

Crowdsourcing and Creativity in Firms: The Mediating Role of Organizational Learning

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Abstract

Crowdsourcing within an organization represents a novel area of research, focused on exploring how crowdsourcing can contribute to the strategic rejuvenation of a company. This study seeks to empirically investigate how crowdsourcing affects organizational learning and creativity, and it aims to determine whether organizational learning plays a mediating role in the connection between crowdsourcing and creativity. To conduct this research, a quantitative approach was employed using SPSS and the PROCESS macro, version 4.0. A survey, which was self-administered, was utilized to collect data from 300 IT firm managers in India. The findings indicate that crowdsourcing has a significant impact on both organizational learning and creativity. Additionally, the results demonstrate that organizational learning significantly influences creativity. Furthermore, organizational learning is shown to partially mediate the relationship between crowdsourcing and creativity, highlighting how crowdsourcing can enhance creativity through the mechanism of organizational learning.

Keywords: Crowdsourcing, Organizational learning, Mediating effect, Bootstrapping, Creativity

Introduction

In the contemporary, constantly evolving landscape, economies and markets are undergoing rapid transformations. The rise of disruptive technologies has become essential for businesses seeking to not only endure but also maintain their competitiveness. The advent of Web 2.0 brought about advancements in Information and Communication Technologies, internet accessibility, a collaborative and interconnected global community, giving rise to intense competition for innovative ideas and skilled talent (Gassmann et al., 2014). Therefore, in such a dynamically changing global scenario, there was an urgent need to develop responsive and agile strategies for continuous learning, creativity, and innovation.

Organizational learning is the primary way to keep pace with the fast-changing environment, which helps in continuous knowledge creation

and creativity (Chiva and Alegre, 2005; Wu and Chen, 2014; Xu et al., 2015). Organizational learning encompasses the acquisition, interpretation, and distribution of knowledge throughout various tiers of the company, ultimately leading to favorable organizational advancements and enhanced firm performance (Templeton et al., 2002). There has been a growing trend in harnessing the collective intelligence of the masses to address intricate issues, complete arduous tasks, generate innovative ideas, and increase brand recognition (Surowiecki, 2004; Schulze et al., 2011). This practice of utilizing external crowd knowledge for the sake of organizational learning and advancement is commonly referred to as crowdsourcing. Crowdsourcing is an IT-enabled tool to recruit an undefined group of individuals to collaborate and coordinate organizational tasks (Giles, 2005; Tapscott and Williams, 2006; Howe, 2006; Brabham, 2010; Kuppaswamy and Bayus, 2018).

Companies that employ crowdsourcing practices tend to possess a superior organizational learning capacity, which fosters adaptability and ongoing enhancement. Using the LEGO crowdsourcing case study as an example, Schlagwein and Andersen (2014) suggested that "organizational learning through crowdsourcing represents a distinctive and innovative form of organizational learning, characterized by its external, non-professional, IT-driven, and entrepreneurial nature. It doesn't merely replicate traditional employee-centered organizational learning in a cost-effective digital form; instead, it offers an alternative learning approach." A perpetual learning system within a company sets it apart from its competitors (Hine et al., 2010).

Similarly, we posit that crowdsourcing enriches a company's capacity for innovation by enhancing an individual's creativity through the quality of tacit and implicit knowledge acquired from external networks (Liao and Chen, 2007; Levy, 2009; Poetz and Schreier, 2010). The quantity and diversity of information gathered through connections and engagements with external networks play a pivotal role in shaping creative abilities, ultimately exerting a positive influence on a firm's performance. Organizations that employ crowdsourcing tools are

consistently involved in enhancing their organizational learning capabilities, resulting in information-rich environments (Huber, 1998). This, in turn, contributes to the effectiveness and efficiency of creativity within the organization.

Numerous empirical and conceptual investigations have been conducted by researchers to gain insights into the impact of crowdsourcing on organizational learning (Schlagwein and Andersen, 2014; Piezunka and Dahlander, 2015; Ye and Kankanhalli, 2015; Devece et al., 2019; Gansiniec and Sulkowski, 2020; Gansiniec, 2021). Organizational learning plays a pivotal role in enhancing the creativity of R & D engineers, encompassing attributes such as openness, managerial commitment, integration, systems perspective, and knowledge transfer (Senge et al., 1999; Gomez et al., 2005; Tan et al., 2015). It serves as a wellspring of inspiration for fresh knowledge and ideas that bolster creativity and serves as the foundation for organizational innovation, which in turn supports organizational intelligence in comprehending and applying these innovations (Huber, 1998; Garcia et al., 2007; Cropley et al., 2011). However, the intricate relationship between crowdsourcing, creativity, and organizational learning has yet to be thoroughly explored. Furthermore, prior studies on crowdsourcing and organizational learning have recommended that future research should delve into the roles of mediators and moderators in these relationships (Xu et al., 2015; Devece et al., 2019; Gansiniec and Sulkowski, 2020; Gansiniec, 2021).

Hence, this study aims to examine the mediating impact of organizational learning in the connection between crowdsourcing and the creativity of organizations. It seeks to determine whether firms that effectively employ crowdsourcing tools exhibit superior organizational learning capabilities and creativity in comparison to those that do not. The theoretical underpinning is scrutinized to propose a model that elucidates the relationship between crowdsourcing, organizational learning, and the creativity of firms. Subsequently, the paper addresses methodological considerations, analyzes the findings, and explores the theoretical, practical, and managerial implications. Lastly, the study concludes by discussing future research

prospects.

Theoretical Framework and Hypotheses Development

Crowdsourcing in Organizations

Crowdsourcing represents a novel IT-enabled mechanism that involves the delegation of organizational tasks to the general public through open online invitations (Howe 2006, 2008; Modaresnezhad et al., 2020). This collective wisdom harnessed from crowds plays a pivotal role in the strategic rejuvenation of enterprises, serving as a crucial avenue for fostering organizational learning (Crossan et al., 1999; Nevo and Kotlarsky, 2020). The utilization of crowdsourcing contributes to an augmentation in the creativity and innovativeness of firms, as it facilitates the acquisition of innovative solutions from external experts possessing a diverse array of knowledge, resources, skills, expertise, and distinct abilities (Whitla, 2009; Ye and Kankanhalli, 2013). Gassmann et al. (2014) framed crowdsourcing as an innovation tool that enhances firms' proficiency by integrating external resources into the innovation process. Xu et al. (2015) delved into the relationship between crowdsourcing and firm performance, highlighting how diverse crowds' knowledge bolsters innovation capabilities. Nonetheless, the primary outcome of crowdsourcing, which is learning, remains relatively unexplored in the context of organizations (Schlagwein and Andersen, 2014; Nevo and Kotlarsky, 2020).

The Relationship between Crowdsourcing and Creativity

Creativity entails the generation of fresh, valuable, and task-appropriate results (Oldham, 2003; Berg et al., 2012; London, 2019). As Web 2.0 technologies, collaborative tools, and internet accessibility continue to progress, organizations are increasingly seeking to harness crowdsourcing as a means to facilitate the exchange of knowledge, interactive experiences, and the cultivation of creativity (Jung et al., 2010; Majchrzak et al., 2014).

Crowdsourcing simplifies the task of encouraging creativity within organizations, thereby enhancing

performance, ensuring organizational survival, and gaining a competitive edge. To elaborate, there are two key aspects to this. First, crowdsourcing allows organizations to tap into the collective intelligence of participants who offer a range of perspectives, diverse skills, expertise, and experiences, all of which serve to foster creativity within the firm (Malhotra and Majchszak, 2013; Chiu et al., 2014; Campos-Blazquez et al., 2020; Gimpel et al., 2020). Second, crowdsourcing facilitates internal employees in elevating their creativity levels by establishing network connections, engaging in interactions, and forming contacts beyond the confines of the organization's established mental frameworks. This exposure serves as a valuable source of experiential learning (Perry-Smith and Shalley, 2003; Poetz and Schreier, 2010; Marjanovic et al., 2012; Sigala et al., 2012; Zhao and Zhu, 2014).

Creativity serves as the foundation upon which organizations can effectively confront the challenges posed by a rapidly evolving environment, providing the impetus for renewal and internal adaptability. Consequently, crowdsourcing assumes a crucial role in enhancing both individual and organizational creativity, ultimately driving innovation through interaction with the organizational ecosystem. Therefore, within the context of the relationship between crowdsourcing and creativity, we have formulated and tested the following hypothesis:

H1- Crowdsourcing positively affects the Creativity of Firms.

The Relationship between Crowdsourcing and Organizational Learning in Firms

Organizational learning, as described by Crossan et al. (1999), constitutes a continuous process of enhancing an organization's knowledge reservoir, occurring across three distinct levels: individual, group, and organizational. This process of enhancement encompasses activities such as assimilation, exploration, exploitation, acquiring new insights, and implementing existing knowledge (Bontis et al., 2002). In today's volatile and competitive business environment, organizational learning serves as an effective strategy for not only maintaining but also gaining a competitive advantage over rivals (Salim and Sulaiman,

2011). Consequently, crowdsourcing emerges as a valuable tool that shapes the landscape of organizational learning, as demonstrated through the case of LEGO Cusoo (Schlagwein and Andersen, 2014).

Crowdsourcing assists organizations in identifying and comprehending the requirements and preferences of their clients. It involves the acquisition of innovative ideas through feedback and suggestions from various stakeholders. As crowdsourcing entails interactions with external networks to gather collective intelligence, it prompts employees within organizations to question conventional approaches. This fosters an innovative environment conducive to knowledge management through the absorption and dissemination of knowledge, thereby supporting individual-level creativity (Ebner et al., 2008; Blohm et al., 2013; Othman et al., 2015). The heightened levels of employee learning contribute to group discussions and the understanding of diverse competencies and ideas. Crowdsourcing enables the generation of new ideas, their assimilation, interpretation, and the integration of knowledge into group-level practices (Prpic et al., 2015; Nevo and Wade, 2011).

Organizations utilize crowdsourcing to institutionalize the knowledge acquired by employees and employee teams, incorporating it into the structures, systems, procedures, and methodologies of the organization (Krupowicz et al., 2020). Crowdsourcing enhances the intuition and both explicit and tacit knowledge of individuals, groups, and organizations, thereby expanding the collective intellectual capacity and fostering more extensive top-down and bottom-up interactions, conversations, dialogues, and discussions within organizations (Nishikawa et al., 2017; Allen et al., 2018).

However, studies that demonstrate the relationship between crowdsourcing and organizational learning have been conducted across various sectors, including innovation (Schlagwein and Andersen, 2014), social product development (Coelho et al., 2018), transportation (Dimitrova and Sarso, 2017), and biotechnology and telecommunications (Devece et al., 2019). Therefore, based on the arguments presented above, it is evident that crowdsourcing represents a novel IT-enabled tool crucial

for fostering organizational learning at different levels within firms. This leads to the generation of employee knowledge through unconventional combinations at the individual level, the enhancement and scalability of group efforts at the group level, and the integration of knowledge into the organization's culture at the organizational level. Keeping this underexplored area of IT in mind, we have formulated and tested the following hypothesis:

H2- Crowdsourcing has a positive influence on the organizational learning of a firm.

The Relationship between Organizational Learning and Creativity

Organizational learning plays a pivotal role in enhancing employees' knowledge and creativity, facilitating a deeper understanding and management of the organizational task environment. Additionally, organizational learning ensures that organizations effectively tap into their internal environment to acquire accurate and current information, which in turn fuels the development of new processes, products, and management techniques (Maktabi and Khazaei, 2014; Onag et al., 2014). There exists a positive correlation between organizational learning and individuals' engagement with their external environment (Sinkula, 1994), a factor that drives organizational creativity.

Organizations that implement crowdsourcing consistently cultivate an internal environment in which information is acquired, assimilated, disseminated, and comprehensively understood through the collective intelligence of the crowd. This results in the creation of an information-rich learning environment where individual crowd members actively contribute to creative endeavors, as exemplified by platforms like MyStarbucksIdea, Threadless, and Innocentive (Acar, 2019).

Tan and Chang (2015) have proposed the establishment of a knowledge acquisition platform that facilitates the exchange of information across various levels, from the source to individuals, groups, and the organization as a whole. This extensive reservoir of knowledge significantly enhances creativity, enabling the resolution of challenges with innovative solutions and increased efficiency.

Ultimately, this fosters creativity and innovation throughout the entire organization. Hence, within the context of the relationship between organizational learning and creativity, we posit the following hypothesis:

H3- Organizational learning has a positive influence on the creativity of firms.

The Mediating Role of Organizational Learning

The role of crowdsourcing in augmenting organizational creativity has been discussed in Section 2.2, and the literature highlights this positive impact. Organizations engage in continuous learning to stimulate changes in beliefs, knowledge, and behaviors, leading to the enhancement and expansion of their creative and innovative capabilities (Aslam et al., 2014). Similarly, Devece et al. (2019) demonstrated that crowdsourcing also fosters technological innovation. In the research conducted by Schlagwein and Bjorn-Anderson (2014), crowdsourcing is viewed as complementary to organizational learning. This study contends that the influence of crowdsourcing on creativity is more pronounced in organizations that actively engage in ongoing learning endeavors. This implies that, apart from the direct impact of crowdsourcing on creativity, there exists an indirect effect mediated by organizational learning. This indirect effect stems from the utilization of external ideas and knowledge to bolster in-house research and development (R&D), a wellspring of creativity and innovation. This, in turn, enriches and cultivates inherent skills, creating an information-rich learning environment (Johnson et al., 2019), enhancing problem-solving abilities (Menon, 2017), creative thinking, and social interaction (Martinez, 2015).

Crowdsourcing substantially reduces transaction cost for information exchange as Parallelism in crowdsourcing enables multiple and diverse groups of people to share their views and ideas in less time. This results in increased participation and improved satisfaction. Moreover, massive online communities exploit the power of anonymity to add content without repercussions, increasing organizational creativity. Increased crowdsourcing allows large and established organizations to learn and innovate

(Tapscott and Williams, 2006; Leimeister et al., 2009; Gallagher and Ransbotham, 2010). In the high-tech industry, organizational learning positively influences employees' creativity by enhancing improvement in communications, employees' feelings and devotion towards work, and collective participation (Duan, 2017).

Crowdsourcing leads to an increase in organizational learning, which subsequently translates into enhanced organizational creativity. Elevated organizational learning contributes to creativity by bolstering managerial commitment, facilitating knowledge transfer, promoting integration, and fostering a systems perspective (Tan and Chang, 2015). Moreover, effective crowdsourcing indirectly influences creativity through the conduit of organizational learning, as exemplified in the research by Feller et al. (2012). Firstly, crowdsourcing enables organizations to gain a deeper understanding of problem formulation, diverse solution alternatives, the processes involved in selecting a solution, and even unsuccessful attempts at solutions. Secondly, organizations acquire valuable insights into collaborating with a diverse array of individuals to generate creative solutions and ideas.

Furthermore, the literature discussed above underscores a substantial relationship between crowdsourcing and organizational creativity, as well as a significant connection between crowdsourcing and organizational learning, and organizational learning and creativity. Consequently, building on the framework established by Baron and Kenny (1986), it is posited that organizational learning can serve as a mediating variable in the relationship between crowdsourcing and creativity. Therefore, the following hypothesis is proposed:

H4- Organizational Learning mediates the relation between crowdsourcing and creativity of firms.

A research model has been formulated, as depicted in Figure 1, to examine the connection between Crowdsourcing and Creativity, and to investigate the function of organizational learning as an intermediary factor in the relationship between crowdsourcing and the creativity of organizations.

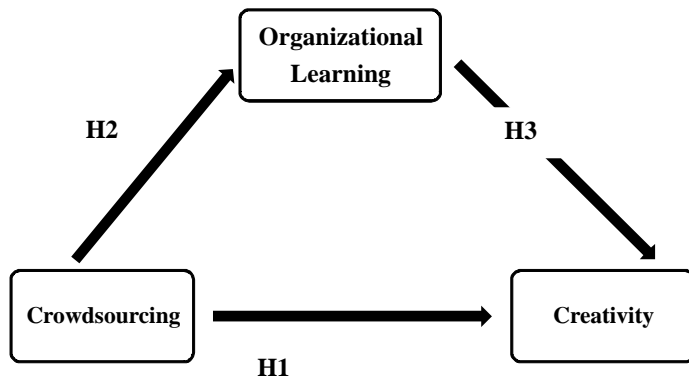


Figure 1. Research model

Method

Data Collection and Sample

The information and communication technology (ICT) sectors have been widely recognized for their adoption of highly technology-intensive methodologies aimed at enhancing organizational performance. These industries, particularly the IT sector, are considered pioneers in this domain due to their dynamic nature characterized by technological discontinuity. This environment necessitates significant research and development efforts to achieve crucial objectives related to creativity and innovation.

Given this context, the current study focuses on various firms within the Indian IT industry. Data collection for this study involved reaching out to high-tech IT companies in India through the distribution of a Google Form survey. The study's target population consisted of middle and senior-level managers from these IT firms that had implemented crowdsourcing initiatives. The data collection phase took place from August 2021 to November 2021. A total of 500 structured questionnaires were distributed to managers working in Indian IT firms. In response, we received completed questionnaires from 300 managers via the Google Form survey.

Measurement Scale

The survey utilized a five-point Likert scale to quantify and operationalize the measurement scales, where respondents could select a score ranging from 1 (strongly disagree) to 5

(strongly agree). The item scales for the three primary variables under investigation are presented in the Appendix.

Crowdsourcing

The notion of crowdsourcing was very novel, so few studies developed measurement scales for this construct. So far, there is only one measurement scale developed by Xu et al. (2015). Therefore, the crowdsourcing was operationalized using this scale as it was well-validated and more accurate for the study. The scale consists of 8 items that measure the IT initiatives of assessing the collective intelligence of a virtual network to gather creative ideas (Marjanovic et al., 2012). A further extensive literature review was conducted to generate more items related to the construct (Appendix A).

Organizational learning

The measurement of Organizational learning was conducted using the scale devised by Bontis et al. (2002). The Strategic Learning Assessment Map (SLAM), comprising 24 items (as detailed in Appendix B), was selected for this purpose. This tool was chosen due to its well-established validation and rigorous development process. All the items within the scale have undergone empirical verification, and they have been found to possess both reliability and validity. Some examples of the items included in the scale are as follows: "Individuals exhibit a clear sense of purpose in their tasks," "Knowledge gained by one team is actively shared with others," and "Teams are willing to reconsider decisions when presented with new information."

Creativity

The assessment of the creativity aspect in this study employed the Creative Solution Diagnosis Scale (CSDS) created by Cropley et al. (2011). The CSDS scale comprises 30 items (as listed in Appendix C), with one item ("the solution is safe to use") from the Creativity scale excluded for the purposes of this study. This scale was chosen due to its well-established internal consistency and reliability. It provides valuable insights into diagnosing and stimulating creativity within organizations for effective innovation management.

Findings

Reliability and Validity Analysis

Principal component analysis with varimax rotation was employed due to the observed correlations among the factors. To establish construct validity, an exploratory factor analysis, as recommended by Hair et al. (2006), was conducted before hypothesis testing. Given the expected interrelationships between variables, principal component analysis with Promax rotation was applied.

The results revealed that crowdsourcing exhibited a one-factor solution, explaining 79.66% of the variance, while organizational learning explained 80.63% of the variance and creativity explained 80.29% of the variance. The analysis also confirmed the adequacy of the sample, with the Keiser-Meyer-Olkin (KMO) measure attaining a value of 0.981, and Barlett's test of sphericity indicating

significance ($p < .001$). All factor loadings exceeded the acceptable threshold of 0.6, as proposed by Fornell and Larcker (1981), thereby affirming the validity of all components.

Furthermore, the reliability and accuracy of the questionnaire were assessed for each scale through the computation of Cronbach's alpha coefficients (Table1). In our study, the Cronbach's alpha for crowdsourcing, measured by 30 items, yielded a value of 0.991. Similarly, for organizational learning, measured by 24 items, the Cronbach's alpha was = 0.989, and for creativity, assessed using 29 items, the Cronbach's alpha was = 0.925. All of these values exceeded the recommended threshold of 0.70, indicating excellent consistency and reliability in the measurement scales.

Table 1. - Cronbach's alpha for each Scale

Scale	Crowdsourcing	Organizational Learning	Creativity
Cronbach's Alpha	0.981	0.851	0.881

Source(s): Primary data

Hypothesis Testing

The research employed Spearman's Rank Correlation test to assess the association between crowdsourcing and creativity. Additionally, a regression analysis was conducted to investigate the dependence of Crowdsourcing on the development of Organizational Learning. The quantitative data collected were processed and analyzed using the IBM SPSS STATISTICS 26 software. An approach involving multiple steps, as recommended by Rovai et al. (2014), was applied to all variables in the study. Consequently, all calculations were based on mean values. Furthermore, the study examined and analyzed the mediation effect using the PROCESS macro bootstrapping technique developed by Hayes (2017) within the SPSS 26 environment (Model 4).

Correlation Analysis

The Spearman rank correlation coefficient was utilized to investigate the relationships between crowdsourcing, creativity, and organizational learning. In assessing the reliability of the obtained results, particular attention was directed towards the p-values (Table2).The correlation matrix reveals that there is a correlation between crowdsourcing and organizational learning, as well as between crowdsourcing and creativity. Additionally, organizational learning exhibits a correlation with creativity.

Table 2. Correlation Matrix

S.No.	Variable	Mean	SD	1	2	3
1	Crowdsourcing	3.47	1.13	1.000		
2	Organizational Learning	3.43	1.16	0.911**	1.000	
3	Creativity	3.43	1.16	0.902**	0.922**	1.000

Notes: ** $p < 0.01$ (two-tailed) was considered as the level of significance, $N = 300$

Regression Analysis

A multiple regression analysis was performed to examine the relationships between the variables, as shown in Table 3. The first hypothesis sought to determine whether crowdsourcing had a significant impact on creativity. In testing hypothesis H1, the dependent variable, creativity, was regressed against the predictor variable, crowdsourcing. The results revealed that crowdsourcing had a significant and positive predictive effect on creativity, as evidenced by $F(1, 298) = 3996.297$, $p < 0.001$, underscoring the substantial role of crowdsourcing in influencing creativity ($\beta = .987$, $p < .001$). These findings strongly support the notion that crowdsourcing positively impacts creativity. Moreover, the R^2 value of .931 indicates that the model explains 93.1% of the variance in creativity. Consequently, H1 is supported.

The second hypothesis aimed to investigate the connection between crowdsourcing and organizational learning. In testing hypothesis H2, the dependent variable, organizational learning, was regressed against the predictor variable, crowdsourcing. The findings revealed that

crowdsourcing had a significant and positive predictive effect on organizational learning, as indicated by $F(1, 298) = 4573.417$, $p < 0.001$, highlighting the substantial role of crowdsourcing in influencing organizational learning ($\beta = .992$, $p < .001$). These results emphasize the positive impact of crowdsourcing on organizational learning. Moreover, the R^2 value of .939 indicates that the model explains 93.9% of the variance in organizational learning. Thus, H2 is supported.

The third hypothesis was formulated to assess the significance of organizational learning for creativity. To investigate hypothesis H3, the dependent variable, creativity, was regressed against the predictor variable, organizational learning. The results reveal that organizational learning significantly predicted creativity, with $F(1, 298) = 12076.659$, $p < 0.001$, highlighting the substantial role of organizational learning in influencing creativity ($\beta = .987$, $p < .001$). These findings strongly affirm the positive impact of organizational learning on creativity. Furthermore, the R^2 value of .976 indicates that the model accounts for 97.6% of the variance in creativity. Therefore, H3 is supported.

Table 3. Regression Analysis Results

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	T	p-value	Hypothesis Supported
H1	CS \rightarrow CRT	.987	.931	3996.297	63.216	.000	Yes
H2	CS \rightarrow OL	.992	.939	4573.417	67.216	.000	Yes
H3	OL \rightarrow CRT	.987	.976	12076.659	108.922	.000	Yes

Notes: * $p < 0.05$. CS: Crowdsourcing, CRT: Creativity, OL: Organizational Learning

Testing of Mediation Analysis

The investigation into the role of organizational learning as a mediator in the relationship between crowdsourcing and creativity was carried out using Model 4 of the bootstrapping method within the PROCESS macro developed by Hayes (2017) in SPSS version 26.0.

The analysis proceeded in several steps. First, crowdsourcing was defined as the independent variable, and creativity was designated as the outcome variable. Next, a test was conducted to determine whether the indirect effect of crowdsourcing on creativity ($a*b$) was statistically significant. The presence of mediation was indicated by the 95% confidence interval (CI) range. If the CI range included 0, it suggested the presence of mediation in the model; conversely, if 0 did not fall within the CI range, it indicated that the mediation model was not appropriate.

The third step involved examining whether the direct effect of crowdsourcing on creativity (c') was statistically

significant. If the 95% CI crossed 0, it suggested that the relationship between crowdsourcing and creativity was entirely mediated by organizational learning. Conversely, if the 95% CI did not cross 0, it indicated that the relationship between crowdsourcing and creativity was partially mediated by organizational learning.

The results presented in Table 4 clearly demonstrate a significant indirect effect of crowdsourcing on creativity through organizational learning, with a CI range of (0.6795, 0.9410), as well as a direct effect of crowdsourcing on creativity, with a CI range of (.0611, .2049). Since the 95% CI range does not include 0, it signifies that organizational learning partially mediates the relationship between crowdsourcing and creativity.

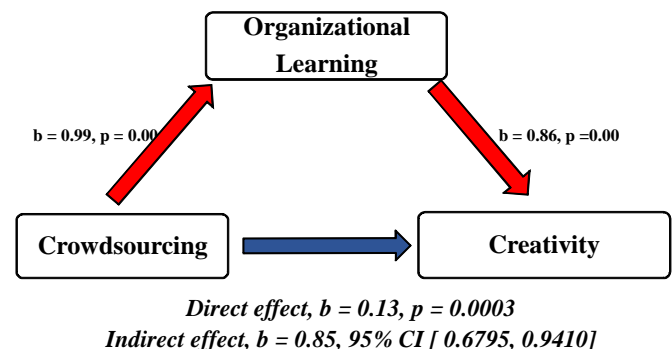
Lastly, a mediation model was constructed, and Figure 2 displayed the respective standardized coefficients, p-values, indirect effect, and bootstrapped confidence interval. Consequently, the ratio of the mediating effect to the total effect amounted to 86.51%.

Table 4. Mediation effect of crowdsourcing shown in mediation model

	Effect	SE	t	p	95% CI
Indirect effect of crowdsourcing on creativity (a*b)	.8535	.0678	-	-	(.6795, .9410)
Direct effect of crowdsourcing on creativity (c')	.1330	.0365	3.6415	.0003	(.0611, .2049)
Total effect of crowdsourcing on creativity	.9865	.0156	63.2163	.0000	(.9558,1.017)

Source(s): Primary data

Figure 2. Model of crowdsourcing as a predictor of creativity, mediated by organizational learning. The indirect effect confidence interval is a bootstrapped CI based on 5000 samples.



Discussion

The primary objective of this study was to investigate the role of organizational learning as a mediator in the relationship between crowdsourcing and creativity within IT firms. While prior research has explored various facets of crowdsourcing, organizational learning, and their impacts, this study contributes by demonstrating how crowdsourcing positively influences organizational learning, which in turn enhances creativity in IT firms.

To begin, we examined the relationship between crowdsourcing and creativity (H1) through multiple regression analysis. The results confirmed that crowdsourcing had a statistically significant effect on creativity. This aligns with existing empirical findings suggesting that the collective intelligence of virtual networks fosters diverse perspectives, fostering creativity in firms, supporting our H1.

Next, we explored the association between crowdsourcing and organizational learning (H2) using multiple regression analysis. Our findings revealed a positive impact of crowdsourcing on organizational learning in IT firms. Crowdsourcing enables firms to establish network ties, contacts, and interactions within virtual networks, thereby increasing their knowledge base and fostering organizational learning. While prior research has acknowledged the influence of organizational learning on crowdsourcing, our study fills a research gap by demonstrating the relationship between crowdsourcing and organizational learning within IT firms.

Subsequently, we established and tested the link between organizational learning and creativity (H3) through multiple regression analysis. The results highlighted a strong correlation between organizational learning and creativity in firms. This finding is consistent with previous research suggesting that an information-rich learning environment is conducive to creativity. IT firms must effectively manage organizational learning to stay current and cultivate an internal environment that supports the strategic renewal of information.

Lastly, we examined the mediating role of organizational learning between crowdsourcing and creativity (H4) using the Hayes (2017) PROCESS macro bootstrap method. Our

results indicated that organizational learning partially mediates the relationship between crowdsourcing and creativity. This partial mediation could be attributed to other factors influencing the relationship, such as an organization's knowledge transfer capability and absorptive capacity.

Conclusion

In this study, we have developed a theoretical framework to assess the influence of crowdsourcing on organizational creativity within Indian IT firms, considering both direct and indirect pathways through organizational learning. Our research has yielded several key findings. Firstly, we've determined that crowdsourcing has a substantial and positive impact on organizational learning. Given the rapidly changing dynamics of today's markets and the increasing need for innovation and creativity, we strongly recommend that IT firms seeking to maintain competitiveness should embrace crowdsourcing as a fundamental driver of organizational learning.

Furthermore, our results have shown that organizational learning plays a pivotal role in enhancing organizational creativity. To foster creativity within a firm, it is essential to prioritize organizational learning, which not only reduces transaction costs associated with information exchange but also promotes in-house research and development, bolsters problem-solving skills, nurtures creative thinking and social interaction, and fosters an information-rich learning environment. Organizational learning serves as a wellspring of creativity and innovation by tapping into novel ideas and optimal solutions derived from the collective intelligence of crowds.

Additionally, we've found that crowdsourcing directly contributes to organizational creativity. By effectively harnessing crowdsourcing practices, IT firms can access valuable information and knowledge, leveraging the diverse skills of external contributors. This approach enhances organizational creativity and provides a competitive advantage in the marketplace.

Lastly, our research has unveiled the positive mediating role of organizational learning in the relationship between crowdsourcing and creativity. To fully unlock the potential benefits of crowdsourcing for organizational creativity, IT

organizations must prioritize and invest in organizational learning. This approach equips firms with explicit and tacit knowledge, broadens the pool of creative minds, and encourages top-down and bottom-up communication, dialogue, and discussions. Crowdsourcing communities within IT firms present numerous opportunities for creativity and innovation. In light of these findings, we encourage IT firms to leverage crowdsourcing tools to acquire valuable knowledge and diverse skills, institutionalizing them within their organizational processes and structures. This holistic approach nurtures creativity at individual, group, and organizational levels, offering a pathway to thrive in the rapidly evolving landscape of technological advancement.

Managerial Implications and Future Directions

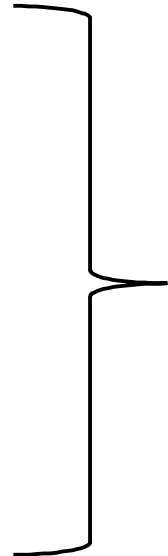
The study has an important managerial implication. Managers in IT firms should expedite crowdsourcing practices when considering organizational learning. The competencies and collective intelligence acquired from crowdsourcing are a valuable source of learning and become more sensitive to market changes and tendencies. Additionally, organizational learning makes it possible for firms to become more flexible and make changes quickly and rapidly compared to their competitors.

Moreover, crowdsourcing practices are a rich source for boosting the organizational creativity of IT firms. Crowdsourcing enhances an organization's ability to build network ties, connections, and contacts, boost in-house R&D and survival, and gain competitive competencies with learning. Managers should be aware that crowdsourcing alone does not ensure improved firm performance. Managers should institutionalize crowdsourcing outcomes among organizational structure, systems, procedures, and methods to enhance the overall creativity of firms.

While crowdsourcing processes directly affect IT firms' organizational creativity, managers should focus on enhancing creativity only by superior organizational learning capability. In today's marketplace, new ideas are shared, improved, and critiqued at a face pace, so managers should use crowdsourcing practices to incorporate continuous learning at every level of organizations, which will boost the creativity of organizations. Managers who ignore the indispensable role of organizational learning in crowdsourcing-creativity linkages will lose the power of competitive strength, creativity, and innovation.

The study was only limited to the Indian IT firms, but it can be extended to different industries and developing countries.

Appendix A. Crowdsourcing measurement items

<ol style="list-style-type: none"> 1. Platforms have been established by organizations to develop new product or service ideas. 2. Users can openly share their opinions on how new developments should be introduced into the company. 3. A group of users, according to the company, can generate new ideas for new products or services, as well as improve existing ones. 4. Financial and non-financial incentives exist to encourage the development of the best ideas. 5. The firm has evaluation methods in place to determine the effectiveness of the concepts it has produced. 6. The best ideas are disseminated through knowledge transfer mechanisms. 7. Virtual communities are used by businesses to develop new products and services. 8. New concepts consider the company's stakeholders. 	 <p style="text-align: right;">Xu et al., 2015</p>
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<ol style="list-style-type: none"> 9. Firms often venture into unknown territory. 10. System and procedures exist for receiving and sharing information received from outside the organizations. 11. Firms interact with stakeholders of firms for knowledge acquisition and problem-solving. 12. Firms' values promote experimentation and adaptability of new ideas. 13. Firms' culture has risk-taking and entrepreneurial capability to handle external crowds' contributions. 14. Firms collaborate and cooperate with external parties to develop further the contributions received. 15. Firms create and maintain networks with stakeholders of the firm. 16. Information and Communication system exists in firms to infuse internally the contributions received. 17. Firms have systematic processes to filter and select ideas and solutions of virtual communities. 18. Firms' expertise is enriched by integrating diverse and creative ideas of external crowds. 19. Firms consider collective intelligence of the crowd as a Market Research tool. 20. Firms have organizational learning capability and are receptive to environmental changes. 21. Firms use a large pool of individuals to come up with a solution that has the greatest possible value. 22. Firms use technologies to know clients' expectations for improved performance. 23. Firms gain access to the available workforce with relevant skills. 24. Organizational efficiencies of firms are improved, and client satisfaction is ensured. 25. Firms use virtual communities to enrich brand visibility. 26. Firms strive to obtain the solution at a relatively low cost and less time. 27. Firms have knowledge management Programmes for absorbing them into organizations. 28. Firms have management capability for acquiring and updating knowledge that is valuable for organizations. 29. Firms get new business direction ideas and partnership opportunities. 30. Firms become specialized in core areas and externalize the risk of failures. 	<p>Tapscott and Williams, 2006; Howe, 2006 Benkler, 2016</p> <p>Kozinets et al., 2008; Afuah and Tucci, 2012; Boudreau and Lakhani, 2013</p> <p>Ye and Kankanhalli, 2013</p> <p>Sigala et al., 2012</p> <p>Perry-Smith and Shalley (2003)</p> <p>Kohler, 2015; Modaresnezhad et al., 2019 Piezunka and Dahlander, 2015; Nagar et al., 2016 Tan and Chang, 2015</p> <p>Litvin et al., 2008; Schmallegger and Carson, 2008; Devece et al., 2017 Xu et al., 2015; Schlagwein and Andersen, 2014</p> <p>Vreede et al., 2013 Menon, 2017</p> <p>Nevo and Kotlarsky, 2021</p> <p>Dubach et al., 2007; Aitamurto et al., 2011; Nevo and Kotlarsky, 2021;</p> <p>Horton and Chilton, 2010; Morgan and Wang, 2010; Ye and Kankanhalli, 2015</p> <p>Kaufman et al., 2011, Cox, 2011</p> <p>Wade and Hulland, 2004 Devece et al., 2017 Dubach et al., 2007; Aitamurto et al., 2011 Howe, 2006; Roman 2009</p>
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Appendix B. Organizational learning measurement items (Bontis et al., 2002)

1. Individuals are able to see things in fresh and unusual ways by breaking free from traditional attitudes.
2. Individuals are proud of their accomplishments.
3. Individuals have a strong sense of direction when it comes to their employment.
4. Individuals are aware of the essential concerns that have an impact on their jobs.
5. Individuals develop a lot of new ideas.
6. When we operate in groups, we are able to resolve conflicts effectively.
7. In group work, different points of view are encouraged.
8. When given with new knowledge, groups are willing to reconsider their decisions.
9. We try to comprehend everyone's point of view during meetings.
10. The right people are involved in resolving the challenges in groups.
11. We have a strategy in place that puts us in a good position for the future.
12. Our strategic direction is supported by our organizational structure.
13. The culture of the company can be described as inventive.
14. We can work efficiently because of the organizational framework.
15. We are able to work efficiently because of our operational methods.
16. One group's lessons are actively shared with others.
17. Individuals have a say in the company's direction.
18. The group's findings are used to improve products, services, and procedures.
19. Group recommendations are accepted by the organization.
20. We don't 'reinvent the wheel,' that is, we don't waste a lot of time or effort producing something that already exists.
21. Individual labor is aided by policies and procedures.
22. The company's objectives are disseminated across the organization.
23. The information we need to execute our jobs comes from company files and databases.
24. Individuals are supportive of group decisions.

Appendix C. Creativity measurement items (Cropley et al., 2011)

1. The solution appropriately represents current knowledge and/or approaches (Correctness).
2. The solution accomplishes its goal (Performance).
3. The solution complies with the task's requirements (Appropriateness).
4. It's simple to use the solution (Operability).
5. The solution is fairly powerful (Durability).
6. The solutions highlight flaws in other existing systems (Diagnosis).
7. The solution demonstrates how existing solutions could be made better (Prescription).
8. The solution aids the observer in anticipating the implications of change (Prognosis).
9. The solution generates uniqueness by utilizing current information (Replication)
10. The approach is based on a fresh combination of existing fragments (Combination).
11. The solution expands on what is already known in a new direction (Incrementation).
12. The solution demonstrates how to go in a new path with what we already know (Redirection).

13. The solution demonstrates that a method that had been abandoned previously can still be useful (Reconstruction).
14. The solution suggests a completely new approach (Reinitiation).
15. The solution allows the user to see fresh and alternative ways to use the result (Redefinition).
16. The solutions provide a completely fresh view on potential solutions (Generation).
17. The observer in the organization immediately recognizes the solution's logic (Recognition).
18. The solution appears to be professionally constructed and well-finished in the eyes of the beholder (Convincingness).
19. The solution is effective and well-done in the eyes of the beholder (Pleasingness).
20. The answer is well-thought-out and well-founded (Completeness).
21. The solution is well-balanced and well-shaped (Gracefulness).
22. The solution's components fit together in a consistent manner (Harmoniousness).
23. The solution is eco-friendly (Sustainability).
24. The solution presents a novel foundation for future work (Foundationality).
25. The solution gives ideas for solving seemingly unconnected problems (Transferability).
26. Solution proposes innovative approaches to current issues (Germinality).
27. The solution calls attention to problems that were previously undetected (Seminality).
28. Solution proposes new standards for evaluating other solutions, whether old or new (Vision).
The issue is re-conceptualized as a result of the solution (Pathfinding).

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