from previous studies on the positive relationship between the satisfaction of the three basic needs with intrinsic motivation and satisfaction of the three basic needs that are universally required.

The research results (Figure 2) indicate that the satisfaction of each of the three basic needs of Chinese IT employees was significantly positively associated with INT. As suggested by Cerasoli and Ford, each of these needs can be an important antecedent of intrinsic motivation and a good predictor of employee participation in organizational activities [58]. Furthermore, this finding is consistent with the theoretical position of SDT, which posits that the three basic needs are universally required [24]. Hence, these results suggest that SDT could be applied to Chinese IT organizations.

The research results reveal that the satisfaction of the needs for AU and COM among Chinese IT employees was significantly positively associated with EXT. Cadwallader et al. posited that the AU is significantly positively related to motivation to participate in innovation projects [44]. As IntCS activities are usually related to innovation idea generation, this explains the results of the research that the AU is important for promoting EXT.

The results of this study show that RE was not significantly associated with EXT. It could be because RE is a modest predictor when compared with autonomy and competence [58]. Another possible explanation is related to the effect of guanxi. Guanxi emphasizes unconditional obedience and loyalty [78], suggesting that employees have no great need for relatedness to participate in IntCS as their participation is due to the instructions of their management. This finding reveals that the effect of guanxi might differ from the satisfaction of needs for relatedness in the context of IT organizations in China.

5.2. Motivation for IntCS Participation

The results of this study support prior study results on two aspects. First, INT is positively related to PE in IntCS activities. This result is consistent with prior research results that INT produces positive consequences [21,22]. Second, this result is also consistent with prior research results suggesting that INT facilitates PE in organizational activities [59,60,79].

Furthermore, this result is consistent with the findings of Frey, Luthje and Haag (2011) [80] that EXT positively relates to a negligible contribution to IntCS. It is consistent with the contentions of Ke and Zhang, and Leimeister, Huber, Bretschneider and Krcmar that compensation is unrelated to the level of effort and not necessarily the strongest motive driving participation in organizational activities [56,81].

5.3. Indirect Effect of EXT on IntCS Participation

The results of this study discovered an interesting finding which supports the suggestion made by Deci and Ryan on the internalization effect of extrinsic motivation on intrinsic motivation [24]. Figure 3 indicates a strong positive relation between the INT and EXT. Moreover, there is a significant total effect of EXT on PE, and EXT explains 62% of the variability of intrinsic motivation. These results suggest that EXT was indeed internalized to intrinsic motivation, as consistent with prior research results [24]. Given that EXT explains 62% of the variability of intrinsic motivation, employees appear inclined to highly internalize behaviors and values to gain a sense of autonomy, competency, and relatedness at work. This result suggests that the AU is most important, which is central to the internalization process, among employees in Chinese IT organizations [24,82,83].

5.4. Generations Differences in the Effect of Participation in IntCS

Table 3 indicates the need for autonomy has different effects on different generational cohorts and Table 4 indicates the need for competence has different effects on different generational cohorts. The t-statistics results of the post-hoc test concerning the need for autonomy among different generational cohorts (Table 3) suggest that this need has a significantly different effect on GenZ and SR groups. Similarly, the results of the need for competence among different generational groups (Table 4) suggest that this need significantly impacts the Gen Z group. Hence, the Gen Z group experiences the need for autonomy and competence differently from the Gen Y and SR groups.

The ANOVA and post-hoc results (Tables 3 and 4) do not support the idea that Gen Z and Gen Y groups of Chinese employees need higher autonomy and competence to be motivated to participate in the workplace [54]. One possible explanation for this finding is that the need for autonomy is less significant in organizations in which senior executives display greater power distance characteristics and have greater overall power to take decisions [53].

6. Contributions, Limitations, and Recommendations

6.1. Theoretical Contributions

This research offers several overarching conceptual and theoretical implications by advancing our theoretical understanding of employee participation in IntCS based on SDT and its applicability in the context of IT organizations in China.

First, using SDT as the theoretical model, this study extends our knowledge of IntCS participation by incorporating the effects of the satisfaction of the three basic needs through IntCS. It is among the first to examine the effect of the three basic needs on employee participation in IntCS in the context of IT organizations in China. The research findings indicate that INT is a significant antecedent of participation effort. Recent findings argued that intrinsic and extrinsic motivation can complement each other but they will not crowd each other's effect out [84]. It is imperative to conduct future research on the supplementary effect of extrinsic motivation, such as monetary reward, and on how that can positively supplement intrinsic motivation on participation effort in IntCS.

The second implication is that SDT can be applied to non-Western cultures. The study samples are all sourced from Chinese IT organizations, in which relationships and *guanxi* are vital. The research results support the idea that the most important basic psychological need of employees is autonomy. The results of previous studies are inconsistent regarding the effect of satisfying the needs for competence and relatedness in relation to intrinsic motivation. However, this study affords a good insight into the influence of organizational culture and practice on the effect of the satisfaction of the needs for competence and relatedness on different types of motivation. This finding presents another interesting area for future researchers to investigate by employing SDT and other motivational theories such as organizational behavior and leader–member exchange theories.

Finally, under SDT, the existence of external support within the working environment improves the satisfaction of the three basic needs, thereby promoting INT and the internalization of EXT. One exciting finding is that of an indirect effect of EXT on PE via INT. This research indicates the value of SDT in investigating the quality of employee motivation towards employee behavioral intention to participate in IntCS. This research enables a deeper understanding of how EXT is internalized and becomes INT. Furthermore, this research provides a starting point for further research on the mediating/moderating effect of the transition process of how EXT is internalized.

6.2. Practical Contributions

The strategic insights resulting from this research can be usefully leveraged by organizational management seeking to use IntCS platforms to generate ideas in the workplace or engage employees in workplace initiatives. Organizational management looking to attract greater employee participation in IntCS should consider making IntCS activities more interesting as this will promote INT, which is highly correlated with PE. As many activities are not inherently interesting, management should foster the internalization of the values they enshrine (i.e., promote identified regulation) and then focus on injecting entertainment into the activities (i.e., promote intrinsic motivation). Employees are more likely to adopt and internalize the desired goals if they understand them and have the necessary knowledge to succeed.

To satisfy the need for autonomy, managers should emphasize that participation is voluntary rather than requiring employees to participate in IntCS, as the opportunity to work independently and exercise autonomy will increase employee motivation to participate. The IntCS platform should incorporate an appreciation and feedback mechanism for the satisfaction of the need for competence, as the importance of positive feedback and peer identification could be demonstrated. Managers must also consider that the effort required to complete the activity as well as its complexity affect how easily the participants' need for competence can be satisfied. Similarly, in regard to satisfying the need for relatedness, the IntCS platform should foster the creation of a network between employees belonging to different organizational departments as well as inter-colleague collaboration. In so doing, it will nurture a good environment in the workplace to enhance the satisfaction of employees' need for relatedness.

When implementing a platform for crowdsourcing initiatives, organizations should also consider the governance structure of the working relationship between management and employees regarding getting feedback from employees and providing more transparency to employees on how the innovative ideas generated are being assessed and adopted. Organizations should consider building a knowledge management platform for tracking and sharing all ideas generated from IntCS activities.

6.3. Limitations and Recommendations

Cross-sectional research: a cross-sectional research approach was adopted because of the time and resource constraints under which the researcher operated. This was also because the research did not investigate change over time in motivational behavior among Chinese IT employees. The limitation is that this approach cannot elicit further information

or draw any conclusions regarding effects over time. A longitudinal study should be conducted to enrich the research findings by offering additional information about possible variations in the relations between the basic psychological needs and the different types of motivation as well as the relation between different types of motivation and participation effort across time. Moreover, it would enhance our understanding of the impact of IntCS on organizational culture and leadership style and of how EXT is internalized to INT over time.

The use of bipolar intrinsic and extrinsic motivations in the research model provides a broad understanding of how SDT can be applied to understand employee participation in IntCS in Chinese IT organizations. However, it does not enable a good understanding of employee behaviors classified by the four subtypes of external, introjected, identified, and integrated regulation of extrinsic motivation, which can also be broadly categorized as controlled and autonomous motivation. If managers in an organization are to implement an effective IntCS platform and ensure the participation of employees, they must understand the four subtypes of employee behaviors that are important to extrinsic motivation: external, introjected, identified, and integrated regulation. Furthermore, an extension of the examination of the effects of the different types of motivation provides better insights into the effect of the internalization of extrinsic motivation to intrinsic motivation.

This research focused on the effects of the satisfaction of the basic psychological needs, as the independent variables on INT and EXT. However, other factors such as environmental context, leadership style, and individual and gender differences may also affect the individuals' perceptions of the extent to which their needs are satisfied. Hence, including other social-contextual variables as independent variables in a research model can give an enhanced understanding of the use of SDT in the workplace. Future research could build on the research framework used by this study. It would, for example, be interesting to investigate employee behavior by examining the impact of social-context variables in the workplace on employee motivation, such as managerial support, leadership style, leader-member relationships, and team atmosphere, all of which influence the satisfaction of the basic needs and different types of motivation. Future research could examine these factors as independent variables. Moreover, a future research model could include different motivation types and the basic needs as mediating or moderating variables to increase our understanding of SDT.

Purposive sampling was used to select a group of IT organizations in Zhuhai, China; however, readily accessible subgroups may over-represent certain types and characteristics. Nevertheless, this sample satisfied the interests and needs of this research. A high response rate indicates that a substantial number of employees in the selected organizations participated, which may reduce any selection effects. However, the sampling may limit the generalizability of the results in terms of geographical location and industry limitations. The population of China is enormous, and cultural differences exist between generational and regional groups. Moreover, many cities host IT organizations, and some of them are heavily influenced by Western culture. Future research could cover other areas in China as well as different organizational cultures.

7. Conclusions

IntCS platforms generate innovative ideas and solutions. Hence, managers of organizations are looking to boost employee participation for their contribution to the reliable and good quality suggestions. The long-term engagement of employees and a sustainable IntCS platform are more likely to be achieved if the platform is properly designed and includes an effective incentive mechanism.

In summary, the research results suggest that employee motivation to participate in IntCS is conditioned by the three basic needs, of which autonomy is the most important factor. Intrinsic motivation is a good predictor of employee participation effort in IntCS activities. Although the research results do not reveal any direct relation between extrinsic motivation and employee participation effort, they indicate the indirect effect of extrinsic

motivation on employee participation via intrinsic motivation. Thus, as suggested by SDT, the internalization process of EXT to INT exists.

The research results suggest that SDT may fruitfully be applied to the Chinese IT workplace; however, further investigation is needed to understand the difference between the effect of the need for relatedness and guanxi. Nonetheless, a carefully designed IntCS platform that incorporates mechanisms to promote the satisfaction of the three basic needs and considers the ages of the employees and different social-contextual factors in the workplace is crucial for the long-term sustainability of any IntCS initiative.

This research contributes to the SDT and IntCS literature related to the interaction between the three basic needs in a Chinese setting. Limitations have been acknowledged, and suggestions for future research have been made to enhance our understanding of how to apply SDT to IntCS within IT and other industries in China. Finally, best practices related to the design of IntCS platforms were discussed to promote the satisfaction of employees' basic psychological needs and boost their motivation to participate in IntCS.

Author Contributions: Writing—original draft, T.Y.T.S.; Writing—review & editing, S.K.S.C., F.L.W. and J.Y.K.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Ethical review and approval were waived for this study, as prior review and approval had been obtained.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest: There is no conflict of interest or competing interest for this manuscript.

References

1. Erickson, L.B.; Trauth, E.M.; Petrick, I. Getting inside your employees' heads: Navigating barriers to internal-crowdsourcing for product and service innovation. In Proceedings of the 33rd International Conference on Information Systems (ICIS), Orlando, FL, USA, 16–19 December 2012.
2. Piazza, M.; Mazzola, E.; Acur, N.; Perrone, G. Governance considerations for seeker–solver relationships: A knowledge-based perspective in crowdsourcing for innovation contests. *Br. J. Manag.* **2019**, *30*, 810–828. [\[CrossRef\]](#)
3. Ullah, A.; Zhang, Q.; Ahmed, M. The influence of intellectual property rights protection on contribution efforts of participants in online crowdsourcing contests. *Comput. Hum. Behav.* **2021**, *123*, 106869. [\[CrossRef\]](#)
4. Kankisingi, G.M.; Dhliwayo, S. Rewards and Innovation Performance in Manufacturing Small and Medium Enterprises (SMEs). *Sustainability* **2022**, *14*, 1737. [\[CrossRef\]](#)
5. Simula, H.; Vuori, M. Benefits and barriers of crowdsourcing in B2B firms: Generating ideas with internal and external crowds. *Int. J. Innov. Manag.* **2012**, *16*, 1–19. [\[CrossRef\]](#)
6. Howe, J. The Rise of Crowdsourcing. *Wired*, 1 June 2006. Available online: <https://www.wired.com/2006/06/crowds/> (accessed on 8 April 2022).
7. Brabham, D.C. Crowdsourcing as a model for problem solving: An introduction and cases. *Convergence* **2008**, *14*, 75–90. [\[CrossRef\]](#)
8. Dissanayake, I.; Zhang, J.; Gu, B. Task division for team success in crowdsourcing contests: Resource allocation and alignment effects. *J. Manag. Inf. Syst.* **2015**, *32*, 8–39. [\[CrossRef\]](#)
9. Cappa, F.; Rosso, F.; Hayes, D. Monetary and Social Rewards for Crowdsourcing. *Sustainability* **2019**, *11*, 2834. [\[CrossRef\]](#)
10. Cappa, F.; Rosso, F.; Capaldo, A. Visitor-Sensing: Involving the Crowd in Cultural Heritage Organisations. *Sustainability* **2020**, *12*, 1445. [\[CrossRef\]](#)
11. Cappa, F.; Oriania, R.; Pinellib, M.; De Massisb, A. When does crowdsourcing benefit firm stock market performance? *Res. Policy* **2019**, *48*, 103825. [\[CrossRef\]](#)
12. Cammarano, A.; Varriale, V.; Michelino, F.; Caputo, M. Open and Crowd-Based Platforms: Impact on Organizational and Market Performance. *Sustainability* **2022**, *14*, 2223. [\[CrossRef\]](#)
13. Villarroel, J.A.; Reis, F. Intra-corporate crowdsourcing (ICC): Leveraging upon rank and site marginality for innovation. In Proceedings of the Crowd Conference 2010: The World's First Conference on The Future of Distributed Work, San Francisco, CA, USA, 4 October 2010.
14. Palin, K.; Kaartemo, V. Employee motivation to participate in workplace innovation via in-house crowdsourcing. *Eur. J. Workplace Innov.* **2016**, *2*, 19–40. [\[CrossRef\]](#)
15. Zheng, H.; Li, D.; Hou, W. Task design, motivation, and participation in crowdsourcing contests. *Int. J. Electron. Commer.* **2011**, *15*, 57–88. [\[CrossRef\]](#)

16. Hossain, M. Crowdsourcing: Activities, incentives and users' motivations to participate. In Proceedings of the 2012 International Conference on Innovation Management and Technology Research, Malacca, Malaysia, 21–22 May 2012; IEEE: Piscataway, NJ, USA, 2012; pp. 501–506.
17. George, J.M.; Jones, G.R. *Understanding and Managing Organizational Behavior*, 6th ed.; Prentice Hall: Reading, MA, USA, 2012.
18. Roth, Y.; Brabham, D.C.; Lemoine, J.-F. Recruiting individuals to a crowdsourcing community: Applying motivational categories to an ad copy test. In *Advances in Crowdsourcing*; Springer International Publishing: Cham, Switzerland, 2015. [CrossRef]
19. Malhorta, Y.; Galletta, D.F.; Kirsch, L.J. How endogenous motivations influence user intentions: Beyond the dichotomy of extrinsic and intrinsic user motivations. *J. Manag. Inf.* **2008**, *25*, 267–300.
20. Ryan, R.; Deci, E. Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemp. Educ. Psychol.* **2000**, *25*, 54–67. [CrossRef]
21. Ryan, R.; Deci, E. Self-Determination theory and the facilitation of intrinsic motivation, Social development, and well-being. *Am. Psychol.* **2000**, *55*, 68–78. [CrossRef] [PubMed]
22. Deci, E.L.; Olafsen, A.H.; Ryan, R.M. Self-Determination theory in work organizations: The state of a science. *Annu. Rev. Organ. Psychol. Organ. Behav.* **2017**, *4*, 19–43. [CrossRef]
23. Maslow, A.H. *Motivation and Personality*; Harper & Row: New York, NY, USA, 1954.
24. Deci, E.L.; Ryan, R.M. *Handbook of Self-Determination Research*; University of Rochester Press: Rochester, NY, USA, 2002.
25. Liu, J.; Chung, P.-K.; Si, G. The application of self-determination theory among Chinese populations. *Adv. Psychol. Sci.* **2013**, *21*, 1803–1813. [CrossRef]
26. Deloitte. China Emerges as Global Technology Innovation Leader. 2019. Available online: <https://deloitte.wsj.com/cmo/2019/11/19/china-emerges-as-global-tech-innovation-leader/> (accessed on 8 April 2022).
27. Oshri, I. Managed Crowdsourcing Model: Another 'Made in China' Idea. 2017. Available online: <https://www.computerweekly.com/opinion/Managed-crowdsourcing-model-Another-made-in-China-idea> (accessed on 8 April 2022).
28. Parry, E.; Urwin, P. Generational differences in work values: A review of theory and evidence. *Int. J. Manag. Rev.* **2011**, *13*, 79–96. [CrossRef]
29. Estellés-Arolas, E.; González-Ladrón-De-Guevara, F. Towards an integrated crowdsourcing definition. *J. Inf. Sci.* **2012**, *38*, 189–200. [CrossRef]
30. Grosse, M.; Pohlisch, J.; Korbel, J.J. Triggers of collaborative innovation in online user communities. *J. Open Innov. Technol. Mark. Complex.* **2018**, *4*, 59. [CrossRef]
31. Zhao, Y.; Zhu, Q. Evaluation on crowdsourcing research: Current status and future direction. *Inf. Syst. Front.* **2014**, *4*, 417–434. [CrossRef]
32. Benbya, H.; Leidner, D. Harnessing employee innovation in internal crowdsourcing platforms: Lessons from Allianz UK. In Proceedings of the 37th International Conference on Information Systems, Dublin, Ireland, 11–14 December 2016.
33. Tokarchuk, O.; Cuel, R.; Zamarian, M. Analyzing crowd labor and designing incentives for humans in the loop. *IEEE Internet Comput.* **2012**, *16*, 45–51. [CrossRef]
34. Pedersen, J.; Kocsis, D.; Tripathi, A.; Tarrell, A.; Weerakoon, A.; Tahmasbi, N.; de Vreede, G.J. Conceptual foundations of crowdsourcing: A review of IS research. In Proceedings of the 2013 46th Hawaii International Conference on System Sciences, Wailea, HI, USA, 7–10 January 2013; IEEE: Piscataway, NJ, USA, 2013; pp. 579–588.
35. Zhu, H.; Djurjagina, K.; Leker, J. Innovative behavior types and their influence on individual crowdsourcing performances. *Int. J. Innov. Manag.* **2014**, *18*, 1440015. [CrossRef]
36. Knop, N.; Durward, D.; Blohm, I. How to design an internal crowdsourcing system? In Proceedings of the 38th International Conference on Information Systems (ICIS), Seoul, Korea, 10–13 December 2017.
37. Malhotra, A.; Majchrzak, A.; Kessebi, L.; Loooram, S. Solutions through Internal Crowdsourcing. *MIT Sloan Management Review*. 31 May 2017. Available online: <http://mitsmr.com/2rkSKC2> (accessed on 8 April 2022).
38. Henttonen, K.; Rissanen, T.; Hallikas, J. Managing internal crowdsourcing-best practices in four large organisations. In Proceedings of the ISPIM Innovation Symposium, Dublin, Ireland, 8–11 June 2014; The International Society for Professional Innovation Management (ISPIM): Manchester, UK, December 2014; pp. 1–18.
39. Jain, R. Investigation of Governance Mechanisms for Crowdsourcing Initiatives. In Proceedings of the Americas Conference on Information Systems, Lima, Peru, 12–15 August 2010; p. 557.
40. Parashar, A. Significance of theory Z in Indian scenario. *Int. J. Manag. Soc. Sci. Res.* **2016**, *5*, 8–16.
41. Giancola, F.L. Should HR professionals devote more time to intrinsic rewards? *Compens. Benefits Rev.* **2014**, *46*, 25–31. [CrossRef]
42. Zhang, T.; Wang, W.; Lin, Y.; Tai, L. Understanding user motivation for evaluating online content: A self-determination theory perspective. *Behav. Inf. Technol.* **2015**, *34*, 479–491. [CrossRef]
43. Maruping, L.M.; Magni, M. Motivating employees to explore collaboration technology in team contexts. *MIS Q.* **2015**, *39*, 1–16. [CrossRef]
44. Cadwallader, S.; Jarvis, C.B.; Bitner, M.J.; Ostrom, A.L. Frontline employee motivation to participate in service innovation implementation. *J. Acad. Mark. Sci.* **2009**, *38*, 219–239. [CrossRef]
45. Pan, Y.; Rowney, J.; Peterson, M.F. The structure of Chinese cultural traditions: An Empirical study of business employees in China. *Manag. Organ. Rev.* **2011**, *8*, 77–95. [CrossRef]

46. Chai, S.K.; Rhee, M. Confucian capitalism and the paradox of closure and structural holes in East Asian firms. *Manag. Organ. Rev.* **2010**, *6*, 5–29. [\[CrossRef\]](#)
47. Pye, L.W. Faction and the politics of guanxi: Paradox in Chinese administrative and political behavior. *China J.* **1995**, *34*, 35–53. [\[CrossRef\]](#)
48. Cheung, F.Y.; Wu, W.P.; Chan, K.K.; Wong, M.L. Supervisor-subordinate guanxi and employee work outcomes: The mediating role of job satisfaction. *J. Bus. Ethics* **2009**, *88*, 77–89. [\[CrossRef\]](#)
49. Kirkman, B.; Lowe, K.; Gibson, C. A quarter century of culture's consequences: A review of empirical research incorporating Hofstede's cultural values framework. *J. Int. Bus. Stud.* **2006**, *37*, 285–320. [\[CrossRef\]](#)
50. Yi, X.; Ribbens, R.; Fu, L.; Cheng, W. Variation in career and workplace attitudes by generation, gender, and culture differences in career perceptions in the United States and China. *Empl. Relat.* **2015**, *37*, 66–82. [\[CrossRef\]](#)
51. Hofstede, G.; Minkov, M. Culture Compass Database. 2014. Available online: <https://geert-hofstede.com/countries.html> (accessed on 8 April 2022).
52. Jaw, B.S.; Ling, Y.H.; Chang, W.C. The impact of culture on Chinese employees' work values. *Pers. Rev.* **2007**, *36*, 128–144. [\[CrossRef\]](#)
53. Huang, X. The romance of motivational leadership: How do Chinese leaders motivate employees? In *Handbook of Chinese Organizational Behavior: Integrating Theory, Research, and Practice*; Huang, X., Michael, H.B., Eds.; Edward Elgar Publishing: Northampton, MA, USA, 2012; pp. 184–208.
54. Wright, P.C.; Berrell, M.; Gloet, M. Cultural values, workplace behavior and productivity in China: A conceptual framework for practicing managers. *Manag. Decis.* **2008**, *45*, 797–812. [\[CrossRef\]](#)
55. Deci, E.L.; Ryan, R.M. Self-determination theory: A macro theory of human motivation, development, and health. *Can. Psychol.* **2008**, *49*, 182–185. [\[CrossRef\]](#)
56. Ke, W.; Zhang, P. The effects of extrinsic motivations and satisfaction in open source software development. *J. Assoc. Inf. Syst.* **2010**, *11*, 784–808. [\[CrossRef\]](#)
57. Triandis, H.C. The psychological measure of cultural syndrome. *Am. Psychol.* **1996**, *51*, 407–415. [\[CrossRef\]](#)
58. Cerasoli, C.P.; Ford, M.T. Psychological need satisfaction under self-determination theory predicts performance: A meta-analysis. In Proceedings of the Annual Society for Industrial-Organizational Psychology (SIOP) Conference, Chicago, IL, USA, 14–16 April 2011.
59. Brabham, D.C. Motivations for participation in a crowdsourcing application to improve public engagement in transit planning. *J. Appl. Commun. Res.* **2012**, *40*, 307–328. [\[CrossRef\]](#)
60. Henshaw, H.; McCormack, A.; Ferguson, M.A. Intrinsic and extrinsic motivation is associated with computer-based auditory training uptake, engagement, and adherence for people with hearing loss. *Front. Psychol.* **2015**, *6*, 2–19. [\[CrossRef\]](#) [\[PubMed\]](#)
61. Wefman-Josefsson, K.; Lindwall, M.; Ivarsson, A. Need satisfaction, motivational regulations and exercise: Moderation and mediation effects. *Int. J. Behav. Nutr. Phys. Act.* **2015**, *12*, 67. [\[CrossRef\]](#) [\[PubMed\]](#)
62. Liu, T.; Yang, J.; Adamic, L.; Chen, Y. Crowdsourcing with all-pay auctions: A field experiment on taskcn. *Manag. Sci.* **2014**, *60*, 2020–2037. [\[CrossRef\]](#)
63. Liang, H.; Wang, M.M.; Wang, J.J.; Xue, Y. How intrinsic motivation and extrinsic incentives affect task effort in crowdsourcing contests: A mediated moderation model. *Comput. Hum. Behav.* **2018**, *81*, 168–176. [\[CrossRef\]](#)
64. Amabile, T. Motivational synergy: Toward new conceptualizations of intrinsic and extrinsic motivation in the workplace. *Hum. Resour. Manag. Rev.* **2001**, *3*, 185–201. [\[CrossRef\]](#)
65. Roberts, J.A.; Hann, I.H.; Slaughter, S.A. Understanding the innovations, participation, and performance of open source software developers: A longitudinal study of the apache projects. *Manag. Sci.* **2006**, *52*, 984–999. [\[CrossRef\]](#)
66. Kankanhalli, A.; Tan, B.C.Y.; Wei, K. Understanding seeking from electronic knowledge repositories: An empirical study. *J. Am. Soc. Inf. Sci. Technol.* **2005**, *56*, 1156–1166. [\[CrossRef\]](#)
67. Wong, K.K.K. Partial Least Squares Structural Equation Modeling (PLS-SEM) techniques using SmartPLS. *Mark. Bull.* **2013**, *24*, 1–32.
68. Bajpai, S.; Bajpai, R. Goodness of measurement: Reliability and validity. *Int. J. Med. Sci. Public Health* **2014**, *3*, 112–115. [\[CrossRef\]](#)
69. MacKenzie, S.B.; Podsakoff, P.M.; Jarvis, C.B. The Problem of measurement model misspecification in behavioral and organizational research and some recommended solutions. *J. Appl. Psychol.* **2005**, *90*, 710–730. [\[CrossRef\]](#)
70. Fornell, C.; Bookstein, F.L. Two structural equation models: LIS-REL and PLS applied to consumer exit-voice theory. *J. Mark. Res.* **1982**, *19*, 440–452. [\[CrossRef\]](#)
71. Hair, J.F.; Hult GT, M.; Ringle, C.M.; Sarstedt, M.A. *A Primer on Partial Least Squares: Structural Equation Modeling (PLS-SEM)*, 2nd ed.; Sage: Thousand Oaks, CA, USA, 2017.
72. Saunders, M.; Lewis, P.; Thornhill, A. *Research Methods for Business Students*, 8th ed.; Pearson Education: New York, NY, USA, 2019.
73. Cenfetelli, R.T.; Bassellier, G. Interpretation of formative measurement in information systems research. *MIS Q.* **2009**, *33*, 689–707. [\[CrossRef\]](#)
74. Fornell, C.; Larcker, D.F. Evaluating structural equation models with unobservable variables and measurement error. *J. Mark. Res.* **1981**, *18*, 39–50. [\[CrossRef\]](#)
75. Chin, W.W. Issues and opinion on structural equation modeling. *MIS Q.* **1998**, *22*, 7–16.
76. Urbach, N.; Ahlemann, F. Structural equation modeling in information systems research using partial least squares. *J. IT Theory Appl.* **2010**, *11*, 5–40.

-
77. Zhao, X.; Lynch, J.G.; Chen, Q. Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *J. Consum. Res.* **2010**, *37*, 197–206. [[CrossRef](#)]
 78. Kim, K.T.; Kwon Yoon, K.; Cho, B.S.; Li, L.Z.; Choi, B.K. Do all Chinese employees have the same cultural values? An exploratory investigation on differences in Chinese cultural values among state, privately, and US-owned firms. *Pers. Rev.* **2016**, *45*, 827–849. [[CrossRef](#)]
 79. Stewart, O.; Huerta, J.; Sader, M. Designing crowdsourcing community for enterprise. In Proceedings of the ACM SIGKDD Workshop on Human Computation, Paris, France, 28 June–1 July 2009. [[CrossRef](#)]
 80. Frey, K.; Luthje, C.; Haag, S. Whom should firms attract to open innovation platforms? The role of knowledge diversity and motivation. *Long Range Plan.* **2011**, *44*, 397–420. [[CrossRef](#)]
 81. Leimeister, J.M.; Huber, M.; Bretschneider, U.; Krcmar, H. Leveraging crowdsourcing: Activation-supporting components for IT-based ideas competition. *J. Manag. Inf. Syst.* **2009**, *26*, 197–224. [[CrossRef](#)]
 82. Vallerand, R.J. Deci and Ryan’s self-determination theory—A view from the hierarchical model of intrinsic and extrinsic motivation. *Psychol. Inq.* **2000**, *11*, 312–318.
 83. Gagné, M.; Deci, E.L. Self-determination theory and work motivation. *J. Organ. Behav.* **2005**, *26*, 331–362. [[CrossRef](#)]
 84. Fischer, C.; Malycha, C.P.; Schafmann, E. The influence of intrinsic motivation and synergistic extrinsic motivators on creativity and innovation. *Front. Psychol.* **2019**, *10*, 137. [[CrossRef](#)] [[PubMed](#)]