

CROWDSOURCING A SOURCE OF VALUE CO-CREATION: ADOPTION, MECHANISM AND ITS IMPACT ON ORGANIZATIONS

**A Thesis Submitted
In Partial Fulfilment of the Requirements
for the Degree of**

DOCTOR OF PHILOSOPHY

by

DIVYA MISHRA

(2K20/PHDUSME/05)

Under the Supervision of

Dr. NIDHI MAHESHWARI

Associate Professor, Delhi Technological University



**Department of University School of Management and
Entrepreneurship**

DELHI TECHNOLOGICAL UNIVERSITY

(Formerly Delhi College of Engineering)

Shahbad Daultpur, Main Bawana Road, Delhi 110042, India

May, 2024

ACKNOWLEDGEMENT

I extend my heartfelt gratitude to my PhD supervisor, Professor Nidhi Maheshwari, for her unwavering support, guidance, and mentorship throughout my research journey. Her constructive criticism and insightful feedback have been crucial in improving my research skills and overcoming challenges. I am deeply grateful to Prof. Manoj Kumar Sharma for connecting me with my supervisor Prof. Nidhi Maheshwari, when I was struggling to find guidance. Their support has been invaluable to me.

I am also grateful to my preliminary examiner, Professor M. Venkatesan, Indian Institute of Foreign Trade, Dr Shikha N. Khera, Delhi School of Management, and Dr Naval Garg, University School of Management and Entrepreneurship, Delhi Technological University, whose guidance and feedback have helped shape my research direction. I would also like to acknowledge the participants of this study for their time, cooperation, and willingness to share their insights, without which this research would not have been possible. I sincerely thank the administration staff, including Richa Mam, Kartik Sir, Karan Sir, and Vijay Sir, who consistently provided supportive assistance in completing my Ph.D program.

I extend my heartfelt gratitude to my family, especially my mother, for her unwavering support, encouragement, and sacrifices. Their belief in me has been a constant source of strength, and I am profoundly grateful for their love and support. I also want to thank my spouse, Kuldeep, for being my rock and unwavering source of support. Your encouragement, strength, and belief in me have been my guiding light throughout this journey. This achievement is as much yours as it is mine, and I am forever grateful for your unwavering support and encouragement. Finally, I would like to express my heartfelt gratitude to all my friends and colleagues who have contributed to my research journey. Your unwavering support, encouragement, and guidance have been invaluable, and I am deeply grateful for your meaningful contributions.

Divya Mishra

CANDIDATE'S DECLARATION

I Divya Mishra, hereby certify that the work which is being presented in the thesis entitled "Crowdsourcing a Source of Value Co-creation: Adoption, Mechanism and its Impact on Organizations," in partial fulfillment of the requirements for the award of the Degree of Doctor of Philosophy, submitted in the Department of University School of Management and Entrepreneurship, Delhi Technological University is an authentic record of my own work carried out during the period from 26 August, 2020 to 30 April, 2024 under the supervision of Dr. Nidhi Maheshwari.

The matter presented in the thesis has not been submitted by me for the award of any other degree of this or any other Institute.

Divya Mishra

(2K20/PHDUSME/05)

Place: Delhi

Date: 03.05.2024

UNIVERSITY SCHOOL OF MANAGEMENT AND ENTREPRENEURSHIP

DELHI TECHNOLOGICAL UNIVERSITY

SHAHBAD DAULATPUR, MAIN BAWANA ROAD DELHI-110042 (INDIA)



CERTIFICATE BY THE SUPERVISOR

Certified that Divya Mishra (2K20/PHDUSME/05) has carried out their research work presented in this thesis entitled “Crowdsourcing a Source of Value Co-creation: Adoption, Mechanism and its Impact on Organizations” for the award of Doctor of Philosophy from University School of Management and Entrepreneurship, Delhi Technological University, Delhi, under my supervision. The thesis embodies results of original work, and studies are carried out by the student herself and the contents of the thesis do not form the basis for the award of any other degree to the candidate or to anybody else from this or any other University/Institution.

Dr. Nidhi Maheshwari

Associate Professor, USME

Delhi Technological University

New Delhi

Date: 03.05.2024

ABSTRACT

In today's rapidly evolving business landscape, organizations increasingly turn to crowdsourcing as a strategic innovation and value creation approach. Crowdsourcing, which involves harnessing the collective intelligence and creativity of a diverse group of external stakeholders, offers immense potential for organizations seeking to enhance their innovation competence and competitive advantage. However, despite its growing popularity and adoption, there remains a need for comprehensive research to understand the intricacies of crowdsourcing initiatives, their impact on organizational processes, and their implications for innovation outcomes.

This thesis addresses this research gap by exploring the multifaceted dynamics of crowdsourcing and its implications for organizational innovation competence. Grounded in social capital theory, organizational learning models, and innovation management literature, the research investigates the interplay between crowdsourcing-based social linkages, internal organizational practices, and innovation outcomes. Through a systematic exploration spanning seven chapters, the thesis aims to provide a holistic understanding of how organizations can strategically leverage crowdsourcing to drive innovation and value co-creation.

The research problem at the core of this thesis revolves around unraveling the complexities of crowdsourcing initiatives and their impact on organizational innovation competence. Drawing on a multidisciplinary approach, the thesis delves into various theoretical perspectives, including open innovation, social capital theory, and absorptive capacity, to develop a conceptual framework that elucidates the underlying mechanisms driving crowdsourcing adoption, design, and outcomes.

The thesis adopts a mixed-methods approach, combining qualitative and quantitative techniques to explore different facets of crowdsourcing. Qualitative methods such as literature review, morphological analysis, and case examples are employed to develop theoretical insights and conceptual frameworks. In contrast, quantitative methods such as surveys and structural equation modeling are used to test hypotheses and validate theoretical propositions.

The results reveal several key insights into the relationship between crowdsourcing and organizational innovation competence. Firstly, the research identifies the critical determinants of crowdsourcing adoption, highlighting the role of organizational readiness, top management support, and perceived benefits in shaping organizations' propensity to engage in crowdsourcing initiatives. Secondly, the thesis explores the strategic design principles for effective crowdsourcing implementation, emphasizing the importance of aligning crowdsourcing initiatives with organizational goals, leveraging technology platforms, and fostering collaborative networks. Thirdly, the study examines the mechanisms for value co-creation through crowdsourcing, emphasizing the mediating role of knowledge transfer effectiveness and absorptive capacity in driving innovation outcomes. Lastly, the research investigates the impact of crowdsourcing on innovation competence, highlighting the significance of internal organizational practices such as knowledge sharing, learning orientation, and organizational culture in facilitating successful crowdsourcing initiatives.

The main contribution of this study is manifold. Practically, the findings offer valuable insights for managers and practitioners seeking to harness crowdsourcing for innovation and value co-creation. By understanding the determinants of crowdsourcing adoption, organizations can develop targeted strategies to leverage external networks and resources effectively. Additionally, the strategic framework for designing crowdsourcing initiatives provides a practical guide for organizations aiming to enhance their innovation capabilities through crowdsourcing. Moreover, the insights into the value co-creation mechanism of crowdsourcing highlight the importance of building social linkages, fostering knowledge transfer, and developing absorptive capacity within organizations.

For future research, several directions emerge from this study. Firstly, there is a need for further exploration of the specific strategies and mechanisms organizations employ to enhance internal practices, such as knowledge transfer effectiveness and absorptive capacity in crowdsourcing. Additionally, comparative analyses across different economic contexts and regulatory environments could shed light on the contextual factors influencing the effectiveness of crowdsourcing initiatives. Longitudinal research designs and experimental methodologies could provide more substantial

evidence of causality and offer insights into the dynamic relationship between crowdsourcing and innovation outcomes. Moreover, extending the investigation to explore the spillover effects of crowdsourcing initiatives on broader innovation ecosystems could provide valuable insights for policymakers and industry stakeholders.

Therefore, the thesis advances the scholarly understanding of crowdsourcing as a transformative force in innovation management. By elucidating the complex interplay between crowdsourcing-based social linkages, internal organizational practices, and innovation outcomes, the research offers valuable insights for both scholars and practitioners. The holistic framework developed in this thesis provides a roadmap for organizations seeking to harness crowdsourcing effectively and drive sustainable innovation and competitive advantage in ever-changing business landscape..

LIST OF PUBLICATIONS

Published Papers

- Mishra, D., & Maheshwari, N. (2023). **Effective governance through crowdsourcing: A strategic framework for empowered participation.** *IEEE Transactions on Engineering Management*, 71, 4647-4664.
- Mishra, D., & Maheshwari, N. (2024). **Crowdsourcing a wellspring of value co-creation: an integration of social capital and organisational learning mechanisms.** *Kybernetes*, 53(1), 424-450.
- Mishra, D., & Maheshwari, N. (2024). **Crowdsourcing-based social linkage and organizational innovation competence: knowledge transfer effectiveness and absorptive capacity as serial mediators.** *Journal of Knowledge Management*.
- Mishra, D., & Maheshwari, N. (2024). **The past, present, and future of crowdsourcing and innovation: A bibliometric analysis and future research agenda.** *Information Development*, 02666669241238430.
- Mishra, D., & Maheshwari, N. (2024). **Elucidating the determinants of crowdsourcing adoption for organisation value creation.** *International Journal of Organizational Analysis*
- Mishra, D., & Maheshwari, N. (2023). **Crowdsourcing and Creativity in Firms: The Mediating Role of Organizational Learning.** *Pacific Business Review International*, 16(6).

Book Published

- Mishra, D. (2023). **Crowdsourcing a source of value co-creation: Mechanism and its impact on organizations.** Eliva Press. ISBN 978-9994985265

Table of Contents

ACKNOWLEDGEMENT	ii
CANDIDATE’S DECLARATION	iii
CERTIFICATE BY THE SUPERVISOR	iv
ABSTRACT	v
LIST OF PUBLICATIONS.....	viii
LIST OF TABLES	ii
LIST OF FIGURES	iv
CHAPTER 1 INTRODUCTION	1
1.1 Background of the Study	2
1.2 The Concept of Crowdsourcing.....	2
1.2.1. The Relationship between Crowdsourcing, Outsourcing and Open Innovation	5
1.2.2. Pillars of Crowdsourcing	6
1.3 Benefits of Crowdsourcing.....	7
1.4 The Concept of Value co-creation.....	7
1.5. Crowdsourcing and Value co-creation	9
1.6 Research Problem	10
1.7 Research Gaps	10
1.8 Rationale for the Current Research	13
1.9 Research Aim and Questions.....	14
1.10 Thesis Structure	15
1.11 Key Terms	18
1.12 Summary.....	20
CHAPTER 2 MAPPING OF CROWDSOURCING, INNOVATION AND VALUE CO-CREATION	21
2.1. Introduction	21
2.2 Literature Review	25
2.2.1 Crowdsourcing.....	25
2.2.2 Crowdsourcing in Innovation Research.....	25
2.3 Research Methodology	26
2.3.1 Data Extraction	26
2.3.2 Keywords and search results.....	28

2.3.3 Analytical techniques and tool.....	28
2.4 Descriptive analysis of systematic review	30
2.4.1 Bibliometrics Analysis of Publication	30
2.4.2 Co-citation analysis.....	31
2.4.3 Keyword Co-occurrence analysis	36
2.4.4 Thematic Mapping	39
2.5 Discussion.....	40
2.6 Implications of Research	41
2.6.1 Theoretical Implications	42
2.6.2 Managerial Implications	42
2.7 Future research avenues.....	43
2.8 Limitations.....	49
2.9 Conclusion.....	51
2.10 Summary.....	52
CHAPTER 3 VALUE CO-CREATION THROUGH CROWDSOURCING: ADOPTION FACTORS	53
3.1 Introduction	53
3.2 Background.....	55
3.2.1 Crowdsourcing.....	55
3.2.2 Adoption Models	56
3.2.3 Diffusion of Innovation (DOI) Theory	56
3.2.4 Technology-Organization-Environment (TOE) Framework	57
3.2.5 Literature on Crowdsourcing Adoption	58
3.2.6 Integrating DOI and TOE Perspective for Crowdsourcing Adoption	60
3.3 Hypotheses and Conceptual Model Formulation	61
3.3.1 Innovation Characteristics of Crowdsourcing Adoption	61
3.3.2 Technology Context of Crowdsourcing Adoption.....	64
3.3.3 Organizational Context of Crowdsourcing Adoption	64
3.3.4 Environment Context of Crowdsourcing Adoption.....	66
3.4 Research Methodology	68
3.4.1 Sampling and Data Collection	68
3.4.2 Instrument Development.....	70
3.4.3 Common Method Bias	73
3.5 Results and Findings.....	73
3.5.1 Evaluation of Measurement Model.....	74

3.5.2 Evaluation of Structural Model.....	77
3.6 Discussion.....	80
3.7 Implications of Research	85
3.7.1 Managerial and Practical Implications.....	85
3.7.2 Theoretical Implications	87
3.8 Limitations and Future Research.....	87
3.9 Conclusion.....	88
3.10 Summary.....	88
CHAPTER 4 DESIGNING PERSPECTIVE OF CROWDSOURCING ADOPTION FOR VALUE CO-CREATION	90
4.1 Introduction	90
4.2 Background.....	93
4.2.1 Crowdsourcing in the Government Sector	93
4.2.2 Literature on Crowdsourcing Initiative Designing	94
4.3 Research Methodology	94
4.3.1 Systematic Literature Review	95
4.3.2 Strategic Framework of Crowdsourcing: Morphological Analysis	99
4.3.3 Examples of Crowdsourcing Initiatives of Government.....	101
4.4 Results	107
4.4.1 Preparation Phase: <i>Plan and Design</i>	107
4.4.2 Execution Phase: <i>Promote and Act</i>	109
4.4.3 Post-Execution Phase: <i>Evaluate and Feedback</i>	111
4.5 Discussion and Implications	112
4.6 Limitation and Future Research	117
4.7 Summary.....	118
CHAPTER 5 VALUE CO-CREATION MECHANISM OF CROWDSOURCING.....	119
5.1 Introduction	119
5.2 Literature Review	121
5.2.1 Crowdsourcing-Based Co-creation Mechanism	121
5.2.2 Co-creation Outcome	122
5.2.3 Organizational Value Capture.....	123
5.3 Theoretical Framework and Hypothesis Development	125
5.3.1 Crowdsourcing-based Social Capital and Organizational learning	125
5.3.2 Organizational Learning and Organizational Value capture	127

5.3.3 Organizational Learning as Mediator	128
5.4 Research Methodology	130
5.4.1 Sample and Data Collection.....	130
5.4.2 Measurement Development	132
5.4.3 Common Method Bias	135
5.5 Data Analysis and Results	135
5.5.1 Measurement Model	135
5.5.2 Structural Model	139
5.5.3 Testing Mediating Effects.....	144
5.6 Discussions and Conclusion	144
5.6.1 Theoretical Implications	146
5.6.2 Practical Implications.....	146
5.7 Limitations and Future Research	147
5.8 Summary.....	148
CHAPTER 6 VALUE CO-CREATION OUTCOME AND IMPACT OF CROWDSOURCING.....	149
6.1 Introduction	149
6.2 Literature Review	152
6.2.1 Crowdsourcing-based Social Linkages.....	152
6.2.2 Knowledge Transfer Effectiveness and Absorptive Capacity	153
6.2.3 Organizational Innovation Competence	154
6.3 Theoretical Framework and Hypotheses Development.....	155
6.3.1 Crowdsourcing-based Social Linkages and Innovation Competence.....	155
6.3.2 The Mediating Role of Knowledge Transfer Effectiveness	157
6.3.3 The Mediating role of Absorptive Capacity	158
6.3.4 Serial Mediation effect of Knowledge Transfer Effectiveness and Absorptive Capacity.....	159
6.4 Research Methodology	160
6.4.1 Sample and Data Collection.....	161
6.4.2 Measurement Development	163
6.4.3 Common Method Bias	165
6.5 Data Analysis and Results	166
6.5.1 Measurement Model	166
6.5.2 Structural Model.....	168
6.5.3 Testing Mediating Effects	170

6.6 Discussion.....	171
6.6.1 Theoretical Implications	172
6.6.2 Managerial Implications	174
6.6.3 Policymaker Implications	175
6.7 Limitations and Future Research.....	176
6.8 Summary.....	177
CHAPTER 7 CONCLUSION AND FUTURE RESEARCH.....	178
7.1. Introduction	178
7.2. Research Questions Revisited	178
7.2.1. What are the adoption factors that need to be considered by practitioners before adopting Crowdsourcing in Organizations?	179
7.2.2. What is the influence of Crowdsourcing-based social linkages on Organizational Learning?.....	180
7.2.3. What is the influence of Crowdsourcing-based social linkages on Innovation Competence?	180
7.2.4. How does Organizational Learning influence the relationship between Crowdsourcing-based social linkages and Innovation Competence?.....	181
7.3. Research Contributions	182
7.3.1. Theoretical Implications	182
7.3.2. Managerial Implications	183
7.4. Limitations and Future Research Avenues.....	184
7.5. Concluding Remarks	185
REFERENCES.....	187
APPENDICES	216
Appendix A: Survey Questionnaire of Study 2.....	216
Appendix B: Survey Questionnaire of Study 4.....	223
Appendix C: Survey Questionnaire of Study 5.....	228
PUBLICATIONS	234
PLAGIARISM REPORT	241

LIST OF TABLES

Table 2.1: Existing reviews in the field of Crowdsourcing

Table 2.2: Main information about data

Table 2.3: Co-occurrence of keywords and the central topic identified in each cluster.

Table 2.4: Proposed research questions related to Cluster 1 Crowdsourcing as a Source of Organizational Innovation

Table 2.5: Proposed research questions for related to Cluster 2 Crowdsourcing-based social capital and organizational value creation

Table 2.6: Proposed research questions related to Cluster 3 Crowdsourcing platform for organization-crowd engagement

Table 3.1: Literature related to the theoretical framework

Table 3.2: Sample characteristics (N= 426)

Table 3.3: Measurement Items

Table 3.4: Results of the measurement model

Table 3.5: Fornell and Larcker criterion

Table 3.6: Item Cross-Loadings

Table 3.7: Hypotheses testing

Table 3.8: Coefficient of determination- R^2 values

Table 3.9: Coefficient of determination effect size- f^2 values

Table 3.10: Predictive capacity values- Q^2

Table 4.1: Systematic Review Process Results

Table 4.2: Crowdsourcidesignning elements and principles

Table 4.3: Application of strategic crowdsourcing framework in government crowdsourcing initiatives

Table 5.1: Elements of co-creation and value capture

Table 5.2: Demographic characteristics of respondents

Table 5.3: Measurement Items

Table 5.4: Confirmatory Factor Analysis (CFA) Results - Reflective Constructs

Table 5.5: Discriminant validity Results -Reflective Constructs Fornell and Larcker criterion

Table 5.6: Item cross-loadings

Table 5.7: Heterotrait and Monotrait (HTMT) criteria

Table 5.8: Confirmatory Factor Analysis (CFA) Results - Formative Constructs

Table 5.9: Structural model variables- VIF values

Table 5.10: Structural Model relationships- Direct effect results

Table 5.11: Structural Model relationships- Indirect effect results

Table 5.12: Structural Model relationships- Total effect results

Table 5.13: Coefficient of determination- R^2 values

Table 5.14: Coefficient of determination effect size- f^2 values

Table 5.15: Predictive capacity values- Q^2

Table 6.1: Prior Studies Related to the Crowdsourcing Adoption and Innovation Competence

Table 6.2: Respondent's Distribution across Industries and Job Positions

Table 6.3: Measurement Items

Table 6.4: Results of the measurement model

Table 6.5: Fornell and Larcker criterion

Table 6.6: Heterotrait and Monotrait (HTMT) criteria

Table 6.7: Structural Model Results

Table 6.8: Serial Mediation Analysis Result

LIST OF FIGURES

Figure 1.1: Thesis Structure

Figure 2.1: Schematic depiction of the article selection process

Figure 2.2: Number of publications per year

Figure 2.3: Document co-citation network for crowdsourcing-related innovation research

Figure 2.4: Keywords in the crowdsourcing and innovation co-occurrence network

Figure 2.5: Thematic Mapping of clusters

Figure 3.1: Research Model of Crowdsourcing Adoption in Organizations

Figure 4.1: Systematic review process results

Figure 4.2: Strategic Framework of designing crowdsourcing initiatives

Figure 4.3: Green Delhi application overview and citizens' reviews

Figure 4.4: Snapshot of Aatmanirbhar App Innovation crowdsourcing initiative results

Figure 4.5: Snapshot of the PMO mobile app crowdsourcing initiative on MyGov

Figure 5.1: Organizational Learning Mechanism Outcome Performance Model

Figure 5.2: Research model

Figure 5.3: Path coefficient analysis

Figure 6.1: Research Model

Figure 6.2: Path Coefficient Analysis

CHAPTER 1 INTRODUCTION

In today's evolving business landscape, organizations are shifting from traditional value-creation models to embrace value co-creation. This paradigm shift acknowledges the role of stakeholders, and the broader community in the creation process. With increasing competition and the emergence of disruptive technologies, organizations are turning to crowdsourcing as a powerful tool to harness collective intelligence and creativity. Crowdsourcing enables collaboration, idea generation, and innovation on an unprecedented scale by engaging external stakeholders. As innovation takes center stage in the knowledge-based economy, the adoption of crowdsourcing encourages organizations to integrate external knowledge flows seamlessly. Within this context, users are recognized as valuable co-creators, contributing essential resources to organizational success. By leveraging Web 2.0 platforms, organizations gain access to a diverse pool of users through crowdsourcing, thus facilitating the acquisition of external knowledge and resources at a reduced cost. However, despite the growing adoption of crowdsourcing, there remains a need for a comprehensive examination of its governance mechanisms and its impact on organizational value co-creation.

This chapter provides a comprehensive overview of the research and a detailed description of the identified problems. In Section 1.1, the introduction presents the concept of co-creation and its pivotal role in generating value collaboratively with stakeholders. Following this, Section 1.2 delves into the co-creation process, elucidating how values are jointly developed through shared ideas and developments. Section 1.3 focuses on defining value co-creation, emphasizing its significance in enabling organizations to tailor service experiences to meet the diverse needs of stakeholders. Building on these concepts, Section 1.4 discusses the transformative shift from traditional value-creation methods to co-creation, driven by the rapid advancement of information technologies. This shift has facilitated collaboration beyond organizational boundaries, leading to the emergence of innovative business practices such as crowdsourcing, strategic alignment, and viral marketing. In Section 1.5, the discussion centers on crowdsourcing as a prime example of value co-creation, where multiple stakeholders contribute to creating value. This section highlights how crowdsourcing, enabled by Web 2.0 technologies, has become instrumental in enhancing organizations' value co-creation capabilities by tapping into the diverse participants' collective knowledge and expertise.

Section 1.6 delves into the research problem, emphasizing the evolving nature of competition in the business world and the growing importance of effective value creation through collaboration. It underscores the complexity of implementing crowdsourcing and the need to understand factors such as organizational readiness and engagement with the crowd. Section 1.7 identifies research gaps and outlines the contributions of the research study, particularly in understanding the adoption factors,

social mechanisms, and outcomes of crowdsourcing for value co-creation. The rationale for the research, as detailed in Section 1.8, emphasizes the need to address gaps in the existing literature, enhance theoretical frameworks, and provide actionable insights for organizations. Finally, Section 1.9 outlines the research aim and questions, setting the stage for a comprehensive exploration of crowdsourcing-based value co-creation and its impact on organizational innovation competence.. In essence, the chapter establishes the foundation for an in-depth investigation of how crowdsourcing influences organizational value co-creation.

1.1 Background of the Study

Crowdsourcing has emerged as a powerful tool for companies to engage the collective intelligence of virtual communities in solving problems and driving innovation (Afuah & Tucci, 2012; Boudreau & Lakhani, 2013; Gruner & Power, 2017). High-tech firms, particularly, have embraced crowdsourcing to tap into rare, valuable, non-substitutable, and inimitable resources for knowledge sharing, cost optimization, and continuous innovation (Täuscher, 2017; Dellermann et al., 2020). Platforms like "Battleofconcepts" and initiatives such as "DHL's innovation centers" demonstrate how organizations leverage crowdsourcing to co-create value with their communities, accelerating innovation acceptance (Marjanovic et al., 2012). Despite its potential benefits, integrating crowdsourcing for value co-creation presents challenges, as organizations may encounter difficulties adjusting to this novel business model due to the intricate dynamics within their communities (Palacios et al., 2016). The literature highlights that replicating a successful crowdsourcing-based business and creating a business based upon crowd is difficult due to internal resistance and failed implementations, emphasizing the need for a proper mechanism to facilitate effective crowdsourcing-based value co-creation (Forbes & Schaefer, 2018; Schenk et al., 2019; Ruiz & Beretta, 2021). This study seeks to understand the role of crowdsourcing as an emergent mechanism for value co-creation and its impact on innovation competences.

1.2 The Concept of Crowdsourcing

The interconnectivity and interactivity facilitated by Internet-based technologies have revolutionized how organizational tasks are carried out (Prahalad & Ramaswamy, 2004; Zwass, 2010). These technologies empower individuals from all over the globe to collaborate on tasks across different organizations (Chesbrough, 2003; Zwass, 2010). Simultaneously, in a world of widely distributed knowledge, organizations recognize the limitations of relying solely on internal resources for competitiveness (Chesbrough, 2003). To maintain a competitive edge, they increasingly embrace open innovation, which involves tapping into external knowledge sources for product or service innovation (Laursen & Salter, 2006). As the momentum behind open innovation grows, the significance of utilizing the wisdom of crowds to address various challenges is capturing management's attention (Howe, 2008; Zwass 20,10). Organizations are beginning to harness crowd wisdom to gather information about

products/services, handle repetitive tasks, gather fresh ideas, and enhance brand visibility (Surowiecki, 2004; Schulze et al., 2011; Palacios et al., 2016; Zahay et al., 2018). This phenomenon is known as crowdsourcing, defined as involving a large group of people (solvers) through Internet-based platforms to solve organizational problems (Howe, 2008). Stakeholders in crowdsourcing encompass companies (often referred to as seekers) posting problems online, the crowd or individual knowledge workers (usually called solvers) providing solutions to these problems, and a crowdsourcing platform facilitating their engagement.

Crowdsourcing has gained much attention in organizations to gain a competitive advantage over the other traditional work models to leverage the information, labor, skills, and expertise to harvest innovation. Fueled by technological developments, crowdsourcing has gained relevance as the novel organizational sourcing model to leverage the collective intelligence of solvers to fulfill the on-demand organization's value creation needs (Deng & Joshi, 2016; Chou, 2021). These days, organizations are well aware that internal R&D is not enough to improve an organization's innovation capabilities; instead, extending beyond closed boundaries leads to the acquisition of valuable information, external knowledge, and required competencies (Gassmann & Schweitzer, 2014). Crowdsourcing is a game changer for achieving participative management goals for idea gathering, problem-solving, information processing, cost savings, responsiveness, and flexibility in responding to the changing business strategy (Kittur et al., 2013; Zhao & Zhu, 2014). Now is the time to use technology-enabled crowdsourcing tools to go beyond internal capacity to improve the innovation competencies of the organizations.

Crowdsourcing is a multifaceted and evolving phenomenon that has undergone significant development since its inception. The term "crowdsourcing" was first coined by Jeff Howe in 2006 when he introduced it in Wired Magazine. Crowdsourcing refers to organizations outsourcing tasks that workers previously performed to an external network of people through an open call. It is a portmanteau of "crowd" and "outsourcing," representing the practice of harnessing the collective knowledge, skills, and efforts of a group of people (referred to as the crowd) to fulfill various organizational needs. Howe (2008) proposed a taxonomy of crowdsourcing, categorizing it into four distinct types based on how organizations engage with the crowd:

- **Crowd Creation:** In this category, companies involve crowds in the generation of new product designs, innovative solutions, and creative concepts. Crowd creation taps into the collective creativity and ideation capabilities of the crowd.
- **Crowd Wisdom:** Crowd wisdom entails utilizing the collective coordination, cooperation, and individual cognitive abilities within a crowd to accomplish specific tasks or solve complex problems. This approach leverages the collective intelligence of the crowd to make informed decisions.

- Crowd Labor: Crowd labor involves organizations outsourcing tasks, both simple and complex tasks. The crowd's diverse skills and expertise are harnessed to perform a wide range of activities, often on a project-by-project basis.
- Crowdfunding: In the crowdfunding model, companies seek financial support and investments from the crowd for specific initiatives or projects. Crowdfunding platforms have become increasingly popular for raising funds for various endeavors.

Howe's pioneering conceptualization of crowdsourcing set the stage for subsequent discussions in the field. Credited with coining the term in 2006, Howe defined crowdsourcing *"as the act of a company or institution outsourcing a function previously performed by employees to an undefined and typically large network of people through an open call"*. This process may involve collaborative peer production or be undertaken by individuals, with the essential prerequisite being the use of an open-call format and a large network of potential contributors (Howe, 2006).

The terminology surrounding crowdsourcing has evolved over time, leading to alternative terms such as "crowd wisdom," "collaborative systems," "mass cooperation," and "collective intelligence" (Doan et al., 2011). Diverse perspectives on crowdsourcing have emerged, with Afuah & Tucci (2012) framing it as a problem-solving methodology, and Maiolini & Naggi (2012) exploring its applications in business-to-business contexts and small to medium-sized enterprises. The multitude of definitions and viewpoints has, however, caused confusion in the field.

To address this ambiguity, Estellés-Arolas & De-Guevara (2012) conducted a synthesis of various crowdsourcing definitions from the literature. They identified three common elements inherent to crowdsourcing: the crowd, the initiator (often an entity or organization), and the process. Subsequently, they proposed a comprehensive definition for crowdsourcing as *"... a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number; via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage what the user has brought to the venture, whose form will depend on the type of activity undertaken"* (p. 197).

Utilizing a varied workforce and information outside the businesses' walls has been seen to offer significant advantages in overcoming difficulties like gaining competitive advantage, boosting return on investment, engaging in research, and addressing global issues. The continued exploitation of these advantages calls for fresh perspectives, tools, and skills to successfully traverse the erratic creative processes of

risk management and audience interaction (Hurni & Wiesmann, 2014; Palacios et al., 2016). Leading companies are shifting the focus from exploiting internal sources to using external resources for their research and innovation skills (Chesbrough & Crowther, 2006).

1.2.1. The Relationship between Crowdsourcing, Outsourcing and Open Innovation

Crowdsourcing is an extension of open innovation. While both allow firms to gain from outside resources, open innovation is more concerned with the innovation process and knowledge flows between organizations. In contrast, crowdsourcing is more concerned with connecting organizations to an undefined group of participants (Schenk & Guittard, 2011; Seltzer & Mahmoudi, 2013). Crowdsourcing has some similarity with outsourcing as both involves tapping external talents for organizational tasks, sharing uncertainties in the process and outcomes (Schenk & Guittard 2009). However, there are certain differences like- Crowdsourcing targets undefined individuals via open calls, unlike outsourcing that recruits identified employees or companies (Howe 2008). The quality of crowdsourced solutions lacks a guarantee, as contributors may lack specialization, rendering some solutions impractical (Roman 2009; Poetz & Schreier 2012). Crowdsourcing often involves multiple solution providers concurrently working on a task, providing firms with diverse options and requiring internal efforts to select the best solutions (Sieg et al. 2010). These differences underscore the need to examine crowdsourcing as a distinct phenomenon.

Crowdsourcing is perhaps best characterised as being founded on the interaction between a ‘seeker’ and a ‘solver’ (Brabham, 2008) as the fulcrum of a value creating process. Why undertake an activity such as this if not in the pursuit of value? Should not the creation of that value be a central element to a definition of crowdsourcing? Therefore, for the purpose of this thesis we define *crowdsourcing as a new participative business model used by organizations for organizations to solicit specific tasks from the crowd, and create value by harnessing their collective knowledge, effort, experience, and diverse skill sets.*

Furthermore, scholars have endeavored to create taxonomies and frameworks to better understand the various dimensions of crowdsourcing. Whitla (2009) categorized crowdsourcing activities into areas such as promotion, advertising, marketing research, and product development. Similarly, Brabham (2012) organized crowdsourcing activities based on their functions, including knowledge discovery, broadcast search, distributed human intelligence tasking, and peer-vetted creative production. The dynamic nature of crowdsourcing and its evolving definitions, taxonomies, and frameworks demonstrate the complexity of this phenomenon, making it a rich and multifaceted subject of study within the realm of organizational and innovation research. While examining the relevance of crowdsourcing in organization there exists four important pillars: the crowd, the crowdsourcer or seeker firm, the task and the crowdsourcing platform.

1.2.2. Pillars of Crowdsourcing

The crowd, crowdsourcing platform, crowdsourcer, and task are the four fundamental building blocks that emerge from an examination of crowdsourcing applications. The pillars enable organizations to employ crowdsourcing for a variety of tasks. A comprehensive understanding of pillars would help increase knowledge of elements essential for successful application.

Crowdsourcing Tasks: The first pillar of crowdsourcing is crowdsourcing tasks to be outsourced. Tasks can be divided into four types simple tasks with high outcome variety, simple tasks with low outcome variety, complex tasks with low outcome variety, and complex tasks with high outcome variety (Ye & Kankanhalli 2013). According to Estelles Arolas et al. (2015), crowdsourcing tasks mainly consist of crowd collaboration, crowd casting, crowd content, crowd opinion, and crowdfunding. Further, Prpic et al. (2015) stated four types of crowdsourcing activities: idea crowdsourcing, micro-tasking, solution crowdsourcing, and crowd voting. Understanding the crowdsourcing task and its requirement is a must for successful applications.

Crowdsourcer: The second pillar of crowdsourcing is the crowdsourcer. Crowdsourcer is also sometimes called sponsor or seeker. Crowdsourcer can be an individual, organization, or non-profit organization with specific problems and searching for crowds to outsource the problems. Crowdsourcer mainly focuses on outsourced tasks, open calls, rewards, and incentives, protecting intellectual property rights, managing contributions, and assimilating them into internal organizations (Hosseini et al., 2014; Randhawa et al., 2019).

Crowd: The third pillar of crowdsourcing is the crowd, namely called solver. Solvers are a large network of unknown people participating in the crowdsourcing process based on their intrinsic and extrinsic motivators. Crowds are a diverse, undefined, and unknown group of people (Hosseini et al., 2014). Organizations can use internal crowds like employees and professional experts or external crowds like customers.

Crowdsourcing Platforms: The fourth pillar of crowdsourcing is crowdsourcing intermediaries or platforms. An organization's ability to engage with people in various places is greatly expanded by technology. It offers a more affordable method for crowdsourcing and utilizing diverse skills. Apps, software, mobile phones, and other inexpensive technologies and tools enable the general public to participate even more actively (Hecker et al., 2018). Using a crowdsourcing platform enables negotiation between the crowd and the crowdsourcer. The crowdsourcing platforms can be mobile-based and web-based (Niu & Qin, 2017). The other platform choices can be using the platform run by the internal IT department of an organization or using the third-party intermediary platforms (Qin et al., 2016).

1.3 Benefits of Crowdsourcing

Crowdsourcing provides organizations with diverse benefits outlined in prior literature, such as accessing valuable heterogeneous knowledge, cost reduction in task execution, externalizing the risk of failure, and maintaining specialization in core areas (Doan et al. 2011; Heeks 2010; Howe 2008; Kittur 2010; Leimeister et al. 2009).

Firstly, organizations can tap into external capabilities and skills unavailable internally by leveraging crowdsourcing. This involves connecting with a large crowd to address organizational tasks, benefitting from specialized knowledge and unique insights into existing products or services. Crowdsourcing facilitates the expression of reactions, experiences, and proposals for improvement, enabling the generation of novel and valuable solutions (Poetz & Schreier 2012). It also allows for the potential creation of ahead-of-trend products or services with commercial viability (Franke et al. 2010; Huston & Sakkab 2006). Additionally, crowdsourcing aids in collecting discrete information about customer preferences for effective utilization.

Secondly, organizations can obtain cost-effective solutions by crowdsourcing, as it generally incurs lower costs than internal problem-solving. For instance, engaging the crowd through platforms like Amazon Mechanical Turk can cost as little as \$1.38 per hour (Horton & Chilton 2010). Some crowds may even engage for free if the tasks are enjoyable, offering organizations a viable way to reduce solution costs and increase profits (Zwass, 2010). Moreover, crowdsourcing allows for quicker task completion by inviting a large number of solvers, enhancing efficiency in activities like image labeling or audio transcription. The accelerated process supports the quick brainstorming of new possibilities, shortening innovation life cycles and bolstering organizational competitive advantage (Chesbrough 2003).

Thirdly, crowdsourcing enables organizations to externalize problem-solving risks, as seen in areas like logo design. Traditionally, firms may rely on internal departments for ideas and prototypes, incurring costs even if designs are unsatisfactory. Crowdsourcing mitigates this risk by allowing organizations to invite external input and select from various proposed solutions. This strategy keeps organizations specialized in core areas while avoiding the need to hire specialists for peripheral tasks (Howe, 2006; Roman, 2009).

1.4 The Concept of Value co-creation

The contemporary business landscape has witnessed a transformative shift from conventional value creation to a collaborative approach known as value co-creation. This paradigmatic evolution is characterized by the joint production of value by the focal entity and its stakeholders (Galvagno & Dalli, 2014). The advent of information technologies has propelled this shift, prompting firms to engage external stakeholders

actively in the value creation process (Ranjan & Read, 2016; Ramaswamy & Ozcan, 2018). Unlike traditional reliance on internal resources, capabilities, and processes, organizations now employ strategies like strategic alignment, outsourcing, crowdsourcing, and viral marketing to co-create value (Ranjan & Read, 2016).

Value co-creation has garnered attention across various fields, including service management, innovation management, marketing, management information systems, and consumer research (Galvagno & Dalli, 2014). Empirical investigations delve into three key dimensions: the co-creator, co-creation process, and co-created value (Zwass, 2010; Saarijarvi et al., 2013; Vega-Vazquez et al., 2013). Co-creators encompass the initiating focal entity and diverse counterparts participating in the joint venture, ranging from service vendors and consumers to competitors, crowds, governments, and suppliers (Galvagno & Dalli, 2014). Identifying major stakeholders is crucial, considering their varying stakes and impacts on the focal entity (Freeman, 2010).

Motivations for stakeholders engaging in value co-creation span diverse factors such as knowledge sharing, resource sharing, cost savings, access to experts, and marketing excellence (Roberts et al., 2014; Pera et al., 2016; Jiang et al., 2021). Despite distinct antecedents, these motivations converge on a shared purpose, forming the foundation of value co-creation. The co-creation process explores how value is generated through leveraging stakeholders' resources (Kim et al., 2015). The resource-based view considers value co-creation as an extension of the firm's resource boundary, combining existing and newly acquired resources (Paredes et al., 2014). The relational view emphasizes establishing and leveraging mutual relationships with stakeholders through shared assets, knowledge-sharing routines, and collective governance mechanisms (Grover & Kohli, 2012; Hadaya & Cassivi, 2012).

Co-created value represents the output of value co-creation, manifesting as a portfolio of value generated by the focal entity and stakeholders (Freudenreich et al., 2020). Ideally, each stakeholder receives a satisfactory share, ensuring mutual benefits. Failure to achieve mutual benefit may lead to stakeholder disengagement, affecting relationship legitimacy and the focal entity's business sustainability (He et al., 2022). In essence, the term 'value-creation' in contemporary business literature signifies a departure from traditional, narrowly defined notions. Scholars like Schumpeter and Porter initially linked value creation to financial performance, emphasizing innovation and buyer willingness to pay (Kim et al., 2015). The resource-based view broadened this perspective to include all firm-controlled resources contributing to customer satisfaction at a lower cost than competitors (Barney, 1991). Hollebeek (2017) further linked engagement to value creation through resource integrating processes, while Vargo and Lusch (2004) highlighted the two-way street nature of value creation, considering perspectives of all transaction participants.

Value, in this context, extends beyond financial returns, embracing utilitarian, social, and hedonic dimensions (Abdul-Ghani et al., 2011). A detailed definition of value considers it as any incremental improvement in an individual or organization's ability to achieve an objective, with perceived benefits outweighing the associated sacrifice. This definition provides a comprehensive framework for understanding value beyond short-term financial gains, reflecting its multifaceted nature. In the context of this thesis, exploring the nexus between engaging a crowd and value co-creation involves unraveling the intricacies of collaborative value creation in today's dynamic business environment.

1.5. Crowdsourcing and Value co-creation

Co-creation is the process of jointly developing values like concepts, solutions, goods, and services with stakeholders or specialists such as customers, suppliers, etc. In co-creation, rather than keeping ideas to oneself, ideas are shared and enhanced jointly. Value co-creation is the process by which an organization and its customers jointly create value, enabling the latter to tailor the service experience to their own needs (Prahalad & Ramaswamy, 2004; Loef et al., 2017). Organizations that involve outsiders in the ideation and development process are said to be co-creating. Most organizations work hard to keep new goods and procedures a secret; some even keep them exclusively internal. But, co-creation enables organizations to work together outside of their own walls in order to generate novel ideas and challenge their own established practices. They fully admit that they are not the only ones with the answers and make it simple for others to do so.

The rapid growth of information technologies has accelerated the shift from value creation to co-creation. From the study perspective, *co-creation refers to a collective process between an organization and a crowd to acquire knowledge and assimilate the available resources to enhance an organization's research and innovation capabilities*. Organizations now collaborate with external stakeholders to co-create value rather than relying primarily on internal processes, talents, and resources to do so. By blurring a company's traditional resource boundaries, value co-creation encourages innovative business practices, including crowdsourcing, strategic alignment, viral marketing, and outsourcing.

Crowdsourcing is a classic example of value co-creation because it involves many stakeholders, and value is co-created. Crowdsourcing is a potential business model to enhance value co-creation capabilities for organizations looking for a way to develop ideas and resolve current issues within enterprises by further expanding the capability and utilization of human knowledge (Hammon & Hippner, 2012). The disruptive changes made possible by Web 2.0 technologies have led to the emergence of new and paradigm-shifting organizational and commercial models, much like how Amazon, eBay, and Facebook have already transformed a number of industries. An integrated understanding of the value-creation mechanisms used by organizations today through crowdsourcing will serve as an important theoretical building block for a unified vision of the future of organizations.

1.6 Research Problem

In the contemporary business sphere, competition is not just about coming up with new ideas but also about working together effectively and efficiently to create value. Innovation is still crucial for success, but the way we find, develop, and use innovative ideas has changed. One big change is the use of crowdsourcing, where we tap into the collective intelligence and expertise of a large and diverse group of people, often from different places. The digital age has made crowdsourcing even more powerful because we now have easy access to digital tools and lots of knowledge. Companies of all sizes and types are turning to the crowd for ideas, solutions to tough problems, and new ways to innovate. But it's not always easy to make crowdsourcing work. It's a complex journey from deciding to use crowdsourcing to actually doing it, and it depends on factors like how ready the organization is, the design of the crowdsourcing platform, and how well the organization engages with the crowd.

At the heart of crowdsourcing is the idea of "value co-creation." This means that people who participate aren't just passive observers; they actively work with the organization to create value. This raises some interesting questions: *How does value get created in crowdsourcing? What makes this co-creation work, and does it vary for different organizations?* Once this co-created value is produced, how does the organization incorporate it, and what are the consequences, both good and bad?

Despite the growing popularity of crowdsourcing for value co-creation, we still don't fully understand it. Current research and industry discussions give us some insights, but they are scattered. This research aims to address a big problem: *How do organizations use crowdsourcing to co-create value together? What are the things that make this co-creation happen? And most importantly, what are the impacts and outcomes of using crowdsourcing for value creation within organizations?* This is not just an academic question – it has significant implications for how organizations plan their strategies, make policies, and design digital tools. This thesis aims to bring all these ideas together and give a complete picture of how crowdsourcing can be a powerful way to create value.

1.7 Research Gaps

Embracing crowdsourcing for value co-creation presents organizations with distinctive challenges, requiring a detailed understanding for successful adoption.

First, the crowdsourcing value co-creation process mainly has three participants: the crowdsourcer, the solver, and the crowdsourcing platform. Many review studies have been conducted on crowdsourcing to explore the theoretical background and know the existing literature on the crowdsourcing domain (Pedersen et al., 2013; Zhao & Zhu, 2014), synthesize the crowdsourcing definitions (Estellés-Arolas & González-Ladrón-De-Guevara, 2012), and model construction for conducting the ideation process in

crowdsourcing. Though the studies have contributed to the crowdsourcing domain by focusing on specific research problems, no such review studies are available in the literature focused primarily on identifying adoption factors of crowdsourcing from the crowdsourcer perspective. There are many studies conducted to understand the crowd's motivation factors to participate in crowdsourcing (Pinto & dos Santos, 2018; Punel et al., 2019; Zhang et al., 2019). Moreover, only a few studies have focused on the seeker firm's perspective for crowdsourcing decisions based on a single factor. Consequently, studies suggest considering multiple factors when deciding to crowdsource (Thuan et al., 2016). There is a lack of an integrated approach to identifying the adoption factors systematically from different contexts that may influence the crowdsourcer adoption of crowdsourcing. Therefore, the current study is the first to identify the adoption factors from both management and designing perspective, that need to be considered by practitioners before adopting crowdsourcing in organizations.

Second, the firm's external network of the crowd consists of information, knowledge, and data that is not available internally and reduces economic and social frictions (Bapna et al., 2017). Thus, the voluntary engagement, contribution, and interaction between crowd-firm results in social capital building. Social capital emerging from crowd-firm interactions is a valuable and productive resource that diminishes information sharing and organizational learning barriers. It enables value creation, knowledge sharing, improved performance, and organizational development to gain a competitive advantage. Research by Liao & Chen (2007), Levy (2009), and Poetz & Schreier (2012) unveils that the amount and variety of information received from connections and interactions with external networks help shape creative competence and gain competitive advantage and organizational innovation. Even though past researchers have talked about its importance in management and research practices, a conceptual understanding of the role of the crowd-firm co-creation mechanism in crowdsourcing is still missing (Liu et al., 2018; Qingliang et al., 2021). No studies have focused on a crowdsourcing-based crowd-firm value co-creation mechanism. Therefore, the study focuses on the perspective of social capital-based social linkages, namely structural, cognitive, and relational, that acts as a catalyst to the value co-creation mechanism. Using the Social Capital theory, this study is the first to investigate the crowdsourcing-based value co-creation mechanism empirically. The study will investigate whether the three linkages formed during crowdsourcing influence the crowdsourcing-based value co-creation mechanism.

Third, past reviews highlight that the organizational learning capability is improved with a firm's connection and the knowledge acquired from external networks (Schlagwein & Andersen, 2014; Xu et al., 2015; Devece et al., 2019). Schulze & Hoegl (2008) further identified the effect of crowdsourcing on learning distinctive competence of the organizations. These learning competencies result in developing a continuous learning system (Hine et al., 2010) that gives an organization a competitive edge. The collective intelligence gathered from the external networks acts as a market research tool to obtain tacit knowledge about trends, customers, products, and services as per the requirements. Thus, organizations that implement crowdsourcing as a value

co-creation tool have a greater capacity to learn, be very receptive to market tendencies, and foresee changes easily compared to competitors. Previous research (e.g., Ye & Kankanhalli, 2013; Schlagwein & Anderson, 2014; Xu et al., 2015; Devece et al., 2019; Lenart-Gansiniec & Sulkowski, 2020) suggested that an IT-enabled crowdsourcing platform drives organizational learning. There is a lack of empirical research examining the influence of crowdsourcing-based co-creation mechanisms on organizational learning. We assume that firms that use crowdsourcing practices as a facilitator of co-creation have excellent organizational learning capability to promote firms' adaptation and continuous improvement and integrate external resources for improving innovation competence. Therefore, taking Iyenger *et al.*'s (2015) model as a base, the present study investigates whether crowdsourcing-based social Linkage as a co-creation mechanism leads to organizational learning via knowledge transfer effectiveness and absorptive capacity capability.

Fourth, companies innovation ability is closely connected to its relationships with outside networks. These networks allow organizations to boost the knowledge they are exposed. The proposed study assumes that innovation competencies can be widened by technological platforms like web 2.0 and online social networks. The firms' creativity and innovativeness are enhanced by leveraging crowdsourcing, as creative solutions are acquired from external specialists having diverse knowledge, resources, abilities, mastery, and heterogeneous skills (Whitla 2009; Ye & Kankanhalli 2013). Gassmann et al. (2014) conceptualized crowdsourcing as an innovation tool where firms' expertise increases as external resources are integrated into the innovation process. Xu et al. (2015) explored the relationship between crowdsourcing and firm performance as knowledge from diverse crowds increases innovation competencies. Innovation competence is the primary outcome of crowdsourcing that is still underexplored in an organizational context (Schlagwein & Andersen 2014; Nevo & Kotlarsky 2020). The implication of crowd-firm co-creation in crowdsourcing for enhancing innovation competence is not studied yet. Crowdsourcing positively impacts the innovation competence of organizations since tacit and implicit knowledge is received from connections and interactions and assimilated into the organizations for shaping innovation performance. As crowdsourcing facilitates organizations to harness the crowd's collective intelligence to enhance innovation performance, it becomes imperative to explore how crowdsourcing-based co-creation mechanism impacts organization innovation competence.

1.8 Rationale for the Current Research

The rationale for undertaking this research is underpinned by several critical considerations.

First, it addresses a significant gap in the existing literature. While previous studies have established the relationship between Crowdsourcing and Innovation, the mechanism at play has received limited attention. This research aims to bridge this gap by examining the mechanism of crowdsourcing-based social linkage formed between crowds and organizations, and the mediating roles of knowledge transfer effectiveness and absorptive capacity, providing a holistic understanding of the complex relationships involved.

Second, in an era characterized by relentless technological advancements and market disruptions, organizations must continually enhance their innovation competence to remain competitive. By uncovering the mediating mechanisms of Crowdsourcing-based social linkage, this research offers actionable insights that can empower organizations to harness the full potential of crowdsourcing for innovation.

Third, this research contributes to theoretical frameworks in the field. It extends the understanding of the organizational learning outcome performance model and social capital theory, providing empirical evidence of how Crowdsourcing-based social linkage influences knowledge transfer effectiveness and absorptive capacity, thus advancing theoretical knowledge.

Fourth, the practical implications of this research are significant. The findings have relevance for organizations across industries. By recognizing the critical role of knowledge transfer effectiveness and absorptive capacity as intermediaries, organizations can strategically design and implement crowdsourcing initiatives that maximize their innovation potential.

Fifth, in the context of strategic decision-making, as organizations increasingly turn to crowdsourcing as a sourcing model, understanding the underlying mechanisms becomes paramount. This research equips decision-makers with valuable insights to make informed choices regarding crowdsourcing implementation.

Finally, this research makes an academic contribution by expanding the knowledge base on crowdsourcing and its impact on organizational innovation. It provides a foundation for further exploration and empirical studies in this evolving field.

1.9 Research Aim and Questions

The study aims to gain a profound understanding of the intricate mechanisms underlying crowdsourcing-based value co-creation and its profound impact on the innovation competences of organizations. This study (1) presented a strategic framework to understand the designing and management perspective of crowdsourcing adoption, (2) develops a comprehensive framework to understand the mechanism of value co-creation through crowdsourcing (3) tested the mediating role of organizational learning in between crowdsourcing-based social mechanism and innovation competence. To comprehensively address the multifaceted nature of this research endeavor, the following research questions have been formulated:

"What is the mechanism of crowdsourcing-based value co-creation and its impact on organizations?"

The following research objectives will be explored in support of the purpose and goals of the study:

1. To identify the adoption factors that need to be considered by practitioners before adopting crowdsourcing in organizations.
2. To understand the mechanism of crowdsourcing-based social linkages on organizational learning.
3. To explore the influence of crowdsourcing-based social linkages on innovation competence.
4. To explore the role of organizational learning in influencing the relationship between crowdsourcing-based social linkages and innovation competence.

The thesis aims to address following research questions:

1. What are the adoption factors that need to be considered by practitioners before adopting crowdsourcing in organizations?
2. What is the influence of crowdsourcing-based social linkages on organizational learning?
3. What is the influence of crowdsourcing-based social linkages on innovation competence?
4. How does organizational learning influence the relationship between crowdsourcing-based social linkages and innovation competence?

This thesis encompasses five different studies that collectively address crucial gaps in understanding crowdsourcing adoption and its organizational impacts. The first study initiates the exploration with a bibliometric analysis, revealing a knowledge gap in operational dynamics. Building upon this, the second study delves into critical factors influencing crowdsourcing adoption, employing theories such as Diffusion of Innovations and the Technological-Organizational-Environmental framework. The third study shifts focus to the design perspective, identifying constituent elements and principles, resulting in the development of a strategic crowdsourcing framework. Moving forward, the fourth study investigates value co-creation mechanisms within crowdsourcing initiatives, emphasizing social mechanisms influencing knowledge transfer and absorptive capacity. The final study explores the outcomes and impact of crowdsourcing, particularly on organizational innovation competence, addressing gaps through the lens of social capital theory and organizational learning models. Together, these studies contribute a comprehensive understanding of crowdsourcing, offering actionable insights and theoretical advancements.

1.10 Thesis Structure

The thesis follows a well-organized structure comprising seven chapters, each contributing to a comprehensive exploration of the intricate relationship between crowdsourcing, value co-creation, and organizational dynamics. The organization of the thesis is shown in Figure 1.1.

In the opening chapter, the background of the study is established, introducing the concepts of crowdsourcing and value co-creation. The chapter outlines the benefits of crowdsourcing and emphasizes the pivotal connection between crowdsourcing and value co-creation. It articulates the research problem, identifies gaps in existing literature, and sets the stage for the expected contributions of the thesis. The chapter concludes by presenting the rationale for undertaking the study, defining research aims and questions, and offering an overview of the thesis structure.

The Chapter 2 delves into the Study 1, which involves a systematic review and bibliometric analysis to map the fields of crowdsourcing, innovation, and value co-creation. The research methodology is detailed, elucidating the process of data extraction, keyword analysis, and various analytical techniques such as co-citation analysis and thematic mapping. The chapter concludes with a discussion of the theoretical and managerial implications derived from the findings of the systematic review.

Building upon the foundation laid in the first study, Chapter 3 introduces Study 2, focusing on the critical factors influencing crowdsourcing adoption and value co-creation. It provides a thorough background, integrating theoretical frameworks such as the Diffusion of Innovation (DOI) theory and the Technology-Organization-Environment (TOE) framework. The chapter details the formulation of hypotheses and the conceptual model, offering insights into innovation, technology, organizational,

and environmental factors. The research methodology, results, and findings are presented and discussed, highlighting both theoretical and practical implications.

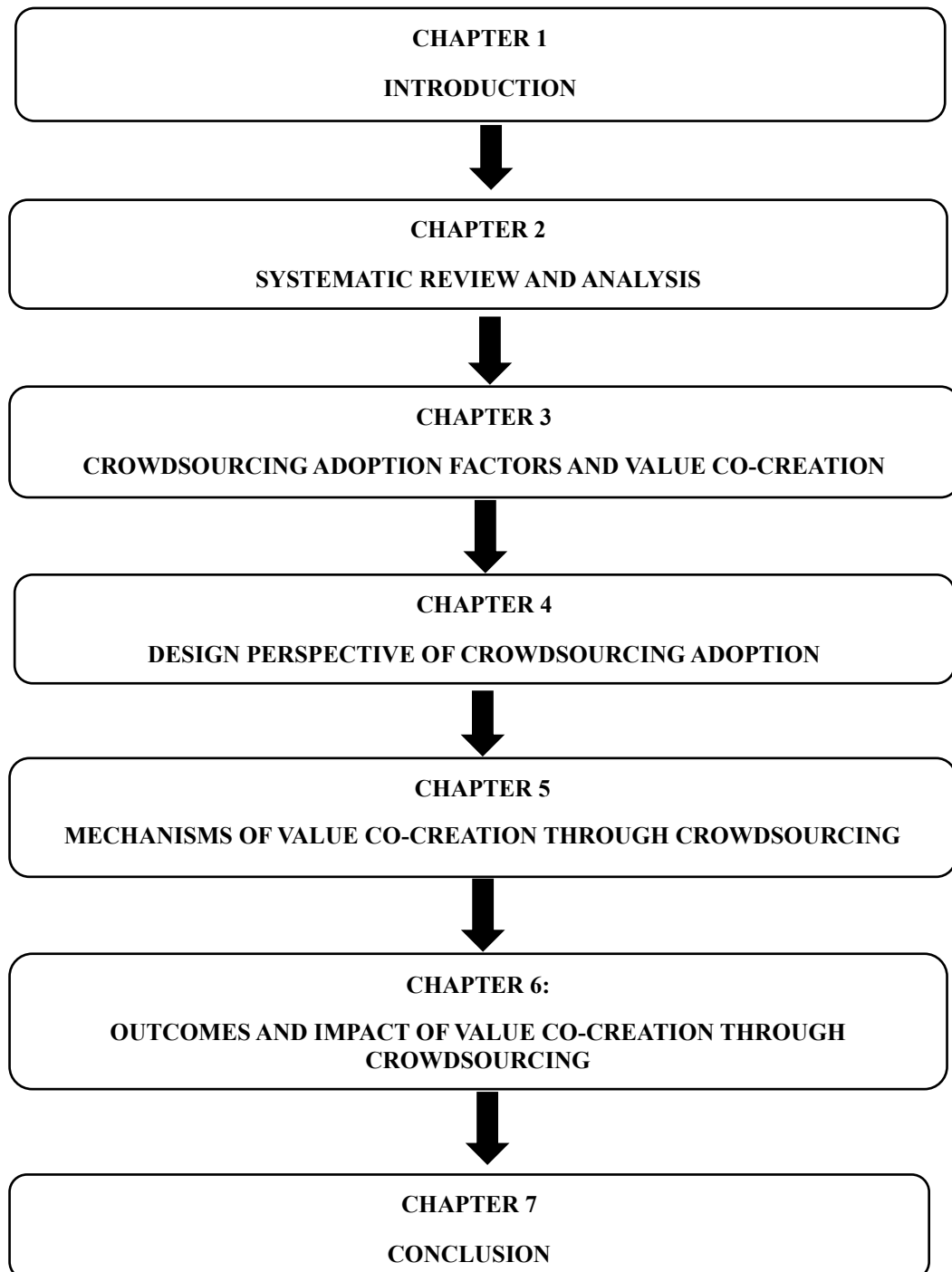
The Chapter 4 centers around the Study 3, investigating the design perspective of crowdsourcing adoption, particularly in the government sector. Conducted through a systematic literature review and morphological analysis, the study explores strategic frameworks and provides examples of government crowdsourcing initiatives. Results across different phases of crowdsourcing initiatives are discussed, emphasizing preparation, execution, and post-execution. The chapter reflects on the implications of these findings and suggests potential areas for future research.

Chapter 5 describes Study 4, which delves into the mechanisms of value co-creation within crowdsourcing initiatives. It offers a comprehensive literature review, develops a theoretical framework, and formulates hypotheses. The research methodology is detailed, covering sample selection, data collection, and measurement development. The chapter presents the results of data analysis, discusses the findings, and concludes with implications for both theory and practice.

Building upon the preceding studies, Chapter 6 describes Study 5, focusing on the outcomes and impact of crowdsourcing-based social linkages on organizational innovation competence. The chapter reviews relevant literature, develops a theoretical framework, and formulates hypotheses. It details the research methodology, presents the results of data analysis, and discusses the findings. The chapter concludes with theoretical and practical implications and outlines potential avenues for future research.

The concluding Chapter 7 serves as the conclusion of the thesis, summarizing key findings from each study, discussing theoretical and managerial implications, and suggesting policy considerations. It also outlines potential avenues for future research, ensuring the thesis contributes not only to the existing body of knowledge but also stimulates further exploration in the dynamic field of crowdsourcing and value co-creation.

Figure 1.1: Thesis Structure



1.11 Key Terms

Crowdsourcing:

Crowdsourcing is a practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, typically via the internet. It harnesses the collective intelligence, expertise, and efforts of a diverse group of individuals to accomplish tasks or solve problems.

Crowdsourcing Adoption:

It refers to the widespread use and acceptance of crowdsourcing methods and platforms for sourcing ideas, solutions, or tasks from a large group of people, typically via the internet. It implies the integration of crowdsourcing into various industries, businesses, and processes as a means to leverage the collective intelligence and resources of a diverse group of individuals.

Value Creation:

Value creation refers to the process of generating benefits for stakeholders through the development of products, services, or solutions. It typically involves a company or entity creating value for its customers or clients through its offerings.

Value Co-creation:

Value co-creation extends the concept of value creation by emphasizing the collaborative nature of value generation. It recognizes that value is not solely created by companies and delivered to passive consumers but is instead co-created through interactions between companies and customers, as well as among customers themselves.

Crowdsourcing-based Structural Linkage:

It refers to the structural aspect of the relationship between a crowd and a organization. It encompasses the overall pattern of relationships, interactions, and network ties that develop between the crowd and the firm during crowdsourcing initiatives. This includes how tasks are distributed, how communication flows, the level of coordination, and the degree of integration between the crowd and the firm's operations.

Crowdsourcing-based Cognitive Linkage:

This term focuses on the cognitive or intellectual aspect of the relationship between the crowd and the firm during crowdsourcing activities. It describes how well the crowd and the firm understand each other's perspectives, goals, values, and objectives during the process of crowdsourcing. This understanding is facilitated through shared language, vision, objectives, and values, enabling effective collaboration and alignment of efforts towards common goals.

Crowdsourcing-based Relational Linkage:

This term pertains to the relational or social aspect of the relationship between the crowd and the firm during crowdsourcing endeavors. It refers to the level of respect, trust, and rapport established between the crowd and the firm during the crowdsourcing process. REL reflects the quality of the working relationship, including communication dynamics, responsiveness, mutual support, and the extent to which both parties feel valued and appreciated in their interactions.

Organizational Learning:

Organizational Learning refers to the process through which organizations acquire, share, and apply knowledge to improve their performance, adapt to changes, and innovate. It involves the continuous acquisition, interpretation, and integration of new information, insights, and experiences into the organization's knowledge base, routines, and practices.

Knowledge Transfer Effectiveness:

Knowledge Transfer Effectiveness refers to the efficiency and success with which knowledge is shared, disseminated, and applied within an organization. High knowledge transfer effectiveness means that information is conveyed accurately, comprehensively, and in a timely manner, resulting in meaningful learning or action by the recipients. Effective knowledge transfer is crucial for fostering innovation, improving decision-making processes, and driving organizational performance.

Absorptive Capacity:

Absorptive Capacity refers to an organization's ability to recognize, assimilate, and utilize external knowledge effectively. It involves not only acknowledging the value of knowledge from external sources but also being able to absorb it into the organization's existing knowledge base and operations. This includes the processes of acquiring, interpreting, and applying external knowledge to address organizational needs, solve problems, and innovate. High absorptive capacity enables organizations to stay adaptable, responsive to changes in their environment, and competitive in their industry by leveraging external expertise and insights.

Organizational Innovation Competence:

Organizational innovation competence refers to an organization's ability to effectively manage and leverage innovation to achieve its strategic goals and objectives. It encompasses the knowledge, skills, processes, and resources required to drive innovation within an organization and sustain a competitive advantage in the marketplace.

1.12 Summary

This chapter introduces the concepts of crowdsourcing and value co-creation. It emphasizes the interrelatedness of these ideas and their importance in the current dynamic business environment. Crowdsourcing is depicted as a strategic tool that allows organizations to access external resources, promoting innovation and improving organizational capabilities. The chapter outlines the main objective of the research study, which is to gain a profound understanding of the mechanisms underlying crowdsourcing-based value co-creation and its impact on organizational innovation competence. It identifies key research questions aimed at exploring adoption factors, the impact of crowdsourcing-based social linkages on organizational learning and innovation competence, and the mediating role of organizational learning.

Additionally, the chapter provides an overview of the thesis structure, highlighting the subsequent chapters' focusing on systematic review and bibliometric analysis, factors influencing crowdsourcing adoption, design perspective of crowdsourcing adoption, mechanisms of value co-creation in crowdsourcing, outcomes and impact of crowdsourcing-based social linkages, and concluding remarks.

This chapter serves as a critical foundation, setting the stage for the subsequent sections of the thesis to address these identified gaps and advance our understanding of crowdsourcing's pivotal role in fostering innovation and value co-creation. In the next chapter, we will explore into a comprehensive analysis of the existing literature at the intersection of crowdsourcing, innovation, and value co-creation. Through a comprehensive bibliometric analysis, we aim to uncover insights into the historical development and current state of knowledge in this dynamic field.

CHAPTER 2 MAPPING OF CROWDSOURCING, INNOVATION AND VALUE CO-CREATION

This chapter serves as a critical foundation for the thesis, embarking on an in-depth exploration of the existing literature at the intersection of crowdsourcing, innovation, and value co-creation. The undertaking of a comprehensive bibliometric analysis aims to shed light on the historical development and current state of knowledge in this dynamic field. The chapter unfolds in distinct sections: the evolution of crowdsourcing and innovation research, keyword co-occurrence analysis, thematic mapping, and a robust discussion encapsulating theoretical and managerial implications. The findings not only showcase the burgeoning growth in research over time but also pinpoint gaps and promising directions. As a pivotal contribution, this chapter sets the stage for the subsequent sections of the thesis, laying the foundation for addressing these identified gaps and advancing our understanding of crowdsourcing's role in fostering innovation and value co-creation.

2.1. Introduction

In the contemporary business landscape, innovation has transitioned from being merely advantageous to becoming a vital component for organizational survival (Boons and Stam, 2019; O'Leary, 2020; Brem et al., 2023). This shift has prompted organizations to explore novel approaches to engage external stakeholders in their research and development endeavors, leading to the emergence of crowdsourcing as a means of expanding the innovation funnel. Crowdsourcing, which involves tapping into the collective intelligence and diverse expertise of individuals to achieve shared objectives, has garnered widespread attention as a promising avenue for promoting innovation (Rass et al., 2013; Schlagwein and Andersen, 2014; Cricelli et al., 2022).

Despite the growing interest in crowdsourcing, managing innovation within organizations remains a complex task (Scuotto et al., 2017; Andriopoulos and Dawson, 2021). While digital technologies and innovative processes such as open innovation and value co-creation have facilitated innovation management to some extent (Santoro et al., 2018; Chesbrough et al., 2006; Piyathasanan et al., 2018; Chung et al., 2021), integrating crowdsourcing with existing innovation capabilities is crucial for organizations to develop unique competencies and maintain a competitive edge. Contemporary organizations recognize the importance of collaborative efforts with external stakeholders to foster innovation (Wazny, 2017). This shift towards open collaboration contrasts with the traditional paradigm of relying solely on internal innovation efforts (Gassmann et al., 2013). Crowdsourcing has emerged as a means to enhance organizational innovation capability by enabling access to valuable ideas and resources from the external environment (Liu et al., 2018) and integrating external expertise into the innovation process (Marjanovic et al., 2012).

Previous research has extensively mapped the landscape of crowdsourcing through various focused efforts, as outlined in Table 2.1. Studies such as Ghezzi et al. (2018) and Palacios et al. (2016) have delved into specific aspects of crowdsourcing, including its origins, developmental trajectory, and its use by organizations for innovative solutions. Meanwhile, others like Nevo and Kotlarsky (2020) have provided comprehensive overviews of crowdsourcing literature, analyzing definitions, establishing boundaries, and critically evaluating selected studies. Hossain (2015) and Malik et al. (2019) conducted systematic literature reviews and bibliometric examinations, respectively, to understand the breadth and depth of crowdsourcing research in business and management disciplines. Modaresnezhad et al. (2020) synthesized crowdsourcing literature into a conceptual framework, aiding in understanding its components and applications in information systems and organizational efficiency. Similarly, Cricelli et al. (2022) and Grimaldi et al. (2022) explored the intersections of crowdsourcing with open innovation and production processes, respectively, through systematic literature reviews and analyses.

However, despite this extensive exploration of crowdsourcing, there appears to be a notable gap in the literature concerning its intersection with innovation management. While existing research has thoroughly examined crowdsourcing in isolation, there has been limited exploration from a bibliometric standpoint (Liang and He, 2017) regarding its relationship with innovation management. No study has systematically investigated how crowdsourcing practices contribute to innovation management processes or the impact of crowdsourcing on innovation outcomes. This gap in the literature serves as the impetus for the current study, which seeks to systematically investigate the relationship between crowdsourcing and innovation management to address this gap in understanding.

Table 2.1: Existing reviews in the field of Crowdsourcing

Research Study	Research Focus	Methodology Adopted
Ghezzi et al. (2018)	Investigating the origins and developmental trajectory of crowdsourcing research, its intersections with open innovation and co-creation.	The study used Systematic literature review and adopts a process perspective to analyze research on crowdsourcing.
Nevo and Kotlarsky (2020)	Crowdsourcing's evolution and its importance as a strategic phenomenon in organizational contexts.	The study employs a comprehensive literature review approach, analyzing definitions, establishing boundaries, and critically evaluating selected studies from prominent IS and management journals.
Hossain (2015)	The study reviews crowdsourcing literature in business and management disciplines, focusing on its relationship with open innovation.	A systematic literature review approach is employed, focusing on articles from recent years. Content analysis synthesizes findings, with qualitative studies typically using single-case methods and quantitative studies relying on online surveys on a single crowdsourcing platform
Malik et al. (2019)	The study conducts a bibliometric examination of crowdsourcing publications, aiming to analyze trends and achievements in crowdsourcing research.	A systematic search is conducted in the Science Citation Index Expanded of the Web of Science for publications.
Modaresnezhad et al. (2020)	This study synthesizes crowdsourcing literature and applications into a conceptual framework to better understand its components and characteristics, aiding Information Systems (IS) and organizational efficiency.	A study utilized structured literature review, the study analyzes existing crowdsourcing literature to identify key elements of crowdsourcing processes
Palacios et al. (2016)	This study explores the use of crowdsourcing by organizations to find innovative solutions, develop products, and engage with the crowd	The study adopts a thematic analysis approach to identify emerging research themes within crowdsourcing
Cricelli et al., 2022	This study aims to explore the intersection between Open Innovation (OI) and crowdsourcing by conducting a comprehensive, systematic literature review	The study conducts a systematic literature review, applies two bibliometric techniques, co-citation and co-word analysis, to analyze the literature.
Grimaldi et al. (2022)	The study examines the relationship between crowdsourcing, production, and quality, aiming to understand how crowdsourcing impacts production processes and enhances product and process quality.	The study utilizes a systematic literature review approach to comprehensively analyze relevant articles in the field

As highlighted in the "Crowdsourced Innovation Report" of 2020, investigating the relationship between crowdsourcing and innovation management addresses a significant organizational inquiry of effectively leveraging crowdsourcing to enhance their innovation processes, while bridging the gap between two distinct research domains. Therefore, to offer a thorough perspective on the relationship between crowdsourcing and innovation, the current research study has formulated a first research question aimed at systematically examining the existing body of literature and its evolution over time.

Research Question (RQ1). What is the historical progression of scholarly literature regarding the relationship between crowdsourcing and innovation?

Furthermore, expanding on prior theoretical foundations that emphasize the significance of crowdsourcing as a means of creating organizational value (Schlagwein and Andersen, 2014; Ye and Kankanhalli, 2013; Xu et al., 2015; Devece et al., 2019; Mishra and Maheshwari, 2022) and democratizing the innovation process in the present era of the knowledge-driven economy (Qingliang et al., 2021), a second research question has been formulated to conduct a bibliometric meta-analysis. This analysis aims to systematically map the pertinent literature concerning different aspects of crowdsourcing and innovation.

Research Question (RQ2). What are the areas of study and research directions that have emerged from the intertwining of crowdsourcing and innovation literature?

Furthermore, a third research question has been formulated to identify potential research directions that can ultimately propel the field forward.

Research Question (RQ3). What novel research questions might open up additional avenues for advancing and expanding existing studies on these topics in the future?

The researchers utilized several analytical methods, including keyword co-occurrence analysis, thematic mapping, co-citation analysis, and keyword analysis, using R Software and VosViewer, to investigate their research questions. They conducted a thorough literature review from 2009 to 2023 and uncovered new research directions in the areas of crowdsourcing and innovation through these rigorous analyses.

2.2 Literature Review

2.2.1 Crowdsourcing

Crowdsourcing is a popular open innovation method where organizations, known as "seekers," share their internal challenges with a wider community of individuals outside the company, known as "crowds" or "solvers," who are asked to provide solutions (Ghezzi et al., 2018; Pollok et al., 2019). This strategy has proven to be efficient and reliable for finding practical and original solutions inside the innovation environment established by the company (Dahlander et al., 2019; Majchrzak & Malhotra, 2020). Organizations can guide the crowd's search efforts towards specific goals, including improving technological performance (Devece et al., 2019; Nevo and Kotlarsky, 2020) or discovering new markets or products (Schlagwein and Andersen, 2014; Fuller et al., 2021), by defining the issue area. Chesbrough (2003) introduced the notion of open innovation, which highlights the significance of incorporating external ideas and knowledge in the innovation process. This paradigm shift entails utilizing external information to improve internal innovation and utilizing external competences when commercializing internally created ideas (Chesbrough, 2003). Organizations are increasing their resource pool by utilizing external expertise, ideas, and labor for innovative activities through crowdsourcing (Chesbrough, 2003; Karachiwalla and Pinkow, 2021). Crowdsourcing, especially in idea creation, is a common method for open innovation (Pollock et al., 2019; Cricelli et al., 2022), where organizations use the collective intellect of the population to create innovative ideas.

2.2.2 Crowdsourcing in Innovation Research

Innovation, often viewed as a firm-level process, entails a proactive search for novel information and expertise to address current challenges and enhance performance (Gavetti et al., 2012; Singh et al., 2021). Companies explore challenging landscapes to find new and improved solutions, engaging in distant search to expand their knowledge limits and acquire new information, leading to adaptation, diversification, or reinvention (Lam et al., 2021; Hwang et al., 2023).

Crowdsourcing, functioning as an internet-based method, involves organizations sharing problem statements with an external group of contributors to gather diverse solutions (Afuah and Tucci, 2012; Nevo and Kotlarsky, 2020). By tapping into the collective intelligence of the population beyond their organizational boundaries, firms aim to discover new solutions, often at a lower cost than internal research and development activities (Vignieri, 2021). Crowdsourcing leverages the combined knowledge of external stakeholders, facilitating innovation by considering a wider array of options and speeding up the innovation process.

Scholars and researchers have recognized crowdsourcing as a transformative force in innovation management, prompting an exploration of its historical progression within scholarly literature. This change in viewpoint has resulted in a detailed analysis of how

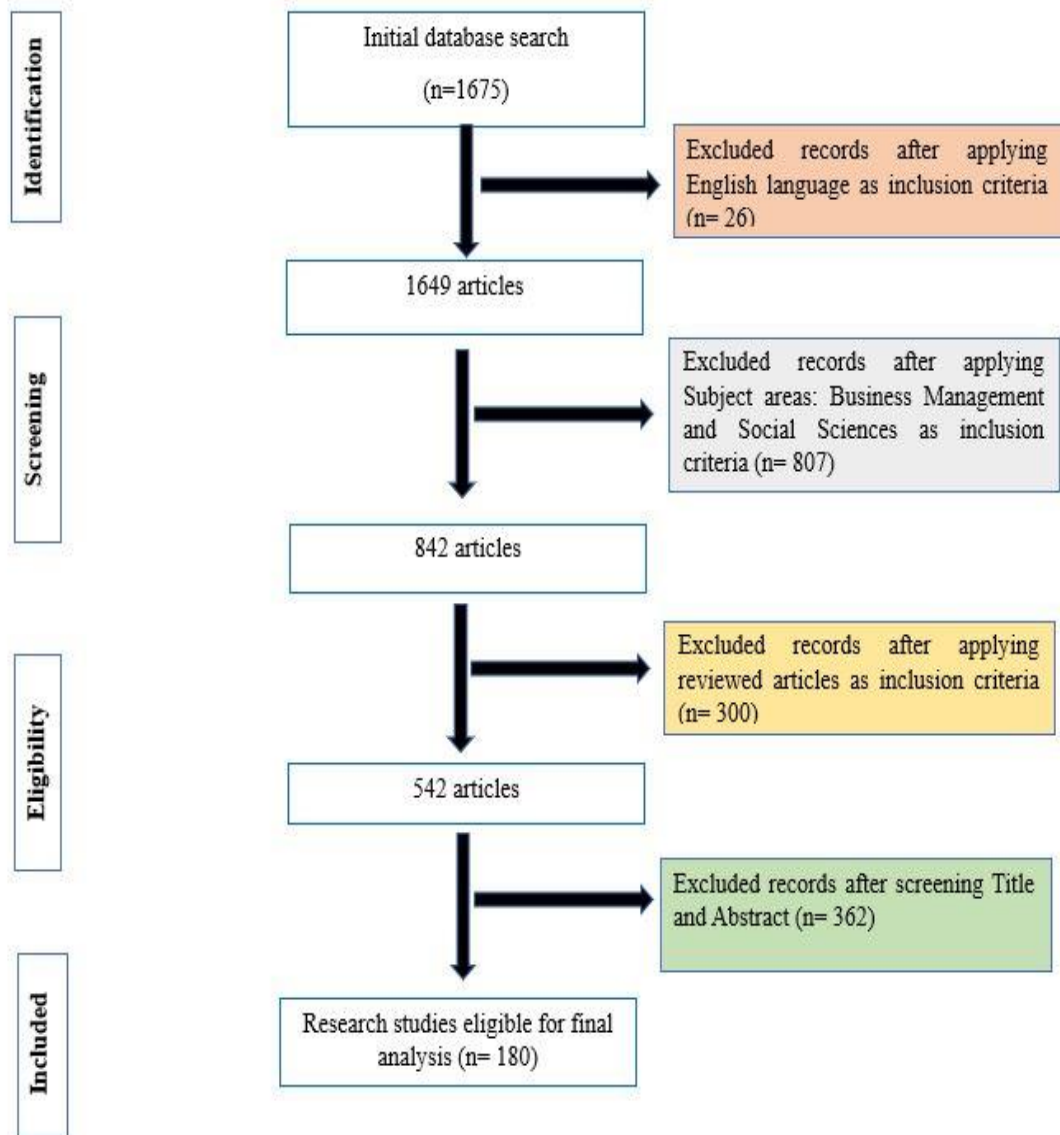
crowdsourcing has evolved over the years (RQ1). The strategic integration of crowdsourcing within the broader innovation context has highlighted the intertwined nature of these concepts, positioning crowdsourcing as a key strategy for innovation in contemporary organizations (Ghezzi et al., 2018). This research aims to unravel the relationship between crowdsourcing and innovation by employing rigorous bibliometric analysis techniques (RQ2), providing a comprehensive understanding of emergent areas of study and research directions within the intersection of crowdsourcing and innovation literature. Through the exploration of novel research questions (RQ3), this study seeks to advance and expand the current body of knowledge on crowdsourcing and innovation. By conducting an extensive bibliometric analysis, this study seeks to provide valuable insights into the past, present, and future of crowdsourcing in innovation research.

2.3 Research Methodology

2.3.1 Data Extraction

This section will explicate the methodology and exclusion criteria used to select and categorize the articles included in the bibliometric review database. To achieve this, we followed the approach developed by Moher et al. (2009) and employed the PRISMA flow diagram to illustrate the screened records and the criteria used to determine eligibility (**Figure 2.1**).

Figure 2.1: Schematic depiction of the article selection process



The data for this study was collected from Elsevier's Scopus database using a methodology that involved a systematic review of the literature for source selection, as described by Kraus et al. (2020) and Akbari et al. (2020). The selection of the Scopus database was based on several factors, including its high-quality standards, wide-ranging information coverage (encompassing over 1.8 billion cited references and 82 million documents), ease of data download, and exceptional coverage of journals focusing on business and management (Scopus, 2020).

In addition, the researchers opted for Scopus as the chosen database for this study due to its robust article cataloging methodology, which has been extensively utilized in numerous bibliometric literature reviews (Cricelli et al., 2022). To ensure comprehensive coverage of relevant publications in the field, the decision was made to include papers published until the start of 2023. Bibliometric reviews employ bibliographic elements to quantitatively analyze and identify patterns (Akbari et al., 2020), as well as potential research directions related to a particular topic.

2.3.2 Keywords and search results

A two-stage data extraction process was employed, in accordance with the methodology outlined by Bretas & Alon (2021). In the preliminary phase, a keyword-based search was carried out on the Scopus database in January 2023. The search utilized a combination of terms, including "crowdsourcing," "crowd-sourcing," and "crowd sourcing," as well as "innovation," "research and development," and "R&D." The Boolean OR and AND operators were employed to refine the search.

In the initial stage of the research, the researchers conducted a search of article titles and authors' keywords to identify relevant studies. Additional keywords discovered were incorporated into the subsequent round of keyword searching, resulting in a total of 1675 articles. For the second stage of data extraction, the search was narrowed down to publications written solely in English, resulting in a final sample size of 1649 articles. We did not impose any date limitations because our goal was to thoroughly analyze the literature on the connection between crowdsourcing and creativity. After that, we concentrated our research on the social sciences ($n = 842$) and business and management ($n = 842$). The second step of our process involved a thorough analysis of the papers. To ensure the reliability of our findings, we excluded conference proceedings and books from our list of information sources ($n = 542$). We meticulously scrutinized the titles and abstracts to ascertain the eligibility of the publications for analysis, eliminating any duplicate or irrelevant papers. Following the initial screening process, a total of 180 studies were chosen to conduct bibliometric analysis.

2.3.3 Analytical techniques and tool

The data extracted from Elsevier's Scopus database was analyzed using bibliometric software. VosViewer, in particular, was employed to examine the relationships between citations and keywords and to generate visual representations of these connections in the form of maps and networks. The data was exported from Scopus and processed in accordance with the methodology outlined by Van Eck & Waltman (2010). Moreover, the mapping of the bibliometric data was carried out using the Bibliometrix® R Software tool created by Aria and Cuccurullo (2017).

Co-citation Analysis

Levine and Gil (2021) posit that scientific papers are not independent but rather are interlinked with the pre-existing body of literature within their respective fields. Citations play a crucial role in supporting statements in research articles, while the reference list is essential for situating the research. According to Abdoulmajid (2022), a citation possesses significance that goes beyond being a simple bibliographic reference included in a document or obtained from a citation index. Dzikowski (2018) emphasizes that co-citation analysis is a methodology that explores articles, journals, and authors to create a comprehensive representation of published data. Akbari et al. (2020) further acknowledge that this method is widely recognized as the principal relational approach in bibliometric research. It plays a crucial role in identifying research clusters, as well as advancements and developments in scientific domains.

Keyword Co-occurrence analysis

In order to investigate the conceptual framework of the subject area, a co-occurrence keyword analysis was performed using the methodology proposed by McAllister et al. (2022). In this study, bibliometric networks were clustered and mapped using VOSviewer software. Clusters are generated through the identification of keywords that exhibit a high degree of co-occurrence, thereby facilitating the identification of distinct research domains within the broader topic. The network that is produced is depicted as a visual representation, in which nodes (also known as keywords) are differentiated in size according to their frequency of appearance, and are colored to indicate their affiliation with different clusters.

Thematic Mapping

A conceptual thematic map has been developed to facilitate the analysis of various themes in the field based on their placement in quadrants, namely basic themes, motor themes, niche themes, and emerging or disappearing themes. The objective of this approach is to enhance our comprehension of the conceptual framework within the field. Cobo et al. (2011) have defined conceptual thematic maps as a process of clustering that facilitates the identification of subgroups of keywords that are closely related. The aforementioned subgroups are representative of focal points of interest or research issues that garner significant attention and resources from scholars. In order to enhance the precision of our analysis, we employ Callon's density and centrality metrics to group the identified themes. The concept of centrality pertains to the degree of interconnectivity that exists between a given network and other networks, as posited by Callon et al. (1991). The statement pertains to the quantification of the potency of extrinsic linkages with other themes. According to Cobo et al. (2011), the measure can be utilized to assess the significance of a theme in the overall advancement of the research field. On the other hand, Callon et al. (1991) suggest that the concept of density acts as an indicator of the level of internal cohesion within a given network. The aforementioned metric serves as an indicator of the robustness of the

interrelationships between various terminologies associated with the research topic, thereby serving as a substitute for gauging the advancement and evolution of the said theme.

2.4 Descriptive analysis of systematic review

In this section, we will present the results of our analysis, which are divided into different subsections that cover various topics. These topics include the annual publication count, keyword co-occurrence analysis, and document co-citation analysis.

2.4.1 Bibliometrics Analysis of Publication

The sample used in this study consisted of 180 articles (as shown in Table 2.2), which were authored by 420 individuals and were published in 118 different journals. On average, each document was cited 41 times. The progression of the field, in terms of publication volume, is illustrated in Figure 2.2. Through a bibliometric literature review, it becomes evident that research on crowdsourcing and innovation began to emerge around 2009. This observation aligns with previous studies (Pavlidou et al., 2020) that highlight the coincidence between the research's inception in 2009 and the establishment of three influential platforms: Amazon Mechanical Turk (launched in 2005), Innocentive (founded in 2001), and 99designs (established in 2008). Additionally, Pavlidou et al. (2020) highlight that the initial studies in each category emerged around five years after the platforms' establishment, coinciding with their substantial growth and increased recognition among the public. Similarly, Cricelli et al. (2022) mention that the exploration of crowdsourcing as a subject commenced in 2009, coinciding with its initial publications.

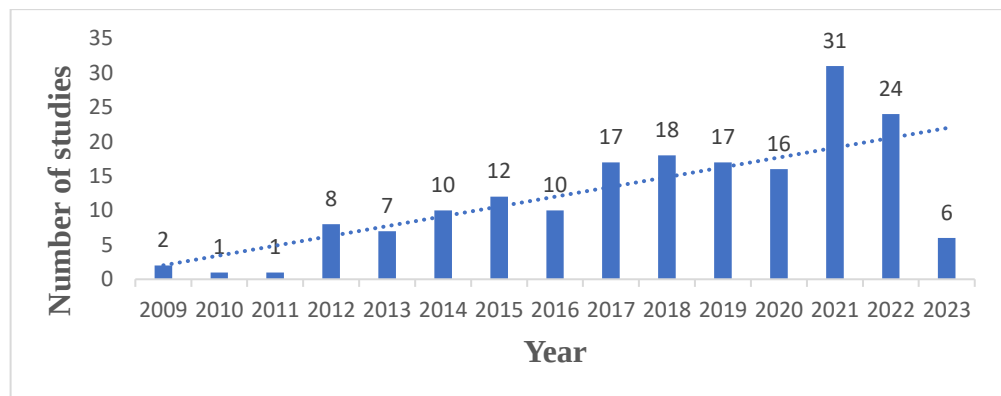
The body of literature in the field has exhibited a steady growth trajectory since 2014, experiencing a notable five-fold increase in the number of publications compared to the preceding year. Particularly, the years 2021 and 2022 emerged as the most prolific, witnessing the publication of 55 articles in the field. However, the investigation of this subject area dates back to 2009, when Leimeister et al. (2009) examined crowdsourcing as a business model that utilizes both internal and external knowledge to promote innovation. Since then, the study in this domain has flourished, as demonstrated by the increase in publications, reaching its pinnacle in 2021 with a total of 31 articles. Despite the advancements made in this area of research, three articles continue to be the most frequently cited works: Estelles-Arolas & De-Guevara (2012) with 1107 citations, Bayus (2013) with 612 citations, and Leimeister et al. (2009) with 578 citations.

Table 2.2: Main information about data

Description	Results
Timespan	2009:2023
Documents	180
Sources (Journals, Books, etc)	118
Author's Keywords (DE)	553
Keywords Plus (ID)	515
Average citations per doc	41.24
Authors	420
Single-authored docs	30

Source: R Software– Author's Elaboration.

Figure 2.2: Number of publications per year

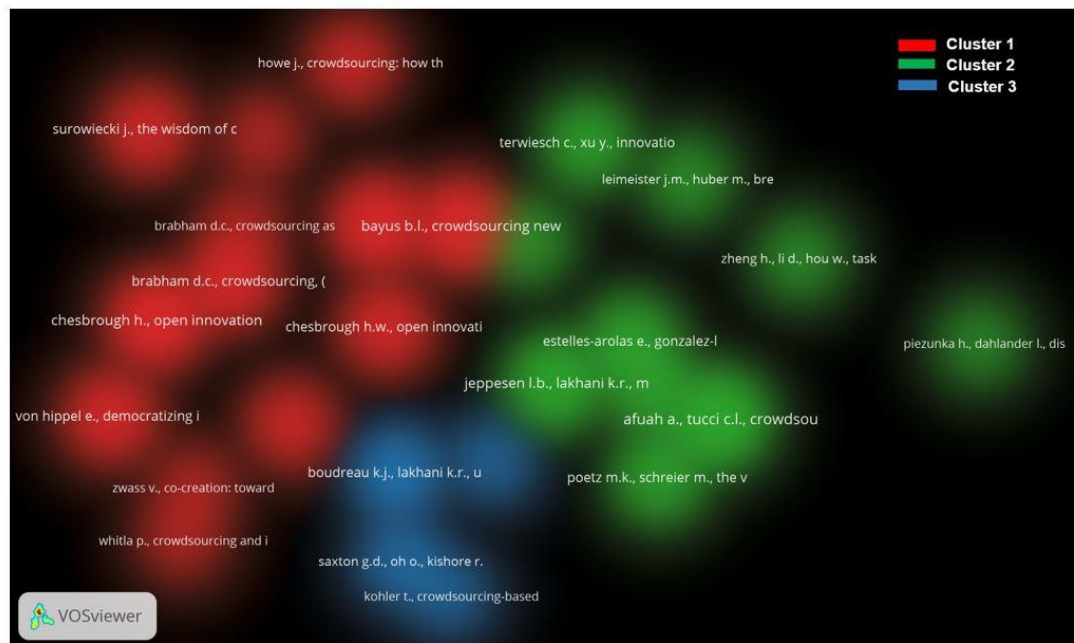


Source: Author's Elaboration

2.4.2 Co-citation analysis

The present study utilized the methodology proposed by Akbari et al. (2020) to conduct a co-citation analysis of scholarly articles. The objective was to identify clusters of co-citations that pertain to the domains of crowdsourcing and innovation. Figure 3 presents a visualization of the co-cited references. Through the utilization of VosViewer, three discrete clusters were identified and visually represented by distinct colors in the accompanying figure. The network depicted in **Figure 2.3** is readily comprehensible, as it consists of three distinct clusters which are interconnected via the central publication authored by Bayus (2013). In the following sections, we will provide a succinct overview of each cluster.

Figure 2.3: Document co-citation network for crowdsourcing-related innovation research



Source: VOSviewer – Author’s Elaboration

Cluster #1: Crowdsourcing as a Source of organizational innovation

After examining the articles in cluster 1, it was determined that the primary focus of crowdsourcing is its potential for both Schumpeterian (radical) and incremental (continuous) innovation. This cluster is particularly significant as it contains publications that delve into how the innovativeness of products and services impacts crowdsourcing outcomes. Xu et al. (2015) outline two dimensions of innovativeness that organizations overlook to obtain better performance: continuous innovation and Schumpeterian innovation. The former refers to a lower degree of novelty and involves the incremental enhancement of existing knowledge, capabilities, and technology. In contrast, radical innovation involves more significant, and unique innovations. The researchers have demonstrated that companies that utilize crowdsourcing to gather customer knowledge and convert it into innovative capabilities can achieve superior performance.

A significant theme that has emerged from the examination of literature within this cluster pertains to the association between crowdsourcing and innovation. This relationship can be approached from two distinct perspectives: firstly, crowdsourcing as a method for problem-solving (Brabham, 2008) within an organization's innovation-driven projects, and secondly, crowdsourcing as a mechanism for facilitating crowd involvement in the innovation process (Bayus, 2013). As noted by Whitla (2009) and Zwass (2010), the interaction between organizations and crowds can foster the development of novel and innovative ideas and, therefore, enhance the outcome of the innovation process. While knowledge typically spreads from the crowd to organizations, it can also go the other way, with organizations sharing knowledge with the crowd. According to existing research (Von Hippel, 2009), the managerial skills of innovative companies are crucial for ensuring effective communication during a crowdsourcing campaign. The authors highlight the importance of these competencies in establishing a solid social connection between the organization and various stakeholders.

Organizations' ability to transfer knowledge to the crowd and absorptive capacity is a critical competence, as it allows them to evaluate their managerial competencies when making an open call for sourcing innovative ideas or product development. This evaluation, in turn, helps organizations determine their capacity to deliver the promised product and services within the crowdsourcing initiative (Howe, 2008) and to increase the demand for the latest products. Nonetheless, disseminating information in this manner poses a risk, as organizations may be unable to handle the overwhelming amount of feedback from the crowd effectively. The sheer volume of information can become overwhelming, making it impractical for organizations to dedicate extensive time to engaging with the crowd. This can result in a slowdown of organizational activities (Enkel et al., 2009). Nevertheless, disregarding feedback from the crowd can yield unfavorable outcomes, as it may lead to detrimental effects on the organization's reputation due to the crowd's negative perception of the project. This can result in negative online reviews and posts that could harm the organization's reputation. To sum up, crowdsourcing goes beyond an organization's problem-solving and also involves the crowd's active participation in the innovation process.

Cluster #2: Crowdsourcing-based social capital and organizational value co-creation

The corpus of literature presented herein centers on the subject of openness and its impact on innovation in crowdsourcing initiatives. According to Afuah & Tucci (2012), the involvement of multiple stakeholders in a collaborative manner is crucial for the success of innovative projects in crowdsourcing. Crowdsourcing platforms function as intermediaries that enable interaction and the recognition of collaborative prospects between crowds and organizations, ultimately leading to improved organizational performance. Crowdsourcing can be considered a manifestation of the open innovation paradigm due to its tendency to seek external ideas, as noted by

Cricelli et al. (2022). The concept of open innovation enables organizations to utilize ideas from external stakeholders to facilitate the development of novel products and, significantly, to foster innovation processes (Poetz & Schreier, 2012). Leimeister's (2009) study investigates the effects of open search depth and breadth on the innovative capabilities of organizations. The results of their study suggest that an increase in open search depth has a positive impact on the performance of the product market. Additionally, an increase in open search breadth tends to promote a concentration on radical innovation. The extant body of literature posits that the practice of open search, which involves actively seeking ideas from external sources, is especially advantageous during the initial phases of product development. This is because the amalgamation or recombination of varied external ideas can yield innovative insights for the organization. According to Bayus (2013), individuals who participate in crowdsourcing often value the opportunity to contribute to the early stages of product development and engage in the entirety of the innovation process. Additionally, academics highlight the importance of direct communication between the innovative organization and the crowd as a social advantage in promoting early-stage innovations, which fosters a desire for crowd participation (Zheng et al., 2011; D'Arrigo & Fachinelli, 2017).

Moreover, several articles in this collection explore how knowledge creation and social capital contribute to the success of crowdsourcing. Crowdsourcing platforms serve as hubs for social connections, allowing organizations to tap into the social capital of participants. Scholars highly value social capital, which refers to the resources present within the network of relationships of an individual or social unit (Nahapiet & Ghoshal, 1998). It plays a crucial role in reducing uncertainty during decision-making processes (Chiu et al., 2014) and influencing crowdsourcing outcomes by fostering innovation (Lüttgens et al., 2014). In the context of online communities, Leckel et al. (2022) explore the significance of social ties established during previous crowdsourcing initiatives and find that the social resources acquired have a significant impact on future outcomes. Furthermore, Bagherzadeh et al. (2019) argue that organizations' social networks facilitate knowledge creation and innovation.

Cluster #3: Crowdsourcing platform for organization-crowd engagement

After analyzing the publications that are categorized under Cluster 3, it is evident that a considerable number of articles underscore the importance of platforms in attaining favorable outcomes in crowdsourcing initiatives (Blohm et al., 2018). The role of platforms in crowdsourcing is crucial as they act as intermediaries between organizations and stakeholders due to the close association between crowdsourcing and social networking (Marjanovic et al., 2012). According to Vignieri (2021), crowdsourcing platforms have been categorized by academic experts as two-sided markets that function as intermediaries between crowds and organizations, resulting in network effects for both parties. The utilization of crowdsourcing platforms that attract a significant number of contributors benefits organizations, while diverse stakeholders

benefit from platforms with a high number of propositions, increasing the probability of finding products and services that align with their preferences.

Several crowdsourcing platforms have surfaced in recent times, including Innocentive, Amazon Mechanical Turk, and 99Designs. The objective of these platforms is to facilitate the acquisition of varied knowledge and expertise by organizations to bolster innovative projects. The roles and functions of the crowd in crowdsourcing platforms are analyzed by Boudreau & Lakhani (2013). The results of their study indicate that both the crowd and organizations exhibit a greater inclination towards leveraging novel technological platforms as a means of gaining a competitive edge, as opposed to placing exclusive emphasis on the substance of the crowdsourcing endeavor.

Kohler (2015) posits that innovative platforms play a crucial role in the triumph of crowdsourcing initiatives by promoting learning and generating interest in novel products and services through the interactions among the participants. Furthermore, the architecture of crowdsourcing platforms facilitates the understanding of messages by the crowd and enables them to undertake actions to provide assistance to projects through the utilization of IT capabilities that are specific to the platform (Saxton et al., 2013). The proposition put forth by the authors suggests that the utilization of crowdsourcing platforms may enhance the probability of achieving project success and effectively tackle concerns pertaining to asymmetric information.

In contemporary times, the employment of social media platforms has gained significance in the evaluation of the effectiveness of crowdsourcing endeavors (Župič, 2013), owing to the growing digitalization and interconnectivity of the environment. The premise that is being posited is that social media platforms aid organizations in forging novel connections. According to Yang's (2021) findings, a greater quantity of social network friends, including those on Facebook, Twitter, or Instagram, is linked to the favorable outcomes of crowdsourcing endeavors. This is due to the heightened likelihood of obtaining external ideas and a decrease in uncertainty. The utilization of social media has brought about a significant transformation in the conventional method of disseminating information, leading to the adoption of a more participatory approach in the information process (Yang & Hang, 2021). The intrinsic characteristics of social networks, such as their capacity to enable communication among extensive user communities, have significantly eased the process of information propagation and knowledge exchange.

Crowdsourcing platforms aim to effectively manage the considerable network effects that arise from this phenomenon, with the ultimate goal of generating value for the platform, the crowd, and the organizations participating in crowdsourcing activities (Gao et al., 2021). The extant literature posits that crowdsourcing platforms function as social network hubs that facilitate the development and augmentation of structural,

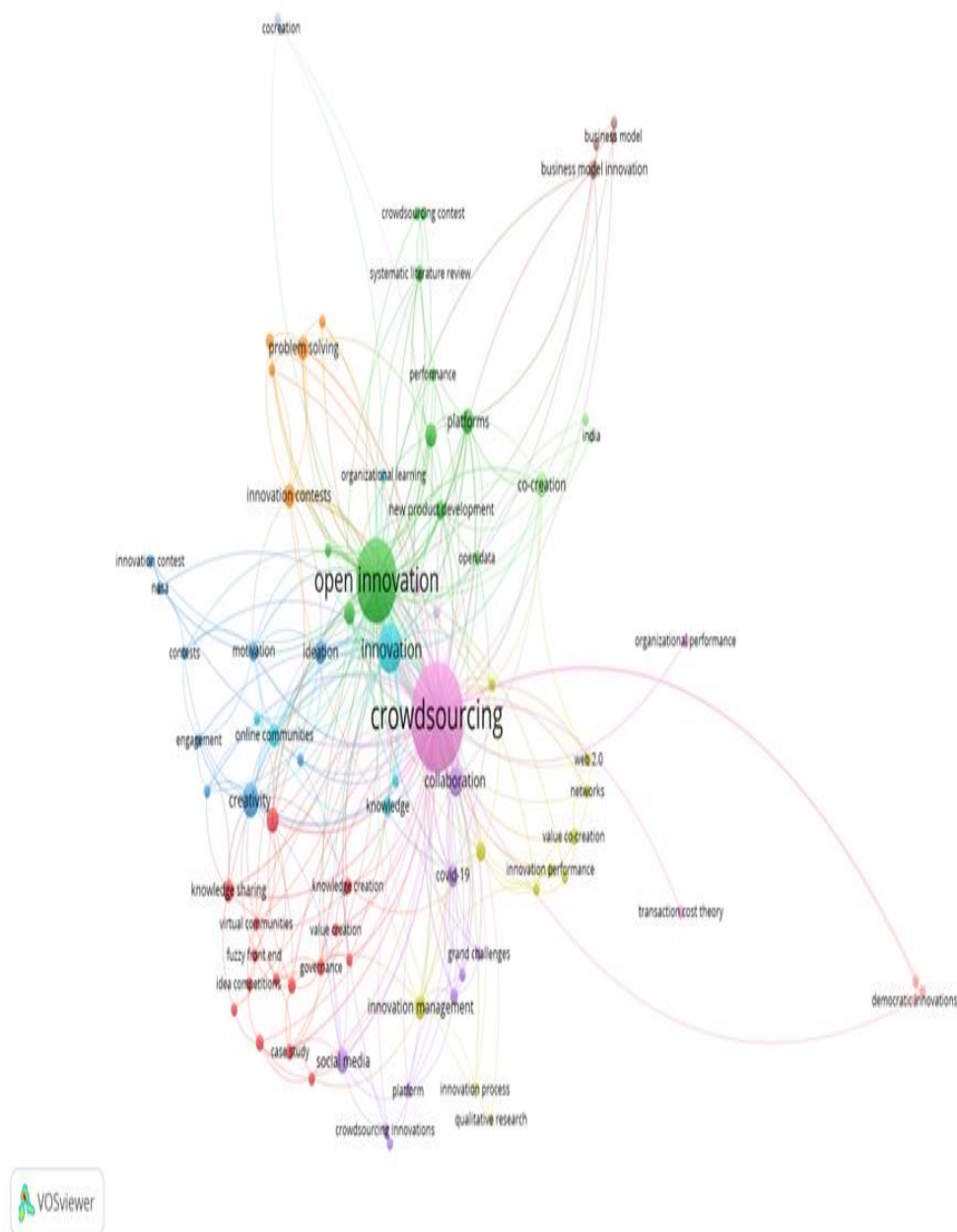
cognitive, and relational capital value for diverse users. This is achieved while also mitigating the adverse consequences of information dissemination on social media, such as the propagation of misinformation. This is supported by the works of Yang & Hang (2021) and Leckel et al. (2022).

2.4.3 Keyword Co-occurrence analysis

The analysis has been conducted on publications pertaining to crowdsourcing and innovation, with a focus on keyword trends dating back to 2009. In Figure 2.4, the underlying structure of co-occurrence network of keyword is depicted, with a specific focus on articles that exhibit at least 7 instances of keyword occurrences. VosViewer was employed to classify the keywords into 7 distinct clusters, as outlined in Table 2.3. The prominence of recurring themes in the sample is indicated by the largest nodes, which represent "crowdsourcing" and "open innovation," as shown in **Figure 2.4**.

The *first cluster*, encompassing keywords such as enterprise crowdsourcing, crowdsourcing platform, fuzzy front end, governance, idea generation, innovation culture, innovation strategy, internal crowdsourcing, knowledge creation, knowledge sharing, value creation, virtual communities, and organizational performance, pertains to the theme of "Crowdsourcing and Organizational Innovation". The *second cluster* centers around keywords associated with "Crowdsourcing and Open Innovation." The *third cluster* comprises keywords such as user innovation, technological innovation, ideation, innovation contest, and creativity, forming the theme of "Crowdsourcing and Technological Innovation." The *fourth cluster* highlights "Crowdsourcing and Value Creation" and includes keywords like social capital, value co-creation, and learning. The subsequent cluster encompasses keywords related to the intersection of crowdsourcing, social media, and innovation. The *sixth cluster* delves into concepts such as knowledge transfer and absorptive capacity, primarily addressing "Crowdsourcing and Organizational Learning". The last cluster primarily relates to "Crowdsourcing and its Application" and features keywords such as broadcast search, product innovation, and problem-solving.

Figure 2.4: Keywords in the crowdsourcing and innovation co-occurrence network



Source: VOSviewer – Author’s Elaboration

Table 2.3: Co-occurrence of keywords and the central topic identified in each cluster

Cluster	Topic and Keywords
Cluster 1	TOPIC: CROWDSOURCING AND ORGANIZATIONAL INNOVATION 14 items: enterprise crowdsourcing, crowdsourcing platform, fuzzy front end, governance, idea generation, innovation culture, innovation strategy, internal crowdsourcing, knowledge creation, knowledge sharing, value creation, virtual communities, organizational performance
Cluster 2	TOPIC: CROWDSOURCING AND OPEN INNOVATION 10 items: collective intelligence, crowdsourcing contest, crowdsourcing design, innovation tournaments, new product development, open data, open innovation performance, platforms
Cluster 3	TOPIC: CROWDSOURCING AND TECHNOLOGICAL INNOVATION 9 items: innovation contest, creativity, engagement, ideation, knowledge communities, user innovation, industry 4.0, motivation, technological innovation
Cluster 4	TOPIC: CROWDSOURCING AND VALUE CREATION 9 items: innovation management, social capital, value co-creation, web 2.0, innovation performance, knowledge management, networks, learning, online community
Cluster 5	TOPIC: CROWDSOURCING, SOCIAL MEDIA AND INNOVATION 8 items: collaboration, crowdsourcing innovation, grand challenges, social media, platform, innovation process , uncertainty reduction theory, business model
Cluster 6	TOPIC: CROWDSOURCING AND ORGANIZATIONAL LEARNING 7 items: knowledge transfer, company sustainable growth, organizational learning, absorptive capacity, transaction cost theory, co-creation, organizational performance
Cluster 7	TOPIC: CROWDSOURCING AND ITS APPLICATION 7 items: broadcast search, outside in innovation, innovation intermediary, problem solving, product innovation, idea generation, wisdom of crowd

Source: Author's Elaboration

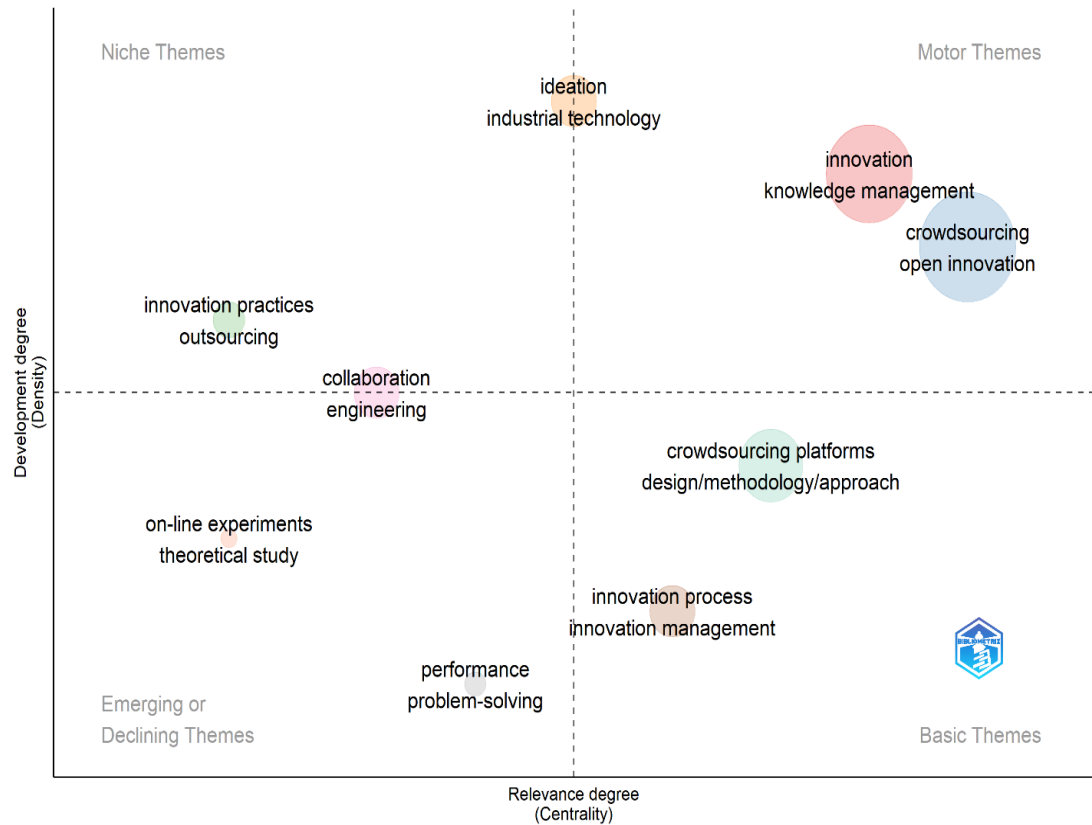
2.4.4 Thematic Mapping

The examination of keywords that appear together enables the detection of thematic groupings, which can be categorized and visualized in a multifaceted thematic map (**Figure 2.5**). In order to ensure the strength and reliability of the analysis, only keywords that had a minimum frequency of three occurrences were incorporated. Cobo et al. (2011) have classified the thematic map into four quadrants based on the density of themes' internal associations and their centrality in external associations.

The first quadrant encompasses motor themes that exhibit strong internal and external associations and have been recognized as mainstream in the literature. In quadrant type 1, the central theme is knowledge management in crowdsourcing-driven innovation, with a focus on minimizing information asymmetry within companies and its beneficial effects on developing unique learning competencies, resulting in enhanced innovation performance. Quadrant type 2, characterized by high centrality and low density, includes fundamental and cross-cutting subjects such as innovation processes, crowdsourcing platforms, and innovation management. The central theme, crowdsourcing platforms, is closely associated with other general topics like innovation process and management. Crowdsourcing platforms serve as essential tools for facilitating crowd-firm engagement in the innovation process, enabling rapid idea generation, and obtaining diverse feedback to gain a competitive advantage.

On the other hand, quadrant type 4 represents weakly developed or emerging themes with low density and low centrality. In this area, there is ongoing exploration of the concept of theoretical study on online experiments and problem-solving performance. This presents opportunities for future research to delve into conducting online experimental studies on crowdsourcing and evaluating the impact of crowdsourcing-based problem solving on organizational performance. In quadrant type 3, which exhibits low centrality and high density, the articles concentrate on specialized and niche themes, particularly innovation practices. These themes have limited importance outside of their specific research area and demonstrate a higher density of internal associations. Overall, the co-words analysis and the thematic map provide insights into the classification and distribution of themes in the literature, highlighting both well-established and emerging research areas in the field of crowdsourcing and innovation.

Figure 2.5: Thematic Mapping of clusters



Source: R Software- Author's Elaboration

2.5 Discussion

The bibliometric analysis conducted in this study provides a comprehensive overview of the scholarly discourse on crowdsourcing and innovation, offering valuable insights into the historical progression, thematic trends, and research directions within the field.

Our analysis revealed a notable increase in scholarly interest in crowdsourcing and innovation (RQ1) since around 2009, coinciding with the emergence and growth of influential crowdsourcing platforms such as Amazon Mechanical Turk, Innocentive, and 99designs. This observation aligns with previous studies highlighting the correlation between the inception of these platforms and the surge in scholarly publications in the field. Moreover, the steady growth trajectory of crowdsourcing research since 2014 underscores the sustained relevance and importance of

crowdsourcing as a strategy for driving innovation in organizations. By tracing the historical evolution of crowdsourcing research, scholars can gain valuable insights into the factors shaping the field and identify key milestones in its development.

The co-citation analysis revealed three distinct clusters of research themes within the crowdsourcing literature (RQ2), each highlighting different aspects of the relationship between crowdsourcing and innovation. Cluster 1 focuses on crowdsourcing as a source of organizational innovation, emphasizing its potential for both radical and incremental innovation. This cluster underscores the importance of leveraging crowdsourcing platforms to solicit innovative ideas from external stakeholders and fostering collaboration between organizations and crowds. In contrast, Cluster 2 emphasizes the role of social capital and value co-creation in crowdsourcing initiatives, highlighting the significance of building strong relationships and networks among participants. Finally, Cluster 3 explores the role of crowdsourcing platforms in facilitating organization-crowd engagement, underscoring the importance of intermediary platforms in driving successful crowdsourcing initiatives. By categorizing research themes into distinct clusters, scholars can identify key areas of focus within the crowdsourcing literature and explore the underlying mechanisms driving innovation in organizational settings.

The thematic mapping analysis identified several areas for future research within the crowdsourcing and innovation domain (RQ3). Quadrant type 1, characterized by strong internal and external associations, represents mainstream research themes such as knowledge management and innovation processes. Quadrant type 3, on the other hand, highlights niche research areas with high internal density but low centrality, suggesting opportunities for further exploration of specialized topics such as innovation practices and online experiments. By identifying gaps and opportunities in the existing literature, scholars can contribute to the advancement of theoretical frameworks and empirical research in the field of crowdsourcing and innovation.

2.6 Implications of Research

The implications of this research extend beyond its immediate findings, offering valuable insights for both theoretical advancement and practical application. Theoretical implications delve into the deeper understanding of crowdsourcing within innovation management, providing insights into its historical evolution, conceptual frameworks, and emerging trends. Meanwhile, managerial implications provide actionable guidance for organizations seeking to leverage crowdsourcing as a strategic tool to drive innovation and enhance competitive advantage. By exploring both theoretical and managerial dimensions, this study contributes to a more comprehensive understanding of crowdsourcing's role in shaping innovation processes and outcomes.

2.6.1 Theoretical Implications

The theoretical implications of the study contribute to a deeper understanding of crowdsourcing as a strategic tool for innovation management. By systematically addressing the research questions and employing robust bibliometric analysis techniques, the study advances our theoretical understanding of crowdsourcing within the broader context of innovation management, offering valuable insights for both scholars and practitioners in the field. Firstly, the study offers insights into the historical progression of crowdsourcing within the context of innovation management, addressing Research Question 1 (RQ1). By examining the development of crowdsourcing literature over time, the research provides a thorough understanding of how the concept has evolved and been conceptualized within scholarly discourse. This contributes to the broader body of knowledge on open innovation and highlights the intertwined nature of crowdsourcing and innovation.

Secondly, the research employs rigorous bibliometric analysis techniques to explore the relationship between crowdsourcing and innovation, addressing Research Question 2 (RQ2). Through co-citation and keyword co-occurrence analyses, the study identifies key themes and research clusters within the literature, providing a comprehensive overview of emergent areas of study and research directions. This contributes to the theoretical understanding of crowdsourcing as a transformative force in innovation management, positioning it as a key strategy for driving organizational performance in contemporary settings. Thirdly, the research advances novel research questions (RQ3) within the intersection of crowdsourcing and innovation literature, providing valuable insights into emerging trends and future research directions. By identifying themes such as crowdsourcing platforms, organizational learning, and value creation, the study highlights potential areas for further exploration and theoretical development. This extends the theoretical boundaries of existing literature and opens up new avenues for future research in the field of crowdsourcing and innovation management.

2.6.2 Managerial Implications

The findings of this research hold several important implications for managers seeking to leverage crowdsourcing for innovation within their organizations. Firstly, the strategic integration of crowdsourcing into innovation processes can significantly enhance organizational performance. By tapping into external talent pools through platforms like InnoCentive or 99designs, companies can access a diverse range of perspectives and expertise, accelerating the generation of innovative ideas and solutions. This aligns with the findings of Boudreau and Lakhani (2013), who emphasize the role of crowdsourcing in facilitating crowd-firm engagement and driving innovation. Secondly, crowdsourcing initiatives can foster a culture of open innovation and knowledge sharing within organizations. By actively soliciting ideas from external sources and engaging with the crowd, companies can enhance their learning capabilities and expand their knowledge base. Leckel et al. (2022)

demonstrate the impact of social resources acquired through crowdsourcing on future outcomes, highlighting the importance of collaboration with external stakeholders in driving innovation success. Thirdly, crowdsourcing platforms can help mitigate information asymmetry and reduce uncertainty in decision-making processes. By leveraging the collective intelligence of the crowd, organizations can gain valuable insights into customer preferences, market trends, and emerging technologies. This enables more informed decision-making and reduces the risk of failure in innovation projects.

Kohler (2015) suggests that crowdsourcing platforms play a crucial role in facilitating communication and collaboration among participants, ultimately leading to more successful innovation outcomes. Finally, crowdsourcing initiatives can help build social capital and strengthen relationships with external stakeholders. By fostering a sense of community around innovation projects, organizations can cultivate long-term partnerships and loyalty among key contributors. Mishra and Maheshwari (2022) highlight the importance of social capital in reducing uncertainty and influencing crowdsourcing outcomes, suggesting that managers can invest in building relationships with key stakeholders to encourage continued participation. The managerial implications underscore the strategic importance of crowdsourcing in driving innovation and enhancing organizational performance. By embracing crowdsourcing as a key component of their innovation strategy, managers can position their companies for success in dynamic and competitive business environment.

2.7 Future Research Avenues

The main objective of this study was to carry out a thorough and comprehensive bibliometric analysis, mapping the body of knowledge and promising research directions at the nexus of crowdsourcing and innovation research disciplines. Through the analysis of 180 articles, we aimed to comprehend the theoretical underpinnings and intellectual framework of this area while critically examining the ways in which crowdsourcing can foster innovation and the ways in which crowdsourcing platforms can profit from it. We used a qualitative review of the literature to answer our third research question as part of our investigation. For each separate cluster, we identified and enumerated potential areas for further research while also taking into account additional information from the content analysis of other articles in our sample. In the end, we combined 18 research topics (Table 2.4, 2.5, 2.6) into three study clusters, indicating possible directions for further investigation.

Despite the considerable expansion of literature on crowdsourcing and innovation, there remains a need for further studies that delve into interconnected concepts. In our study, we aimed to address this gap by generating a comprehensive list of future research opportunities. The compilation of this list was formulated by considering the clusters identified through the bibliometric analysis and the insights extracted from the

content analysis of the articles included in our sample. For each cluster, we discuss potential directions for future research, highlighting areas where advancements can be made.

Table 2.4: Proposed research questions related to Cluster 1
Crowdsourcing as a Source of organizational innovation

Research Questions derived from the Literature	Suggested research directions
[1] What are the enduring effects of gathering external knowledge sources through crowdsourcing on organizational innovation over a prolonged period? [2] Scholars could explore how different external knowledge sources contribute to enterprise strategies and goals, such as reducing in-house operational costs and enhancing the quality of existing goods and services. [3] Future studies can investigate the extent to which crowdsourcing fosters innovation growth in terms of both the number and diversity of innovations.	[1] Researchers have the opportunity to investigate how crowdsourcing influences innovation in diverse organizational contexts, specifically exploring the impact of the wisdom-of-the-crowd effect on innovation within MNEs, startups, and SMEs,. [2] There is potential for future academic research to analyze how the interactions between organizations and crowds can impact innovation within organizations. Although some research has examined their effect on crowdsourcing initiative success, there is a lack of analysis on the actual interactions between the two parties and their impact on innovation. [3] Future research endeavors could aim to explore whether crowdsourcing has a greater influence on Schumpeterian innovation or continuous innovation.

Source: Author's Elaboration

Cluster 1 of the research analysis focuses on the relationship between crowdsourcing and innovation. The articles explore how crowdsourcing can facilitate both radical and incremental innovation. Companies that leverage crowdsourcing to gather customer knowledge and convert it into innovative capabilities can achieve superior performance. Crowdsourcing can be approached as a method for problem-solving within innovation projects or as a mechanism for involving the crowd in the innovation

process. The interaction between organizations and the crowd can foster the development of innovative ideas. Effective communication and managerial skills are crucial for establishing a strong connection between organizations and stakeholders. Organizations' ability to transfer knowledge to the crowd and their absorptive capacity plays a significant role in evaluating their managerial competencies and delivering promised products/services. But the question remains still unanswered on the long time impact of acquiring external knowledge through crowdsourcing on organizational innovation. Future scholars can examine the specific ways in which different external knowledge sources contribute to enterprise strategies and goals, such as cost reduction and improving the quality of products and services.

Furthermore, future studies can delve into the extent to which crowdsourcing facilitates the growth of innovation in terms of both the quantity and diversity of innovations. While crowdsourcing is frequently thought of as a way for start-ups to access a variety of knowledge and expertise, other kinds of organizations are now using it to increase the chances that their innovative projects will succeed. Small and medium-sized businesses (SMEs) or multinational enterprises (MNEs) may use crowdsourcing to address uncertainties regarding aggregate demand and minimize risks associated with their initiatives or go-to-market strategies, whereas startups frequently use it due to a lack of expertise.

Therefore, there is an avenue for future researchers to explore how crowdsourcing affects innovation in different organizational settings, particularly the role of the wisdom-of-crowd effect in driving innovation for startups, SMEs, and MNEs. Additionally, our content analysis of the literature has uncovered the crucial function of crowdsourcing in enabling the exchange of information between organizations and the crowd. This bidirectional flow of information stimulates feedback in the form of ideas from the crowd to organizations. The involvement of a larger crowd brings in more information, expertise, and resources, which contribute to innovation development. This highlights the importance of studying the interactions between organizations and crowds and their impact on organizational innovation. While some studies have examined the influence of these interactions on the success of crowdsourcing initiatives, further analysis is needed to understand the actual dynamics and their effects on innovation. Additionally, future research can explore whether crowdsourcing has a stronger influence on Schumpeterian innovation or continuous innovation, providing insights into the specific types of innovation that are more likely to be fostered through crowdsourcing.

Table 2.5: Proposed research questions for related to Cluster 2
Crowdsourcing-based social capital and organizational value creation

Research Questions derived from the Literature	Suggested research directions
[1] Researchers have the opportunity to investigate how the connections between organization-crowd impact their ability to drive innovation. More specifically, by utilizing network theory, researchers can analyze how network structures, such as structural holes, centrality, and tie strengths, influence the level of innovation achieved. [2] Future researchers could enhance understanding of value creation by undertaking a comprehensive examination of the characteristics exhibited by a seeker company, platform designs, and crowd contributors. Additionally, exploring the interplay between these characteristics will provide valuable insights into the mechanisms that drive value creation. [3] Future research could examine the dimensions of social capital (such as trust, reciprocity, and network density) that exert the greatest influence on value creation in crowdsourcing contexts.	[1] Academics may research the significance of social connections established in online crowdsourcing communities. One area that researchers may be interested in exploring is examining the contents of crowds to assess the importance of their expertise in the innovation process. [2] Future researchers might study the strategies that organizations can utilize to promote and nurture social capital among crowd contributors. This exploration aims to enhance the process of value creation within crowdsourcing initiatives. [3] Scholars could explore the mechanisms by which diversity among crowd contributors affects the value creation process in crowdsourcing projects.

Source: Author's Elaboration

Cluster 2 identified through the bibliometric analysis, focuses on the connection between crowdsourcing-based social capital formed and value creation. It highlights the importance of involving multiple stakeholders in a collaborative manner for successful innovation. Crowdsourcing platforms serve as intermediaries that facilitate interaction and collaboration between organizations and the crowd, leading to improved organizational performance. Crowdsourcing is considered a manifestation of the open innovation paradigm, as it seeks external ideas to drive product development and foster innovation processes. Research suggests that open search, actively seeking ideas from external sources, positively impacts product market performance and promotes radical innovation. The early stages of product

development are particularly advantageous for open search, as the combination of diverse external ideas generates innovative insights. Communication between organizations and the crowd is crucial for promoting crowd participation and early-stage innovations. The literature also explores the role of knowledge transfer effectiveness and social capital formed in the success of crowdsourcing. Crowdsourcing platforms serve as hubs for social connections, allowing organizations to tap into the social capital of participants. Social capital reduces uncertainty in decision-making processes, influences crowdsourcing outcomes, and promotes innovation. Social ties formed within online communities significantly affect future outcomes in crowdsourcing initiatives. Additionally, organizations' social networks facilitate knowledge creation and innovation.

In this context, future researchers have the opportunity to investigate the impact of organization-crowd connections on driving innovation. By employing network theory, they can analyze how network structures, such as structural holes, centrality, and tie strengths, influence innovation outcomes. Additionally, researchers can deepen the understanding of value creation by examining the characteristics of seeker companies, platform designs, and crowd contributors, as well as exploring their interactions. The dimensions of social capital, such as trust, reciprocity, and network density, can be studied to identify their influence on value creation in crowdsourcing contexts. Furthermore, the significance of social connections established in online crowdsourcing communities and the expertise of the crowd in the innovation process can be explored. Strategies for promoting and nurturing social capital among crowd contributors can also be investigated. Finally, the impact of diversity among crowd contributors on the value creation process in crowdsourcing projects is another area that scholars could delve into.

Table 2.6: Proposed research questions related to Cluster 3
Crowdsourcing platform for organization-crowd engagement

Research Questions derived from the Literature	Suggested research directions
[1] Future studies have the potential to delve further into how the design of crowdsourcing platforms influences the motivation and commitment of crowd contributors to participate in organizational initiatives. [2] Furthermore, future research could further investigate how organizations can effectively ensure the quality and relevance of contributions from the crowd on crowdsourcing platforms while simultaneously maintaining high levels of engagement. [3] Finally, future research could explore how organizational factors, such as organizational culture and leadership, influence the engagement of the crowd on crowdsourcing platforms.	[1] In the future, scholars could explore how digital technologies contribute to enhancing the effectiveness, safety, and affordability of crowdsourcing platforms. This could involve examining the advantages and disadvantages experienced by different stakeholders within these platforms. [2] Researchers have the opportunity to employ quantitative methodologies to investigate the connection between platform innovation and the perceptions of crowds towards Internet platforms. They can compare this relationship with the effects of other factors such as the nature of the crowdsourcing initiative or its communication methods. [3] Researchers could work on studying the most effective methods that organizations can employ to provide feedback and recognition to crowd contributors on crowdsourcing platforms, to foster sustained engagement.

Source: Author's Elaboration

Cluster 3 highlights the importance of platforms in achieving successful outcomes in crowdsourcing initiatives. Crowdsourcing platforms act as intermediaries between organizations and stakeholders, resulting in network effects for both parties. The use of social media platforms has become significant in evaluating the effectiveness of crowdsourcing, as it aids organizations in forging novel connections and enables communication among extensive user communities. Crowdsourcing platforms aim to effectively manage the considerable network effects that arise from this phenomenon, with the ultimate goal of generating value for the platform, the crowd, and the participating organizations. The literature suggests that crowdsourcing platforms function as social network hubs that facilitate the development and augmentation of

structural, cognitive, and relational capital value for diverse users while mitigating the adverse consequences of information dissemination on social media.

Therefore, future research in crowdsourcing can focus on various aspects. One avenue is examining how the design of crowdsourcing platforms influences the motivation and commitment of crowd contributors. Additionally, researchers can explore strategies for ensuring the quality and relevance of crowd contributions while maintaining high levels of engagement. The influence of organizational factors like culture and leadership on crowd engagement is also worth investigating. Another area of research is the role of new digital technologies in enhancing the efficiency, security, and affordability of crowdsourcing platforms, as well as understanding the costs and benefits for different platform participants. Quantitative methods can be utilized to study the relationship between platform innovation and crowd attitudes, comparing it with other factors like the nature of the crowdsourcing initiative or communication methods. Lastly, researchers can explore effective methods for providing feedback and recognition to crowd contributors, promoting sustained engagement on crowdsourcing platforms.

2.8 Limitations

The present study has certain limitations. One limitation is the exclusive reliance on Scopus as the data source, which may have resulted in the omission of publications from other databases, such as Web of Science. Future studies can address this potential bias by incorporating multiple databases. Additionally, the exclusion of non-English articles is another limitation, which could be addressed in future research by including articles written in languages like Spanish, Italian, and French.

The current research on crowdsourcing and innovation presents a comprehensive overview of the field, utilizing a combination of quantitative (bibliometric analysis) and qualitative (content analysis) techniques. While the study makes valuable contributions to understanding the evolution, trends, and key clusters within the literature, there are certain aspects that warrant further in-depth discussion and empirical testing by future scholars.

➤ Crowdsourcing as a Source of Organizational Innovation:

- The research effectively outlines the potential of crowdsourcing for both radical and incremental innovation. However, it leans towards an optimistic view without thoroughly delving into the challenges and potential drawbacks of crowdsourcing for innovation. Future scholars could conduct empirical studies to investigate cases where crowdsourcing initiatives did not meet expectations or even led to negative outcomes. Understanding the nuances and potential pitfalls is crucial for a more balanced perspective.

- **Crowdsourcing-based Social Capital and Organizational Value Co-creation:**
 - While the paper recognizes the importance of social capital in crowdsourcing initiatives, it lacks a deep analysis of how social capital can vary across different contexts and industries. Future research could explore the cultural and contextual factors that influence the formation and effectiveness of social capital in crowdsourcing. Additionally, empirical studies could provide insights into cases where social capital did not lead to the anticipated value co-creation, highlighting potential limitations or boundary conditions.

- **Crowdsourcing Platform for Organization-Crowd Engagement:**
 - The discussion around crowdsourcing platforms touches on their design and the role of organizational factors. However, it falls short of a comprehensive analysis of the potential ethical concerns related to crowdsourcing, such as issues of fairness, privacy, and the exploitation of contributors. Future scholars could explore the ethical dimensions of crowdsourcing platforms and investigate how ethical considerations impact engagement and the quality of contributions. Empirical studies on the ethical challenges faced by organizations in managing crowdsourcing initiatives would contribute valuable insights.

- **Thematic Map and Keyword Clusters:**
 - The identification of thematic clusters and keyword associations provides a broad understanding of the conceptual landscape. However, the research could benefit from a more detailed exploration of emerging themes and how they intersect with broader technological, social, and economic trends. Future scholars could conduct qualitative interviews or surveys with experts to delve into the nuances of emerging themes and validate their significance.

- **Three-way Analysis of Authors, Countries, and Keywords:**
 - The analysis of authors, countries, and keywords sheds light on the primary contributors and trends. Yet, it lacks an examination of the potential biases or limitations in the geographical distribution of research. Future scholars could investigate whether the dominance of certain countries in crowdsourcing research reflects global trends or if there are disparities in research focus and perspectives. This would contribute to a more detailed understanding of the field's global landscape.

➤ **Strategic Keywords Diagram:**

- The strategic keywords diagram provides insights into the evolution of literature across sub-periods. However, the absence of certain terms in the latest sub-period raises questions about the evolving discourse. Future scholars could explore the reasons behind the shifts in keyword usage, considering changes in technology, industry dynamics, or research methodologies. This would help in anticipating future research directions and potential paradigm shifts in the field.

In conclusion, while the current research provides a solid foundation, future scholars have the opportunity to deepen the analysis by exploring the challenges, ethical considerations, contextual variations, and evolving dynamics within the intersection of crowdsourcing and innovation. Empirical studies and in-depth investigations will be crucial for refining theoretical frameworks and ensuring the practical relevance of crowdsourcing strategies for organizational innovation.

2.9 Conclusion

The study provides a comprehensive analysis of the scholarly discourse on crowdsourcing and innovation, providing insights into the historical evolution, thematic trends, and research directions. We observed a significant increase in scholarly interest in crowdsourcing and innovation since around 2009, coinciding with the rise of influential crowdsourcing platforms. Three distinct clusters of research themes were identified, focusing on crowdsourcing as a source of organizational innovation, crowdsourcing-based social capital and organizational value creation, and crowdsourcing platforms for organization-crowd engagement. Our findings contribute to a deeper theoretical understanding of crowdsourcing's role in innovation management, emphasizing the importance of involving multiple stakeholders collaboratively for successful innovation.

Practically, organizations can strategically leverage crowdsourcing to access diverse expertise, accelerate innovation processes, and build social capital with external stakeholders. Future research should consider incorporating multiple databases and exploring the variations of social capital across different contexts and industries. Additionally, the ethical dimensions of crowdsourcing platforms warrant further exploration, along with investigations into the reasons behind shifts in keyword usage. Overall, our study provides a solid foundation for future research to refine theoretical frameworks and ensure the practical relevance of crowdsourcing strategies for organizational innovation in the dynamic business landscape.

2.10 Summary

Chapter 2 of the thesis explores the scholarly discourse on crowdsourcing and innovation through a comprehensive bibliometric analysis. It begins by highlighting the notable increase in scholarly interest in crowdsourcing and innovation since around 2009, correlating with the emergence of influential crowdsourcing platforms. The analysis identifies three distinct clusters of research themes within the literature: crowdsourcing as a source of organizational innovation, crowdsourcing-based social capital and organizational value creation, and crowdsourcing platforms for organization-crowd engagement.

For each cluster, the chapter proposes research questions derived from the literature and suggests directions for future research. In Cluster 1, the focus is on investigating the enduring effects of external knowledge sources gathered through crowdsourcing on organizational innovation, exploring the impact of different external knowledge sources and the interaction between organizations and the crowd. Cluster 2 delves into the connection between crowdsourcing-based social capital and organizational value creation, suggesting research directions such as exploring the dimensions of social capital and studying the influence of diversity among crowd contributors. Cluster 3 emphasizes the role of crowdsourcing platforms in organization-crowd engagement, proposing research questions regarding platform design, quality control, and organizational factors influencing engagement.

Additionally, the chapter acknowledges limitations of the study, including data source bias and language bias, and identifies areas for further exploration such as the challenges and ethical considerations of crowdsourcing, variations in social capital across industries, and shifts in keyword usage. Overall, Chapter 2 lays a solid foundation for understanding the evolution, trends, and key clusters within the literature on crowdsourcing and innovation, providing valuable insights for both theoretical advancement and practical application in organizational settings. Moving further, in Chapter 3, we will delve into an exploration of the critical factors influencing the adoption of crowdsourcing within organizational settings. Drawing upon insights from the bibliometric analysis, the chapter aims to unravel and scrutinize the determinants that shape organizations' decisions to embrace or resist crowdsourcing initiatives.

CHAPTER 3 VALUE CO-CREATION THROUGH CROWDSOURCING: ADOPTION FACTORS

In response to the insights gathered from the bibliometric analysis presented in the previous chapter, which distinctly emphasized a knowledge gap in understanding the operational dynamics and organizational impacts of crowdsourcing adoption, this chapter aims to identify and elucidate the critical factors influencing the adoption of crowdsourcing within organizational settings. The bibliometric analysis acted as a starting point, directing attention to the intricate mechanisms of crowdsourcing adoption and its organizational implications. In Chapter 3, we carefully examine the factors that influence organizations' decisions to adopt crowdsourcing. This exploration extends to a comprehensive analysis of innovation characteristics and organizational perspectives, unveiling seven pivotal factors—namely, relative advantage, perceived cost reduction, perceived opportunity, compatibility, complexity, technology readiness, and top management support. By incorporating the Diffusion of Innovations theory and the Technological-Organizational-Environmental framework, we not only fortify the theoretical underpinnings but also offer a holistic model that captures the interplay between innovation characteristics and organizational dynamics. The empirical validation of these factors significantly bolsters our understanding of crowdsourcing adoption, providing practitioners with actionable insights and contributing to the theoretical landscape of technology adoption.

3.1 Introduction

In the contemporary landscape of organizational dynamics, the convergence of intricate challenges and heightened expectations from the crowd has spurred organizations to embark on transformative journeys into the realm of digital innovation. The complexity of modern challenges, including dynamic market shifts, requires innovative capacities that surpass conventional organizational capabilities (Xu et al., 2015; Nevo & Kotlarsky, 2020). In response to these imperatives, open innovation methodologies, notably crowdsourcing, have emerged as pivotal mechanisms for addressing organizational issues and enhancing innovation performance.

Organizations now consider crowdsourcing a pivotal strategy in their pursuit of a competitive edge, utilizing information, labor, skills, and expertise to drive innovation. Enabled by technological progress, crowdsourcing represents an innovative sourcing strategy, tapping into the collective intelligence of contributors to meet the value-creation needs of on-demand enterprises (Zhu et al., 2016). Notable applications include T-shirt designing at Threadless (Acar 2019), micro-task execution at Amazon Mechanical Turk (Garrow et al., 2020), customer idea collection at Starbucks (Johnson et al., 2019), and innovative idea generation at SAP. The literature underscores

crowdsourcing's competitive advantages in idea generation (Schemmann et al., 2016), problem-solving (Lee et al., 2015), information processing, cost-effectiveness (Ye & Kankanhalli, 2017), responsiveness, and adaptability to evolving business strategies.

However, despite these benefits, crowdsourcing is not a universal solution for all organizations (Wilson et al., 2017). Uncertainty arises when organizations leverage external resources like expertise, IT services for crowdsourcing adoption decisions, dealing with challenges such as requirement ambiguity and compatibility with solvers. Crowdsourcing success depends on organizations collaborating effectively with external solvers, who contribute feasible solutions aligned with initial requirements, offer feedback for proposal improvement, and participate in the refinement of solutions (Zogaj et al., 2015). For specific crowdsourcing tasks, requirements often involve implicit domain knowledge and business processes, posing challenges for solvers and incurring costs for organizations.

Existing literature on crowdsourcing has predominantly focused on motivations influencing organizations' crowdsourcing decisions, emphasizing resource management for cost reduction (Chou, 2021) through external competences. Limited empirical research has explored crowdsourcing phenomena from the viewpoint of a seeking firm. (Thuan et al., 2016; Qin et al., 2016), with Ye & Kankanhalli (2015) being an exception, primarily focusing on resource and cost management influencing crowdsourcing adoption on the "Taskcn" platform. Prior research on crowdsourcing has primarily delved into technical and operational aspects, with limited attention given to organizational perspectives.

To bridge these research gaps, our study develops a comprehensive research framework that combines the innovation characteristics of crowdsourcing with the technology-organization-environment (TOE) perspectives shaping its adoption. In response to the increasing emphasis on leveraging external providers' services, as emphasized by Benlian & Hess (2011), our study aims to unravel the underlying reasons that compel organizations to embrace outsourcing, particularly in the context of on-demand service delivery sourced from external providers. Aligned with this objective and addressing existing voids in crowdsourcing adoption research, our current study pursues two primary research goals:

- (a) identifying the most influential factor in the adoption of crowdsourcing within organizations from a theoretical standpoint and
- (b) evaluating the innovative readiness and capacity to adopt crowdsourcing from technological, environmental, and organizational standpoints.

Leveraging the foundational theories of and Diffusion of Innovation (DOI) and Technological-Organizational-Environmental (TOE), the study integrates these

perspectives, particularly focusing on the technological and environmental context within organizations. This research contributes significantly by providing a comprehensive theoretical framework for crowdsourcing adoption in Indian organizations, filling a notable gap in the existing literature. The study offers practical and theoretical insights, enhancing our understanding of adopters of crowdsourcing within organizations and providing valuable guidance to managers and policymakers on optimizing efforts to promote crowdsourcing adoption.

3.2 Background

3.2.1 Crowdsourcing

Crowdsourcing, a complex phenomenon, has evolved significantly since its inception. In 2006, Howe introduced the term "crowdsourcing" in *Wired Magazine*, merging "crowd" and "outsourcing" to describe the practice of seeking expertise, performing specific tasks, or engaging online communities to solve problems by involving a group of people (the crowd). In 2008, Howe categorized crowdsourcing into four types based on various application methods: crowd creation, where crowds are engaged in generating new product designs, solutions, and concepts; crowd wisdom, where companies utilize the collective coordination, cooperation, and individual cognition of the crowd to accomplish tasks; crowd labor, where crowds' intelligence is leveraged to perform simple and complex tasks; and crowdfunding, where companies seek crowd investments for specific activities (Modaresnezhad et al., 2020). Crowdsourcing has been called crowd wisdom, collaborative systems, mass cooperation, and collective intelligence (Doan et al., 2011) since Howe (2006) popularized the term. Other words in the literature include collective wisdom, open innovation, and crowd work (Marjanovic et al., 2012; Kittur et al., 2013). The current research study has used the term "crowdsourcing" since it accurately describes the concept and has been frequently used (Howe, 2008; Estellés-Arolas & González-Ladrón-De-Guevara, 2012; Afuah & Tucci, 2012). As crowdsourcing has gained popularity as a new research arena, many scholars have proposed different definitions, taxonomies, and frameworks for crowdsourcing.

Some scholars like Howe (2006) and Saxton et al. (2013) compared crowdsourcing to outsourcing organizational tasks, whereas Afuah & Tucci (2012) used crowdsourcing as a problem-solving approach. Maiolini & Naggi (2012) applied crowdsourcing in business-to-business applications and small and medium organizations. The term has been described from many angles in the past literature. Brabham (2008) described crowdsourcing as a strategic strategy for gathering motivated and intrigued people who can provide better answers than standard company models. According to Doan et al. (2011), crowdsourcing is an approach to solving general problems. So, crowdsourcing became confusing when researchers gave multiple definitions (Howe, 2008; Brabham, 2008). Keeping this in mind, Estelles-Arolas & De-Guevara (2012) integrated all the definitions mentioned in the literature

to resolve the ambiguity and found three similar elements: crowd, initiator, and process. As a result, the definition was presented for "every given crowdsourcing activity" that included "participatory online activity in which an entity, individual, or non-profit organization proposes to a group of unknown individuals with diverse knowledge to do a work freely that involves proposing ideas, problem-solving, offering expertise, or funding" (Estelles-Arolas & De-Guevara, 2012). The current study will consider crowdsourcing as a technique in which an organization uses a flexible open call to propose specific tasks to the crowd to use their knowledge, effort, experience, and diverse skills. Past researchers have also conceptualized crowdsourcing studies by investigating different taxonomies and frameworks. As per the study conducted by Whitla (2009) crowdsourcing activities mainly include a promotion, advertising, marketing research, and the development of the product. Similarly, Brabham (2013) categorized crowdsourcing activities by their functions like "knowledge discovery, distributed human intelligence tasking, broadcast search, and peer-vetted creative production".

3.2.2 Adoption Models

Over the last few decades, researchers have sought to examine the determinants impacting the adoption of technology within organizational settings. Prominent theories such as DOI (Rogers, 2003), the technology acceptance model (TAM) (Davis, 1989), technology-organizational-environmental framework (Tornatzky & Fleischer, 1990), theory of planned behavior (TPB), theory of reasoned action (TRA), resource-based theory (RBT) (Wade & Hulland, 2004), and social cognitive theory (SCT) have been extensively utilized for this purpose. However, none of these individual theories offers a comprehensive explanation of the entire technology adoption process. Consequently, scholars have employed various models to elucidate diverse scenarios related to technology adoption, as observed in studies by Chatterjee et al. (2021), and Gangwar et al. (2015). This research specifically delves into the influential factors affecting the adoption of crowdsourcing innovation within Indian organizations. To understand this complex phenomenon better, the study introduces a new framework. This framework combines ideas from the TOE and DOI theories and draws on insights from technology and innovation literature.

3.2.3 Diffusion of Innovation (DOI) Theory

The Theory of Innovation Diffusion, initially formulated by Rogers (1983), is a widely employed model in Information Systems (IS) research (Min et al., 2021; Toufaily et al., 2021; Agi and Jha, 2022). This theory delineates five crucial attributes explaining the adoption of innovation within an organization. These attributes encompass various dimensions essential for innovation adoption within organizations. They include relative advantage, signifying the improvement an innovation brings compared to its predecessor; compatibility, indicating how well an innovation aligns with existing business processes, practices, and value systems; complexity, representing the level of

difficulty associated with implementing the innovation; observability, denoting the visibility of the innovation to others; and trialability, conveying the ease with which experimentation with the innovation can occur. The Diffusion of Innovations (DOI) theory concentrates on both the technological characteristics and user perceptions within an organization. Acknowledging the complexity of organizations compared to individuals, Rogers emphasizes that the innovation process is essentially a communication process utilizing various channels within the social system.

In the context of organizational dynamics, the adoption of innovation is shaped by three fundamental factors. These factors consist of individual elements, such as the attitudes of leaders towards change, as well as internal aspects related to the organizational structure, including centralization, interconnectedness, number of employees, complexity, and organizational slack. Additionally, external attributes, such as the extent of system openness within the organization, further contribute to the overall influence on innovation adoption.

3.2.4 Technology-Organization-Environment (TOE) Framework

The Technology-Organization-Environment (TOE) Framework, first introduced by Tornatzky & Fleischer (1990), provides a comprehensive perspective on the process of adopting innovation within organizational settings. This framework takes into account three crucial dimensions that play a substantial role in influencing innovation adoption. Within the Technology Context, the TOE framework delves into both internal and external technologies that are pertinent to the organization. This dimension involves an assessment of the technologies presently employed by the organization, as well as those that are potential candidates for adoption. A thorough understanding of the technological landscape empowers organizations to make well-informed decisions regarding the incorporation of new innovations.

The Organization Context dimension delves into descriptive characteristics of the firm. This includes aspects such as organizational structure, size, managerial configuration, degree of centralization, and the availability of resources, both human and slack. Additionally, it considers communication processes within the organization, encompassing both formal and informal channels among employees. These organizational factors play a pivotal role in shaping the innovation adoption process. In the third dimension, Environment Context, the TOE framework takes into account the structural aspects of the industry and the circumstances under which the organization operates (Oliveira et al., 2011). This involves an analysis of the external environment, considering factors such as industry trends, competitive forces, and regulatory conditions. Understanding the broader environmental context is crucial for organizations to align their innovation adoption strategies with the prevailing conditions. By concurrently examining these three dimensions, the TOE framework provides comprehensive insights into the intricate interplay between technological,

organizational, and environmental factors (Tornatzky & Fleischer, 1990) that influence an organization's decision-making regarding the adoption of technological innovations. The applicability of this framework has been instrumental in deciphering the complex dynamics of innovation adoption across diverse organizational contexts and industries, contributing significantly to the field of technology adoption research.

3.2.5 Literature on Crowdsourcing Adoption

The research argues that the crowdsourcing process starts with the adoption decision and further evaluates whether there is value addition in organizations. Muhdi et al. (2011) have given a five-step procedure adopted in organizations where deciding the appropriateness of crowdsourcing for solving internal organizational problems is the first step. Similarly, the study conducted by Wexler (2011) proposed to check the appropriateness of crowdsourcing first, identify the pros and cons of crowdsourcing, evaluate its efficacy in comparison to outsourcing and internal sourcing, and prepare resources to approach the crowd. Wexler (2011) agreed with Muhdi et al. (2011) and added that organizations should persuade their employees to favor crowdsourcing while making the adoption decision. In light of the above discussion, the current study defines crowdsourcing adoption decisions as an approach to determine whether crowdsourcing is a beneficial and rewarding method for completing specific organizational tasks. Before adopting crowdsourcing, organizations must consider different determinants to check readiness, such as organizational environments, culture, crowdsourcing's advantages, obstacles, and capacities.

The decision to adopt crowdsourcing plays a critical role for organizations that intend to employ external crowds for the following reasons. If the crowdsourcing decisions fail to achieve organizational objectives, this will negatively impact organizations due to unanticipated obstacles and misuse of organizational possessions (Rouse, 2010). The adoption decision is closely related to organizational strategies, one of which is whether the organizations' operations are freely accessible for general public contribution (Seltzer & Mahmoudi, 2013). Further, the crowdsourcing adoption decision impacts the success of crowdsourcing and cannot be changed later. (Muhdi et al., 2011). Lastly, although crowdsourcing helps build a good relationship with external parties (Djelassi & Decoopman, 2013), crowdsourcing failure may affect the brand image of the organization.

As a result, there is a growing interest in the crowdsourcing adoption decision, particularly the determinants influencing the adoption choice. Few researchers focused on a single aspect to evaluate crowdsourcing relevance for certain activities. The decision to adopt crowdsourcing is sometimes based on the type of challenges and tasks organizations want to solve, as Ranade and Varshney (2012) suggested. Similarly, Naroditskiy et al. (2013) focused on a single element, researched malicious behavior, and proposed to compare the pros and cons of adopting crowdsourcing. In contrast,

numerous academics have shown that crowdsourcing is a complex process that requires the evaluation of multiple aspects (Djelassi & Decoopman, 2013; Zhao & Zhu, 2014). Afuah & Tucci (2012) proposed five variables to examine before crowdsourcing for problem-solving contests. Four variables influencing crowdsourcing adoption relate to organizational and environmental elements such as problem, knowledge, crowd, solution, and evaluator characteristics. The fifth variable relates to technological characteristics that moderate the relationship between organizational elements and crowdsourcing adoption. Lu et al. (2015) examined "five antecedent aspects involved in deciding online micro sourcing using data from 240 IT crowdsourcing platform clients. The authors found three reasons organizations use crowdsourcing: access to resources and expertise, complementary resources, and venues for bridging the lack of resources. Cost reduction and risk minimization are not essential factors for crowdsourcing decisions.

According to the findings of the research mentioned above, it is clear that a thorough investigation is necessary before deciding whether or not to use crowdsourcing (Afuah & Tucci, 2012; Thuan et al., 2013; Lu et al., 2015). But there are two major gaps in the literature investigating the crowdsourcing decision elements. First, there isn't a consensus on what determinants should be considered when deciding whether or not to adopt crowdsourcing. Second, this research has focused mainly on a certain kind of activity, including micro-sourcing (Lu et al. 2015), gathering group wisdom (Buecheler, et al., 2010), or solving problems (Afuah & Tucci, 2012). As a result, the big picture of crowdsourcing adoption has yet to be revealed. Recently researchers like Bigliardi & Gulati (2016), Zahay et al. (2018), and Mergel (2021) used theoretical perspectives to uncover the adoption factors of crowdsourcing. Bigliardi & Galati (2016) used transaction cost theory and a resource-based view to evaluate 157 Italian SMEs' behaviors and hindering variables. Strategic impediments, collaboration, knowledge, financial, and organizational were identified as barriers by Bigliardi and Galati. Similarly, Mergel (2021) examined public sector adoption hurdles of open innovation to boost innovation in the government sector.

The examination of published journal articles reveals that the majority of studies typically focus on empirically assessing either the direct impacts of innovation or contextual factors (Thuan et al., 2016; Chou, 2021; Coninck et al., 2023). Alternatively, they undertake analyses using qualitative methods (Thuan et al., 2016) or rely on secondary data to investigate crowdsourcing adoption. Nonetheless, the current literature lacks a comprehensive method that thoroughly validates both the direct and indirect impacts of innovation characteristics while considering the underlying technological, organizational, and environmental context. In an effort to bridge this notable research gap, our study aims to construct an integrative research model. This model integrates the theoretical viewpoints of innovation diffusion with the context of technology, organization, and the environment. Utilizing this model, we aim to conduct a holistic evaluation of the determinants influencing crowdsourcing adoption within organizations.

3.2.6 Integrating DOI and TOE Perspective for Crowdsourcing Adoption

Researchers have advocated for the integration of multiple theoretical perspectives to comprehend adoption of innovative technologies (Oliveira, 2010; Wu et al., 2013; Skafi, 2020). A comprehensive study context tailored to the innovation's specificity is crucial for understanding organizational decisions related to technological adoption. The empirical robustness of DOI and TOE is well-established in the realm of IT adoption studies. The integration of TOE perspectives not only upholds the empirical consistency but also amplifies the depth and comprehensiveness of the DOI theory, particularly when considering innovation characteristics delineated by Rogers. While similarities exist, differences, such as TOE's omission of individual characteristics and DOI's oversight of the environment context, highlight the theories' complementary nature. The extensively referenced studies were systematically categorized to discern the predominant factors scrutinized in the current body of literature on adoption studies. Following this categorization, a meticulous examination was conducted for each identified construct, assessing its relevance to the adoption of crowdsourcing. The resulting articles that fulfilled the criteria for alignment with the proposed conceptual model are presented in Table 3.1. This table provides a comprehensive overview of the main categories, sub-factors, and their respective sources.

Table 3.1: Literature related to the Theoretical Framework

Context/ Characteristics	Factors	Sources
Innovation	Compatibility	Afuah & Tucci (2012); Saxton et al. (2013); Mentes-Mulero et al. (2013); Djelassi & Decoopman (2013); Qin et al. (2016)
	Complexity	Mentes-Mulero et al. (2013); Zahay et al. (2018); Evans et al. (2016)
	Relative Advantage	Saxton et al. (2013); Qin et al. (2016); Zhao & Zhu (2014)
Technological	Technology Readiness	Lynn et al. (2018); Fu and Chang (2016); Sadoughi et al. (2020).
Organizational	Support of Top Management	Sadoughi et al. (2020); Ren (2019); Ali et al. (2020);
	Organizational Culture	Siren and Knudsen (2017); Ren (2019); Hamad et al. (2018); Sadoughi et al. (2020).
	Organizational Size	Ali et al. (2020); Mabad et al. (2021); Ali et al. (2018)

Environmental	Technological turbulence	Johnson et al. (2019); Meng et al. (2021)
	Competitive pressure	Kohler & Chesbrough (2019); Johnson et al. (2019); Meng et al. (2021)

Within the framework of DOI, the adoption of crowdsourcing can be analyzed using three key characteristics associated with DOI innovation: relative advantage, complexity, and compatibility. These attributes are closely connected to economic benefits and perceived opportunities. However, it's important to note that trialability and observability have not been extensively studied in the context of IT innovation, hence they are excluded from consideration in relation to crowdsourcing technology, following the established guidelines of IS research. Rogers (2003) suggests that the nature of the innovation determines the crucial type of relative advantage for adopters, which can manifest in various ways including economic profitability or social prestige. In our specific study, we propose that crowdsourcing presents an economic advantage in terms of cost savings and opportunities. To further explore this concept, we introduce two additional variables—perceived cost reduction and perceived opportunity—as preceding factors that contribute to the relative advantage of crowdsourcing. These variables ascertain whether crowdsourcing is deemed relatively advantageous when it offers cost savings and increased opportunities.

The TOE framework emphasizes the significance of the technology context in shaping the adoption of crowdsourcing within a firm. The readiness of a firm to embrace crowdsourcing is influenced by various factors inherent in the organizational context, including top management support, organizational culture, and firm size. Furthermore, the environmental context, as captured by the variables of competitive pressure and technological turbulence, plays a crucial role in determining the organization's inclination towards adopting crowdsourcing.

3.3 Hypotheses and Conceptual Model Formulation

3.3.1 Innovation Characteristics of Crowdsourcing Adoption

Relative Advantage: The adoption of crowdsourcing in organizations is heavily influenced by the perceived relative advantage it offers compared to traditional methods. The concept of relative advantage, drawn from innovation theory, suggests that an innovation or approach is more likely to be adopted if it is perceived as superior to existing alternatives (Greenhalgh et al., 2004). In the context of crowdsourcing, organizations evaluate whether the method provides clear advantages such as increased innovation, cost-effectiveness, and access to a broader skill set. If organizations believe that crowdsourcing offers a relative advantage over traditional methods in terms of efficiency, speed, and diversity of ideas, they are more inclined to adopt it (Thuan et

al., 2015). The decision hinges on the organization's assessment of how crowdsourcing aligns with its goals, enhances competitiveness, and brings about positive outcomes that outweigh any potential challenges or risks associated with external collaboration. Ultimately, the perceived relative advantage becomes a crucial factor shaping the decision-making process, driving organizations to embrace crowdsourcing as a strategic and innovative approach (Qin et al., 2016). Thus, the following hypothesis is proposed:

H1: Relative advantage positively influences crowdsourcing adoption.

Perceived opportunities entail the advantages gained from externally solving tasks through solvers, as opposed to internal solutions. Conversely, perceived cost reduction refers to the savings achieved in the mentioned task-solving scenario. Existing literature emphasizes the significant role of attitudinal assessments in adoption intention, observed in outsourcing and IT applications at both individual and organizational levels (Featherman & Pavlou, 2003; Kim et al., 2008). Studies on Internet-based applications highlight consumers' attitudinal appraisals as key drivers for adoption intention, considering factors like perceived risk, benefits, and overall attitude. At the organizational level, Gewald & Dibbern (2009) discovered that the perceived opportunity for outsourcing significantly impacts adoption intention. Other studies, particularly those focusing on on-demand outsourcing, emphasize the role of organizations' attitudinal appraisals—specifically regarding opportunities and costs—in influencing the adoption decision. Drawing from organizational theory, our research delves into the influence of organizations' perceptions of opportunities and cost reduction on their choices regarding crowdsourcing adoption, as highlighted in the work of Chou et al. (2021). Grounded in the attitude-behavior framework and informed by empirical findings, we argue that the attitudinal assessments of organizations, specifically regarding relative advantages like perceived opportunities and cost reduction through crowdsourcing, play a pivotal role in shaping their intention to adopt. Consequently, we hypothesize the following:

H1a: Perceived opportunities will exert a positive influence on the relative advantage of crowdsourcing.

H1b: Perceived cost reduction will exert a positive influence on the relative advantage of crowdsourcing.

Complexity: An innovation's perceived complexity is measured by how much effort is required to understand and implement it truly. The impact of complexity on crowdsourcing adoption decisions in organizations is a crucial consideration that weighs the benefits of external collaboration against the challenges posed by intricate project requirements (Zahay et al., 2018). Complex projects, often characterized by specialized knowledge and multifaceted tasks, necessitate a careful evaluation of

whether crowdsourcing is a suitable approach. Organizations must assess whether the inherent complexity of a task aligns with the capabilities of a diverse and distributed crowd (Muntes-Mulero et al., 2013). While crowdsourcing offers access to a wide range of skills and expertise, the intricacy of certain projects may pose coordination challenges, quality control issues, and difficulties in managing diverse contributions. Therefore, the decision to adopt crowdsourcing hinges on the organization's ability to navigate and mitigate the complexities associated with the chosen projects. Organizations must weigh the potential benefits, such as innovation and efficiency, against the complexity of task management, ultimately determining whether crowdsourcing is a viable and effective solution for their specific operational needs (Evans et al., 2016). Therefore, it can be hypothesized that technological complexity has an inhibiting effect.

***H2:** Complexity will exert a negative influence on the adoption of crowdsourcing*

Compatibility: Compatibility measures the degree to which an innovation is perceived to be in harmony with the existing practices of potential users. Compatibility plays a pivotal role in the decision-making process regarding crowdsourcing adoption in organizations. The level of alignment between crowdsourcing and the existing organizational culture, structure, and processes determines the feasibility and success of its integration (Afuah & Tucci, 2012). Organizations must evaluate whether the decentralized and collaborative nature of crowdsourcing aligns with their established workflows and communication channels. Compatibility extends to technological infrastructure as well, as the integration of crowdsourcing platforms should seamlessly complement existing systems (Saxton et al., 2013; Djelassi & Decoopman, 2013). When there is a high level of compatibility, organizations are more likely to perceive crowdsourcing as a feasible and practical solution. Conversely, if the integration of crowdsourcing requires significant changes or disrupts established norms, it may face resistance or reluctance in adoption (Muntes-Mulero et al., 2013). Therefore, the decision to adopt crowdsourcing hinges on the organization's assessment of how well it fits within the current operational framework, ensuring a smooth and harmonious integration (Qin et al., 2016). Therefore, technology compatibility can act as an enabler for crowdsourcing adoption in organizations. Hence, we posit the following hypothesis:

***H3:** Compatibility has a positive impact on the adoption of crowdsourcing*

3.3.2 Technology Context of Crowdsourcing Adoption

Technology Readiness: The adoption of new technological innovation within organizations hinges on effective organizational preparedness, and this readiness involves gearing the organization to embrace emerging technologies. When evaluating the organization's readiness for crowdsourcing adoption, particular attention is given to technological readiness and the internal competencies of the organization, both crucial elements of organizational readiness (Oliveira & Martins, 2009). The concept of technological readiness delves into the organization's inherent technological capability to actively integrate new technologies (Sadoughi et al., 2020). Notably, the focus on organizational-level technological readiness concerning the adoption of crowdsourcing has been underemphasized. In this context, readiness pertains to the organization's internal technological capacity, encompassing structural components such as the organizational system, or technological framework that can be aligned or replaced by emerging technologies (Schiavi & Behr, 2018). It involves having ample resources and budget allocated to crowdsourcing (Ali & Shrestha, 2017), coupled with the availability of the requisite level of crowdsourcing infrastructure and organizational systems essential for embracing new technology (Lynn et al., 2018). Therefore, organizations that exhibit a greater level of preparedness in technology are more likely to adopt crowdsourcing. Thus, the following hypothesis is proposed:

H4: Technology readiness positively relates to crowdsourcing adoption in organizations.

3.3.3 Organizational Context of Crowdsourcing Adoption

Support of Top Management- Top management support (TMS) in the context of technology adoption, as emphasized by Hsu et al. (2019), pertains to the extent of commitment and resource backing provided by senior executives. Studies highlight the significance of top management's awareness of the value of embracing new technologies, such as cloud computing, in aligning organizational change processes with their expressed commitment to change. Given the complex nature of incorporating crowdsourcing, involving resource integration and process changes, senior managers play a crucial role in facilitating this transition. Numerous organizational factors influence technology adoption, with top management support consistently identified as a positive factor. In the specific context of crowdsourcing, Chou (2021) underscores the pivotal role of top management in fostering a culture of innovation. Acknowledging and encouraging executives with decision-making authority can significantly impact the successful integration of crowdsourcing, as top management's belief in the positive outcomes of crowdsourcing motivates employees to contribute ideas and develop innovative products. In essence, top management acts as a catalyst, enabling and accelerating the adoption of crowdsourcing within organizations (Djelassi & Decoopman, 2013). Thus,

H5: Top management support positively relates to crowdsourcing adoption in organizations.

Organizational Culture: Organization culture is recognized as a pivotal factor influencing the successful adoption of crowdsourcing within an organization. Past analyses underscore that an organizational environment fostering transparency, openness, and external experimentation is more conducive to embracing crowdsourcing (von Hippel, 2005). Notably, organizational cultures that promote collaboration, innovative thinking from the top-down, and a fearless approach to innovation without the fear of failure are well-positioned to align crowdsourcing initiatives with the organizational mission (Djelassi & Decoopman, 2013). On the flip side, a negative internal culture can impede crowdsourcing adoption, especially in organizations resistant to experimentation and unconventional thinking. Instances of the "not invented here" syndrome and general organizational resistance can hinder collaboration and stifle the acceptance of crowdsourcing (Simula & Ahola, 2014; Evans et al., 2016). In the context of crowdsourcing adoption, the influence of organizational culture is two-fold, acting as both a facilitator and an inhibitor based on the predominant cultural attributes. Specifically within the domain of technology-related cultural elements, encompassing user attitudes toward technology, attitudes towards change, and awareness, organizational culture assumes a pivotal role. An organizational culture that fosters knowledge sharing among its members contributes to the collective expertise of the organization and optimizes the effective utilization of such knowledge, as emphasized by Muhammed & Zaim (2002). Additionally, having an awareness and a positive attitude toward crowdsourcing prepares individuals for the adoption process, fostering a more adaptive and innovation-friendly culture within the organization (Scupola & Nicolajsen, 2021). Therefore, we posit the following hypothesis:

H6: The presence of a supportive organizational culture is positively correlated with the adoption of crowdsourcing within organizations.

Organizational Size- The influence of organizational size on crowdsourcing adoption decisions is evident in the distinct advantages that larger entities can leverage in the pursuit of innovation and adaptability. Larger organizations, equipped with greater resources (Zahay et al., 2018), have the capacity to embrace crowdsourcing as a strategic tool for tapping into external expertise. The flexibility and scalability of crowdsourcing align seamlessly with the expansive structures of larger enterprises, allowing them to swiftly assemble diverse teams (Djelassi & Decoopman, 2013) and respond to dynamic market conditions. Additionally, the robust infrastructure of larger organizations provides the necessary support to manage the complexities of external collaboration. Research indicates that despite their agility, smaller firms exhibit a reluctance to embrace emerging technologies due to resource constraint (Mathauer & Hofmann, 2019). Consequently, the size of a firm emerges as a decisive factor in

determining the likelihood of crowdsourcing adoption (Thuan et al., 2015). Therefore, it is hypothesized that

H7: Organizational Size will exert a positive influence on the adoption of crowdsourcing.

3.3.4 Environment Context of Crowdsourcing Adoption

The TOE framework's "environmental context," as outlined by Tornatzky & Fleischer (1990), encapsulates the external aspects of the business environment that play a role in shaping the adoption of innovation. Specifically, in the context of crowdsourcing adoption within organizations, environmental factors such as technological turbulence and competitive pressure come into play.

Technological Turbulence- Technological turbulence significantly shapes the decisions of organizations to adopt crowdsourcing as a strategic response to the challenges posed by rapidly evolving technologies. In the midst of this turbulence, there is a heightened need for continuous innovation to stay ahead in the competitive landscape (Ishikawa, 2019). Crowdsourcing becomes a key driver for innovation as it enables organizations to tap into external pools of diverse talents and perspectives, fostering a continuous flow of creative ideas and solutions. The specialized knowledge required to navigate emerging technologies is often best sourced from a global talent pool, which crowdsourcing platforms facilitate. The agility and adaptability offered by crowdsourcing become essential attributes in turbulent technological environments, allowing organizations to quickly assemble teams and respond to emerging trends (Johnson et al., 2019). Furthermore, crowdsourcing serves as a risk mitigation strategy by distributing projects across a diverse set of contributors, providing alternative solutions in the face of uncertainty. The market validation capabilities of crowdsourcing also prove invaluable, ensuring that organizations remain aligned with evolving market demands. In addition to its practical benefits, crowdsourcing promotes an open innovation culture, fostering collaboration beyond organizational boundaries. In essence, technological turbulence shapes the decision to adopt crowdsourcing by highlighting its role as a versatile and adaptive approach, essential for organizations navigating the uncertainties of rapidly changing technological landscapes (Meng et al., 2021). Thus,

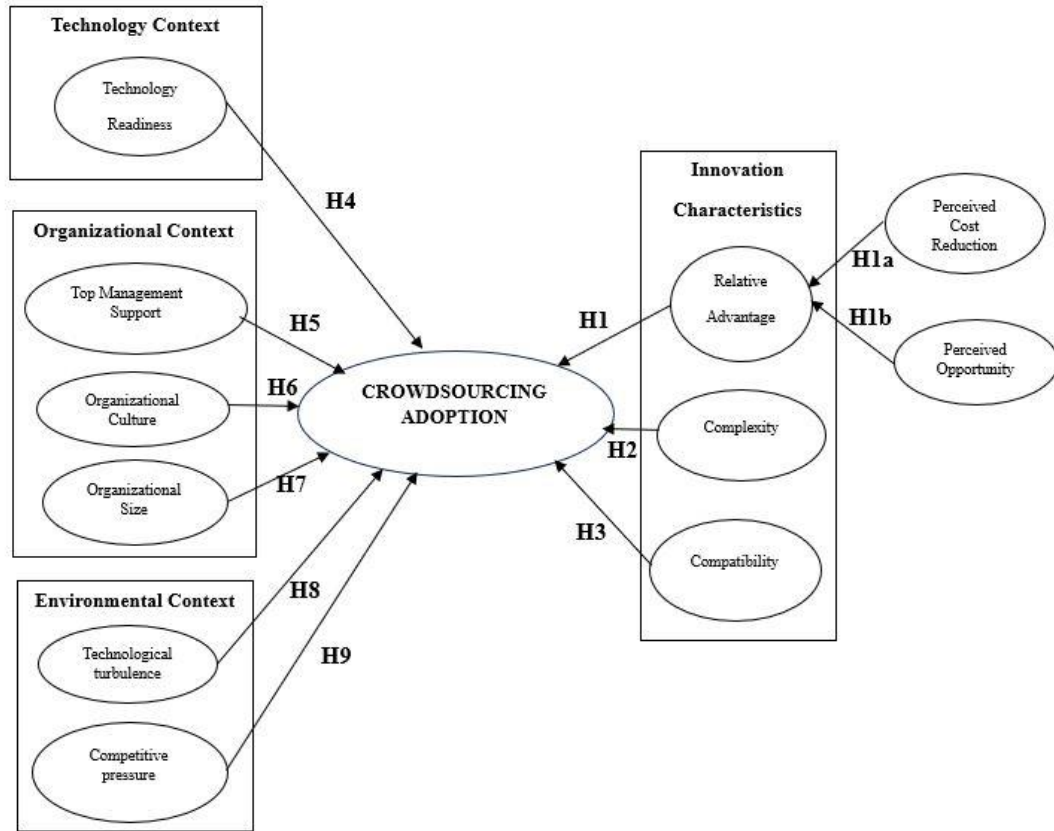
H8: Technological turbulence positively relates to crowdsourcing adoption in organizations.

Competitive pressure- The impact of competitive pressure on crowdsourcing adoption decisions in organizations is profound, driven by the imperative to innovate, streamline operations, and gain a competitive edge (Johnson et al., 2019). In highly competitive markets, where staying ahead is critical, organizations turn to crowdsourcing as a strategic response to external challenges (Kohler & Chesbrough, 2019). Meeting the imperative for innovation as a strategic differentiator, crowdsourcing emerges as a valuable mechanism for companies to tap into a diverse reservoir of external contributors and ideas. The efficiency and speed inherent in crowdsourcing align with the need for swift project execution in response to competitive pressures (Meng et al., 2021), enabling organizations to adapt and respond quickly to market demands. The access to a global talent pool offered by crowdsourcing is particularly valuable in industries where specific skills are scarce locally, contributing to competitiveness. Moreover, the cost-efficient utilization of resources, risk distribution, and continuous market sensing capabilities provided by crowdsourcing further enhance organizations' ability to navigate and thrive in competitive environments (Ishikawa, 2019). As a result, competitive pressure plays a pivotal role in the decision to adopt crowdsourcing, as organizations recognize it as a strategic tool for fostering innovation, efficiency, and competitiveness in dynamic marketplaces. Thus, the following hypothesis is proposed:

H9: Competitive pressure positively relates to crowdsourcing adoption in organizations.

Drawing from the literature discussed earlier, we present a conceptual framework rooted in DOI and TEO theories. This conceptual framework seeks to identify the determinants influencing the adoption or utilization of crowdsourcing within organizational contexts (**Figure 3.1**).

Figure 3.1: Research Model of Crowdsourcing Adoption in Organizations



3.4 Research Methodology

3.4.1 Sampling and Data Collection

The study gathered data via a survey (**Appendix A**) specifically tailored for senior executives in Research and Development departments, occupying various innovation roles, including information system managers, business operations managers, and administrators across different production, sales, and marketing departments. These executives play crucial roles in shaping innovation strategies, guiding R&D initiatives, and supervising innovation-related activities. Their valuable insights aid in understanding the factors influencing their decisions to adopt crowdsourcing in organizations. To minimize bias, a purposive sampling method, commonly employed in quantitative studies (Ebrahimi et al., 2018), was utilized. For the online survey, Google Forms was employed, and communication with respondents occurred through emails, Facebook messengers, and LinkedIn connections. Potential respondents were

informed about the study's academic contribution and reassured of the strict confidentiality of their identities. A guide on completing the questionnaire was provided, and these measures were taken to enhance the response rate (Chidlow et al., 2015).

Initially, the survey link was distributed to 600 individuals, resulting in 480 responses (an 80% response rate). Following Hair et al.'s (2021) recommendation, 54 questionnaires with incomplete or consistently linear responses were excluded. In order to establish an appropriate sample size for testing the research model, a pre-analysis sample size calculation was performed using the commonly applied "10-times rule" in PLS-SEM. As per this rule, the sample size should surpass 10 times the highest count of connections in the measurement or structural model associated with any latent variable. Given the presence of 12 latent variables and 40 observed variables, a minimum recommended sample size of 400 was determined; the obtained sample size of 426 met this requirement. Among the respondents, 29.3% were from the information technology industry, while others represented diverse service sectors such as education, e-commerce, manufacturing, FMCG, and automobile. The majority of respondents (28.17%) held positions as information system managers, with others in roles like purchase, sales, marketing managers (21.60%), and business operations managers. This distribution aligns well with the study's objectives. Further details about respondents' industries and job positions are available in Table 3.2.

Table 3.2: Sample characteristics (N= 426) for Study 2

Measure	Category	Frequency	%
Industry	FMCG	85	19.91
	Automobile	55	12.92
	Information Technology	125	29.34
	Education	76	17.84
	Manufacturing	40	9.39
	E-commerce	45	10.56
Respondent's Job Position	Information system managers	120	28.17
	Other IS department managers	85	19.91
	Business operations manager	76	17.84
	Administration	53	12.44
	Other (Purchase, sales, marketing)	92	21.60
Organizational Size	Small	150	35.21
	Medium	225	52.81
	Large	51	11.97

3.4.2 Instrument Development

This research was conducted through a survey, with a questionnaire formulated after an extensive review of relevant literature. The survey comprises two sections: the initial part captures general information about the organization, including aspects such as size, the positions of respondents, and the industry type. The second segment encompasses eleven independent constructs and one dependent construct, constituting a total of 40 items. A meticulous two-step pre-testing process was implemented for the items, involving pilot testing and evaluation by industrial experts and experienced academicians. All constructs and items were drawn from existing literature, and a comprehensive breakdown, including the sources for adaptation of each item, is provided in Table 3.3. Data collection employed a Likert scale ranging from 1 to 5, where 1 indicates 'strongly disagree,' and 5 signifies 'strongly agree'.

To ensure questionnaire validity, three information systems industrial experts were interviewed, leading to adjustments based on their insights to enhance clarity and comprehension. Subtle adjustments were made prior to the conclusive data collection phase. Furthermore, to enhance measurement precision, a pilot study involving five practitioners with specialized knowledge in innovation was conducted, refining the research instruments based on their feedback.

Table 3.3: Measurement Items for Study 2

Construct	Items	Adapted Source
Perceived Opportunity	PO1- Crowdsourcing offers numerous benefits PO2- Crowdsourcing is effective in accomplishing tasks PO3- Crowdsourcing enhances the overall competitive edge	Benlian & Hess (2011); Ye & Kankanhalli (2015)
Perceived Cost Reduction	PCR1- Crowdsourcing cuts task-solving expenses PCR2- Crowdsourcing allows our company to economize on task execution PCR3- Crowdsourcing offers a more cost-effective approach than alternatives such as internal task handling or engaging external solvers	Benlian & Hess (2011); Ye & Kankanhalli (2015)
Relative Advantage	RA1- Using crowdsourcing helps manage organization operations more efficiently. RA2- Crowdsourcing makes operations better in quality.	Ifinedo (2011); Moore & Benbasat (1991); Ghobakhloo et al. (2011)

	RA3- Crowdsourcing allows you to do specific tasks more quickly. RA4- Using crowdsourcing results in novel ideas and opportunities. RA5- Crowdsourcing helps boost organization's productivity.	
Complexity	CX1- Engaging in crowdsourcing demands significant mental effort. CX2- The process of crowdsourcing can be frustrating. CX3 - The utilization of crowdsourcing is deemed too intricate for organization operations. CX4- The skills necessary for adopting crowdsourcing are considered too complex for the organization employees.	Moore & Benbasat (1991); Ifinedo (2011); Thiesse et al. (2011)
Compatibility	CM1 - The utilization of crowdsourcing aligns with the current IT infrastructure within my organization. CM2 - The integration of crowdsourcing aligns with the processes and operations of my organization. CM3 - The adoption of crowdsourcing aligns with our preferred work practices. CM4 - The application of crowdsourcing aligns with the preferences of our clients.	Sultanonpaiboon & Pearson (2008); Tripopsakul (2018)
Technology Readiness	TR1 - The organization has sufficient resources and budget allocated for adopting new technology TR2- The organization knows how crowdsourcing can be used to support operations. TR3 - Organizations have enough internal expertise available to implement crowdsourcing. TR4- Organizations have availability of appropriate level of IT infrastructure	Ifinedo (2011); Oliveira & Martins (2010)
Top Management Support	TMS1 – The Top Management of organization is supportive of implementing crowdsourcing. TMS2- The top management of organizations demonstrates robust	Chwelos et al. (2001); Zhu et al. (2010); Alam et al. (2011)

	leadership and actively participates in the process. TMS3- The top management of organizations is open to undertaking the financial and organizational risks associated with adopting crowdsourcing.	
Organizational Culture	OC1- Organizations have positive attitude towards adopting new technologies OC2- Organizations encourage innovative thinking OC3- Organizations embrace external experimentation and take risks OC4- Organizations promote collaboration and knowledge sharing	Beatty et al., 2001; Soliman & Janz, 2004
Organizational Size	OS1- The total workforce size within organizations. OS2- The yearly financial volume or revenue generated by the organization.	Premkumar & Roberts (1999); Zhu et al. (2006); Chwelos et al. (2001)
Technological turbulence	TT1- The technology landscape within the industry is evolving at a rapid pace. TT2- Significant opportunities arise in the industry due to technological shifts. TT3- Many new product ideas are now possible due to technological breakthroughs.	Sethi & Iqbal (2008)
Competitive pressure	CP1: Not adopting crowdsourcing may lead to customer loss to competitors. CP2: Crowdsourcing is crucial for strategic marketplace competitiveness. CP3: Crowdsourcing enhances our competitive advantage.	Gangwar et al. (2015); Tripopsakul (2018)
Crowdsourcing adoption	CA1- What is the current status of your organization's involvement in crowdsourcing adoption? Options include: not considering at present, currently in the evaluation phase (e.g., conducting pilot studies), evaluated but not planning to adopt, evaluated and planning to adopt, or already adopted crowdsourcing services, infrastructure, or platforms.	Thiesse et al. (2011)

	CA2- If your organization anticipates future adoption of crowdsourcing, how do you envision this happening? Choices range from not considering, a timeline of more than 5 years, between 2 and 5 years, between 1 and 2 years, less than 1 year, to already having adopted crowdsourcing services, infrastructure, or platforms.	
--	--	--

3.4.3 Common Method Bias

In order to address the potential impact of common method bias stemming from a singular survey for data collection, this study employed two distinct statistical analyses. Firstly, Harman's one-factor test, as proposed by Podsakoff et al. (2003), was executed to examine whether the items significantly loaded onto a single factor. The findings revealed the absence of a singular factor in the data.

In order to further evaluate the potential impact of common method bias (CMB), the study employed the construct-level correction (CLC) approach, as recommended by Chin et al. (2013). This approach incorporates the measured latent marker variable (MLMV) technique, wherein unmeasured marker variables are introduced as exogenous variables that predict each endogenous variable in the model. In this study, the designated measured latent marker variable was "self-efficacy," which was assessed using five distinct items. Notably, all the significant effects observed in the model without the marker variable remained significant even in the presence of the marker variable. This suggests that no significant common method bias was present in the data, indicating that the findings of this study are not affected by such bias.

3.5 Results and Findings

The validation process for the study model encompassed two sequential phases: the measurement model and the structural model. To establish the soundness of the measurement model, we employed the Partial Least Squares (PLS) method, a component-based structural equation modeling technique. To ensure the robustness of the measurement model, we utilized the Partial Least Squares (PLS) method, a component-based approach to structural equation modeling. This validation was executed using SmartPLS 3.2.7 software, and we generated 5000 bootstrap resamples to ensure the robustness of our results. It is important to recognize that, despite its advantages, PLS does have certain limitations. For instance, when applied to small samples, PLS may exhibit tendencies toward overfitting, potentially leading to inflated model fit and unreliable parameter estimates. Although it effectively addresses

concerns related to multicollinearity, PLS may not offer the same level of precision in estimating relationships among latent variables as some other methodologies. Furthermore, the absence of traditional goodness-of-fit indices in PLS may restrict the comprehensive assessment of model fit. Additionally, PLS assumes a reflective measurement model, which may not always be the most appropriate choice for intricate constructs.

Nevertheless, despite these limitations, the selection of PLS for this study is justified based on its advantages and alignment with the research context. PLS excels in handling complex models involving both formative and reflective constructs, making it a suitable choice for predictive purposes and model exploration. Given the limited sample size in this study, the preference for PLS over covariance-based techniques like LISREL and AMOS is warranted. This decision is grounded in PLS's ability to mitigate challenges associated with factor unpredictability and invalid solutions, rendering it effective in estimating intricate interaction effects.

3.5.1 Evaluation of Measurement Model

The assessment conducted on the Partial Least Squares Structural Equation Modeling (PLS-SEM) encompassed two primary phases: the measurement model and the structural model. Evaluation of the measurement model focused on key aspects such as internal consistency, convergent validity, and discriminant validity, adhering to the guidelines outlined by Hair et al. (2017). The outcomes of the analysis of the measurement model are detailed in Table 3.4. Cronbach's alpha values ranged from 0.819 to 0.945, indicating a robust level of internal consistency. Additionally, composite reliability values were within the range of 0.849 to 0.961. Convergent validity was established, with Average Variance Extracted (AVE) values exceeding 0.50. The item factor loadings, spanning from 0.866 to 0.947, further affirmed both internal consistency and convergent validity.

To evaluate discriminant validity, we applied Fornell and Larcker's criterion and examined cross-loadings as suggested by Henseler et al. (2016). The square roots of the Average Variance Extracted (AVE) values, presented in Table 3.5, surpass the respective correlation coefficients between the constructs. This observation supports the presence of discriminant validity, aligning with the criteria established by Fornell & Larcker (1981). The second criterion mandates that each indicator's loading must exceed all cross-loadings. Examination of the loading and cross-loading tables (Table 3.6) reveals that the loading patterns consistently exceed those of the cross-loadings.

Table 3.4: Results of measurement model for Study 2

Construct	Indicator	Item loadings >0.70	Cronbach's α (CA) >0.70	Composite Reliability (CR) >0.70	Average Variance Extracted (AVE) >0.50
PO	PO1	0.943	0.819	0.949	0.861
	PO2	0.925			
	PO3	0.916			
PCR	PCR1	0.924	0.919	0.849	0.86
	PCR2	0.911			
	PCR3	0.948			
RA	RA1	0.916	0.941	0.955	0.809
	RA2	0.893			
	RA3	0.866			
	RA4	0.906			
	RA5	0.914			
CX	CX1	0.943	0.939	0.956	0.845
	CX2	0.922			
	CX3	0.882			
	CX4	0.928			
CM	CM1	0.914	0.931	0.951	0.828
	CM2	0.919			
	CM3	0.902			
	CM4	0.906			
TR	TR1	0.95	0.945	0.961	0.859
	TR2	0.9			
	TR3	0.926			
	TR4	0.931			
TMS	TMS1	0.927	0.89	0.932	0.819
	TMS2	0.905			
	TMS3	0.884			
OC	OC1	0.911	0.941	0.958	0.85
	OC2	0.928			
	OC3	0.934			
	OC4	0.915			
OS	OS1	0.914	0.836	0.924	0.858
	OS2	0.938			
TT	TT1	0.943	0.912	0.945	0.851
	TT2	0.883			
	TT3	0.941			
CP	CP1	0.906	0.893	0.934	0.824
	CP2	0.929			
	CP3	0.889			
CA	CA1	0.939	0.875	0.941	0.889
	CA2	0.947			

Table 3.5: Fornell and Larcker criterion for Study 2

	PO	PCR	RA	CX	CM	TR	TMS	OC	OS	TT	CP	CA
PO	0.928											
PCR	0.914	0.927										
RA	0.919	0.912	0.899									
CX	0.83	0.864	0.86	0.919								
CM	0.923	0.923	0.862	0.842	0.91							
TR	0.898	0.919	0.85	0.858	0.845	0.927						
TMS	0.873	0.913	0.864	0.828	0.824	0.917	0.905					
OC	0.925	0.922	0.872	0.882	0.857	0.91	0.829	0.922				
OS	0.909	0.925	0.851	0.878	0.86	0.917	0.901	0.85	0.926			
TT	0.904	0.727	0.848	0.857	0.9	0.85	0.825	0.917	0.816	0.923		
CP	0.922	0.921	0.856	0.918	0.754	0.916	0.897	0.921	0.739	0.916	0.908	
CA	0.907	0.917	0.845	0.916	0.807	0.826	0.839	0.915	0.904	0.895	0.906	0.943

Table 3.6: Item Cross-Loadings for Study 2

	CA	CM	CP	CX	OC	OS	PCR	PO	RA	TMS	TR	TT
CA1	0.939	0.82	0.817	0.838	0.845	0.812	0.848	0.806	0.891	0.906	0.837	0.79
CA2	0.947	0.888	0.89	0.943	0.934	0.89	0.934	0.901	0.891	0.866	0.907	0.894
CM1	0.825	0.914	0.852	0.9	0.879	0.873	0.895	0.818	0.865	0.848	0.904	0.843
CM2	0.828	0.919	0.897	0.868	0.884	0.887	0.837	0.857	0.901	0.837	0.838	0.883
CM3	0.823	0.902	0.844	0.88	0.858	0.857	0.887	0.829	0.859	0.872	0.884	0.84
CM4	0.824	0.906	0.879	0.854	0.863	0.877	0.815	0.855	0.877	0.808	0.813	0.829
CP1	0.812	0.851	0.906	0.834	0.834	0.84	0.798	0.816	0.83	0.769	0.8	0.812
CP2	0.84	0.872	0.929	0.859	0.913	0.853	0.829	0.859	0.906	0.846	0.842	0.85
CP3	0.817	0.874	0.889	0.788	0.869	0.865	0.809	0.79	0.844	0.826	0.881	0.789
CX1	0.847	0.888	0.89	0.943	0.934	0.89	0.934	0.901	0.891	0.866	0.907	0.894
CX2	0.85	0.874	0.856	0.922	0.915	0.859	0.895	0.83	0.881	0.879	0.899	0.874
CX3	0.767	0.874	0.857	0.882	0.838	0.814	0.834	0.782	0.837	0.779	0.852	0.873
CX4	0.898	0.904	0.883	0.928	0.918	0.918	0.878	0.896	0.919	0.883	0.866	0.872
OC1	0.834	0.871	0.922	0.854	0.911	0.848	0.825	0.851	0.9	0.843	0.839	0.846
OC2	0.846	0.896	0.877	0.898	0.928	0.905	0.888	0.862	0.914	0.837	0.895	0.875
OC3	0.927	0.888	0.89	0.923	0.934	0.89	0.924	0.901	0.891	0.866	0.907	0.894
OC4	0.85	0.874	0.856	0.912	0.915	0.859	0.895	0.83	0.881	0.879	0.899	0.874
OS1	0.767	0.874	0.857	0.882	0.838	0.914	0.834	0.782	0.837	0.779	0.852	0.883
OS2	0.898	0.904	0.883	0.928	0.918	0.938	0.878	0.896	0.919	0.883	0.866	0.872
PCR1	0.894	0.866	0.85	0.875	0.899	0.829	0.924	0.901	0.891	0.853	0.865	0.86
PCR2	0.817	0.876	0.889	0.89	0.87	0.868	0.911	0.792	0.846	0.827	0.891	0.89
PCR3	0.92	0.884	0.853	0.918	0.907	0.877	0.948	0.849	0.896	0.916	0.913	0.885
PO1	0.882	0.848	0.857	0.873	0.89	0.842	0.869	0.943	0.885	0.856	0.854	0.828
PO2	0.829	0.871	0.862	0.88	0.877	0.851	0.876	0.925	0.841	0.805	0.846	0.877

PO3	0.812	0.851	0.906	0.834	0.834	0.84	0.798	0.916	0.83	0.769	0.8	0.812
RA1	0.83	0.884	0.844	0.864	0.844	0.872	0.831	0.819	0.926	0.856	0.854	0.869
RA2	0.836	0.826	0.813	0.823	0.839	0.818	0.852	0.816	0.893	0.805	0.84	0.796
RA3	0.79	0.846	0.785	0.852	0.833	0.824	0.855	0.77	0.866	0.864	0.843	0.855
RA4	0.84	0.872	0.829	0.859	0.903	0.853	0.829	0.859	0.906	0.846	0.842	0.85
RA5	0.847	0.897	0.878	0.898	0.928	0.905	0.888	0.864	0.914	0.837	0.894	0.876
TMS1	0.808	0.841	0.825	0.826	0.838	0.805	0.827	0.782	0.85	0.927	0.863	0.848
TMS2	0.836	0.826	0.823	0.843	0.849	0.818	0.852	0.816	0.893	0.905	0.84	0.796
TMS3	0.79	0.846	0.785	0.852	0.833	0.824	0.855	0.77	0.866	0.884	0.843	0.875
TR1	0.868	0.879	0.844	0.9	0.898	0.865	0.89	0.826	0.9	0.889	0.95	0.897
TR2	0.869	0.816	0.906	0.904	0.909	0.897	0.903	0.873	0.892	0.849	0.915	0.907
TR3	0.872	0.867	0.855	0.895	0.886	0.862	0.897	0.833	0.877	0.878	0.926	0.869
TR4	0.819	0.837	0.841	0.851	0.865	0.809	0.863	0.794	0.852	0.856	0.931	0.845
TT1	0.825	0.914	0.852	0.9	0.879	0.873	0.895	0.818	0.865	0.848	0.904	0.943
TT2	0.828	0.819	0.867	0.868	0.88	0.881	0.837	0.857	0.801	0.737	0.838	0.883
TT3	0.822	0.899	0.842	0.88	0.856	0.856	0.887	0.825	0.858	0.874	0.886	0.941

3.5.2 Evaluation of Structural Model

After confirming the validity of the measurement model, the analysis proceeded to assess the structural model. Various indicators were scrutinized, including path coefficients (β) to gain an understanding of the significance of the relationship, determination coefficients (R^2) to gauge model variance, impact size (f^2) to evaluate the influence of the endogenous constructs, and Stone-Geisser's Q^2 value to appraise the predictive relevance of the model. This assessment adhered to the guidelines outlined by Hair et al. (2017). The primary focus centered on the examination of path coefficients and their corresponding t-values to determine the significance of the relationships. The results of the hypotheses testing are summarized in **Table 3.7**.

Table 3.7: Hypotheses Testing results for for Study 2

Hypotheses	Relation	Beta	t values	P values	Supported
H1	RA→CA	0.445	6.285	0.000	Supported
H1a	PO→RA	0.326	6.223	0.000	Supported
H1b	PCR→RA	0.649	13.652	0.000	Supported
H2	CX→CA	0.366	12.595	0.000	Supported
H3	CM→CA	0.232	2.005	0.045	Supported
H4	TR→CA	0.110	0.181	0.001	Supported
H5	TMS→CA	0.287	6.157	0.000	Supported
H6	OC→CA	-0.306	2.942	0.003	Supported
H7	OS→CA	-0.655	7.944	0.000	Supported
H8	TT→CA	-0.531	6.053	0.000	Supported
H9	CP→CA	0.109	1.666	0.096	Not Supported
Indirect effect	PCR→RA→CA	0.289	5.746	0.001	Supported
	PO→RA→CA	0.145	4.344	0.003	Supported

The examination of the R^2 value shows that perceived cost reduction and perceived opportunity explain 73.3% of the crowdsourcing adoption. The path coefficient between relative advantage and crowdsourcing adoption ($\beta = 0.445$) shows that higher levels of relative advantage led to higher levels of crowdsourcing adoption. Similarly, higher levels of perceived opportunity ($\beta = 0.326$), perceived cost reduction ($\beta = 0.649$), complexity ($\beta = 0.366$), and compatibility ($\beta = 0.232$) cause higher levels of crowdsourcing adoption. Moving further, the higher level of technology readiness ($\beta = 0.110$), and top management support ($\beta = 0.287$), indicate a higher level of crowdsourcing adoption. From another angle, higher levels of organizational culture ($\beta = -0.306$), organizational size ($\beta = -0.655$), and technological turbulence ($\beta = -0.531$) lead to lower levels of ICT adoption. Competitive pressure ($\beta = 0.109$) is not statistically significant for crowdsourcing adoption.

In our model, we explore the indirect influence of perceived cost reduction on crowdsourcing adoption by multiplying the path coefficient of perceived cost reduction, which elucidates relative advantage, with the path coefficient of relative advantage, explaining crowdsourcing. This computation results in 0.289 (0.649×0.445), and our examination confirms the statistical significance of the indirect impact of perceived cost reduction ($p < 0.05$). In a similar vein, a parallel assessment demonstrates that the indirect effect of perceived opportunity also attains statistical significance ($p < 0.05$). The comprehensive research model comprehensively accounts for 83.1% of crowdsourcing adoption. These findings underscore the model's effectiveness in understanding the adoption of crowdsourcing by organizations. Additionally, the investigation extended to scrutinizing both the structural model and individual associations. The evaluation of the structural model involved the examination of the coefficient of determination R^2 , while the model's predictive accuracy was gauged through predictive relevance Q^2 . The precise values of both the coefficient of determination R^2 and the adjusted R^2 are detailed in Table 3.8.

Table 3.8: Coefficient of determination- R^2 values for Study 2

	R^2	Adjusted R^2
Crowdsourcing adoption (CA)	0.944	0.943
Relative advantage (RA)	0.913	0.913

The examination of effect size f^2 was conducted to determine the individual impacts of endogenous construct variables, following the methodologies of Henseler et al. (2016) and Roldan et al. (2012). According to Hair et al. (2017), the interpretation of f^2 values is as follows: 0.01 indicates a small effect, 0.15 suggests a moderate effect, and 0.35 signifies a large effect. The f^2 values reported in Table 3.9 show that compatibility has a small f^2 size effect on crowdsourcing adoption. Complexity,

perceived cost reduction, relative advantage, top management support has a large f^2 size effect on crowdsourcing adoption. Whereas on the other hand, perceived opportunity has a moderate f^2 size effect on crowdsourcing adoption. Organizational culture, size, technological turbulence, and competitive pressure has a negligible effect.

Table 3.9: Coefficient of determination effect size- f^2 values for Study 2

	Crowdsourcing Adoption	Relative Advantage
Compatibility	0.013	
Competitive pressure	0.001	
Complexity	0.314	
Organizational culture	0.000	
Organizational size	0.000	
Perceived cost reduction		0.797
Perceived opportunity		0.201
Relative advantage	0.665	
Top management support	0.742	
Technology readiness	0.214	
Technology turbulence	0.000	

Finally, in the blindfolding process, the predictive capacity of the model (Q^2) was evaluated. The positive Q^2 values presented in Table 3.10 demonstrate that all endogenous variables possess favorable values, confirming the model's predictive significance.

Table 3.10: Predictive capacity values- Q^2 for Study 2

	Q^2
Crowdsourcing adoption	0.831
Relative advantage	0.733

3.6 Discussion

Examining the factors influencing the adoption of crowdsourcing holds significant importance as organizations explore integrating crowdsourcing for activities like innovation, problem-solving, data collection, marketing initiatives, and creative projects. This study seeks to evaluate the determinants of crowdsourcing adoption using a comprehensive approach that takes into account the innovation characteristics applicable to crowdsourcing, as well as the technological, organizational, and environmental perspectives within the organization. The results indicate that seven crucial factors play a substantial role in influencing crowdsourcing adoption: relative advantage, perceived cost reduction, perceived opportunity, compatibility, complexity, technology readiness, and top management support (Table 3.7).

Innovation Characteristics for Crowdsourcing Adoption:

In terms of innovation characteristics, the positive impact of relative advantage on the adoption of crowdsourcing (*H1*) is evident among the three identified characteristics. This observation aligns with findings reported in existing literature (Gangwar et al., 2015; Tripopsakul, 2018; Shahadat et al., 2023). The positive influence of relative advantage on crowdsourcing adoption is grounded in the belief that individuals and organizations are more likely to embrace a new practice or technology if it is perceived as significantly better than existing alternatives. In the context of crowdsourcing, this translates to efficiency and effectiveness improvements, a diverse pool of skills and ideas, potential cost savings, quicker results, and enhanced quality. Organizations recognizing these advantages are more inclined to adopt crowdsourcing as a strategic approach, driven by the perceived relative advantage it offers over traditional methods.

To assess the relative advantage of crowdsourcing and its potential advantages, we examined the constructs of perceived cost reduction and perceived opportunity as predictors. The rationale behind considering perceived cost reduction and perceived opportunity as predictors of relative advantage is rooted in their significant impact on the overall appeal and effectiveness of crowdsourcing adoption within organizational contexts. *Perceived cost reduction (H1a)* is confirmed as the important driver to explain the relative advantage of crowdsourcing. This result is consistent with studies that have found perceived cost reduction to be a strong driver for the adoption of crowdsourcing, as organizations are inherently motivated by the prospect of achieving economic efficiency and optimizing resource allocation. The ability of crowdsourcing to provide cost savings can be a compelling factor for organizations seeking innovative solutions without incurring substantial financial burdens.

Similarly, *perceived opportunity (H1b)* contributes to the relative advantage of crowdsourcing by presenting organizations with the prospect of accessing a diverse pool of skills, ideas, and solutions. The notion that crowdsourcing opens avenues for novel opportunities aligns with the broader goal of achieving competitive advantages and fostering innovation within organizations. Consequently, the consideration of

perceived cost reduction and perceived opportunity as predictors of relative advantage reflects the strategic importance of these factors in shaping organizations' perceptions and decisions regarding the adoption of crowdsourcing.

The hypothesis proposed that *Complexity (H2)* would exert a negative influence on the adoption of crowdsourcing, as the substantial effort required by organizations to implement and manage it might deter its adoption. However, the statistical analysis reveal that organizations continue to adopt crowdsourcing despite the complexities involved. The challenges of complexity—such as coordinating diverse contributions, ensuring quality control, and integrating crowdsourcing into existing processes—are outweighed by its benefits (Schlagwein et al., 2014; Chou, 2021). Maybe practitioners are adopting crowdsourcing because it offers access to a diverse pool of external contributors, enabling organizations to address specialized needs and gaps in internal expertise. Further, modern crowdsourcing platforms reduce organizational effort by offering advanced tools for task segmentation, workflow coordination, and quality management. These tools streamline the adoption process, making it more manageable for organizations to navigate inherent complexities. In scenarios where addressing technical challenges or driving innovation is critical for survival, crowdsourcing serves as a strategic approach. It allows organizations to overcome resource limitations, remain competitive, and effectively manage complexity while leveraging collective intelligence for sustained success.

Compatibility (H3) emerges as a crucial facilitator for the widespread adoption of crowdsourcing within organizations. This finding aligns with the notion that the degree to which crowdsourcing aligns with existing organizational structures, processes, and values significantly influences its successful integration. Organizations are more likely to embrace crowdsourcing when it complements their existing workflows, technologies, and strategic objectives (Qin et al., 2016). One key reason for compatibility being a facilitator is that it minimizes disruptions and ensures a smoother integration of crowdsourcing initiatives into the organizational framework. When crowdsourcing aligns with established practices, it becomes easier for employees to adapt and incorporate these collaborative approaches into their daily routines. Furthermore, compatibility fosters a positive organizational culture, as it signifies that crowdsourcing is not perceived as a radical departure from existing norms but rather as a complementary and value-enhancing tool. This alignment enhances the likelihood of successful implementation and sustained engagement with crowdsourcing initiatives, as it resonates with the organizational context and goals. Overall, compatibility acts as a facilitator for crowdsourcing adoption by promoting a seamless fit within the organizational landscape.

Technology Context for Crowdsourcing Adoption:

Technology readiness (H4) emerges as a vital facilitator in the widespread adoption of crowdsourcing within organizations, a finding consistent with previous studies in the field. This underscores the understanding that the organization's preparedness and openness to adopting and integrating new technological solutions significantly influence the successful implementation of crowdsourcing initiatives. In essence, when an organization is technologically ready, it possesses the infrastructure, systems, and supportive environment necessary for the seamless integration of crowdsourcing into its operations. One key reason for technology readiness serving as a facilitator is its role in minimizing hurdles related to the implementation of new technologies. Organizations that are technologically ready are equipped with the necessary resources, skills, and infrastructure, making the adoption of crowdsourcing platforms and tools more straightforward (Sadoughi et al., 2020). Moreover, a technologically ready environment fosters a culture of innovation and experimentation, where employees are more inclined to embrace and adapt to new technological solutions, further promoting the success of crowdsourcing initiatives.

Furthermore, technology readiness ensures that organizations can harness the full potential of crowdsourcing, leveraging advanced features and functionalities offered by modern platforms (Lynn et al., 2018). This readiness contributes to a more efficient and effective crowdsourcing process, enhancing collaboration, problem-solving, and overall organizational performance. Therefore, technology readiness acts as a facilitator for crowdsourcing adoption by providing the essential foundation for successful integration and utilization within the organizational context.

Organizational Context for Crowdsourcing Adoption:

Our study furnishes empirical evidence emphasizing the significance of *Top management support (H5)* in elucidating the adoption of crowdsourcing within organizational contexts. This finding aligns with the broader literature on organizational change and innovation, highlighting the pivotal role of leadership endorsement in driving the acceptance and integration of novel practices (Hsu et al., 2019; Djelassi & Decoopman, 2013). Top management support serves as a catalyst for crowdsourcing adoption by signaling a commitment to innovation and a recognition of the strategic value that crowdsourcing can bring. One crucial reason for top management support being a key factor lies in its ability to allocate resources, both in terms of finances and personnel, towards the successful implementation of crowdsourcing initiatives. When leaders actively endorse and champion crowdsourcing, it not only provides legitimacy to the practice but also ensures that the necessary investments are made to facilitate its seamless integration into existing workflows. Moreover, top management support creates a culture that encourages experimentation and risk-taking, fostering an environment where employees feel empowered to engage with crowdsourcing initiatives.

Additionally, the influence of top management extends beyond resource allocation; it also plays a pivotal role in shaping organizational priorities and values (Thuan et al., 2015). A supportive top management fosters a culture that values collaboration, open communication, and continuous improvement—elements that are integral to the success of crowdsourcing initiatives. Therefore, our study underscores that top management support acts as a linchpin in the organizational context, propelling crowdsourcing adoption by providing the necessary leadership endorsement, resources, and cultural alignment.

Organizational Culture (H6) exhibits a noteworthy correlation with crowdsourcing adoption, albeit characterized by a negative relationship. This seemingly paradoxical discovery implies that specific facets of organizational culture may function as hindrances or limitations to the integration of crowdsourcing initiatives. One plausible rationale for this adverse correlation may stem from the entrenched organizational mindset and resistance to change (Simula & Ahola, 2014). If the prevalent organizational culture leans towards conservatism, resistance to novel collaborative models like crowdsourcing might emerge. Traditional organizational cultures, valuing hierarchy, centralized decision-making, and established workflows, could perceive crowdsourcing as disruptive or incongruent with their norms. In such scenarios, both employees and leaders may be hesitant to embrace crowdsourcing due to apprehensions regarding potential disruptions, perceived loss of control, or uncertainties about collaborative outcomes. Furthermore, organizational cultures prioritizing individual contributions over collaborative endeavors might regard crowdsourcing as a departure from established norms. The negative correlation may also mirror concerns about the impact of crowdsourcing on individual accountability, recognition, and performance evaluation. In essence, the adverse connection between organizational culture and crowdsourcing adoption underscores the intricate interplay between cultural factors and the willingness to adopt innovative collaborative practices. It emphasizes the need to address cultural barriers and cultivate a culture marked by openness, adaptability, and an appreciation for collaborative approaches (Scupola & Nicolajsen, 2021) to enhance the probability of successful crowdsourcing adoption within organizations.

Organizational Size (H7) demonstrates a statistically significant relationship with crowdsourcing adoption, yet the direction of influence is negative. This intriguing finding suggests that as organizational size increases, the propensity to adopt crowdsourcing initiatives tends to decrease. Several factors may contribute to this negative association (Mathauer & Hofmann, 2019). Larger organizations often possess more established and traditional structures, making them potentially resistant to the agility and flexibility offered by crowdsourcing. The bureaucratic nature of larger organizations may impede the swift decision-making and adaptability required for effective crowdsourcing implementation. Additionally, communication challenges and coordination issues inherent in larger entities could pose obstacles to the seamless integration of crowdsourcing practices. Furthermore, the increased complexity and layers of hierarchy in larger organizations might lead to a more cautious approach toward adopting innovative collaborative models like crowdsourcing. The negative influence of organizational size on crowdsourcing adoption underscores the detailed

dynamics at play, emphasizing the need for tailored strategies and considerations based on the organizational scale when implementing crowdsourcing initiatives.

Environmental Context for Crowdsourcing Adoption:

The results of our study indicate that *Technological Turbulence (H8)* exhibits a significant relationship with crowdsourcing adoption, yet the impact is negative. This intriguing finding suggests that higher levels of technological turbulence within an industry or organizational context may hinder the adoption of crowdsourcing initiatives. The negative influence could be attributed to several factors (Ishikawa, 2019). In technologically turbulent environments, organizations may prioritize stability and risk mitigation, making them less inclined to embrace the dynamic and potentially uncertain nature of crowdsourcing. Rapid technological changes and uncertainties may create a reluctance to add another layer of complexity through crowdsourcing initiatives. Additionally, organizations facing technological turbulence may prioritize internal innovation and R&D activities over external collaborative models like crowdsourcing. The need for stability and focus on internal capabilities may overshadow the perceived benefits of engaging external contributors through crowdsourcing. The negative association between technological turbulence and crowdsourcing adoption emphasizes the importance of understanding the specific challenges posed by the technological landscape when introducing collaborative practices, requiring a detailed approach to navigate the complexities of technological change and organizational innovation.

The examination of Competitive Pressure (H9) in relation to crowdsourcing adoption revealed a lack of statistical significance, indicating that there is no discernible relationship between competitive pressure and the adoption of crowdsourcing initiatives within organizations. Several factors may contribute to this absence of correlation. Firstly, organizations may prioritize internal factors, such as innovation goals, operational efficiency, or strategic objectives, over external competitive pressures when deciding to embrace crowdsourcing. In dynamic and competitive industries, where organizations face multifaceted challenges, the decision to adopt crowdsourcing may be influenced by a complex interplay of factors beyond immediate competitive pressures (Kohler & Chesbrough, 2019). Additionally, the perceived benefits of crowdsourcing, such as innovation and problem-solving, might be seen as independent of external competitive forces. This finding emphasizes the multifaceted nature of the decision-making process surrounding crowdsourcing adoption, suggesting that organizations weigh a range of internal and industry-specific considerations beyond competitive pressures when evaluating the integration of crowdsourcing into their operational frameworks.

3.7 Implications of Research

The findings of our study hold profound significance for both practical decision-making and theoretical advancements in the realms of crowdsourcing adoption. In the following sections, we outline the managerial and practical implications, providing actionable insights for organizational leaders, and subsequently delve into the theoretical implications, elucidating the contribution of our research to the broader theoretical landscape of technology adoption and crowdsourcing.

3.7.1 Managerial and Practical Implications

The findings of our study offer valuable insights for decision-makers steering the adoption of crowdsourcing initiatives within their organizations. Seven crucial factors—relative advantage, perceived cost reduction, perceived opportunity, compatibility, complexity, technology readiness, and top management support—have emerged as critical determinants influencing crowdsourcing adoption. Decision-makers contemplating crowdsourcing initiatives can leverage these findings as a robust foundation for assessing the direct and indirect impacts of innovation characteristics.

Firstly, decision-makers must recognize the relative advantage that crowdsourcing provides. This advantage manifests in enhanced problem-solving, increased productivity, cost savings, quality improvement, innovation, faster decision-making, and risk mitigation. Understanding and capitalizing on these benefits can position crowdsourcing as a strategic approach, particularly when perceived as significantly superior to existing alternatives. Perceived cost reduction and perceived opportunity play pivotal roles in shaping the relative advantage of crowdsourcing. Organizations motivated by economic efficiency and resource optimization are more likely to embrace crowdsourcing, given its potential for cost savings and access to a diverse pool of skills, ideas, and solutions.

The study also reveals that complexity, instead of acting as a barrier, can drive crowdsourcing adoption when organizations recognize the benefits of accessing external expertise to address intricate challenges. To capitalize on this, organizations should reduce the effort required by implementing platforms with tools for task segmentation, workflow coordination, and quality management. These tools simplify integration, streamline operations, and help manage complexities while leveraging collective intelligence for innovation. Furthermore, ensuring the compatibility of crowdsourcing with existing organizational structures, processes, and values is crucial for its seamless integration. Decision-makers should align crowdsourcing initiatives with existing organizational structures, processes, and values to ensure successful integration. Compatibility minimizes disruptions and fosters a positive organizational culture, signaling that crowdsourcing is a complementary and value-enhancing tool rather than a radical departure from existing norms.

In the technology context, our study underscores the importance of technology readiness as a vital facilitator for crowdsourcing adoption. Organizations need to assess their preparedness and openness to adopting and integrating new technological solutions, ensuring the necessary infrastructure, systems, and supportive environment are in place for seamless crowdsourcing integration.

Moving to organizational considerations, our study offers crucial insights into top management support, organizational culture, and organizational size. The empirical evidence emphasizes the paramount importance of top management support in elucidating the adoption of crowdsourcing within organizations. Decision-makers should recognize top management as a linchpin in the successful implementation of crowdsourcing initiatives. Leadership endorsement serves as a catalyst for adoption, signaling a commitment to innovation and acknowledging the strategic value of crowdsourcing. The role of top management extends beyond mere resource allocation; it shapes organizational priorities and values. A supportive top management fosters a collaborative culture, encouraging experimentation and risk-taking. Our findings reveal a noteworthy correlation between organizational culture and crowdsourcing adoption, characterized by a negative relationship. Decision-makers should be attentive to cultural barriers and work towards cultivating an organizational culture marked by openness, adaptability, and an appreciation for collaborative approaches. Addressing concerns related to potential disruptions, loss of control, and uncertainties about collaborative outcomes is crucial. The study demonstrates a statistically significant relationship between organizational size and crowdsourcing adoption, with a negative influence. Decision-makers should consider that as organizational size increases, the inclination to adopt crowdsourcing initiatives tends to decrease. Larger organizations, characterized by more established and traditional structures, may exhibit resistance to the agility and flexibility offered by crowdsourcing.

Moving to the environmental context, our study indicates a significant negative relationship between technological turbulence and crowdsourcing adoption. Decision-makers should be aware that higher levels of technological turbulence may create reluctance to embrace external collaborative models like crowdsourcing. Prioritizing stability and risk mitigation in such environments may lead organizations to focus on internal innovation and R&D activities. Furthermore, our study reveals a lack of statistical significance between competitive pressure and crowdsourcing adoption. Decision-makers should recognize that the decision to adopt crowdsourcing initiatives is not solely driven by external competitive forces. This multifaceted nature of decision-making emphasizes the need for a comprehensive evaluation that considers a range of internal and industry-specific considerations beyond external competitive pressures. In summary, these implications provide valuable insights for managers seeking to introduce crowdsourcing initiatives in environments characterized by technological turbulence and competitive dynamics.

3.7.2 Theoretical Implications

This research significantly contributes to the technology adoption and crowdsourcing field, addressing the growing need for comprehensive approaches that integrate multiple theoretical perspectives to understand the adoption of innovative technologies. Recent scholarly discussions emphasize the importance of a holistic understanding, prompting researchers to combine various theoretical frameworks. In response, our study integrates two crucial theoretical perspectives—the TOE framework and the Diffusion of innovation theory—to create a robust research model. Unlike many other crowdsourcing studies that often overlook a holistic evaluation of innovation characteristics and contextual factors, our model considers both aspects. Notably, our research is the first to empirically validate the indirect effects of antecedents on crowdsourcing adoption determinants.

Our study's uniqueness extends to conducting reliability, validity, and discriminant tests on the instrument, affirming its credibility. In conclusion, our research model and instrument establish a solid foundation for comprehending crowdsourcing adoption determinants, offering applicability in future innovation studies. The development and evaluation of this integrative research model using a large dataset address the research gap in comprehensively assessing the social, organizational, and environmental perspectives of cloud adoption. Beyond filling this critical gap, our study enhances firms' awareness of the direct and indirect effects of constructs influencing crowdsourcing adoption in organizations.

3.8 Limitations and Future Research

This study, while offering valuable insights into the determinants of crowdsourcing adoption, has certain limitations that warrant consideration. The research is confined to the Indian context, thus exclusively addressing the specific conditions prevalent in India. The cross-sectional nature of the research design provides a static snapshot, limiting the ability to capture the dynamic evolution of crowdsourcing factors over time. The generalizability of the findings may be constrained by the context specificity of the study, prompting the need for future research to validate these results across diverse industries, organizational sizes, and cultural settings. Relying on self-reported data introduces the potential for response bias, and future studies could benefit from incorporating objective measures or multiple data sources. The cross-sectional design also hinders establishing causal relationships between variables, suggesting that longitudinal or experimental approaches could enhance the robustness of the evidence. Additionally, the study focuses predominantly on internal determinants, overlooking potential external factors that might influence crowdsourcing adoption. Continuous monitoring of the rapidly evolving technological landscape is essential to maintain the relevance of the research model over time.

3.9 Conclusion

This research endeavors to shed light on the multifaceted landscape of crowdsourcing adoption within organizational contexts. Through a comprehensive examination of innovation characteristics and organizational perspectives, our study identifies seven pivotal determinants—relative advantage, perceived cost reduction, perceived opportunity, compatibility, complexity, technology readiness, and top management support. These determinants offer a detailed understanding of the factors influencing the decision-making process surrounding crowdsourcing initiatives. The integration of the Diffusion of Innovations (DOI) theory and the Technological-Organizational-Environmental (TOE) framework contributes to the theoretical landscape, presenting a holistic model that captures the intricate interplay between innovation characteristics and organizational dynamics. The empirical validation of the indirect effects of these determinants enhances the robustness of our findings. As organizations navigate the evolving landscape of technology adoption and innovation, the findings presented in this study offer a timely guide. Recognizing the significance of top management support, aligning crowdsourcing initiatives with organizational culture, and understanding the impact of organizational size and technological turbulence are crucial steps toward informed decision-making. In the ever-changing realm of organizational practices, this research provides a solid foundation for further exploration. Longitudinal studies, cross-cultural analyses, and investigations into the external influences on crowdsourcing adoption represent avenues for future research. By continually refining our understanding of the factors influencing crowdsourcing adoption, we can contribute to the development of informed strategies that foster innovation, collaboration, and organizational success.

3.10 Summary

Chapter 3 of the thesis explores the factors influencing the adoption of crowdsourcing initiatives within organizations. It begins by identifying seven crucial determinants of crowdsourcing adoption: relative advantage, perceived cost reduction, perceived opportunity, compatibility, complexity, technology readiness, and top management support. These determinants are discussed in detail, highlighting their impact on the adoption process. Managerial and practical implications of the research findings are then outlined. Decision-makers are advised to recognize the relative advantage of crowdsourcing, leverage perceived cost reduction and perceived opportunity, ~~mitigate complexities, ensure~~ compatibility with existing organizational structures, foster technology readiness, and seek top management support. Additionally, negative correlations between organizational culture and size and crowdsourcing adoption are noted, suggesting potential barriers in certain organizational contexts.

Theoretical implications of the study are also discussed. By integrating the Technological-Organizational-Environmental (TOE) framework and the Diffusion of Innovations theory, the study offers a holistic model for understanding crowdsourcing adoption. It validates the indirect effects of antecedents on crowdsourcing adoption determinants, contributing to the theoretical understanding of technology adoption. Limitations of the study are acknowledged, including its confinement to the Indian context, the cross-sectional research design, and potential response bias from self-reported data. Future research directions are proposed, such as longitudinal studies, cross-cultural analyses, and investigations into external influences on crowdsourcing adoption.

In conclusion, Chapter 3 provides valuable insights for practitioners and contributes to theoretical advancements in the field of crowdsourcing adoption within organizational contexts. Now that we've understood the factors that influence the adoption of crowdsourcing initiatives in Chapter 3, it's time to delve into how organizations can effectively design and implement these initiatives. In Chapter 4, we will explore the design perspective of crowdsourcing adoption for value co-creation.

CHAPTER 4 DESIGNING PERSPECTIVE OF CROWDSOURCING ADOPTION FOR VALUE CO-CREATION

Crowdsourcing has emerged as an innovative sourcing model for organizations, emphasizing the importance of tapping into external knowledge sources to drive innovation. Despite this recognition, the domain of crowdsourcing adoption remains unexplored, with the design aspect characterized by fragmentation and lack of structure. Consequently, there is a pressing need for a deeper understanding of this concept, given its increasing relevance in practice. Therefore, Chapter 4 sets out to *identify and understand the constituent elements and design principles associated with crowdsourcing initiatives, structured across different phases*. This systematic exploration culminates in the development of a novel strategic crowdsourcing framework, contributing to an enhanced comprehension of how organizations can effectively design and implement crowdsourcing initiatives.

4.1 Introduction

Web 2.0 emergence has led to a revolution in information and hyperconnectivity, resulting in transparency, empowered participation of citizens in policy decisions, and changing the relationship between citizens and government (Sivarajah et al., 2015). Second-generation Web tools like social media and networking sites (Anttiroiko, 2010; Grimmelikhuijsen & Meijer, 2015) provide a participatory and social virtual platform to collaborate and network with stakeholders (O'Reilly, 2007). Therefore, public agencies have started incorporating novel technologies to encourage citizen participation in collaborative governance. Challenge.gov platform of the United States (Mergel & Desouza, 2013) and MyGov India's portal (Gandhi, 2016) included disenfranchised citizens in solving complex problems of society and policy designing, which has opened a vista of the digital transition of government from thin democracies to strong democracies (Vragov & Kumar, 2013). The involvement of citizens in government policy-making and improvement leads to a participatory governance scenario in a country, reducing the chances of policy failure (Murotua et al., 2020) and achieving the three pillars of open government: transparency, participation, and collaboration (McDermott, 2010).

The "crowd" (i.e., citizens) is the heart of any governance system. Therefore, every government machinery needs active and empowered citizens to execute the policies successfully. There was a surge of interest to leverage the crowd's collective intelligence to enrich public participation in governance and get work done with an amateur crowd. This phenomenon of using the collective intelligence of citizens to produce something together (Howe, 2006; 2008; Ikediego et al., 2018; Toledo & Leon, 2019) is known as crowdsourcing. Crowdsourcing practices used by the government to tap the collective intelligence of citizens are also known as citizensourcing (Lukensmeyer & Torres, 2008; Randhawa et al., 2019). Crowdsourcing or

citizensourcing mainly refers to a participative online activity where the government engages in a top-down management process to obtain bottom-up creative input from citizens in a virtual community. The government uses citizensourcing to get citizens' diverse ideas, opinions, and suggestions, thereby establishing a continuous contact loop. It was seen as an enabler of increased and improved governance via enriched engagement (e-participation) (Khan et al., 2014), involvement of democratic communities (inclusive e-governance and e-inclusion) (Bala, 2018), increased accountability, transparency in delivery, and standard of government services and through democracy (e-democracy) (Department of Government and Development, 2020). This phenomenon of citizen sourcing has changed the perspective of the government on the public from "users and choosers" to "makers and shapers" of government policies and decisions (Lukensmeyer & Torres, 2008). The widespread adoption of new phenomena resulted in the addition of democratic principles from by the people, for the people, and of the people to with the people, and from the people (Nam, 2012).

Although crowdsourcing can change the reality of governance in many developing countries, the outcomes are not very satisfactory (Belangar & Carter, 2012; Wirtz & Daiser, 2018). Literature shows that crowdsourcing in the public sector is still in its infancy since e-government success stories are limited (Elkadi, 2013; Louis & Charalabidis, 2015; Lastovka, 2015; Lehdonvirta & Bright, 2015; Zogaj et al., 2015; Chandrasekaran et al., 2016; Liu, 2017; Taeihagh, 2017; Venturini & Verbano, 2017; Clark et al., 2019). The failure rate of e-government initiatives, specifically in developing nations, is alarming, as Furuholt & Wahid (2008) reported that more than 60% of projects have not achieved the desired outcome. Of these failures, 35% were categorized as total failures, and 50% were classified as partial failures due to non-attainment of goals or detrimental outcomes. These failures lead to unbearable losses in the form of valuable resources, loss of status, financial crisis, and many political impediments (Nam, 2012). This implies that crowdsourcing can be a double-edged sword as it has enormous potential to improve citizen–government relationships, reduce administrative costs (Ozcan et al., 2020; Dutil, 2015), and improve the efficiency and effectiveness of government services (Brabham, 2015; Bott & Young, 2012). In contrast, it may also lead to adverse effects if unmanaged well.

Crowdsourcing research in the government sector has mainly focused on single aspects of designing crowdsourcing, such as citizen rewards, motivation, task design (Bozzon et al., 2015; Royo & Yetani, 2015; Cupido & Ophoff, 2014), feedback, and validation (Mergel, 2015; Srivastava & Mostafavi, 2018). This fragmented approach to crowdsourcing literature poses threats to the effective implementation of crowdsourcing initiatives. Successful adoption of crowdsourcing requires a conceptual understanding of all the design elements and principles that focus on citizen, technology, and channel orientation (Malodia et al., 2021) in every crowdsourcing phase. Although government agencies have started to experiment with crowdsourcing for empowered citizenship, they have not yet mapped the crowdsourcing implementation framework that leads to the satisfaction of citizens' requirements, building relationships with the coordinating agencies, and using technology

innovatively with respect to governance. Failures in implementing crowdsourcing initiatives for the empowered participation of citizens suggest the lack of an integrated approach to understanding all the design elements and principles of crowdsourcing adoption. Certain elements and design principles may impact the successful implementation of crowdsourcing initiatives. Therefore, this study aims to fill the knowledge gap and guide government agencies to improve the crowdsourcing initiatives in progress.

The research study that focuses on standardized processes for the phase-wise designing of crowdsourcing initiatives and the crowdsourcing strategic framework that represents the different elements and design principles for government agencies is not yet established (Neto & Santos, 2018). No such guidelines exist in crowdsourcing literature that properly guides practitioners in initiating and managing crowdsourcing initiatives (Amrollahi, 2013). From a practical viewpoint, it is essential to have a standardized and comprehensive blueprint that addresses the government challenges when setting up crowdsourcing initiatives. This gap leaves room for conducting this research study. In particular, the important research question investigated in this study is "What elements and design principles should be considered by government agencies while making a blueprint of crowdsourcing initiatives?" The elements and principles will provide direction on what decisions government agencies must make while designing crowdsourcing initiatives to motivate the citizens to engage in governance decision-making, ensure that solutions are implemented well, and provide value to government agencies. Paik *et al.* (2020) suggested to remain cautious while planning and designing crowdsourcing initiatives because crowdsourcing is costly. Therefore, the proposed strategic framework can help public administrators and government agencies identify common pitfalls and issues in design, such as having post-implementation government strategies early in the designing phase of crowdsourcing initiatives that may lead to the attainment of desirable outcomes from crowdsourcing.

The current study is the leading study that conceptualizes the designing of crowdsourcing initiatives in three phases, with the overall goal of developing a crowdsourcing framework. The study further adds to the call for future research related to the rigorous need for "comprehensive guidelines" and "lack of standardization" to manage and understand crowdsourcing initiatives well (Amrollahi, 2015; Neto & Santos, 2018; Zheng *et al.*, 2011). A strategic crowdsourcing framework will facilitate and support effectively designing crowdsourcing initiatives for civic participation and collaborative governance. Effective design can help the government leverage the benefits of collaborative governance at four levels, namely, attractor effects (Brabham, 2013), learning (Ansell & Gash, 2018), leverage, and synergy (Dutil, 2015). In the emerging Indian market, despite the growing importance of the use of crowdsourcing, it is underexplored. Therefore, from a practical viewpoint, the framework will help government agencies save their precious time and resources on crowdsourcing initiatives rather than wasting time on legalities. The contribution of this study is twofold. First, identifying and describing elements and design principles phase-wise contribute to the overall understanding of designing crowdsourcing initiatives in the government sector. This refined understanding provides scope to conduct future

research positioning on the proposed strategic crowdsourcing framework, leading to a more logical study design. Second, with a focus on the Indian context, this study proposes a framework that disentangles the efforts of the government to engage citizens in the crowdsourcing initiatives effectively and to further identify the strengths and weaknesses of those efforts taken by the government. Public administrators can use the proposed strategic framework to gain more insights into designing crowdsourcing initiatives.

4.2 Background

4.2.1 Crowdsourcing in the Government Sector

Brabham (2015) proposed that crowdsourcing is a government-citizen relationship where the government executes a top-down process and seeks to obtain bottom-up, open, and creative citizens' input from an online citizen community, making it productive and full of potential to achieve social welfare. Crowdsourcing is not a panacea but a crucial part of the new governance system (Dutil, 2015) that has become popular after the emergence of Web 2.0 to enhance citizen engagement and ultimately increase trust in the democratic process. There has been a rapid growth in the use of crowdsourcing for e-governance, policy recommendations, increased public participation (Shirky, 2008), sourcing ideas and solutions from citizens for increased satisfaction and empowerment (Brabham, 2009), and e-democracy (Lastovka, 2015).

Crowdsourcing in governance works well with long-standing concepts of deliberate democracy, public participation, and e-democracy. Information flows from citizens to the government. In return, the public helps the government be more responsive and effective. Thus, citizens are empowered to strengthen political legitimacy (Mergel & Desouza, 2013; Brabham, 2015; Lastovka, 2015; Liu, 2017). Many researchers called this new phenomenon citizen sourcing, where sourcing refers to how government agencies acquire collective intelligence of citizens for the accomplishment of their mission. Hence, citizen sourcing done in crowdsourcing enhances citizens' knowledge. Moreover, competence enriches confidence and trust in citizen-government relationships and increases the chances of successful policy execution (Amrollahi, 2015). Crowdsourcing can be used as a strategic tool for realizing the ideals of participatory democracy, resulting in effective government (Aitamurto, 2012).

Crowdsourcing made the constitution reform process efficient by gathering a diverse range of knowledge from the citizens of Iceland, as evident from the Constitution Reform of Iceland. Similarly, budget preparation in Chicago and Calgary used crowdsourcing to gather ideas and perspectives of citizens regarding the budget, leading to transparency in governance. Thus, crowdsourcing is a technological enabler that supports the government in solving governance issues (Brabham, 2019), informing (Aitamurto, 2012), communicating (Bott & Young, 2012), strengthening public participation (Prpic et al., 2015; Certoma et al., 2015), and empowering citizens (Liu,

2017) to solve the day-to-day problems (Certoma & Rizzi, 2017; Al-Omoush et al., 2021).

4.2.2 Literature on Crowdsourcing Initiative Designing

Since the emergence of crowdsourcing, numerous studies have focused on fragmented aspects of crowdsourcing initiatives, such as task meaningfulness, well-framed tasks, worker participation, the quantity of output and quality outcomes (Chandler & Kapelner, 2013), fundamental pillars (i.e., the crowdsourced task, the crowd, the crowdsourcer, and the platform) (Hosseini et al., 2014), crowd identification and evaluation of crowds (Cullina et al., 2016), crowdsourcing stages (e.g., task designing, workflow design, and quality control) (Rocheska et al., 2014; Thuan et al., 2017; Mergel, 2018), task clarity and type, crowd motivation, offering extrinsic and intrinsic motivation, incentives, or rewards for the public (Dahlander & Piezunka, 2014).

Most studies were tilted toward the private sector, as crowdsourcing was initially applied to leverage collective intelligence for designing and creative industries. The government sector started to experiment with crowdsourcing in the much later stages "to collect citizens' opinions," information, expertise, and knowledge to solve the complex issues of society (Randhawa et al., 2019; Hilgers & Ihl, 2010; Desouza, 2012). However, the design and implementation principles used in the corporates may present valuable insights and hints for crowdsourcing implementation in the government sector. Crowdsourcing initiatives in governance are mainly undertaken for social innovation, whereas the private sector focuses on business innovation (Linders, 2012). Therefore, elements of the private crowdsourcing process may not be directly applicable in government agencies because the nature of objectives, duties, and challenges are different. Additionally, the private sector undervalues, overvalues, or ignores the important design aspects (Kohler & Chesbrough, 2019). Therefore, there is a requirement to conduct a holistic study on the identification of design elements of the planning, implementation, and post-implementation phases of crowdsourcing initiatives, with special context to the government sector (Clark et al., 2019; Ozcan et al., 2020; Brabham, 2015; Mergel, 2015; Linders, 2012; Seltzer & Mahmoudi, 2013; Koch et al., 2011).

4.3 Research Methodology

Different qualitative techniques were primarily used to fulfill the aim of the study. A comprehensive systematic literature review was conducted to extract and analyze all the elements and principles of the three phases of designing crowdsourcing. The theoretical background has the power to integrate and evaluate all previous findings of crowdsourcing elements, which cannot be possible if a single study is assessed in isolation. Thus, a literature review is an appropriate research method to systematically extract and synthesize past research, acting as a basis for the further expansion of

knowledge and theory development (Paul & Criado, 2020).

4.3.1 Systematic Literature Review

The systematic literature review used a five-step procedure, i.e., definition of a central topic and research goals, sources and types of data for review, data extraction, data evaluation, and data analysis and synthesis, as proposed by Tranfield *et al.* (2003) and Hallinger (2013).

Definition of central topic of interest and research goals

The first step of a systematic literature review is to state the research problem that needs to be addressed. Later, a search strategy is decided, such as search terms, databases, data extraction, evaluation criteria, analysis, and synthesis of searched data. As mentioned earlier, the study aims to identify and comprehend the elements and design principles that government agencies should consider while making a blueprint for crowdsourcing initiatives. Therefore, this study focuses on studying all individual elements that need to become accustomed to different phases of crowdsourcing initiatives.

Definition of sources and type of data for review

The data sources need to be defined to select the appropriate literature for the study. The search for articles was performed extensively on three databases, Web of Science, Emerald, and ScienceDirect, which have the highest number of publications in our research area. The three databases were selected because of their multidisciplinary research articles published in 30,000 peer-reviewed journals. The choice of database is consistent with past studies conducted (Sarı et al., 2019; Zhen et al., 2023). A broad keyword was used to obtain a complete picture of the previous research conducted in this area. For convenience, the keywords used were separated by *AND* and *OR*. The search incorporates academic papers written in English and within the time frame of a 15-year period, i.e., from 2006 (when the crowdsourcing term was coined) to 2021. As Synder (2029) proposed narrowing the search results by a predefined criterion, four-level criteria were used to conduct the final analysis. Articles that emphasize crowdsourcing in business, management, and governmental contexts were referred to at the initial stage, and the articles that focus on crowdsourcing initiatives were then selected. Later articles based on the crowdsourcing framework and conceptual models were extracted. Finally, articles related to crowdsourcing and design elements were selected.

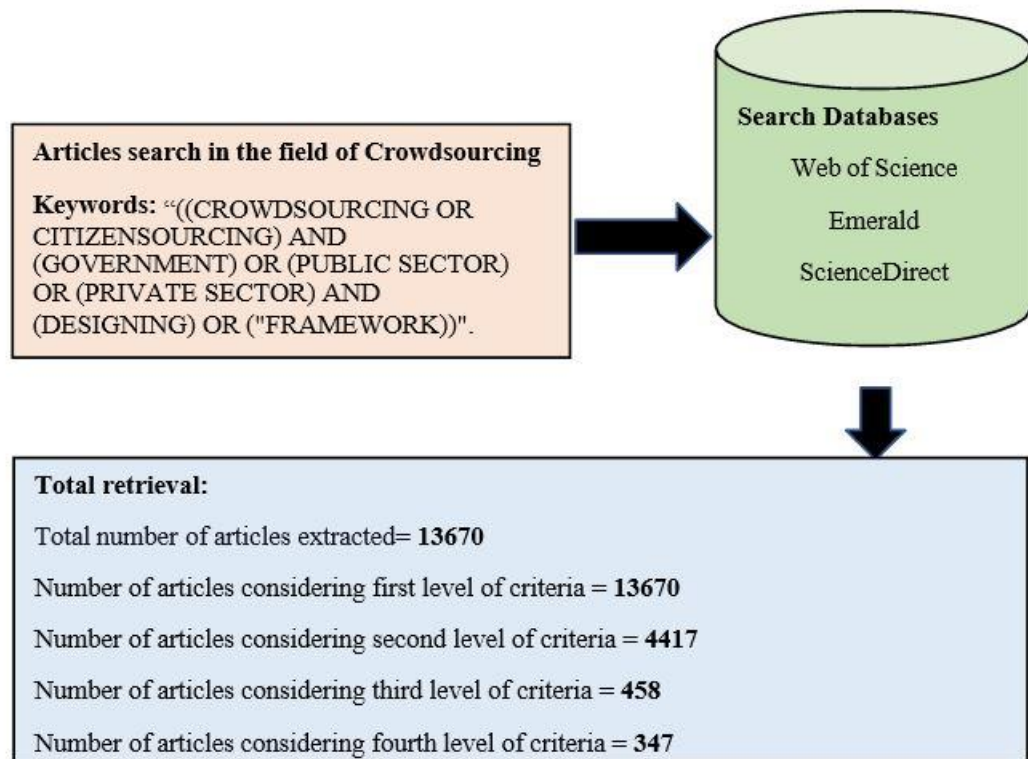
Data extraction

The search was performed using the keywords in all mentioned databases. Four criteria were applied to limit our articles. First, the search includes academic papers written in English and within the time frame of 15-year period, i.e., from 2006 to 2021. Using this criterion, metadata of 13,670 articles were created. This offered a broader view of studies conducted in the area researched. Now the data results were narrowed down as per the focus of the study. Therefore, in the second-level criteria, only those papers that include crowdsourcing studies conducted in business, management, and public administration were searched. Now the search results declined to 4,417 studies. This decline in articles showcases that there are fewer studies conducted in business, public administration, and management contexts. A third criterion was established to include those articles that focused on crowdsourcing initiatives in business, public administration, and management. In doing this, the articles declined to 458. As a final criterion, articles that mentioned crowdsourcing framework or crowdsourcing designing elements were considered. This was done to ensure that only those articles relevant to attain the research objectives were to be taken into our corpus of review. The above criteria were met by reading the title, abstract, keywords, introduction, and conclusion. If this was not sufficient for the decision, the paper was read thoroughly. Therefore, this final step resulted in a total of 347 articles that were relevant to this study's research purpose, as presented in **Table 4.1**. Data evaluation was performed to remove the duplicate papers, resulting in a total of 131 articles. **Figure 4.1** illustrates the selection and evaluation process of articles incorporated under study.

Table 4.1: Systematic Review Process Results for Study 3

Databases	First Criteria	Second Criteria	Third Criteria	Fourth Criteria
Web of Science	4885	462	165	50
Emerald	1681	1435	151	65
Science Direct	7104	2520	142	232
Total	13670	4417	458	347

Figure 4.1: Systematic review process results for Study 3



Data evaluation

All the extracted papers that mentioned individual elements of crowdsourcing initiatives were studied in detail. Designing elements and principles were divided into three phases per their need and relevance, i.e., preparation, execution, and post-execution. All papers were thoroughly analyzed to determine the designing elements phase-wise. There were a total of 131 articles after the data extraction and evaluation process. After having a closer look, researchers noticed that the number of studies conducted that focused on designing elements for crowdsourcing in the government sector was less than that in the business and management sector. The findings of the prior research show that many researchers considered monetary rewards to be the most important reward, while in the government sector, there was community-oriented motivation, building professional networks, and intrinsic motivation to solve complex societal issues in general.

The monetary incentive did not lead to citizens' increased participation rate (Linders, 2012; Meijer, 2014; Bozzon et al., 2015; Loukis & Charalabidis, 2015). "To attract the citizen's attention," there was a need to frame, define, and delineate the purpose of using crowdsourcing. There must be rubrics for how the solution evaluation will be performed

and implemented after the final selection because this only creates enthusiasm in citizens to contribute and make a difference in the government sector.

Data analysis and synthesis

The results of the systematic literature were meticulously analyzed to identify all the design elements and principles from the individual papers extracted. All the design elements were classified under three phases according to their importance. **Table 4.2** presents the six elements and seventeen design principles highlighted in the literature that guide public administrators to create a roadmap for crowdsourcing implementation.

Table 4.2: Crowdsourcing: designing elements and principles for Study 3

Phases	Elements	Principles	Sources
Preparation	Plan and design	Goals specification	Lim <i>et al.</i> (2021); Sharma (2010); Ahuah & Tucci (2012); Lykourantzou <i>et al.</i> (2013); Bassi <i>et al.</i> (2020); Malone <i>et al.</i> (2010); Rosen (2011)
		Task description	Schafer <i>et al.</i> (2017); Nguyen <i>et al.</i> (2013); Moussawi & Koufaris (2013); Tokarchuk <i>et al.</i> (2012); Leineister <i>et al.</i> (2009); Muhdi <i>et al.</i> (2011)
		Task duration	Ayaburi <i>et al.</i> (2020); Chen <i>et al.</i> (2020); Boudreau <i>et al.</i> (2011); Massa & Testa (2017); Kulkarni <i>et al.</i> (2012); Nakatsu <i>et al.</i> (2014)
		Task decomposition	Natalicchio <i>et al.</i> (2017); Pee <i>et al.</i> (2018); Blohm <i>et al.</i> (2018); Kittur <i>et al.</i> (2013); Hetmank (2013)
		Citizen qualification	Geiger & Schader (2014); Christensen & Karlsson (2019); Bucheler & Sieg (2011)
		Coordinating agencies	Heeks & Nicholson (2004)
		Infrastructure	Surowiecki (2004); Potter <i>et al.</i> (2010); Wexler <i>et al.</i> (2011)
		Level of commitment	Ozcan <i>et al.</i> (2020); Hansson <i>et al.</i> (2016)
Execution	Promote and act	Launch promotional plans	Choi & Lee (2016); Naparat & Finnegan (2013); Doan <i>et al.</i> (2011); Kaufmann <i>et al.</i> (2011)
		Incentives	Chandler & Kepelner (2013); Sun <i>et al.</i> (2012); Zhou & Zhu (2014); Zou <i>et al.</i> (2015); Allahbakhsh <i>et al.</i> (2012); Stewart <i>et al.</i> (2010)
		Crowd management	Piezunka & Dahlander (2015); Khazanki <i>et al.</i> (2012); Sauerwein <i>et al.</i> (2016); De Beer <i>et al.</i> (2017)
		Regulatory guidelines	Hirth <i>et al.</i> (2013); Downs <i>et al.</i> (2010)
Post-execution	Evaluate and feedback	Technical assistance	Srivastava & Mostafavi (2018); Zogaj <i>et al.</i> (2015)
		Quality control	Kim <i>et al.</i> (2012); Lampe (2006); Dellarcas (2010)
		Evaluation	Saxton <i>et al.</i> (2013); Baruch <i>et al.</i> (2016); Wooten & Ulrich (2017)
		Acknowledgment and recognition	Brabham (2009); Srivastava & Mostafavi (2018); Baruch <i>et al.</i> (2016)
		Feedback	Nguyen <i>et al.</i> (2013); Sauerwein <i>et al.</i> (2016); Jian <i>et al.</i> (2018); Chan <i>et al.</i> (2020); Kiran & Sharma (2021)

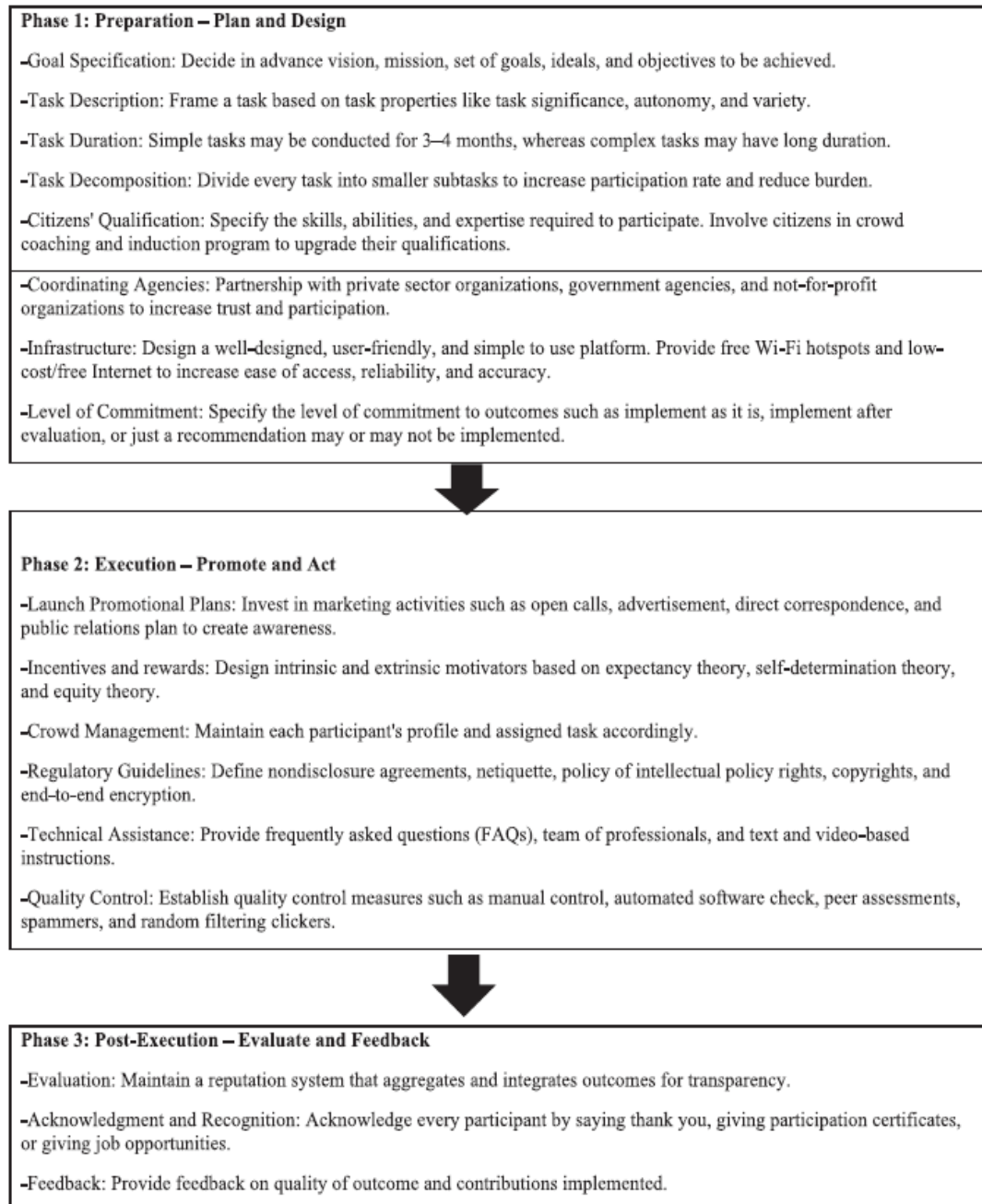
4.3.2 Strategic Framework of Crowdsourcing: Morphological Analysis

Morphological analysis was applied to develop a strategic crowdsourcing framework that considers different phases, elements, and principles of designing crowdsourcing in the government sector. Morphological analysis is a qualitative analytical technique to identify, investigate, structure, and accommodate different multidimensional elements from the literature into a holistic conceptual system (Ritchey, 2011). Hence, this analysis works well in consolidating the findings of the systematic literature review into a theoretical framework.

Morphological analysis is used to present a comprehensive and holistic view of the relevant findings from the literature. Once the dimensions of crowdsourcing initiatives are identified, a concept-specific method is used to comprehend them cohesively. All the phases, elements, and design principles of crowdsourcing were organized in a morphological box matrix. This morphological box will work as a strategic framework to guide public administrators in designing crowdsourcing initiatives. The strategic framework has three phases for designing crowdsourcing, namely, preparation, execution, and post-execution.

Figure 4.2 shows the developed strategic crowdsourcing framework for designing crowdsourcing initiatives in the government sector. A strategic theoretical framework gives public administrators an overall view for designing crowdsourcing initiatives.

Figure 4.2: Strategic framework of designing crowdsourcing initiative



4.3.3 Examples of Crowdsourcing Initiatives of Government

This section suggests a wider applicability of the framework for government and public administration. While locating how the proposed framework fits within governance, researchers discussed three examples of governmental crowdsourcing initiatives. These instances allow the researchers to generate theoretical propositions and develop theories based on empirical evidence in a real-life setting. It provides a detailed explanation of every component and structure of phenomena to gain an in-depth understanding from different angles. Along these lines, this methodology justifies that the proposed framework is an asset for designing crowdsourcing initiatives in the government sector. The three illustrations discussed give an overview of the crowdsourcing practices of the Indian government. Since India is an emerging market, the framework relevance can be checked appropriately. The initiatives were chosen not randomly but instead because they support testing the proposed strategic framework for government crowdsourcing. Many more crowdsourcing instances might have been included in the article, but the decision was made to stick with only three for the sake of parsimony. Real-life illustrations help understand the crowdsourcing design framework applicability and present an overall picture of the context, situation, relationship, and social setting in which the research event is situated. Considering the differing population volumes and the digital literacy rate, the researcher discussed the examples from both the central and state levels. The three crowdsourcing initiatives of India have ingenious concepts of idea generation and micro-tasking that helped the government to achieve effective governance.

In the first example, a state-level initiative is discussed where the government used citizens' contributions (citizensourcing) to combat pollution issues and rectify them on time. The second and third example is a crowdsourcing initiative of the central government where citizens' participation led to the improvement and development of applications in India. The examples were chosen based on their diverse crowdsourcing goals and context- idea generation and microtasking for solving pollution problems, upgradation, and developing applications. Practitioners interested in adopting crowdsourcing in their organizations can learn from the three successful crowdsourcing initiatives.

GREEN DELHI

Green Delhi is an interactive e-governance mobile application that empowers and engages citizens to complain about antipollution norms, which are forwarded to the concerned department for timely rectification. This app was launched on October 30, 2020, as a part of the antipollution measure "Yuddh, Pradushan Ke Viruddh" campaign. The objectives behind this initiative were to beat air and noise pollution by the government and citizens' combined efforts in the capital. The app is a free mobile phone application available to android phone users. Therefore, the enabling infrastructure is already present with the ubiquity of mobile phones in India (<https://www.aninews.in/news/national/general-news>). Hence, the effort required for involvement in the initiatives was minimal. No specific crowd qualification was needed as the government motive was the maximum participation. The government stated that citizens should report the activities causing any pollution to the concerned authorities in the Green Delhi app. For the ease of citizens, the tasks were divided into three parts: directly attaching photos, videos, or voice notes to a complaint registered through the app.

The demographic details of citizens were collected at sign-up for crowd management. The location was detected using phone GPS, and the complaint was communicated to the government authorities for a quick resolution. Monitoring was performed 24/7 in a "Green War Room" for quality evaluation of the received complaints. The government was committed to solving complaints after ground verification. The only motivation for citizens' participation was quick resolution and an intrinsic motive to solve the practical issues of their society. The initiative was criticized for technical failures and lack of assistance, creating a hurdle in participation (Figure 4.3). To keep a check on false reporting, 12 coordinators evaluated every complaint and overlooked resolution. For monitoring, 21 departments have been attached. These linkages with coordinating agencies added a trust factor to the campaigns, which increased participation from citizens. The initiative has been a hit in just 3 days of the launch due to high media visibility. Over 250 complaints were lodged every day, which made this initiative successful in 3 days. The total complaint received within 1 month was 11,946 (<https://www.hindustantimes.com/india-news>). Therefore, involving citizens to solve groundlevel issues will lead to transparency, empowered participation, and collaboration as citizens' awareness will increase.

Figure 4.3: Green Delhi application overview and citizens' reviews



An Initiative for pollution control and pollution reporting in Delhi.

Disclaimer: The app does not represent a government or political entity.

- gagan kulyana**
★ ★ ★ ★ ★ 16 November 2020
Idea is good but the app is not working as it does not register the complaint. I tried number of times to register the complaint but of no use... please improve it to fulfill the motive of this app.
- Chaitanya Baweja**
★ ★ ★ ★ ★ 30 October 2020
Facing technical issues. Feel the app hasn't gone through rigorous testing. The drop option for selecting city while signing up isn't showing.
- Maneet Singh**
★ ★ ★ ★ ★ 22 February 2021
Can these please explain why they have made this app when it is not working and not maintained, I have Downloaded the app but not getting the OTP sms to register, so how can we inform or send pics of the waste disposed.
- Manmeet Singh**
★ ★ ★ ★ ★ 30 October 2020
App doesn't let me sign up, option to choose city is not working. Doesn't work without selecting city. This is a great initiative. Please fix the bugs asap. Thanks

Source: https://play.google.com/store/apps/details?id=com.aeologic.green_delhi&hl=en, accessed on October 16, 2021

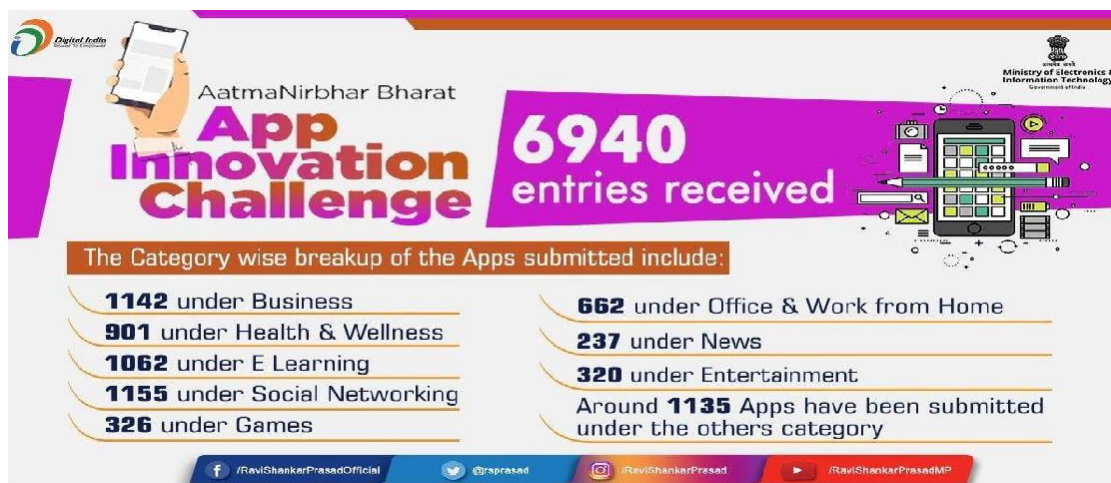
AATMANIRBHAR BHARAT APP INNOVATION

Aatmanirbhar Bharat App Innovation is a crowdsourcing initiative launched by the prime minister of India, Narendra Modi, on July 4, 2020, the day after the government banned 59 Chinese apps. This challenge was a hunt to recognize the best Indian app that can become world class. The campaign aims to recognize and honor the efforts of the unsung digital warriors that have the potential to empower Brand India and showcase India as the leading app developing country in the world. The government gave specific tasks to entrepreneurs, companies, and Indian Tech developers to accomplish this mission. The task was to create an app that can be used worldwide and identify existing apps that can be scaled to become world class. The task decomposition was done in two parts. First, citizens should submit their proposals. In the second phase, a practical demonstration was then performed by citizens for further app development. As per the objective of the initiative, the government permitted only citizens with technical expertise to participate. In an attempt to manage the voluminous crowd, a profile was maintained using login and registration details filled on "MyGov portal" (www.my.gov.in), a citizen engagement platform of the government concerning India.

The coordinating agencies that actively supported and collaborated with this crowdsourcing initiative were NITI Aayog, the Atal Innovation Mission MeitY Startup Hub, and the National e-governance Division under the Digital India Program of the Ministry of Electronics and Information Technology (MeitY). External support provided by these reputable organizations increased the trust factor, resulting in maximum citizen participation. The government promoted this initiative on social media handles such as Twitter, LinkedIn, and newspaper advertisements to make citizens aware of the campaign. The challenge fits in well with the fundamental ambitions of the crowd. Therefore, a total of 6940 entries (Figure 4.4) were received until July 26, 2020 (<https://pib.gov.in/>). The challenge witnessed massive participation from across the country, ranging from large cities to small towns.

Once the entries were received, they were screened and evaluated by jury members with expertise in the technical field. The Ministry of Electronics and Information and Technology (MeitY) made the final decision in all stages. In advance, the government stated that the prize money from Rs. 20 lakhs, Rs. 15 lakhs, and Rs. 10 lakhs as monetary incentives will be given to all 24 winners for the first, second, and third positions. The guidelines were laid down on the platform to protect citizens' personal information and the intellectual property rights of contributions (MyGov portal: www.my.gov.in). Technical assistance was also provided at every step by various coordinating agencies for the ease of citizens. The unprecedented success of the crowdsourcing initiative led to transparency, responsiveness, equity, accountability, inclusiveness, and empowerment of citizens in governance-related activities.

Figure 4.4: Snapshot of Aatmanirbhar App Innovation crowdsourcing initiative results



Source: <https://telecomtalk.info/aatma-nirbhar-bharat-app-entries> accessed on September 4, 2021

INNOVATIVE IDEAS FOR PMO's MOBILE APP

India's government citizens engagement platform (MyGov) (Singh & Kaushik, 2020) launched a nationwide contest on March 4, 2015, to design and develop a mobile application for the Prime Minister's Office (PMO). The competition occurred in different colleges and universities around the country. With an increase in smartphones and Internet users, this seems to be a significant step toward allowing people to use their phones as a window to look into the Prime Minister's Office. Additionally, this initiative has boosted the idea of democratization of governance through "Jan Bhagidari" and Digital India's motive of maximum digital awareness.

This initiative aims to seek suggestions from citizens regarding the structure and content of the application. The tasks to be performed were divided into three parts. Phase 1 was the idea submission phase, phase 2 was the wireframe development phase, and phase 3 was the app development and mentorship phase (<https://www.mygov.in/search?title=PMO&type=All>). Every Indian citizen aged 18 years or above with technical skills was qualified to participate in the idea submission phase by registering or logging in on MyGov (<http://mygov.in>). In contrast, citizens with thorough knowledge and experience in app designing and development were eligible to contribute to the other two phases. The government used social media handles such as Twitter, LinkedIn, and newspaper advertisements to promote this campaign. This initiative was launched with the partnership of Internet giant Google and MyGov. All types of technical issues citizens had were resolved with FAQs and video tutorials that were present on the platform. Google provided guidance and mentoring, which resulted in maximum participation.

During the ideation phase, which was held between March 4 and March 23, 2015, more than 9,273 entries were received (Figure 4.5). The top 20 contributions (<https://blog.mygov.in/unveiling-the-winning-ideas-ofpmo-mobile-app-contest-phase-i/>) with specific features of the PM India and MyGov websites were included in the blueprint. A panel of jury members evaluated all 110 mock-ups submitted and selected the top five teams to design and develop the apps. The rewards provided to winning teams were an android device from Google, an appreciation certificate from MyGov, 6 weeks of Google mentorship for app development, and a sponsored trip to the United States to meet Google developers. The result of the crowdsourcing initiative was declared on the MyGov portal, and the winning PMO mobile app was launched in India. The regulatory guidelines of these initiatives were agreed on from the initiation stage, whether they related to the government having copyrights of entries submitted or participants not disclosing any information to the third party. This initiative achieved tremendous success with the continuous collaboration of government, jury members, organizations, and citizens.

Figure 4.5: Snapshot of the PMO mobile app crowdsourcing initiative on MyGov



Source: <https://www.mygov.in/task/suggest-innovative-ideas-pmos-mobile-app/> accessed on September 5, 2021

4.4 Results

Crowdsourcing is a novel approach to strengthening civic participation and collaborative governance (Brabham, 2013). Most promisingly, it creates a trustworthy and transparent relationship between citizens and government, provided the initiatives are managed well. Therefore, there was a pressing need to know the design aspect of crowdsourcing that guides public administrators. The study developed a strategic framework to provide a comprehensive view of elements and designing principles of a successful crowdsourcing initiative that government agencies must consider. A crowdsourcing initiative's design process may differ based on its objective and purpose. When running crowdsourcing initiatives, three general phases can be distinguished: preparation, execution, and post-execution. Following each phase is of utmost importance to public administrators.

4.4.1 Preparation Phase: *Plan and Design*

The first phase is the preparation phase, which provides a roadmap for planning and designing a crowdsourcing initiative. This is the most critical phase because the attainment of objectives is impossible and ultimately fails without proper planning. Hence, the need arises to follow specific elements and principles for the successful preparation of crowdsourcing initiatives in the government sector.

Goals Specification: Every crowdsourcing initiative must have a predefined set of goals, ideals, and objectives, which gives a direction to achieving the end results. The clarity in vision is an essential design principle for crowdsourcing to be successful (Lim et al., 2021; Sharma, 2010; Afuah & Tucci, 2012; Lykourantzou et al., 2013; Bassi et al., 2020; Malone et al., 2010; Rosen, 2011). When government organizations specify well-defined goals in advance, citizens perceive the initiative as wellintentioned and valuable.

Task Description: Well-framed tasks or activities must be specified before initiating any crowdsourcing campaign. A successful crowdsourcing solution is the outcome of the clarity of tasks or activities to citizens (Schafer et al., 2017; Nguyen et al., 2013; Moussawi & Koufari, 2013; Tokarchuk et al., 2012; Leimeister et al., 2009). For task description, task properties, such as significance, autonomy, and variety, must be considered (Muhdi et al., 2011).

Task Duration: To attract more participation, the time frame for each task must be specified in advance (Ayaburi, 2020; Chen et al., 2020; Boudreau et al., 2011). It may range from three to four months (Massa & Testa, 2017; Kulkarni et al., 2012). The complex challenges may run for a longer duration (Nakatsu et al., 2014).

Task Decomposition: Every task of crowdsourcing initiative should be divided into smaller subtasks. This resulted in increased participation of crowds (Natalicchio et al., 2017; Pee et al., 2018; Blohm et al., 2018; Kittur et al., 2013; Hetmank, 2013). The chunking of tasks reduces the burden on anyone, particularly citizens who contribute to the project.

Citizen Qualification: Clearly specify the skills, abilities, and expertise required from citizens for participation. This is the most important determinant of meaningful participation (Geiger & Schader, 2014; Christensen & Karlsson, 2019; Bücheler & Sieg (2011). To upgrade the qualifications of citizens, crowd coaching should be used, where experienced participants may assist new participants. Meanwhile, an induction program must be conducted to make participating citizens practice on sample tasks and become accustomed to performing the task properly.

Coordinating Agencies' Specification: Coordinating authorities and agencies in crowdsourcing initiatives must be clearly specified, namely, private sector organizations, government agencies, not-for-profit organizations, or software/app development companies [113]. These linkages add substantial trust factors to crowdsourcing initiatives.

Infrastructure Specification: A well-designed, user-friendly, and simple to use platform catalyzes the growth of crowdsourcing. Heeks and Nicholson (2004) claimed that crowd participation requires the ease of access, reliability, and accuracy of information and communication technology such as telecom and the Internet. The government sector may provide free Wi-Fi and low-cost or free Internet services in public places with the help of a public-private partnership. The citizen's motivation to participate increases due to the accessibility of infrastructure facilities (Surowiecki, 2004; Potter et al., 2010; Wexler, 2011).

Specify the Level of Commitment: Every organization, whether public or private, must state clearly in beginning their commitment to the participant's contributions. Whether the outcome of the crowd will be implemented as it is or the government commits to the outcome after evaluation of experts or the contributions is a recommendation which the government may or may not implement. This can act as a confidence booster for crowd participation (Ozcan et al., 2020; Hansson et al., 2016). Otherwise, participants will remain skeptical and discourage future governance activities.

4.4.2 Execution Phase: *Promote and Act*

The second phase includes elements that guide public administrators in promotion and action activities. The government should spend their time promoting the crowdsourcing campaign, motivating participants to contribute, managing the excessive crowds involved in the process, preventing the misappropriate behavior of citizens, providing all types of technical assistance demanded by the group, and finally becoming involved in quality control mechanisms for keeping track of crowdsourcing initiatives.

Launch promotional plans: Crowd participation is an important element of a successful crowdsourcing initiative. Therefore, there should be an investment in marketing activities to grow and sustain the community. Tools used to position crowdsourcing initiatives in citizens' minds are open calls and advertisements (Choi & Lee, 2016; Naparat & Finnegan, 2013; Doan et al., 2011) and direct correspondence with the selected crowd (Kaufmann et al., 2011). An aggressive public relations plan and marketing activities should be done on the launch of crowdsourcing initiatives.

Incentive and Rewards Specification: Incentives act as a driving force for the engagement and attraction of citizens for participation. A literature review clearly indicates that crowdsourcing systems use incentives as a motivation, namely, intrinsic motivations such as meaningful tasks (Chandler & Kapelner, 2013), fun (Sun et al., 2012), and love for the community (Zhao & Zhu, 2014). Moreover, extrinsic motivations such as monetary prizes and rewards can create willingness to participate. Fundamental theories such as expectancy theory (Zou et al., 2015), self-determination theory (Allahbakhsh et al., 2012), and equity theory (Stewart et al., 2010) can be used to understand extrinsic and monetary incentives.

Crowd Management: In the implementation phase of crowdsourcing initiatives, a need arises to properly manage citizens participating in accomplishing the defined task. It mainly has two components: the profiling of crowds and the assignment of tasks. The required number of participants for performing the task needs to be identified to maintain the profiles of contributing participants (Piezunka & Dahlander, 2015). This will restrict unwanted crowds from landing on crowdsourcing platforms (Khazankin et al., 2012; Sauerwein et al., 2016). Based on maintained participants' profiles, the task can be assigned properly to attain the desired outcome (Beer et al., 2017).

Regulatory Guidelines: Clear policies must be framed that consider the legal needs of the government sector and online community. A nondisclosure agreement and netiquette should be established to avoid the exploitation of crowdsourcing solutions outside and to handle the misbehavior of participants (Hirth et al., 2013; Downs et al., 2010). A policy of protecting the intellectual property rights and copyrights of crowdsourcing contributions must be specified well on the platform. To ensure

participant privacy protection, guidelines need to be framed, such as end-to-end encryption to be applied to the data collected through crowdsourcing, reducing citizens' resistance to participation. This encryption is similar to what WhatsApp uses for the protection of user calls and messages.

Technical Assistance: A technical assistance team must be available on the crowdsourcing website to address citizens and coordinate agency problems. Frequently asked questions must be present on the crowdsourcing platform, giving instructions for the use and participation steps. A team of software professionals is hired to solve issues such as hacking, system crashes, and failures, including bug reports (Srivastava & Mostafavi, 2018). Text and video-based instructions for smoothly solving crowdsourcing tasks must be present on crowdsourcing websites (Zogaj et al., 2015).

Quality Control: Crowdsourcing tasks or activities are performed by participants with different skills, expertise, and backgrounds, which can result in low-quality contributions (Kim et al., 2012). Hence, quality control becomes a critical part of a positive outcome. Measures to control quality can be manual control where solutions are manually checked. Another one can be automated software that can countercheck the solutions. Peer assessments can also be used, where citizens evaluate each other's solutions. Outcomes need to be vetted by the administration to remove off topics and irrelevant content, which can drift too much if ignored. Spammers and random filtering clickers may be used to check the quality of outcomes (Lampe, 2006; Dellarocas, 2010).

4.4.3 Post-Execution Phase: *Evaluate and Feedback*

In the final phase of post-execution, crowdsourcing initiatives come to an end by accepting all contributions from citizens. The government should now adopt elements such as evaluation and feedback to discuss what went wrong and how to improve crowdsourcing initiatives in the future. This phase is one of the most rewarding stages of crowdsourcing because it gives an opportunity for the government to recognize and acknowledge valuable citizens and celebrate their success for continuous engagement in future crowdsourcing initiatives.

Evaluation: After obtaining a plethora of contributions from citizens, it becomes indispensable to have a reputation system for evaluating the outcomes received. A well-designed reputation mechanism that connects activities with participant contributions while maintaining transparency is needed (Saxton et al., 2013; Baruch et al., 2016; Wooten & Ulrich, 2017). This system can display aggregated reviews after integrating outputs such as scores, votes, and ratings editing from peer reviews. Researchers have advocated that the effectiveness of such an evaluation system can filter the crowdsourcing outputs, citizens' preferences can be disclosed, and it can enhance the transparency of reward systems.

Acknowledgment and Recognition of Contribution: Once the crowdsourcing task or activities are completed by citizens properly, giving acknowledgment is necessary (Brabham, 2009; Srivastava & Mostafavi, 2018) for keeping citizens connected and for encouraging them to participate in future governance-related activities. Acknowledgment can take the form of saying "thank you" to the mass participants for their cooperation and valuable contributions. Sometimes, individual participants demand recognition for their contributions (Baruch et al., 2016), which can be fulfilled by giving out participation certificates for extraordinary performance. These certificates can be used for advancing career opportunities.

Feedback: Citizens spend a lot of time and effort completing crowdsourcing activities, so they remain keen to receiving feedback on their performance. This can take the form of conveying to citizens the quality of work they have contributed (Nguyen et al., 2013; Sauerwein et al., 2016), and contributions being implemented or considered must be clearly mentioned (Jian et al., 2018; Chan et al., 2020; Kiran & Sharma, 2021). These types of feedback can act as facilitators for making citizens aware that their contributions are taken seriously and getting to know about feasible solutions.

4.5 Discussion and Implications

The three pillars of governance, transparency, participation, and collaboration, can be achieved as more data becomes freely accessible to the public through crowdsourcing. Citizens will be better able to comprehend and participate in their government in novel, possibly even exciting ways. James Surowiecki (2018) asserts that there is true wisdom in crowds, but it will be challenging to harness the power of a highly skilled workforce in a meaningful way. As government agencies become more accustomed to crowdsourcing, the need arises to efficiently design the process and elements of crowdsourcing initiatives. This study intends to answer the design-related factors the government must consider in the fundamental phase of developing crowdsourcing initiatives.

Table 4.3 serves as a roadmap for the conclusions and explanation of how the practitioners can devise a design strategy for crowdsourcing initiatives by understanding the intricacies of all the design elements.

Table 4.3: Application of strategic crowdsourcing framework in government crowdsourcing initiatives

Designing elements	Designing principles	Green Delhi	Aatmanirbhar Bharat App Innovation	Innovative ideas for PMO's mobile app
Preparation				
Plan and design	Goal specification	The empowerment and engagement of citizens for reporting violations of antipollution norms, locating, viewing, and discussing and getting it resolved by government officials.	To allow and empower citizens to participate in the app-making challenge and make India a leading app-developing country globally.	To seek suggestions from citizens on the structure and content of PMO's mobile app leading to a democratization of governance.
	Task description	Complaints to be registered under nine heads of different departments using the Green Delhi app.	Development of world class 'Made in India' apps, identification of best existing apps of India that can scale up to the world-class app.	Creation and development of an app for PMO office
	Task decomposition	Photos, videos, and voice notes to be attached to the app in every complaint registered by users.	The first task includes submitting proposals on leader boards, and in the second task, citizens present a demo for evaluation.	Task divided and assigned into three phases idea submission, wireframe development, and app development.
	Crowd qualification	No specific skill and minimum age limit were prescribed for citizens participation.	Indian entrepreneurs and start-ups having technical expertise were qualified to participate.	Indian citizens aged 18 or above were qualified for idea submission, whereas prior technical experience and expertise were required for wireframe and app development. For the development of app-making skills in citizens, mentorship activities were conducted.
	Coordinating agencies' specification	They were started by the Delhi Government, supported by 70 green marshals for ground verification of complaints, 830 enforcement field personnel to resolve complaints, 12 coordinators to check and overlook complaints, and 21 departments to monitor protests.	My Startup Hub, National e-governance Division under Digital India Program of Meity, Atal Innovation Mission, and NITI Aayog	The initiative is launched with the partnership of Google and MyGov.

Execution phase Promote and act	Infrastructure specification	Available for android phone users	Registration and submission of proposals on MyGov portal: (www.my.gov.in)	Citizens can register and submit their proposals through the MyGov portal: (www.my.gov.in).
	Specify level of commitment	Complaint resolution has been made after ground verification.	The decision of the MeitY will be final and binding	The decision of jury members will be final and obligatory to be followed in all stages of shortlisting.
	Launch promotional plans	Promotion of initiatives done on Twitter and newspaper advertisement	The promotion was posted on Twitter, LinkedIn, and newspaper advertisement	Promotional activities on LinkedIn, Twitter, and newspaper advertisements.
	Incentive specification	Rewards were not identified	The shortlisted app will be awarded Rs. 20, Rs. 15, and Rs. 10 lakhs. The government accepted suitable apps and guide them to reach a more comprehensive level.	Financial incentives lacking. Rewards include android devices, certificate of appreciation, sponsored trip to the USA and mentorship.
	Crowd management	Demographic details were collected through registration on apps	Task assignment done to Indian entrepreneurs and start-ups; a profile of participants was maintained with registration and login details.	The task was assigned to Indian citizens aged 18 years and above; the profile of participants was maintained with registration and login details.
	Regulatory guidelines	Privacy and protection of information was not available	Intellectual property rights of innovation shall remain with participants. For privacy protection, citizens agreed that MeitY would share information with panel experts and reviewers. Rejection of proposals to be done if participants provide incorrect information.	The government of India has copyrights of all submitted ideas. All guidelines were specified on the MyGov portal.
	Technical assistance	Technical help service to resolve citizens' issues was lacking.	Various coordinating agencies assisted, but FAQs and video-based training displaying sample tasks were not	Frequently asked questions (FAQs) as well as video-based tutorials are present

Post-execution phase Evaluate and feedback	Quality control	Green marshals deployed for quality control	present to understand the task. Screening of entries done by a panel of experts, and top two entries are shortlisted in each category.	on the website for technical assistance. To ensure best-quality outcomes, filtration and shortlisting are done by jury members.
	Evaluation	12 coordinators deployed to check on complaints received, and false reporting was prohibited	Evaluation of contributions is done based on "ease of use, robustness, security features, scalability" by jury members who were experts from the private sector and academia with actual demo.	Evaluation of contributions done by jury members who are experts on different parameters
	Acknowledgment and recognition of contribution	No public recognition and appreciation.	Shortlisted apps of participants to be awarded and displayed on leader boards for recognition.	Selected participants received certificates of appreciation from MyGov and Google for advancement in career opportunities.
	Feedback	Department uploaded a picture after the resolution of complaints. If citizens were unsatisfied, complaints reopen.	Regular feedback to participants is given through emails provided by participants. After campaign success, the government adopts a suitable app to ideate, incubate, build, nurture, and sustain it.	Regular feedback and results were displayed on the MyGov platform of India.

Based on the investigation of three crowdsourcing initiatives in the government sector, six elements and seventeen design principles were identified and integrated into a strategic crowdsourcing framework. A comparison of three crowdsourcing government initiatives reveals the three key findings:

The preparation phase (Phase 1): All three cases have clear and precise goals and task descriptions in terms of involving citizens' collaboration and maximum participation in solving governance-related issues. Therefore, the first design principle the government must consider in the preparation phase is to decide the initiative's goals in advance. The problem statement that is easy to understand results in improved work performance. It was also observed that for the convenience of citizens, the task was divided and split into smaller tasks, making complex problem-solving easy. Furthermore, as a diverse pool of citizens participates, the government decides the citizens' qualifications to participate in advance. This principle restrains the unwanted traffic of citizens from landing on crowdsourcing initiatives, which, if not controlled, results in a waste of time and resources of the government. The age limit of citizens, specific skills, and expertise required to participate should be prescribed in advance because the quality of inputs may vary according to citizens' qualifications and expertise. The strong information management system and infrastructure capabilities helped the government efficiently manage the process and obtain optimum results in a shorter period.

The execution phase (Phase 2): was characterized by interactivity and bidirectionality among government officials and citizens. The government should use a series of marketing activities to reach citizens and increase awareness of crowdsourcing campaigns. In the example, it was observed that monetary incentives trigger citizens to participate. Alternatively, intrinsic motivation such as solving environmental issues, the satisfaction of doing morally good deeds, and a greater sense of accomplishment with the community are also important motivators. The initiative's success depends on appropriate crowd management, so the design rules of demographic profiling of citizens must be considered for managing a diverse citizen group. Accordingly, the task should be assigned to citizens. The anonymous and voluntary contributions of citizens were put into quality check with jammers, a jury of experts, and citizens doing peer reviewing. Thus, the design principles of quality control were considered to obtain the desired outcome. The study revealed that citizens gave their maximum contribution and high-quality inputs when they understood the task and purpose well. Therefore, there exists a relationship between clear goals, task specifications, motivation, and quality outcomes.

The post-execution phase (Phase 3): The government sector must provide immediate feedback when citizens offer their time and efforts to contribute to crowdsourcing initiatives. The citizens were informed of how the selected contribution would be further developed with their collaboration and implemented for massive use. This principle indicated that citizens' participation was not a hollow exercise and that their contributions were valuable. Delayed feedback gave better results in the simple task,

whereas solving complex tasks in-between and delayed feedback worked better. These results show that feedback plays a pivotal role in motivating, guiding, and enhancing citizens' participation in future crowdsourcing opportunities. Therefore, comparing the three crowdsourcing initiatives with the developed crowdsourcing framework showcases the theory-based framework's relevance and practicality for successful crowdsourcing initiatives. The progressive crowdsourcing design guides implementers to accelerate crowdsourcing initiatives from growth to maturity.

The following implications can be deduced from a theoretical standpoint. First, the limited empirical research on crowdsourcing in governance could be expanded. Second, the phase-wise process and design elements of the crowdsourcing initiative combined into a single integrated strategic framework provide a one-stop point for practitioners. From a practical perspective, the proposed strategic framework can guide public administrators and government agencies to identify common pitfalls and issues, such as having post-implementation government strategies early in the designing phase of crowdsourcing initiatives that lead to the attainment of desirable outcomes from crowdsourcing. Government agencies can better understand the intricacies of all elements and principles and devise a design strategy for crowdsourcing implementation. The public administrators in government agencies can gain insights from the results to increase their level of knowledge and expertise in designing crowdsourcing initiatives. Therefore, the lessons learned from designing principles or rules will create epistemic value for government agencies. The interactivity and bidirectionality among government officials and citizens can be promoted in the execution phase of crowdsourcing. This aspect helps in creating economic value for government administrators. Finally, the crowdsourcing strategic framework might be utilized as a guide and decision step when envisioning and conducting crowdsourcing initiatives.

4.6 Limitation and Future Research

Though the study gives the first idea for government implementers to design crowdsourcing initiatives using a strategic crowdsourcing designing framework, it is not free from limitations. The morphological approach gives a systematic overview of various design elements but doesn't capture potential linkages or interdependencies. Due to the morphological methodology, we believe these interdependencies are outside the scope of the current study. As developing a crowdsourcing initiative involves several interrelated decisions, future studies should explore the interrelationships among the design elements, as certain decisions may limit the decision opportunities for others. Further research should examine whether there is a hierarchy between design choices, such that early decisions influence others and limit the decision space of other design aspects.

The study focuses mostly on crowdsourcing initiatives for idea generation and micro-tasking; however, the outcomes may vary in various crowdsourcing contexts, such as knowledge pooling or open collaboration. Although we present a beginning point, further research can be conducted with alternative sorts of crowdsourcing using the developed strategic framework of designing crowdsourcing and modifying it as necessary.

Lastly, the exploratory study outlines crowdsourcing design elements in Indian-based crowdsourcing initiatives. Although the geographic focus may seem limited, the selected examples are valid in a specific judicial and political framework. Transferring crowdsourcing practices to other countries needs an in-depth review of the legal situation, such as territorializing government levels and responsibilities, evaluating local property rights, and determining if monetary incentives are allowed in government. Therefore, from a methodological standpoint, future research could check the crowdsourcing design framework in a more extensive empirical study with different countries and initiatives. This will provide further insights to implementers of the government sector.

4.7 Summary

Chapter 4 of the thesis explores the design perspective of crowdsourcing adoption for value co-creation. It begins by highlighting the increasing relevance of crowdsourcing in organizational practice and the need for a deeper understanding of its design aspects. The chapter systematically identifies and explains the constituent elements and design principles associated with crowdsourcing initiatives across different phases. This systematic exploration leads to the development of a novel strategic crowdsourcing framework, offering valuable guidance for organizations seeking to effectively design and implement crowdsourcing initiatives. The chapter emphasizes the importance of clear goals, task specifications, motivation, interactivity, bidirectionality, and feedback mechanisms in the successful execution of crowdsourcing initiatives. Overall, Chapter 4 contributes to enhancing the understanding of crowdsourcing adoption and provides practical insights for organizations aiming to leverage crowdsourcing for value co-creation.

After exploring the design aspect of crowdsourcing initiatives in Chapter 4, next chapter will delve into the mechanism of value co-creation through crowdsourcing. This chapter aims to unravel the intricate dynamics that govern the value co-creation process within crowdsourcing initiatives. It intends to provide valuable insights on how organizations can effectively extract value from these endeavors to enhance innovation performance and maintain a competitive edge.

CHAPTER 5

VALUE CO-CREATION MECHANISM OF CROWDSOURCING

In the dynamic landscape of modern innovation, delving into the intricacies of crowdsourcing's value co-creation mechanisms becomes an imperative for organizations aiming to maintain a competitive edge. Chapter 5 conducts a thorough investigation into the multifaceted dynamics that govern the value co-creation process within crowdsourcing initiatives. The paramount significance of this exploration is underscored by the prevailing challenge faced by organizations in effectively extracting value from crowdsourcing endeavors, primarily attributed to the absence of a robust co-creation mechanism between the crowd and the organization. This deficiency in understanding the mechanisms hinders the realization of optimal organizational learning, knowledge transfer effectiveness, absorptive capacity, and, consequently, innovation performance. Notably, despite the burgeoning popularity of crowdsourcing, the absence of a well-defined co-creation mechanism remains a pervasive obstacle. Hence, this study not only seeks to bridge this gap but also strives to unravel the crowdsourcing-based social mechanisms influencing knowledge transfer effectiveness and organizational absorptive capacity, ultimately leading to an enhancement of innovation performance. The empirical insights and theoretical contributions presented in this chapter serve not only to advance scholarly understanding but also to provide actionable guidance for organizations navigating the intricate nature of crowdsourcing to bolster their innovation capabilities. The study's focal point on crowdsourcing-based co-creation mechanisms acts as a strategic beacon for organizations, offering valuable insights to harness the transformative power of crowdsourcing for sustainable innovation and competitive advantage.

5.1 Introduction

The emerging disruptive technologies are becoming a key for companies to survive, stay competitive, and cope with the flexibility and high dynamics of the innovation process. Taking the first-mover advantage in advanced technologies requires adopting responsive and agile innovation strategies. Therefore, advances in information technologies have resulted in "crowdsourcing," which involves crowds' collective intelligence to innovate and reach a wider spectrum of people (Heeks, 2010; Bullinger *et al.*, 2010), which adds richness and depth to the innovation process. Crowdsourcing has gained management's attention as a co-creation tool for companies to engage the virtual community of the crowd for solving a problem and innovation needs of the organization (Afuah & Tucci, 2012; Boudreau & Lakhani, 2013).

High-tech firms have started leveraging crowds collective intelligence to share knowledge, optimize cost, and involve in continuous innovation and co-creation that is rare, valuable, non-substitutable, and inimitable (Barney, 1991; Teece & Pisano, 1994). Organizations engage with the "wisdom of crowds" to gather innovative ideas

and then keep making changes as per their needs, thereby accelerating the rate of innovation acceptance among crowds (Marjanovic *et al.*, 2012). For instance, the "Battleofconcepts" is a crowdsourcing platform where winning ideas are rewarded and winners co-create their ideas into realization. This results in meaningful crowd-firm engagement and value capture. Similarly, "DHL's innovation centers," a logistic company, invited experts and their hardcore fans to actively collaborate in solving complex problems of voyage sequencing and package delivery. Thus, crowdsourcing-based co-creation allows companies to work with their crowd community and fulfill their requirements per their needs. The underlying premise of such a collaborative business model is that crowd-firm engagement specific to value capture in companies can improve innovation performance. Although literature exhibits the need to understand the role of crowd-firm co-creation in crowdsourcing, studies focusing on the mechanism behind the influence of crowdsourcing-based co-creation on value capture are not yet explored.

The past scholarly research reviewed gives important insights into the effect of crowdsourcing-based co-creation. First, past research highlights the benefits and risks associated with crowd value co-creation. On the one hand, the collective intelligence of crowds helps in the strategic renewal of an enterprise (Nevo & Kotlarsky, 2020), solving complex problems (Brabham, 2008; Vukovic, 2009), performing tedious tasks (Afuah & Tucci, 2012), gathering novel ideas (Boudreau & Lakhani, 2013), brand awareness (Schulze *et al.* 2011). Conversely, crowd value co-creation leads to culture, coordination, intellectual, and control risk (Lehner, 2016; Wazny, 2017). The results indicate that the overall effect of crowdsourcing-based value co-creation on organizational innovation is dependent on moderating and mediating factors. Second, limited studies focused on crowdsourcing-based crowd-firm value co-creation from an organizational perspective. The implication of crowd-firm co-creation in crowdsourcing for organizational innovation is not well known. As crowdsourcing facilitates organizations to harness the crowd's collective intelligence to enhance innovation performance, it becomes imperative to explore how crowdsourcing-based co-creation influences an organization's value capture.

This gap propels the researchers to unravel how crowdsourcing-based crowd-firm co-creation influences organizations' value capture (measured by organizational innovation performance). More specifically, the important research question investigated in the present study is - *What mechanism influences the relationship between crowdsourcing-based crowd-firm co-creation and organizational value capture?*

Research by Liao & Chen (2007), Levy (2009), and Poetz & Schreier (2012) unveils that the amount and variety of information received from connections and interactions with external networks help shape creative competence and gain competitive advantage and organizational innovation. Even though past researchers have talked about its importance in management and research practices, a conceptual understanding of the role of crowd-firm co-creation in crowdsourcing is still missing. Taking Iyenger *et al.*'s (2015) model as a base, the present study takes crowdsourcing-based social linkage as a co-creation mechanism leading to organizational learning via

knowledge transfer effectiveness and absorptive capacity capability. Social capital, organizational learning, and innovation performance are presented in a nomological framework to examine the process of crowdsourcing-enabled value co-creation.

While previous literature has revealed the significance of Information technologies in influencing value co-creation, the studies linking IT-mediated technologies to the crowd-focused value co-creation process are limited. Therefore, this study is the first step towards understanding the role of IT-mediated technologies for crowd-firm interactions and value capture in organizational innovation. With Web 2.0, there was an advancement in Information and Communication Technologies, internet access, and the collaborative and networked world (Gassmann *et al.* 2014), resulting in crowdsourcing proliferation. However, to the author's knowledge, published studies have not yet empirically investigated the role of crowdsourcing as a facilitator for crowd co-creation and improved organizational innovation performance. Despite the growing importance of crowdsourcing usage in developed countries, the role of crowdsourcing as a co-creation tool to enhance organizations' value capture is not yet studied in developing countries like India. Given the aforementioned gap, the study explores how crowdsourcing use complements crowd-firm social linkage, its effect on organizational learning, and value capture in the form of organizational innovation. The empirical study will be based on Indian employees working on different crowdsourcing projects in the Information and technology (IT) industry. The self-administered survey will be directed to the managers of IT firms involved in crowdsourcing.

5.2 Literature Review

5.2.1 Crowdsourcing-Based Co-creation Mechanism

A firm's external network of the crowd consists of information, knowledge, and data that is not available internally and reduces economic and social frictions (Bapna *et al.*, 2017), value capture, and co-creation of value between crowds and firms (Piyathananan *et al.*, 2017). Thus, the voluntary engagement, contribution, and interaction between crowd-firm results in the social capital building. Resource-based view states that knowledge and resources are heterogeneously distributed among the crowd that is valuable, immobile, scarce, and difficult to substitute (Grover & Kohli, 2012). Similarly, the relationship view states that an organization's internal resources help gain a competitive advantage from the wisdom of crowd-firm and crowd-crowd relationships (Rai *et al.*, 2012). The views are the logic behind co-creation and value capture between the firm and its community of crowds.

Social capital emerging from crowd-firm interactions is a valuable and productive resource that diminishes information-sharing and organizational learning barriers. It enables value creation, knowledge sharing, improved performance, and organizational development to gain a competitive advantage (Abili, 2011; Sayyed, 2018). In particular, several organizational studies have considered social capital as a facilitator of knowledge contribution, acquisition, creation, and innovation (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998; Wasko & Faraj, 2005). Therefore, the study focuses on the perspective of social capital-based social linkage that acts as a catalyst for the value co-creation mechanism.

Social capital mainly consists of structural, cognitive, and relational linkage (Nahapiet & Ghoshal, 1998). Hence, the study intellectualizes the three dimensions emerging from the association between a crowd and a firm as a mechanism of crowd-firm value co-creation. The co-creation mechanism leads to real-time interactions between the firm and the crowd's wisdom. Therefore, the focus of the study is to understand the relationships formed, shared understanding, and the mutual relationship of crowdsourcing-based crowd-firm interactions for improving innovation capability (value capture). The structural dimension describes the overall relationship pattern between the crowd and the firm during crowdsourcing. The cognitive dimension describes how the crowd and firm understand each other's perspectives through shared language, vision, objectives, and values (Wasko & Faraj, 2005) during crowdsourcing. Finally, the relational dimension refers to the level of respect and trust, the working pattern between crowd and firm during crowdsourcing (Chow & Chan, 2008).

5.2.2 Co-creation Outcome

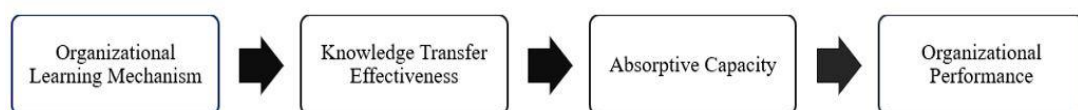
The crowdsourcing-based crowd-firm co-creation for value capture in innovation is based on the premise of Organizational learning. Past reviews highlight that the organizational learning capability is improved with a firm's connection and the knowledge acquired from external networks (Schlagwein & Andersen, 2014; Xu *et al.*, 2015; Devece *et al.*, 2019). Schulze & Hoegl (2008) further identified the effect of crowdsourcing on learning the distinctive competence of the organizations. These learning competencies result in developing a continuous learning system (Hine *et al.*, 2010) that gives an organization a competitive edge. The collective intelligence gathered from the external networks acts as a market research tool to obtain tacit knowledge about trends, customers, products, and services as per the requirements. Thus, organizations that implement crowdsourcing as a value capture tool have a greater capacity to learn, be very receptive to market tendencies, and foresee changes easily compared to competitors.

Previous research (e.g., Ye & Kankanhalli, 2013; Schlagwein & Anderson, 2014; Xu *et al.*, 2015; Devece *et al.*, 2019; Lenart-Gansiniec & Sulkowski, 2020) suggested that an IT-enabled crowdsourcing platform drives organizational learning for improved innovation capability. However, from a broader perspective, crowdsourcing-enabled

value capture is a process that involves interacting with external specialists having diverse knowledge, resources, abilities, mastery, and heterogeneous skills (Whitla 2009; Ye & Kankanhalli, 2013). Firms that use crowdsourcing practices as a facilitator of co-creation and value capture have excellent organizational learning capability to promote firms' adaptation and continuous improvement and integrate external resources into the innovation process. With the case study of Crowdsourcing in LEGO, Schlagwein and Andersen (2014) proposed that "organizational learning with crowdsourcing is a novel, unique (e.g., external, non-professional, IT-shaped, and entrepreneurial) form of organizational learning. It is not just a cheaper, digital re-enactment of traditional employee-based organizational learning, but rather an alternative learning mode". Therefore, we intellectualize crowdsourcing-based crowd-firm co-creation in innovation as a process of organizational learning.

Iyengar *et al.*'s (2015) "Learning mechanism-outcome performance" model (Figure 5.1) linked learning and improved organizational performance as an organizational learning mechanism. The outcome of organizational learning capability is improved firm knowledge transfer propensity and absorptive capacity. Knowledge transfer refers to the functional competencies and proficiencies to acquire external resources to enhance operational activities. Absorptive capacity refers to a dynamic capability of integrating external resources into firms' innovation capacity. Therefore, we intellectualize crowdsourcing-based value capture as an organizational learning process by taking the Iyengar model as a base. The study considers knowledge transfer propensity as acquiring tacit and implicit knowledge from connections and interactions with external networks and absorptive capacity as an acclimatization capability to identify and assimilate the knowledge acquired for shaping innovative performance. Crowdsourcing-based co-creation is a means of enhancing acquisition (knowledge transfer propensity) and acclimatization (absorptive capacity) capabilities, thus, resulting in value capture (organizational innovation capability).

**Figure 5.1: Organizational Learning Mechanism Outcome Performance Model
Purported by Iyengar et al. (2015)**



5.2.3 Organizational Value Capture

Co-creating value with IT-enabled tools has five essential components that influence organizational value capture: "complementary resources, knowledge-sharing routines, effective governance, new information technologies, and complementary capabilities (Grover & Kohli, 2012). Value capture is the capacity of an organization to capture the crowd's collective intelligence to improve innovation performance (Lepak, *et al.*, 2007). Organizational innovation refers to the innovative processes, procedures, and practices that an organization utilizes to meet the changing needs and expectations,

resulting in competitive advantage (Rezaei & Moghanlo, 2015). From the study perspective, co-creation refers to a collective process between a firm and a crowd to acquire knowledge and assimilate the available resources to enhance an organization's research and innovation capabilities. Organizations such as IBM (Innovation Jam), Adidas, Foldit, BMW, Starbucks, Fiat Mio (Bjelland & Wood, 2008; Saldanha *et al.*, 2014), MyStarbucksIdea, Threadless, and Innocentive (Acar 2019) have embraced crowdsourcing-based co-creation to enhance their research and innovation capabilities leading to value capture in operations. Table 5.1 lays out the elements of co-creation and value capture used in our study and discussed in different empirical studies at the organizational level.

Table 5.1: Elements of co-creation and value capture used in Study 4

Empirical Studies	Complementary resources	Knowledge -sharing routines	Effective Governance	New Information Technologies	Complementary Capabilities	Organization Value Capture Integrating Innovation capability	Organizational Innovation
Forbes and Schaefer (2018)	✓	✓			✓		
Chanal and Fasan (2008)	✓	✓		✓	✓		
Afuah and Tucci (2012)			✓		✓		
Marjanovic <i>et al.</i> (2012)							✓
Mehtala <i>et al.</i> (2016)	✓	✓			✓		✓
Palacios <i>et al.</i> (2016)	✓				✓		✓
Hammon and Hippner (2012)		✓		✓		✓	✓
Zhu <i>et al.</i> (2016)					✓		✓
Ye and Kankanhalli (2013)						✓	✓
Xu <i>et al.</i> (2015)							✓
Modaresnezhad <i>et al.</i> (2020)				✓		✓	
Elements Focussed in Study	✓	✓		✓	✓	✓	✓

Notes: The Table depicts the study's novelty compared to the other studies conducted

5.3 Theoretical Framework and Hypotheses Development

5.3.1 Crowdsourcing-based Social Capital and Organizational learning

Value co-creation research often focuses on the notion that co-creation is a facilitator of enhancing an organization's acquisition and assimilation capabilities (Grover & Kohli, 2012). For instance, Lusch & Nambiasan (2015) argued that value co-creation allows the customer and a firm to exchange knowledge and resources to enhance operational capabilities. Similarly, Johannessen & Olsen (2010) stated that co-creation between the firm and a crowd results in knowledge acquisition and integration of diverse expertise, thus resulting in enhanced capabilities of organizations. Prior research on social capital (Wasko & Faraj, 2005; Chang & Chuang, 2011) also claimed that social capital leads to knowledge contribution. For instance, Yan *et al.*, 2019 proposed a relationship between social capital and knowledge contribution among online user communities. Nov *et al.* (2012) asserted that a strong connection between a firm and a crowd leads to knowledge sharing and acclimatization of resources acquired. The social capital theory claims that social capital facilitates cooperation and coordination for mutual benefit (Putnam, 1995), enabling knowledge acquisition and exploitation to accelerate innovation in technology-based firms (Tsai & Ghosal, 1998; Nahapiet & Ghosahal, 1998; Yli-Renko *et al.*, 2001).

The social capital theory offers numerous reasons that provide an impetus to propose that social capital entrenched in the crowdsourcing-based interaction between a firm and a crowd leads to organizational learning, with enhanced knowledge transfer propensity and absorptive capacity. The crowdsourcing-based structural linkage between a crowd and a firm reduces transaction costs for information acquisition, assimilation, diffusion, and collective understanding (Chiu *et al.*, 2006). Structural linkage formed during crowdsourcing facilitates interaction, transferring diverse knowledge, resources, abilities, mastery, and heterogeneous skills (Whitla, 2009; Ansari *et al.*, 2012; Ye & Kankanhalli, 2013) between parties viz. a crowd and a firm. Thus, crowdsourcing-based structural linkage enhances explicit and tacit knowledge broadening the base of minds resulting in more top-down and bottom-up connections, conversations, dialogue, and discussions in organizations (Wagner *et al.*, 2014; Nishikawa *et al.*, 2017; Allen *et al.*, 2018) to fulfill the crowd's requirement. Prior research (Yli-Renko *et al.*, 2001; Chang *et al.*, 2012; Krupowicz *et al.*, 2020) suggests that strong ties, connections, and interactions in a network provide a mechanism to enhance knowledge sharing behavior; achieve and sustain intensity, breadth, frequency of knowledge transfer, and absorptive capacity. For instance, the success of "Danish LEGO Group," a toy manufacturer company, lies in the structural linkage that fosters social interaction among the company and users to develop innovative product concepts and get feedback directly from users and the company for further development (Rass *et al.*, 2013; Schlagwein and Andersen, 2014).

Further, crowdsourcing-based cognitive linkage impacts knowledge transfer by enhancing the ability of the crowd to access and contribute knowledge to a community (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). In a knowledge exchange process, the crowd discusses ideas and answers with others, receives updates on the best solutions, and reads and comments on other people's thoughts and solutions. Additionally, cognitive linkage enables mutual understanding of collective goals between a crowd and a firm, which are indispensable to augment the dynamic capability of an organization to apply knowledge and resources (Nambisan & Baron, 2010; Lusch & Nambisan, 2015). For instance, "Threadless," an apparel company, uses shared codes and languages between the crowd and a firm to create, inspect, approve, improve and select shirt designs. The cognitive linkage formed during crowd-firm interaction facilitates "Threadless" to correctly understand the preferences and needs of crowds and then proceed with customized shirt designing (Piller, 2010). Therefore, cognitive linkages impact the absorptive capacity by enhancing three capabilities: identifying innovative ideas, acclimatizing new insights, and making changes accordingly in the product and services (Iyengar *et al.*, 2015).

Finally, crowdsourcing-based relational linkage in the study focuses on respect and trust built from the crowd-firm interactions that affect the quality and quantity of knowledge exchange (Gu and Jarvenpaa, 2003; Dholakia *et al.*, 2004; Wiertz & De Ruyter, 2007; Porte & Donthu, 2008; Wagner *et al.*, 2014). The respect and trust in the crowdsourcing community enhance knowledge-sharing intentions and collaboration capability by creating a positive atmosphere to exchange knowledge, assimilate, interpret, and integrate within the organization (Nevo & Wade, 2011; Prpic *et al.*, 2015). The outcome of the crowd-firm collaboration is improved organizational learning capability resulting in information acquisition, assimilation, diffusion, and collective understanding to be applied for innovation purposes (Maktabi & Khazaei, 2014; Onag *et al.*, 2014). Therefore, we tested the following hypotheses:

H1: Crowdsourcing-based Social capital formed with structural, cognitive, and relational linkages between crowd-firm positively relates to an organization's knowledge transfer propensity.

H1a: Crowdsourcing-based structural linkage positively affects an organization's knowledge transfer propensity.

H1b: Crowdsourcing-based cognitive linkage positively affects an organization's knowledge transfer propensity.

H1c: Crowdsourcing-based relational linkage positively affects an organization's knowledge transfer propensity.

H2: Crowdsourcing-based Social capital formed with structural, cognitive, and relational linkages between crowd-firm positively relates to the organization's absorptive capacity.

H2a: Crowdsourcing-based structural linkage positively affects an organization's absorptive capacity.

H2b: Crowdsourcing-based cognitive linkage positively affects an organization's absorptive capacity.

H2c: Crowdsourcing-based relational linkage positively affects an organization's absorptive capacity.

5.3.2 Organizational Learning and Organizational Value capture

The essence of absorptive capacity lies in the knowledge transfer effectiveness of an organization. Organizations go beyond organizational boundaries to acquire and integrate the crowd's contribution to solving innovation problems. Prior research (Roberts *et al.*, 2012; Prpic *et al.*, 2015) has demonstrated that organizations' absorptive capacity depends on knowledge transfer effectiveness. For instance, in the case of "Xiaomi," a mobile internet company used crowdsourcing to acquire knowledge to develop a mobile operating system further. The interaction between crowd-firm led to a knowledge intersection that enhances developers' understanding to draw an association between new innovative ideas and the existing ones. The association helped "Xiaomi" developers understand the potential of creative ideas and absorb knowledge for further product development (Argote & Miron-Sektor, 2011; Liu *et al.*, 2018). Therefore, we hypothesize that absorptive capability is developed by effective knowledge transfer:

H3: The knowledge transfer propensity is positively related to an organization's absorptive capacity.

Past studies have confirmed the relationship between absorptive capacity and organizational performance (Roberts *et al.*, 2012; Xie *et al.*, 2018; Muller *et al.*, 2021) in the context of new product development. A firm's absorptive capacity is a dynamic capability to acquire, integrate, enhance knowledge transfer effectiveness and use external knowledge and resources to significantly improve financial growth (Iyengar *et al.*, 2015). Organizations with a higher absorptive capacity can continually expand their skill and knowledge base, absorb new information from the external environment, and develop the core competencies to apply information in enhancing innovation performance (Xun & Xuehan, 2014). Hence, organizations that use crowdsourcing as a co-creation tool have a greater absorptive capacity that makes it possible to create new external knowledge, keep updating the competencies, and understand the development process of knowledge management capabilities to achieve innovative performance that is difficult to imitate.

Similarly, excellent absorptive capacity can use acquired knowledge to respond to external changes better. However, suppose the organizations want to survive the cut-throat competition and build innovation strategies per demand. In that case, there is a need to continuously absorb new information and apply it internally to achieve greater competitiveness (Zamora *et al.*, 2022). Therefore, we tested the following hypothesis:

H4: The organization's absorptive capacity positively relates to organizational value capture from an innovation perspective.

5.3.3 Organizational Learning as Mediator

Knowledge transfer effectiveness beyond organizational boundaries facilitates organizations to reduce knowledge management costs, speed up the product development process, and respond quickly to external market changes for innovations and further improvement (Xun & Xuehan, 2014). Thus, this supports the notion that a high level of dynamic capability, namely absorptive capacity, uses past knowledge and depends more on transferring external knowledge resources (Iyengar *et al.*, 2015). Effective knowledge transfer makes it possible for organizations with social linkage to supplement, refocus and strengthen the knowledge base to grasp the innovation opportunities. On the same lines, the knowledge-based view of Trantopoulos *et al.* (2017) highlighted the role of new knowledge acquired in enhancing a firm's absorptive capacity. Therefore, we propose the following hypotheses:

H5: The relationship between social capital and absorptive capacity is mediated by the efficacy of knowledge transfer during crowdsourcing.

H5a: The relationship between structural linkage and absorptive capacity is mediated by the efficacy of knowledge transfer during crowdsourcing.

H5b: The relationship between cognitive linkage and absorptive capacity is mediated by the efficacy of knowledge transfer during crowdsourcing.

H5c: The relationship between relational linkage and absorptive capacity is mediated by the efficacy of knowledge transfer during crowdsourcing.

Absorptive capacity is a facilitating factor between crowdsourcing-based social linkage and organizational innovation capability. Organizations that are continuously involved in the absorption of external knowledge have a greater ability to innovate, seize the opportunities present in the market, identify and fulfill the demands of the community of crowd and gain a competitive advantage against competitors (Nieto & Quevedo, 2005; Roberts *et al.*, 2012). Even though social linkage formed during crowd-firm interaction helps acquire the crowd's wisdom for further innovation and improvements, absorptive capability helps the organizations absorb innovative knowledge and apply it commercially to improve processes, products, and organizational innovations (Schmidt & Rammer, 2006; Saldanha *et al.*, 2017). Thus, absorptive capacity enhances an organization's ability to recognize market trends and

innovation prospects through knowledge acquisition acclimatization and application for further value capture.

Crowdsourcing-based social linkage formed with crowd-firm interactions improves the quantity and quality of information sharing, understanding, and applying knowledge for crowd-enabled innovativeness (Roberts *et al.*, 2012). The increase in competition and sudden market changes forces the organizations to interact and acquire the external resources to combine them internally through absorptive capacity and respond quickly to the community demands through innovation. Hence, we stipulate that co-creation results in structural, cognitive, and relational linkages that further affect an organization's absorptive capacity and innovation performance. Therefore, we tested the following hypotheses:

H6: The relationship between social capital formed and organizational innovation is mediated by the organization's absorptive capacity.

H6a: The relationship between structural linkage formed and organizational innovation is mediated by an organization's absorptive capacity.

H6b: The relationship between cognitive linkage formed and organizational innovation is mediated by an organization's absorptive capacity.

H6c: The relationship between relational linkage formed and organizational innovation is mediated by an organization's absorptive capacity.

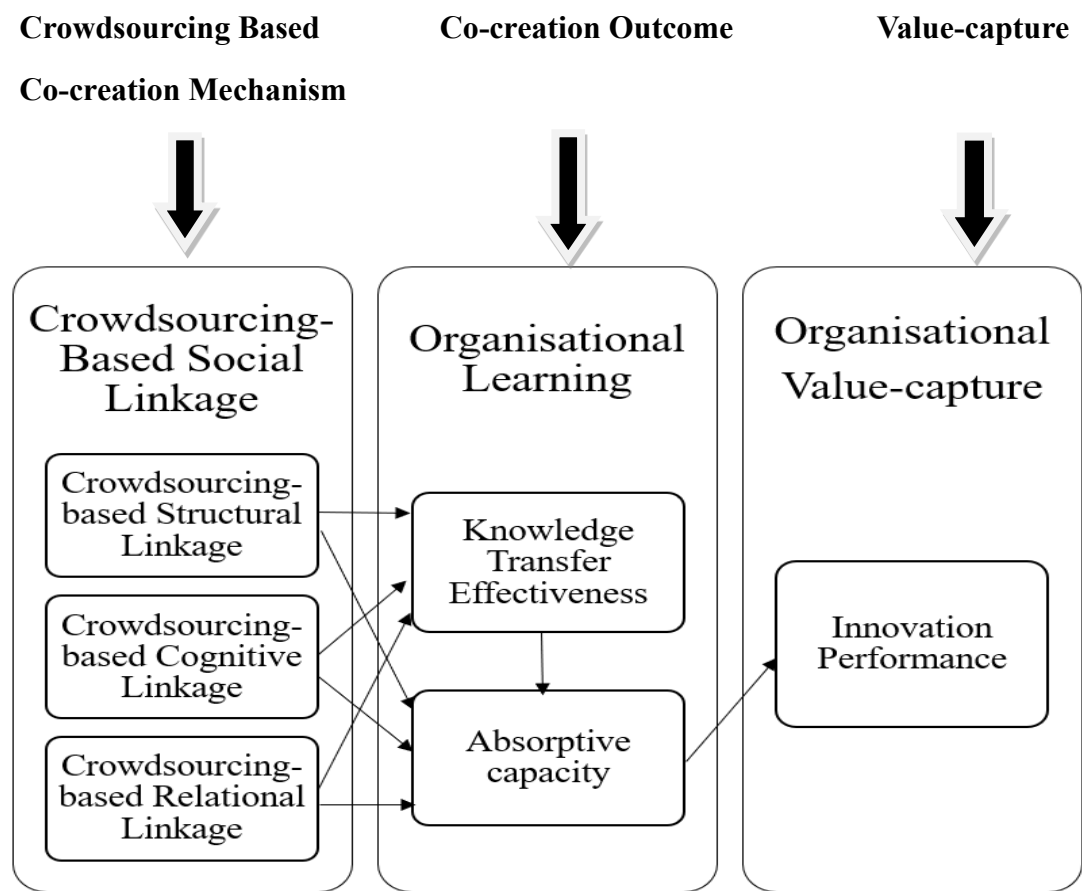
Iyengar *et al.* (2015) proposed that organizations' absorptive capacity to assimilate, convert, and apply the knowledge determines the relationship between knowledge transfer effectiveness and firms' innovation performance. In the fast-changing environment, mere crowd-firm interaction and knowledge sharing are not enough. Instead, organizations should build greater absorptive capacity to recognize valuable information and its commercial application to develop innovation strategies. Hence, we tested the following hypothesis:

H7: An organization's absorptive capacity mediates the relationship between effective knowledge transfer and organizational innovation performance.

5.4 Research Methodology

The proposed research model is shown in Figure 5.2.

Figure 5.2: Research model



5.4.1 Sample and Data Collection

The Information and Technology (IT) industries were considered the most suitable for conducting empirical study because of their highly dynamic nature of technological discontinuity, where research and development efforts are very high to achieve the ultimate aim of innovation. Such firms rely heavily on the crowd's knowledge to anticipate market changes and keep updating their products and services per the crowd's requirements, which is vital to success.

The study considered a sample of Indian IT firms that have used crowdsourcing to interact with the crowd community to enhance their innovation capability. Employees involved in different crowdsourcing projects of Indian IT firms were mainly contacted to collect their views. Data collection for the study was carried out between August 2021 to November 2021 via mail questionnaire (**Appendix B**) and by sharing google form links on LinkedIn. The study mainly targeted middle and senior-level managers of IT firms as they are a rich source of knowledge and have reasonable perspectives about organizational performance and operations. The survey hyperlink was shared with 400 managers, out of which 325 responses (response rate of 81.25 %) were received. After removing the invalid and incomplete responses, 300 responses were used to test the proposed research model. Table 5.2 presents the demographic characteristics of the respondents.

Table 5.2: Demographic characteristics of respondents

Measure	Category	Frequency	%
Gender	Female	115	38.2
	Male	185	61.8
Age	Under 20	20	6.8
	20-30	127	42.2
	30-40	110	36.8
	Over 40	43	14.2
Position	Middle-level managers	125	41.67
	Senior-level managers	175	58.33
IT Firms	Wipro	25	8.33
	IBM	24	8
	Philips	16	5.33
	Deloitte	18	6
	TCS	23	7.67
	Infosys	24	8
	Cognizant	16	5.33
	HCL technologies	24	8
	Genpact	16	5.33
	Tata Group	26	8.67
	Capgemini	16	5.33
	Microsoft	24	8
	Dell	19	6.34
	Google	15	5
	Apple	14	4.67

Source(s): Primary data

5.4.2 Measurement Development

The measurement items for the construct were adapted from the existing validated scales, as presented in Table 5.3. A five-point Likert scale (1=strongly disagree to 5=strongly agree) was used to measure the items. The four-item scale of structural linkage was adapted from Wagner *et al.* (2014) and Hsu & Hung (2013). The four-item scale of cognitive linkage was adapted from Wagner *et al.* (2014) and Chiu *et al.* (2006). The relational linkage three-item scale was adapted from Wagner *et al.* (2014). The measurement items of knowledge transfer effectiveness and absorptive capacity were adapted from Iyengar *et al.* (2015). The scales for organizational innovation performance were adapted from Chen *et al.* (2009).

Table 5.3: Measurement Items

Construct and Source	Category/Type	Scales
Structural linkage (STL) adapted from Wagner <i>et al.</i> (2014) and Hsu & Hung (2013)	Reflective construct/ Independent variable	1. The organization's crowdsourcing platform enables crowds to express their innovative knowledge simultaneously (STL1). 2. The organization regularly uses a crowdsourcing platform to share innovation-related communications (STL2). 3. A community of crowds can discuss innovation-related concerns on the organization's crowdsourcing platform (STL3). 4. The organization and its external crowds can communicate through crowdsourcing platforms to ensure an effective and efficient innovation process (STL4).
Cognitive Linkage (COL) adapted from Wagner <i>et al.</i> (2014) & Chiu <i>et al.</i> (2006)	Reflective construct/ Independent variable	1. When communicating on a crowdsourcing platform, the organization and its external crowd members utilize the same terminology (COL1). 2. The organization and its crowds connect on a

Relational Linkage (REL) adapted from Wagner et. (2014).	Reflective construct/ Independent variable	crowdsourcing platform using a comprehensible communication pattern (COL2). 3. The organization and its external crowds can use a crowdsourcing platform to discuss innovation-related issues (COL3). 4. The organization and its crowds can post innovation-specific messages on crowdsourcing platforms using easily accessible narrative styles (COL4). 1. During the innovation process in crowdsourcing platforms, crowds and the organization have a high mutual trust and respect (REL1). 2. External crowds and organizations routinely consult one other for improved innovation performance in crowdsourcing platforms (REL2). 3. During the innovation process in crowdsourcing platforms, crowds and the organization work closely together.
Knowledge transfer effectiveness (KTE) adapted from Iyengar <i>et al.</i> (2015)	Reflective construct/ Mediator variable	1. Crowds offer organizations critical and practical innovation-related knowledge (KTE1). 2. Crowds have provided organizations with an abundance of innovation-related information (KTE2). 3. External crowds are seen as a valuable source of innovation-specific information by the organization (KTE3). 4. External crowds frequently provide the organization with relevant innovation-specific information (KTE4). 5. Overall, crowd-firm interactions have improved the firm's

Absorptive Capacity (ABC) adapted from Iyengar <i>et al.</i> (2015)	Reflective construct/ Mediator variable	innovation-related knowledge (KTE5). 1. The organization has established excellent procedures for identifying and acquiring new innovation-specific data and expertise (ABC1). 2. The organization has suitable procedures in place to examine the innovation-specific data and knowledge gathered (ABC2). 3. The organization has suitable procedures in place to integrate new innovation-specific knowledge and information (ABC3). 4. In innovation, the organization may successfully integrate current knowledge with new information and expertise gained from crowds (ABC4). 5. The organization can effectively incorporate internal and external data and knowledge into the innovation process (ABC5). 6. The organization is good at putting innovation-related knowledge to use (ABC6).
Innovation Performance (INP) adapted from Chen <i>et al.</i> (2009)	Formative construct/ Dependent variable	1. The organizations' merchandise quality can be improved through innovation (INP1). 2. Through innovation, the organization can speed up the commercialization of new products (INP2). 3. The organization improved innovation performance have the potential to generate a significant profit (INP3).

5.4.3 Common Method Bias

The data collection was done only one time from a single survey. Therefore, we conducted different statistical analyses to assess the common method bias. First, Harman's one-factor test was performed using all items' in the principal component analysis (Podsakoff *et al.*, 2003). The exploratory factor analysis results gave four factors with eigenvalues greater than 1.0, accounting for 66% of the total variance. The findings revealed that no single factor accounted for the majority of the variance, implying that common method bias was not an issue in this study. Second, the correlation matrix technique was performed (Pavlou *et al.*, 2007). Previous studies have mainly suggested that intra-construct correlations higher than 0.90 depict the issue of common method bias. The highest intra-construct correlation in our study was 0.79, which is below the threshold limit of 0.90. Therefore, from the results of the two statistical analyses, it was inferred that common method bias is not the issue in our study.

5.5 Data Analysis and Results

A two-step approach (Anderson & Gerbing, 1988) was used to validate the instrument using a measurement model. Then the structural model was assessed to test the research hypothesis. Partial least squares (PLS), a component-based structural equation modeling, were used to validate the study model. The bootstrap operation was performed using the SmartPLS 3.2.7 software package with 5000 resamples. We mainly used SmartPLS to analyze data and test hypotheses for the following reasons. First, PLS has an advantage when working with complicated models that include reflective and formative constructs. Second, PLS is a prediction-oriented model meant to evaluate exploratory models. Third, the sample size was small, which drove the choice for PLS over the other co-variance-based techniques like LISREL and AMOS. Lastly, PLS avoids factor indeterminacy and inadmissible solutions, making it a better choice for estimating complicated interaction effects.

5.5.1 Measurement Model

Confirmatory Factor analysis (CFA) was used to check the reliability and validity of the first-order reflective constructs. Three criteria for assessing the measurement model were discriminant validity, convergent validity, and multicollinearity.

Convergent validity was established when item loadings, Cronbach's alpha (CA), and Composite Reliability (CR) exceeded the threshold limit of 0.70 (Straub *et al.*, 2004). Additionally, the average variance extracted (AVE) exceeds the threshold of 0.50 (Fornell and Larcker, 1981). Table 5.4 shows that all the Cronbach's values were higher than 0.70, and composite reliability values ranged from 0.831 to 0.908. The indicator loadings were above the threshold limit of 0.32 (Tabachnick & Fidell, 2001).

The average variance extracted values of all the reflected constructs were between 0.558 and 0.733. Therefore, the results exhibited good convergent validity.

Discriminant validity was established using three criteria: Fornell-Larcker, cross loads, and the HTMT (Heterotrait-Monotrait). Each construct's average variance extracted square root was higher than the other construct's correlation values (Hair *et al.*, 2016). The Fornell and Larcker criterion results in Table 5.5 suggest that reflective constructs have adequate discriminant validity as each construct's average variance extracted square root was higher than the other construct's correlation values (Hair *et al.*, 2016). Table 5.6 shows that all the indicator loadings were loaded better on their intended constructs than the other, reflecting the discriminant validity. Finally, the HTMT criterion was used to estimate that the correlation between all constructs was perfectly reliable and measured without errors (Hair *et al.*, 2016). Table 5.7 shows that all the HTMT values were less than 0.85 (Ritcher *et al.*, 2016), thus indicating discriminant validity.

Multicollinearity was validated by Variance Inflation factor values (VIF) of constructs with a threshold limit of 5 or below (Hair *et al.*, 2014). As shown in Table 5.4, all the variance inflation values lie between 1.078 to 3.590, indicating a lack of multicollinearity issues in our constructs.

Table 5.4 Confirmatory Factor Analysis (CFA) Results - Reflective Constructs

Construct	Indicator	Item loadings	Cronbach's α (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)	Variance Inflation factor values (VIF)
		>0.32	>0.70	>0.70	>0.50	<5
STL	STL1	0.846	0.742	0.844	0.586	2.562
	STL2	0.879				2.747
	STL3	0.786				1.539
	STL4	0.486				1.078
COL	COL1	0.540	0.723	0.831	0.558	1.107
	COL2	0.842				1.881
	COL3	0.826				1.849
	COL4	0.742				1.443
REL	REL1	0.865	0.819	0.892	0.733	1.829
	REL2	0.830				1.796
	REL3	0.873				1.843
KTE	KTE1	0.793	0.871	0.908	0.666	1.762
	KTE2	0.882				3.590
	KTE3	0.864				3.007
	KTE4	0.865				2.935
	KTE5	0.654				1.300
ABC	ABC1	0.700	0.875	0.905	0.615	2.097
	ABC2	0.780				2.261

	ABC3	0.778				2.726
	ABC4	0.770				2.748
	ABC5	0.828				2.484
	ABC6	0.842				2.685

Source(s): Primary data

Table 5.5: Discriminant validity Results -Reflective Constructs

Fornell and Larcker criterion

	STL	COL	REL	KTE	ABC
STL	0.765				
COL	0.739	0.747			
REL	0.749	0.739	0.856		
KTE	0.756	0.740	0.784	0.816	
ABC	0.425	0.511	0.442	0.525	0.784

Source(s): Primary data

Table 5.6: Item cross-loadings

Items	ABC	COL	INP	KTE	REL	STL
ABC1	0.734	0.376	0.459	0.527	0.415	0.404
ABC2	0.802	0.475	0.636	0.591	0.508	0.456
ABC3	0.753	0.169	0.58	0.106	0.122	0.125
ABC4	0.777	0.258	0.545	0.238	0.264	0.223
ABC5	0.843	0.343	0.596	0.337	0.323	0.315
ABC6	0.847	0.235	0.675	0.294	0.202	0.194
COL1	0.361	0.894	0.346	0.382	0.189	0.224
COL2	0.365	0.847	0.272	0.598	0.652	0.615
COL3	0.269	0.857	0.187	0.702	0.672	0.686
COL4	0.376	0.745	0.273	0.47	0.595	0.468
INP1	0.521	0.365	0.679	0.478	0.421	0.35
INP2	0.683	0.166	0.888	0.243	0.217	0.179
INP3	0.579	0.324	0.754	0.416	0.277	0.278
KTE1	0.365	0.631	0.328	0.785	0.652	0.615
KTE2	0.312	0.603	0.271	0.879	0.633	0.622
KTE3	0.299	0.623	0.259	0.856	0.609	0.607
KTE4	0.334	0.652	0.24	0.877	0.643	0.691
KTE5	0.59	0.434	0.522	0.646	0.494	0.449

REL1	0.341	0.7	0.32	0.697	0.859	0.689
REL2	0.308	0.643	0.211	0.57	0.837	0.511
REL3	0.38	0.655	0.272	0.705	0.858	0.653
STL1	0.195	0.58	0.098	0.61	0.563	0.832
STL2	0.248	0.621	0.175	0.622	0.616	0.873
STL3	0.285	0.612	0.211	0.598	0.636	0.773
STL4	0.444	0.326	0.403	0.346	0.336	0.461

Notes: STL- Crowdsourcing-based structural linkage; COL-Crowdsourcing-based Cognitive linkage; REL- Crowdsourcing-based relational linkage; KTE- Knowledge transfer effectiveness; ABC- Absorptive Capacity; INP-Innovation performance

Table 5.7: Heterotrait and Monotrait (HTMT) criteria

	Absorptive Capacity	Crowdsourcing-based Cognitive linkage	Knowledge transfer effectiveness	Crowdsourcing-based relational linkage
Crowdsourcing-based Cognitive linkage	0.611			
Knowledge transfer effectiveness	0.506	0.528		
Crowdsourcing-based relational linkage	0.447	0.662	0.640	
Crowdsourcing-based structural linkage	0.476	0.630	0.637	0.680

Three criteria examined the measurement model of the second-order formative constructs, namely outer loading, outer weights, and multicollinearity. The outer weights of all the formative indicators were statistically significant except for one (INP1). Therefore, to decide whether the insignificant indicator should be dropped or retained, we further assessed the outer loadings of all formative constructs items as suggested by Hair *et al.* (2016). As shown in Table 8, all the item loadings were above the limit of 0.50; therefore, we retained INP1 for data analysis as it forms a vital part of the innovation construct. Lastly, the variance inflation factor values (VIF) were below the threshold limit of 5 (Hair *et al.*, 2014), so multicollinearity was not a severe issue in our formative constructs. Therefore, the results exhibited the reliability and validity of the formative constructs used in the study.

Table 5.8: Confirmatory Factor Analysis (CFA) Results - Formative Constructs

Formative Constructs	Indicators	Outer weights	Outer Loadings	Variance inflation factor values (VIF)
Organizational Innovation	INP1	0.164 n/s	0.701***	1.941
	INP2	0.717***	0.913***	1.268
	INP3	0.327***	0.706***	1.811

Source(s): Primary data, ***p<0.001

5.5.2 Structural Model

The structural model was evaluated by a four-step process given by Hair *et al* (2017). First, to assess the absence of collinearity. Second, assess and find the relevance and significance of the relationships of variables. Third to assess the effect size f^2 and the coefficient of determination R^2 . Lastly, the predictive capacity Q^2 of the model was assessed.

The collinearity assessment was done using the VIF values of the model. Table 5.9 shows that all the variance inflation values were below the threshold limit of 3.3 (Diamantopoulos & Siguaw, 2006), indicating a lack of collinearity issues.

Table 5.9: Structural model variables- VIF values

	Knowledge transfer effectiveness	Absorptive capacity	Innovation performance
Knowledge transfer effectiveness		3.147	
Crowdsourcing-based structural linkage	2.750	3.022	
Crowdsourcing-based cognitive linkage	2.654	2.842	
Crowdsourcing-based relational linkage	2.761	3.185	
Absorptive capacity			1.000

Source(s): Primary data

Following this, the relationship coefficients and the significance of the relationships between variables were assessed. Table 5.10, 5.11, and 5.12 show the values of relationship coefficients, mean values, standard deviation, t values, and significance level. The confidence interval values of 2.5% and 95% were also reported as recommended by the authors (Hair *et al.*, 2016; Henseler *et al.*, 2016; Roldan *et al.*, 2012). The results of the structural model analysis shown in Figure 5.3 depict the causal relationships between constructs. The research hypotheses is tested using path coefficient values (β) and p-values.

Table 5.10: Structural Model relationships- Direct effect results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	2.5%	97.5%	P Values
ABC → INP	0.731	0.735	0.035	21.18	0.667	0.80	0.001
COL → ABC	0.338	0.345	0.092	3.669	0.149	0.518	0.000
COL → KTE	0.237	0.233	0.055	4.321	0.114	0.341	0.002
REL → ABC	-0.029	-0.035	0.096	0.306	-0.215	0.151	0.76
REL → KTE	0.396	0.398	0.063	6.308	0.277	0.518	0.000
STL → ABC	-0.064	-0.068	0.097	0.662	-0.262	0.113	0.508
STL → KTE	0.285	0.288	0.052	5.479	0.184	0.388	0.001
KTE → ABC	0.285	0.286	0.084	3.411	0.459	0.459	0.001

Notes: STL- Crowdsourcing-based structural linkage; COL-Crowdsourcing-based Cognitive linkage; REL- Crowdsourcing-based relational linkage; KTE- Knowledge transfer effectiveness; ABC- Absorptive Capacity; INP-Innovation performance

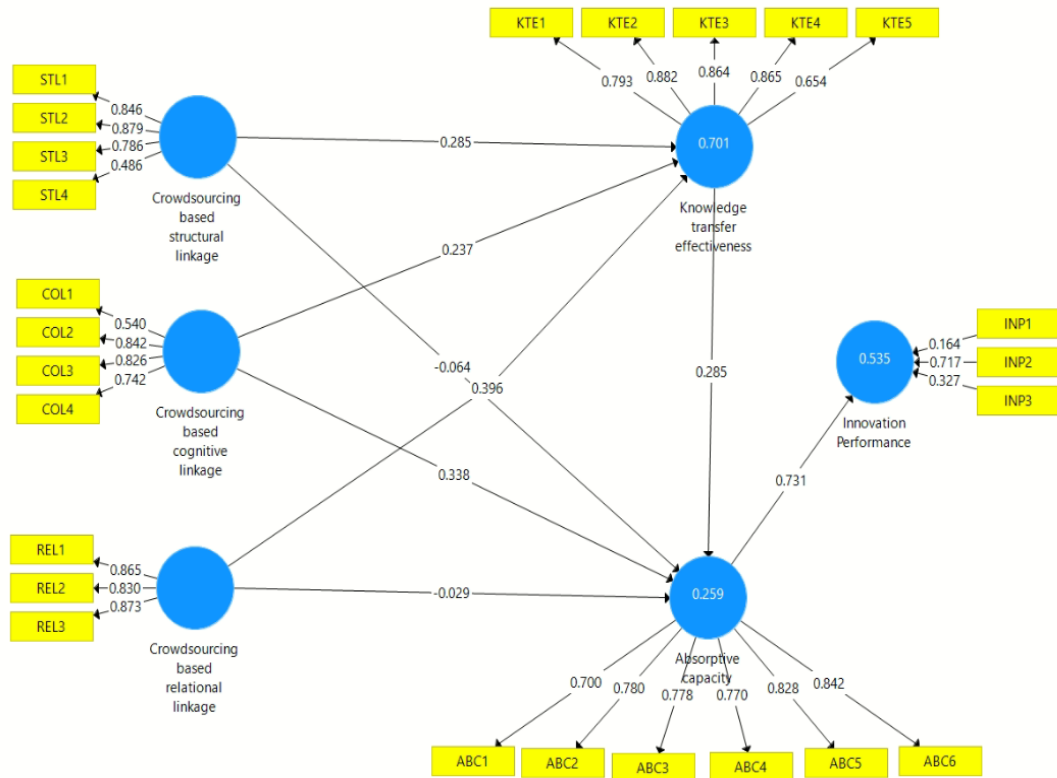
Table 5.11: Structural Model relationships- Indirect effect results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Statistics t (O/STDEV)	2.5%	97.5%	P values
REL ->KTE ->ABC -> INP	0.083	0.084	0.029	2.816	0.032	0.142	0.005
COL->ABC->INP	0.248	0.254	0.071	3.486	0.102	0.396	0.001
REL->KTE->ABC	0.113	0.114	0.039	2.86	0.045	0.199	0.004
COL->KTE->ABC->INP	0.049	0.049	0.018	2.679	0.018	0.089	0.008
COL->KTE->ABC	0.068	0.066	0.025	2.728	0.024	0.119	0.007
STL->KTE->ABC	0.081	0.082	0.028	2.904	0.036	0.138	0.004
REL->ABC->INP	-0.022	-0.026	0.071	0.303	-0.157	0.108	0.762
STL->ABC->INP	-0.047	-0.05	0.072	0.652	-0.193	0.081	0.515
STL->KTE->ABC->INP	0.059	0.06	0.021	2.873	0.026	0.102	0.004
KTE->ABC->INP	0.209	0.21	0.062	3.345	0.092	0.342	0.001

Table 5.12: Structural Model relationships- Total effect results for Study 4

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Statistics t (O/STDEV)	2.5%	97.5%	P values
ABC->INP	0.731	0.735	0.035	21.18	0.667	0.8	0.001
COL->ABC	0.406	0.411	0.09	4.511	0.22	0.583	0.001
COL->INP	0.297	0.303	0.07	4.219	0.154	0.44	0.002
COL->KTE	0.237	0.233	0.055	4.321	0.114	0.341	0.002
REL->ABC	0.084	0.079	0.092	0.908	-0.098	0.257	0.364
REL->INP	0.061	0.058	0.068	0.9	-0.073	0.194	0.369
REL->KTE	0.396	0.398	0.063	6.308	0.277	0.518	0.000
STL->ABC	0.017	0.014	0.098	0.175	-0.186	0.202	0.861
STL->INP	0.013	0.01	0.072	0.173	-0.141	0.142	0.863
STL->KTE	0.285	0.288	0.052	5.479	0.184	0.388	0.000
KTE->ABC	0.285	0.286	0.084	3.411	0.127	0.459	0.001
KTE->INP	0.209	0.21	0.062	3.345	0.092	0.342	0.001

Figure 5.3: Path coefficient analysis



The results of the structural equation model for the hypothesis testing showed that crowdsourcing-based structural linkage ($\beta = 0.285$, $p < 0.001$), cognitive linkage ($\beta = 0.237$, $p < 0.05$), and relational linkage ($\beta = 0.396$, $p < 0.001$) positively influenced organizational knowledge transfer effectiveness. Therefore, H1a, H1b, and H1c were supported. Furthermore, crowdsourcing-based cognitive linkage ($\beta = 0.338$, $p < 0.05$) also influenced organizations absorptive capacity. Thus, supporting H2b. Whereas, crowdsourcing-based structural linkage ($\beta = -0.064$, $p > 0.05$) and relational linkage ($\beta = -0.029$, $p > 0.05$) had nonsignificant effects on the organization's absorptive capacity. Thus, it provides evidence to reject H2a and H2c. Meanwhile, organizational knowledge transfer effectiveness positively influenced their absorptive capacity capability ($\beta = 0.285$, $p < 0.05$), and the absorptive capacity capability of an organization positively influenced organizational value capture, i.e., innovation capability ($\beta = 0.731$, $p < 0.001$). Hence, this provides strong support to confirm H3 and H4. The model explained 25.9% and 53.5% variance in an organization's absorptive capacity and organizational value capture.

Additional analyses were also conducted to assess the structural model and the individual relationships. The structural model was evaluated using a coefficient of determination R^2 . While the model's predictive accuracy was evaluated using predictive relevance Q^2 . The values of the coefficient of determination R^2 and the adjusted R^2 are reported in Table 5.13.

Table 5.13: Coefficient of determination- R^2 values

	R^2	Adjusted R^2
Knowledge transfer effectiveness	0.701	0.699
Absorptive Capacity	0.259	0.251
Innovation performance	0.535	0.251

Source(s): Primary data

The effect size f^2 was also assessed to find the individual effects of endogenous constructs variables (Henseler *et al.*, 2016; Roldan *et al.*, 2012). Hair *et al.* (2017) described that f^2 values of 0.01 have a small effect, 0.15 has a moderate effect, and 0.35 has a large effect. The f^2 values reported in Table 5.14 show that an organization's absorptive capacity has a strong f^2 size effect on innovation performance. Crowdsourcing-based structural linkage has a small effect on the organization's knowledge transfer effectiveness and absorptive capacity. Crowdsourcing-based Cognitive linkage has a small effect on the organization's knowledge transfer effectiveness and absorptive capacity. Crowdsourcing-based relational linkage has a moderate effect on knowledge transfer effectiveness.

Table 5.14: Coefficient of determination effect size- f^2 values

	Knowledge transfer effectiveness	Absorptive Capacity	Innovation performance
Knowledge transfer effectiveness		0.033	
Crowdsourcing-based structural linkage	0.099	0.002	
Crowdsourcing-based Cognitive linkage	0.071	0.054	
Crowdsourcing-based relational linkage	0.19		
Absorptive Capacity			1.15

Finally, the model's predictive capacity (Q^2) was assessed using the blindfolding process. The Q^2 values shown in Table 5.15 indicate that all the endogenous variables have positive values, thus, depicting the predictive relevance of the model.

Table 5.15 Predictive capacity values- Q^2

	Q^2
Knowledge transfer effectiveness	0.457
Absorptive Capacity	0.141
Innovation performance	0.319

Source(s): Primary data

5.5.3 Testing Mediating Effects

The bootstrapping method was used to check the mediating role of organizational knowledge transfer effectiveness and absorptive capacity capability. Mediation analysis results are shown in Table 5.11. The results indicated that organizational knowledge transfer effectiveness mediated the relationship between crowdsourcing-based structural linkage formed and absorptive capacity ($\beta = 0.081$, $CI = [0.031, 0.141]$), crowdsourcing-based cognitive linkage formed and absorptive capacity ($\beta = 0.068$, $CI = [0.023, 0.123]$), crowdsourcing-based relational linkage formed and absorptive capacity ($\beta = 0.113$, $CI = [0.043, 0.194]$). Hence, this provides strong support to confirm H5a, H5b, and H5c. Meanwhile, the organization's absorptive capability mediated the relationship between crowdsourcing-based cognitive linkage and organizational value capture ($\beta = 0.248$, $CI = [0.103, 0.396]$). Whereas an organization's absorptive capacity does not mediate the relationship between crowdsourcing-based structural linkage formed and organizational value capture ($\beta = -0.047$, $CI = [-0.192, 0.091]$), and crowdsourcing-based relational linkage formed and organizational value capture ($\beta = -0.022$, $CI = [-0.153, 0.115]$). Thus, H6b was supported, and H6a and H6c were not supported. Lastly, an organization's absorptive capacity mediated the relationship between organizational knowledge transfer effectiveness and organizational value capture ($\beta = 0.209$, $CI = [0.063, 3.290]$). Thus, supporting H7.

5.6 Discussions and Conclusion

The study's primary goal was to understand how crowdsourcing use complements crowd-firm social linkage, its effect on organizational learning as a co-creation outcome, and value capture in the form of organizational innovation. One of the interesting findings was that the crowdsourcing-based social capital formed between crowd and firm positively influenced organizational knowledge transfer effectiveness.

Along the same lines, only cognitive linkage formed between crowd-firm during crowdsourcing influenced the organizations' absorptive capacity capability. Conversely, crowdsourcing-based structural and relational capital formed between crowd-firm was not enough to develop the organization's absorptive capacity for the following possible reasons. Social interactions, respect, and trust between crowds and firms enhance an organization's market knowledge and novel insights. But organization absorptive capacity is mainly determined by individual members' shared understanding and previous knowledge base (Roberts *et al.*, 2012). Thus, organizations and crowds with a common understanding and similar backgrounds having the potential to comprehend and employ the knowledge base in a specific domain ultimately speed up the knowledge transfer well, which further improves the organization's absorptive capacity. Further, the results indicated a positive relationship between an organization's knowledge transfer effectiveness and absorptive capacity. Additionally, an organization's absorptive capacity has a significant role in determining organizational value capture (improved innovation performance).

The crowdsourcing-based co-creation between crowd-firm results in organizational learning, thus enabling organizational knowledge transfer effectiveness and absorptive capacity and creating a synergetic effect on organizations value capture. Therefore, our research findings reveal that organization's knowledge transfer effectiveness mediated the relationship between crowdsourcing-based social linkage formed and the organization's absorptive capacity. The results thus indicate that social capital formed between crowd-firm affects an organization's absorptive capacity by enhancing knowledge transfer capability from crowds to the firm.

On the other hand, organizations' absorptive capacity mediated the relationship between cognitive linkage formed during crowdsourcing and organization value capture. At the same time, the organization's absorptive capacity mediated the relationship between organizational knowledge transfer effectiveness and value capture (innovation performance). In contrast, organizations' absorptive capacity does not mediate the relationship between structural and relational linkage formed during crowdsourcing and organization value capture. The rationale behind insignificant relationships is that the development of an organization's absorptive capacity depends on a specific path which is mainly domain and firm-specific (Roberts *et al.*, 2012) and can't be easily incorporated into an organization. Though structural and relational capital formed during crowdsourcing creates an information-rich learning environment, the application and acclimatization of new knowledge acquired depend on the transfer of common understanding and collective goals (Cohen & Levinthal, 1990) between crowd and firm.

5.6.1 Theoretical Implications

Using the Iyengars *et al.* (2015) organizational learning model, the present study explored the impact of crowdsourcing-based crowd-firm co-creation on organizational learning. The outcome of the current study supports the Iyengar *et al.* (2015) notion that organizational learning positively impacts organizational knowledge transfer effectiveness and absorptive capacity capability. The collective intelligence gathered during crowdsourcing, and crowd-firm interaction can improve an organization's learning capability when an organizational environment facilitates knowledge transfer. The study also promotes that crowdsourcing enriches the learning capabilities of organizations, which further enriches the innovative capacity of the firms.

Further, the study used Social capital theory to distinguish the crowdsourcing-based co-creation mechanism into three dimensions. The findings show that social linkages between a crowd and a firm enhance knowledge transfer effectiveness. Crowdsourcing-based structural linkage formed will result in an acquisition of explicit and tacit knowledge in organizations that further broadens the base of minds, resulting in more top-down and bottom-up connections, conversations, dialogue, and discussions within organizations. Crowdsourcing-based cognitive linkage formed between crowd-firm will impact knowledge transfer by enhancing the ability of the crowd to access and contribute knowledge to a community. Crowdsourcing-based relational linkage formed between crowd-firm will enhance knowledge-sharing intentions and collaboration capability, thus, creating a positive atmosphere to exchange knowledge, assimilate, interpret, and integrate within the organization. The study is the pioneer in using the social capital dimensions to understand the entire mechanism behind the formation of crowdsourcing-based social linkage for effective knowledge transfer and absorptive capacity.

5.6.2 Practical Implications

Social linkages between a crowd and a firm in crowdsourcing act as a catalyst for effective knowledge transfer and organizations' absorptive capacity, further improving innovation performance. The findings apprise practitioners that crowdsourcing-based co-creation can be used as a panacea to improve innovation performance only when complemented with the organizational capabilities to build social linkages, effective knowledge transfer, and better absorptive capacity. Therefore, organizations should work on the improvement of three social linkages formed with the crowd to enhance organizational innovation performance. First, managers should build interaction channels in crowdsourcing to enable new connections and tie-up between the crowd and a firm to interact and share their knowledge. For instance, "Dell's IdeaStorm" (www.ideastorm.com) and "IBM's Innovation Jam" (www.collaborationjam.com) enable rich interactions and discussions with external crowds to acquire experience and knowledge for improving innovation performance. Second, organizations should

build standard codes and languages, namely cultural and business assumptions, descriptions of technology, and task requirements that enable the formation of cognitive linkage (Yang & Li, 2016) between a crowd and an R&D teams for further innovation opportunities. Thus, the cognitive linkage formed results in shared understanding and learnings between a crowd and a firm. For instance, "Threadless," an apparel company, uses shared codes and languages between the crowd and a firm to create, inspect, approve, improve and select shirt designs. The cognitive linkage formed during crowd-firm interaction facilitates "Threadless" to correctly understand the preferences and needs of crowds and then proceed with customized shirt designing (Piller, 2010). Third, managers should develop a co-creation process and acclimatize these processes in organizations to build a crowd-firm relationship. Additionally, certain guidelines and regulations should be formulated to reduce crowd concerns related to privacy, security, and intellectual property rights in the co-creation processes.

Another interesting finding of the study is that effective knowledge transfer and an organization's absorptive capacity create a synergetic effect on organizations' value co-creation and capture. Therefore, managers should use crowdsourcing as a co-creation platform to enrich the relationship between effective knowledge sharing and an organization's absorptive capacity. Moreover, organizations should create different activities and processes to reach a wider crowd, resulting in the acquisition of quality information between a diverse crowd and an R&D team. Organizational innovation capability depends on the breadth of knowledge acquisition (Cohen & Levinthal, 1990). Therefore, organizations should use crowdsourcing as a co-creation platform to enable effective knowledge sharing and further enhance organizational capacity to acquire knowledge and assimilate the available resources to enhance an organization's research and innovation capabilities. Crowdsourcing is mainly a co-creation tool to create knowledge within organizations and improve R & D's capabilities to innovate well. Our research has indicated that organizations using social linkages in crowdsourcing is more innovative and enable innovation through new ideas and knowledge transfer, enhancing employees' capability to comprehend and employ collective intelligence.

5.7 Limitations and Future Research

The study has a few limitations that need to be acknowledged in future research. First, the operationalization of three dimensions of social capital was adapted from the study of Wagner *et al.* (2014). Such conceptualization may limit the research findings to a single aspect. For instance, different studies suggest that structural capital is an overall interaction pattern and plays a significant role in network decentralization (Robert *et al.*, 2008), increased communication intensity (Chiu *et al.*, 2006), etc. Our study defined structural capital as an interaction mechanism between a firm and a crowd during crowdsourcing for improved innovation performance. Second, future studies may use different qualitative techniques to understand better the three dimensions used and the co-creation mechanism from the perspective of social capital. Third, our study's

outcome of crowd-firm co-creation was organizational learning; therefore, future research studies may take a different outcome perspective of co-creation. Fourth, the study used only cross-sectional data to examine the proposed research model. Thus, future research may be conducted based on longitudinal data to investigate the co-creation processes and outcomes over time. Finally, the co-creation performance between a crowd and a firm may differ at different stages of the innovation process. Hence, future researchers may explore the role of co-creation and its outcome at different stages of organizational innovation performance.

5.8 Summary

In this chapter, we delved into the complex relationship between crowdsourcing, organizational learning, and innovation performance. Our investigation aimed to uncover how crowdsourcing initiatives, by fostering co-creation between organizations and external crowds, contribute to organizational dynamics and innovation outcomes. Our findings revealed that the social capital formed between the crowd and the firm plays a pivotal role in enhancing organizational knowledge transfer effectiveness. Notably, cognitive linkage emerged as a significant factor influencing the organization's absorptive capacity, while the impact of structural and relational linkages was more indirect. Through the lens of organizational learning, we observed that effective knowledge transfer mechanisms within organizations serve as crucial mediators between crowdsourcing-based social capital and organizational innovation. By prioritizing the development of absorptive capacity, organizations can effectively utilize the knowledge acquired through crowdsourcing initiatives to drive innovation. Our study offers practical insights for organizations, highlighting the importance of fostering interaction channels, developing shared codes and languages, and establishing co-creation processes to facilitate effective knowledge sharing and enhance absorptive capacity. Moreover, by leveraging social capital theory, our research contributes to a deeper understanding of how different forms of social linkages influence organizational learning and innovation. Overall, our findings provide valuable guidance for organizations seeking to strategically leverage crowdsourcing to enhance innovation capabilities and achieve sustainable growth in the competitive environment.

After comprehensively understanding the mechanisms underlying crowdsourcing-based social linkages and their influence on organizational outcomes, the next pertinent question arises: how do these mechanisms impact organizational outcomes? This question forms the crux of Chapter 6, where we delve into the detailed exploration of the outcome and impact of crowdsourcing on organizational innovation competence.

CHAPTER 6

VALUE CO-CREATION OUTCOME AND IMPACT OF CROWDSOURCING

The need to unravel the intricacies of crowdsourcing-based social linkages arises from the evolving landscape of collaborative practices between organizations and external stakeholders. Chapter 6 of this thesis delves into the crucial exploration of crowdsourcing-based social mechanisms and their profound impact on organizational outcomes, particularly focusing on innovation competence. While previous research has presented mixed findings regarding the direct impact of crowdsourcing on innovation competence, this chapter addresses a critical gap by delving into the mediating role of knowledge transfer effectiveness and absorptive capacity. Understanding these mechanisms becomes imperative as they are identified as pivotal factors in shaping the relationship between crowdsourcing-based social linkages and organizational innovation competence. The exploration is grounded in social capital theory and the organizational learning outcome performance model, offering a theoretical foundation for comprehending the dynamics at play. Recognizing that successful crowdsourcing outcomes are not solely dependent on external connections but also hinge on internal organizational preparedness, this chapter emphasizes the significance of internal practices. Moreover, it introduces the concept of crowdsourcing maturity and dynamic capabilities, advocating for a dynamic analysis approach. By addressing the limitations of past research and proposing avenues for future exploration, Chapter 6 aims to contribute valuable insights that extend our understanding of how organizations can strategically leverage crowdsourcing-based social linkages for enhanced innovation competence.

6.1 Introduction

In the highly competitive business environment, organizations can gain a competitive edge by developing product or service innovations that are directly relevant to their target market. Following the crowdsourcing model, an organization can enhance its innovation competence by intentionally expanding its horizons and incorporating external knowledge into its innovation processes (Afuah & Tucci, 2012). Employing crowdsourcing allows organizations to tap into the creativity and intellectual potential of an online community in a controlled yet open manner. This approach combines traditional top-down project management with bottom-up, open innovation concepts (Boudreau & Lakhani, 2013). The underlying principle is that community members possess the ability to solve complex problems that even scientific experts may struggle with. By actively involving the audience, crowdsourcing generates solutions that resonate with the intended audience, thus strengthening the innovative competence of the organizations (Xu et al., 2015).

Several empirical studies have shown that the implementation of crowdsourcing leads to an improvement in organization innovation competences (Ye & Kankanhalli, 2013; Lüttgens et al., 2014; Zhu et al., 2016). However, other research has suggested that it may not have any effect on innovation competence or may even have a negative impact in certain situations (Wazny, 2017; Hanine & Steils, 2018; Vellera et al., 2022). Moreover, researchers have recorded instances of failed crowdsourcing initiatives, wherein organizations were unable to achieve their set targets for improving innovation competence.

The contradictory empirical results (Table 6.1) pertaining to the influence of adopting crowdsourcing on organizations' innovation competence have led to a state of perplexity. The inconsistency observed in prior studies could be attributed to the diversity in internal practices of firms in managing innovation processes, given the managerial complexities associated with utilizing external knowledge (Kannangara & Uguccioni, 2013; Zhao & Zhu, 2014; Zahay et al., 2018). An obstacle that must be addressed pertains to the need for employees to possess a comprehensive comprehension of the organization's knowledge requisites, which would enable them to effectively recognize and evaluate pertinent external knowledge sources (Bapna et al., 2017). Ensuring that the external knowledge that has been identified is in a format that is suitable for internal application and can be efficiently transferred to the relevant business units and departments is another obstacle (Liao et al., 2007). The aforementioned challenges highlight the necessity for organizations to establish internal protocols for their crowdsourcing endeavors, thereby enhancing the probability of enhancing their innovation competences. The abovementioned proposition implies that the internal procedures may act as intermediaries between crowdsourcing and the ability to innovate (Devece et al., 2019). It is noteworthy that prior research has primarily concentrated on investigating the correlation between crowdsourcing and innovation competence through direct means (Boons & Stam, 2019; Ruiz et al., 2020).

As far as the current understanding goes, the sole consideration of internal practices as mediators have been made by Devece et al. (2019). Notwithstanding, the study conducted by Devece et al. (2019) has furnished empirical substantiation of a favorable indirect impact of crowdsourcing on innovation capability by means of internal practices. It is noteworthy, however, that their investigation solely encompassed one category of external collaborators, namely customers. The present study endeavors to investigate and explore the relationship between crowdsourcing-based social linkage and innovation competence in a comprehensive manner. It seeks to examine the internal mechanism that firms can employ to enhance their innovation competence by utilizing crowdsourcing, while also taking into account a wider spectrum of external participants. More specifically, we propose to examine knowledge transfer effectiveness and absorptive capacity as serial mediators of the relationship between crowdsourcing-based social linkages and organizational innovation competence. Specifically, study focuses on investigating two critical research questions.

Research Question 1 (RQ1.) How does crowdsourcing-based social linkages influence organizational innovation competence?

Research Question 2 (RQ2.) How do knowledge transfer effectiveness and absorptive capacity interact with crowdsourcing-based social linkages to influence the innovation competence of organizations?

Table 6.1: Prior Studies Related to the Crowdsourcing Adoption and Innovation Competence

Research Study	Findings
Zhu et al. (2016)	Crowdsourcing adoption enhances organizations' innovation performance by leveraging external expertise and diverse perspectives.
Dahlander and Piezunka (2020).	While some organizations experience improved innovation competence through crowdsourcing, others face challenges due to coordination difficulties and potential loss of control.
Forbes and Schaefer (2018)	Organizational context and strategy play a role. Crowdsourcing is more likely to enhance innovation when aligned with strategic goals, supported by appropriate complementary resources and capabilities.
Pollock et al. (2019)	Three categories of lower-level organizational components can impact benefits derived from crowdsourcing: informal and formal roles within the organization, along with knowledge management processes.
Modaresnezhad et al. (2020)	The impact of crowdsourcing on value capture depends on the organization's absorptive capacity and ability to effectively integrate external knowledge.
Palacios et al. (2021)	Organizational culture that promotes openness and collaboration can amplify the positive impact of crowdsourcing adoption on innovation competence.
Shergadwala et al. (2020)	Crowdsourcing adoption for innovation fails due to design solutions not meeting quality requirements, influenced by factors like domain knowledge, problem complexity, and incentives.

Scholarly literature indicates that knowledge transfer effectiveness and absorptive capacity are two crucial internal practices in the realm of crowdsourcing. These practices have been found to play a pivotal role in enabling firms to enhance their innovation competence through crowdsourcing (Schlagwein & Andersen, 2014; Lenart-Gansiniec & Sulkowski, 2020). The capacity of an organization to identify and utilize diverse knowledge domains relevant to the innovation process is influenced by the effectiveness of knowledge transfer and the organization's ability to absorb knowledge from external partners. Moreover, these internal procedures facilitate the integration and proficient application of acquired knowledge, thereby augmenting innovation competence (Xun & Xuehan, 2014; Iyengar et al., 2015). Furthermore, academic experts have proposed that the dissemination of knowledge within organizations across various departments and staff members can enhance the integration and utilization of external knowledge throughout the process of innovation.

According to Iyengar et al. (2015), the dissemination of knowledge within an organization has the potential to enhance its innovation capabilities. It is crucial to acknowledge that the concept of absorptive capacity in an organization pertains to its ability to actively acquire, integrate, and enhance the efficacy of knowledge transfer. In addition, it requires leveraging external resources and expertise to achieve significant revenue growth (Iyengar et al., 2015). According to Xun & Xuehan (2014), organizations with a higher absorptive capacity can consistently enhance their skills and knowledge, assimilate novel information from outside sources, and cultivate core competencies that efficiently utilize this information, thereby enhancing the effectiveness of their innovation efforts.

Given that knowledge sharing occurs between firms and their external partners, and that absorptive capacity is intricately linked to the social connections established between organizations and external partners in the context of crowdsourcing, this study delves into their potential roles as mediating factors between crowdsourcing-based social linkage (CBSL) and innovation competence. By examining these internal practices, the aim is to bridge the divergent perspectives on how firms can effectively leverage crowdsourcing-based social linkage. The research draws upon a diverse sample of 300 senior managers from different industries in India that are currently engaged in the implementation of crowdsourcing strategies. The data that was gathered underwent analysis utilizing the Partial Least Squares and Bootstrapping methodologies. The findings challenge the notion of a direct association between crowdsourcing-based social linkage and innovation competence. Instead, this connection is fully mediated by the mechanisms of knowledge transfer effectiveness and absorptive capacity. This indicates that successful translation of crowdsourcing-based social linkage into enhanced innovation competence hinges on consistent and systematic knowledge sharing within and beyond organizational boundaries. Furthermore, organizations must establish a well-defined strategy for knowledge transfer and assimilation in order to attain the intended outcome. This study contributes twofold to the field of crowdsourcing. Firstly, it dispels the notion that engagement in crowdsourcing inherently leads to improved innovation competence. Secondly, it demonstrates that the effectiveness of crowdsourcing-based social linkage hinges on internal practices like knowledge transfer effectiveness and absorptive capacity, elucidating the factors behind varying degrees of success in crowdsourcing endeavors.

6.2 Literature Review

6.2.1 Crowdsourcing-based Social Linkages

The concept of crowdsourcing-based social linkages embodies the synergistic intersection of external community interactions and organizational connections, resulting in a novel form of capital akin to social capital. Sociologically grounded in the works of Bourdieu (1980), social capital signifies the reservoir of tangible and latent resources embedded within interconnected relationships among individuals. In

the realm of innovation and collaboration, social capital emerges as a potent resource facilitating the acquisition and cultivation of valuable competencies (Nahapiet & Ghoshal, 1998; Wasko & Faraj, 2005). By tapping into networked relationships, actors can access pivotal and often scarce resources, steering them towards goal attainment and deriving benefits, ultimately bolstering innovation competence and organizational performance (Ng & Law, 2015).

Three fundamental dimensions of social capital, as articulated by scholars like Nahapiet & Ghoshal (1998) and Tsai & Ghoshal (1998) are structural, relational, and cognitive. The structural dimension encompasses the intricate web of connections and networks among members, encapsulating attributes such as relationship strength and other characteristics that significantly influence resource utilization. In the context of this study, the focus rests on assessing the interactions between organizations engaged in crowdsourcing and the external crowd community. Moreover, the overarching pattern of relationships evolving during the crowdsourcing process aligns with the structural dimension, reflecting how connections are woven. The relational dimension pivots around the bedrock of trust and esteem, shaping the operational dynamics during collaborative efforts between organizations and crowds (Wagner et al., 2014). Trust plays a pivotal role in the interactions between stakeholders, serving as a cornerstone for productive collaboration. In the context of this research, trust forms the foundation for evaluating the relational facet of social capital within crowdsourcing-based linkages. Lastly, the cognitive dimension delves into the alignment of perspectives between the crowd and organizations, facilitated by shared visions, objectives, language, and values (Lusch & Nambisan, 2015). This dimension gains prominence within the context of crowdsourcing, where successful outcomes hinge on the convergence of understanding and purpose between the involved entities.

Therefore, crowdsourcing-based social linkages, comprising the dimensions of structural, relational, and cognitive social capital, underscore the pivotal role of interconnectedness, trust, and shared understanding in fostering innovation and collaboration. This multidimensional framework illuminates how organizations harness the power of external networks to bolster innovation competence and drive organizational success.

6.2.2 Knowledge Transfer Effectiveness and Absorptive Capacity

Effective knowledge transfer denotes the efficiency of transmitting external knowledge to an organization's internal domain, emerging as a cornerstone for innovation success. Ortiz et al. (2018) and Di Vaio et al. (2021) emphasize the role of timely and precise knowledge acquisition from external sources in gaining a competitive edge. Simultaneously, the literature acknowledges the hurdles inherent in knowledge transfer. Challenges identified by García-Sánchez et al. (2017) and Goyal et al. (2020) encompass communication gaps and diverse organizational cultures, underscoring the

complexity of the process. Additionally, the quality of transferred knowledge becomes a focal point, as Nazam et al. (2020) and Bloodgood (2019) stress the importance of meticulous consideration during transfer.

Concurrently, absorptive capacity, denoting an organization's ability to effectively assimilate and apply external knowledge, emerges as a pivotal predictor of innovation competence. Cohen & Levinthal (1990) and Zahra & George (2002) highlight its role in integrating external knowledge into existing internal structures to enhance innovation capabilities. Predictive in nature, absorptive capacity as emphasized by Knudsen & Roman (2004) and Caloghirou et al. (2004) is intrinsic to an organization's innovation potential. Moreover, Minbaeva et al. (2014) extend this concept by asserting its broader influence on overall organizational performance. Collectively, the literature underscores the intricate connection between knowledge transfer effectiveness and absorptive capacity in fostering innovation competence. Effective knowledge transfer serves as the means for incorporating external knowledge, while absorptive capacity determines an organization's ability effectively utilize and incorporate this knowledge for innovation. The implications are profound: organizations aspiring to enhance innovation competence should meticulously address challenges in knowledge acquisition, transfer, and integration, while nurturing their absorptive capacity. By doing so, they unlock the potential of external knowledge, paving the way for improved innovation outcomes and a heightened competitive advantage in dynamic markets.

6.2.3 Organizational Innovation Competence

Organizational Innovation competence is the assets that simultaneously meet the requirements for being a strategic asset and a dynamic capability of an organization. They aim to combine the exploitation of established processes and practices with the exploration of change and innovation. Innovation competence makes it possible for organizations to integrate functional activities and acquire and exploit the latest resources and capacities to adapt to the changing market conditions or change them completely. In the field of innovation competences, scholars have identified two distinct dimensions, namely Schumpeterian competence and continuous improvement competence (Chandy & Tellis, 1998; Gopalakrishnan & Damanpour, 1997; Damanpour 1996; Subramaniam & Youndt, 2005). Schumpeterian competence involves a substantial expansion of knowledge and generative learning, resulting in transformative changes in organizational activities through the development of new technological or organizational abilities. On the other hand, continuous improvement competence entails incremental growth of knowledge and leads to modest changes in the organization's practices, reinforcing its competences and capabilities.

Organizational innovation competence is the ability to consistently generate and implement innovative ideas, products, processes, or business models. This competence plays a pivotal role in enhancing a firm's competitive advantage through continuous renewal and adaptation. The dynamic capability's view underscores the importance of firms' adaptability and resource reconfiguration for innovation (Wang, 2014). Strategic orientations, such as market and entrepreneurial orientation, influence a firm's responsiveness to market needs and its capacity for proactive innovation. Furthermore, innovation competence is intricately tied to knowledge management and learning capabilities. Cross-functional collaboration, knowledge sharing, and learning orientation facilitate the assimilation of new knowledge for innovation (Boons & Stam, 2019). The concept of absorptive capacity highlights the critical role of effectively internalizing and applying external knowledge for innovation purposes. Open innovation practices and dynamic networks also contribute to innovation competence by expanding resource access and collaborative opportunities (Srivastava et al., 2017).

In essence, organizational innovation competence emerges as a multidimensional construct shaped by factors like strategic orientation, knowledge management, and collaborative practices. By effectively integrating these determinants, organizations can elevate their innovation capabilities, driving the creation of novel offerings and bolstering their competitive edge in a rapidly changing business environment.

6.3 Theoretical Framework and Hypotheses Development

6.3.1 Crowdsourcing-based Social Linkages and Innovation Competence

The external network of an organization, comprising the crowd, encompasses information, knowledge, and data that are not readily accessible within the organization's internal systems. The main objective of this network is to mitigate economic and social barriers, as elucidated by Bapna et al. (2017), through facilitating the collaboration between the crowd and the organization in order to generate value and engage in co-creation, as emphasized by Fedorenko & Berthon (2017). Hence, the active engagement, involvement, and collaboration between the collective and the institution foster the advancement of social capital. The theory of social capital offers multiple justifications for suggesting that the existence of social connections in the interaction between an organization and a crowd in crowdsourcing contributes to organizational learning, increased propensity for knowledge transfer, and enhanced absorptive capacity.

According to Chiu et al. (2006), the utilization of crowdsourcing establishes a structural linkage that effectively decreases the transaction costs related to the acquisition, assimilation, diffusion, and collective comprehension of information. The existence of this structural linkage facilitates and amplifies interaction, resulting in the exchange of different types of knowledge, resources, capabilities, expertise, and diverse skills (Ye & Kankanhalli, 2013; Ansari et al., 2012) between the external

stakeholders and the organization. The application of crowdsourcing as a method for establishing structural connections has been discovered to enhance the dissemination of both explicit and tacit knowledge. This, in turn, promotes the establishment of connections, conversations, dialogues, and discussions within organizations, following both top-down and bottom-up approaches. This phenomenon has been observed in studies conducted by Wagner et al. (2014), Nishikawa et al. (2017), and Allen et al. (2018), all of which highlight the ability of crowdsourcing to effectively address the diverse requirements of the crowd. Based on previous research conducted by Chang et al. (2012), Yli-Renko et al. (2001), and Krupowicz et al. (2020), it has been suggested that strong connections, relationships, and interactions within a network can serve as mechanisms to enhance the behavior of sharing knowledge, as well as the extent, scope, and frequency of knowledge transfer, and the ability to absorb new knowledge.

Furthermore, the cognitive linkage established through the utilization of crowdsourcing has a substantial impact on the dissemination of knowledge by enhancing the crowd's ability to both acquire and share their expertise (Tsai & Ghoshal, 1998; Nahapiet & Ghoshal, 1998). During the process of knowledge exchange, individuals within a collective participate in dialogues, acquire information regarding optimal solutions, and engage in the analysis and evaluation of the thoughts and solutions put forth by others. Furthermore, the concept of cognitive linkage plays a pivotal role in facilitating a shared comprehension of collective objectives between the crowd and the organization. This is of utmost importance as it contributes to the development of the organization's dynamic capability to effectively utilize its knowledge and resources (Lusch & Nambisan, 2015).

The importance of trust, as well as respect in the interactions between the crowd and the firm, is emphasized by the relational connection established through crowdsourcing. The relationship between this linkage and the extent and quality of knowledge exchange is supported by research conducted by Wagner et al. (2014). The cultivation of mutual respect and trust within the crowdsourcing community plays a pivotal role in fostering an environment that is conducive to the exchange of knowledge and collaborative efforts. Consequently, this process enables the transfer, absorption, comprehension, and incorporation of knowledge within the organizational context (Prpic et al., 2015). The result of the partnership between the collective and the company is an enhanced capacity for organizational learning, which facilitates the process of acquiring, integrating, disseminating, and collectively comprehending information to enhance the organization's ability to innovate (Maktabi & Khazaei, 2014).

We argue that using social linkages based on crowdsourcing improves innovation competence because it allows users to gain access to implicit and explicit knowledge from external networks, which can then be used to improve existing procedures or create new products (Liao et al., 2007; Levy, 2009; Hine et al., 2010; Poetz & Schreier, 2010). In order to solve problems on the International Space Station (ISS), for instance,

NASA has effectively used crowdsourcing. These problems have ranged from developing solutions for astronaut exercises in space to the identification of new planets. The use of crowdsourcing in this way has greatly improved NASA's capacity for creativity. Similar to this, a study on Spanish biotechnology and telecommunications companies by Palacios et al. (2016) found that working on R&D projects with external partners, such as rival companies, suppliers, clients, and universities or research institutions, can significantly improve a firm's capacity for innovation. Thus, we investigated the following claim:

H1: Crowdsourcing-based Social Linkages are positively related to Innovation Competence.

6.3.2 The Mediating Role of Knowledge Transfer Effectiveness

The effectiveness of transferring knowledge from external sources into an organization's internal environment serves as a critical bridge that connects the positive impact of crowdsourcing-based social linkages to the organization's innovation competence. By leveraging crowdsourcing-based social connections, organizations gain access to external knowledge resources that have the potential to significantly enhance their innovation capabilities. However, the success of this knowledge acquisition process hinges upon the organization's ability to effectively transfer the acquired knowledge into its operational framework. This pivotal role of knowledge transfer is underscored by existing literature, as highlighted by Ortiz et al. (2018) and Di Vaio et al. (2021), who emphasize the crucial nature of obtaining accurate, current knowledge from external sources to gain a competitive advantage.

While the potential benefits of crowdsourcing-based social linkages are clear, the process of acquiring external knowledge is not devoid of challenges. García-Sánchez et al. (2017) and Goyal et al. (2020) point out the complexities associated with this knowledge acquisition process, suggesting that it can be a demanding endeavor. Furthermore, the quality of the knowledge transferred also warrants careful consideration, as noted by Nazam et al. (2020) and Bloodgood (2019). Crowdsourcing-based social linkages act as conduits that facilitate the exchange of knowledge between organizations and external partners. The dimensions of trust, norms, and shared goals inherent in these social linkages are instrumental in shaping the effectiveness of knowledge transfer. For instance, trust fosters open communication and the sharing of knowledge, as demonstrated by Diallo & Thuillier (2005). The efficacy of knowledge transfer is also contingent on the presence of common objectives and aspirations, as highlighted by Corral de Zubielqui et al. (2019), along with the sharing of cognitive resources, as emphasized by Ferreras-Méndez et al. (2015).

Within the context of innovation competence, the ability to transfer external knowledge effectively emerges as a decisive factor. Organizations that excel in knowledge transfer effectiveness demonstrate an increased propensity to not only assimilate and integrate external knowledge but also apply it purposefully for innovation endeavors. The extent of this effectiveness is influenced by key factors such as trust, norms, and shared goals established through crowdsourcing-based social linkages. The social connections nurtured through crowdsourcing pave the way for the establishment of trust, norms, and shared goals, which, in turn, exert a positive influence on the effectiveness of knowledge transfer. Enhancing knowledge transfer effectiveness emerges as a pivotal strategy for organizations aiming to incorporate external knowledge into their innovation processes successfully. This integration ultimately enhances the organization's innovation competence by bolstering its ability to capitalize on external knowledge for innovation purposes.

Therefore, the discussion underlines the significance of not only establishing robust crowdsourcing-based social linkages but also ensuring the implementation of effective knowledge transfer mechanisms. Organizations that strategically address both these aspects—social linkages and knowledge transfer effectiveness—are better positioned to elevate their innovation competence and, subsequently, fortify their competitive edge in the dynamic landscape. Hence, we hypothesize the following:

***H2:** Knowledge transfer effectiveness positively mediates the relation between crowdsourcing-based social linkages and innovation competence.*

6.3.3 The Mediating role of Absorptive Capacity

Organization's capability to effectively absorb, assimilate, and apply external knowledge obtained through crowdsourcing-based social connections acts as a mediator, influencing the positive impact of these linkages on the organization's overall innovation competence. The foundation for this concept rests on the notion that external knowledge holds immense potential for boosting innovation capabilities. Crowdsourcing-based social linkages act as conduits, facilitating access to diverse external knowledge sources. However, the actual impact of this knowledge on innovation hinges on the organization's ability to harness and internalize it. This ability is encapsulated in the idea of absorptive capacity, which encompasses processes like identifying pertinent knowledge, weaving it into existing knowledge frameworks, and translating it into innovation (Winkelbach & Walter, 2015). Numerous studies align with this viewpoint, underlining the pivotal role of external knowledge integration for enhanced innovation. The works of Cohen & Levinthal (1990), Zahra & George (2002), Knudsen & Roman (2004), and Caloghirou et al. (2004) collectively emphasize how external knowledge infusion is central to bolstering innovation capabilities. Furthermore, Minbaeva et al. (2014) accentuate how absorptive capacity isn't just a conduit but a determinant of knowledge transfer and organizational performance.

In the mediation process, absorptive capacity emerges as the bridge that transforms crowdsourcing-based social linkages into innovation competence. Organizations with a robust absorptive capacity are better equipped to amalgamate external knowledge into their existing knowledge repository, effectively leveraging it to fuel innovation. This process entails recognizing the significance of acquired knowledge (Inkpen & Tsang, 2005) and aligning it with the organization's broader objectives. The strategic absorption of external knowledge through crowdsourcing-based social linkages yields tangible benefits for innovation competence. The assimilation of this knowledge catalyzes the creation of novel products, services, and processes, thereby enhancing overall innovation performance. From a practical standpoint, this perspective underscores the significance of nurturing absorptive capacity alongside active engagement in crowdsourcing-based social linkages. By bolstering their absorptive capacity, organizations are better poised to extract the maximum potential from external knowledge sources, amplifying their competitive edge through heightened innovation competence. Hence, based on the above discussion, the following hypothesis is proposed:

H3: Absorptive capacity positively mediates the relation between crowdsourcing-based social linkages and innovation competence.

6.3.4 Serial Mediation effect of Knowledge Transfer Effectiveness and Absorptive Capacity

The crowdsourcing-based social linkage does not have a direct impact on the innovation competence of the organization. Instead, it is mediated serially by two pivotal factors: knowledge transfer effectiveness and absorptive capacity. Serial mediation here signifies that the influence of one factor (knowledge transfer effectiveness) occurs before the impact of another factor (absorptive capacity), eventually culminating in the final outcome (innovation competence). When an organization engages in crowdsourcing-based social linkages, it gains access to diverse external knowledge sources. However, mere knowledge acquisition isn't sufficient. The initial step in this serial mediation framework revolves around the efficiency of transferring this external knowledge into the organization's internal operations. Essentially, it's about how effectively the organization manages to assimilate the external knowledge into its existing knowledge framework (Martn-de Castro, 2015). Effective knowledge transfer entails transparent communication, understanding, and alignment of the external knowledge with the organization's objectives and current practices. Elements like trust, shared goals, and a common language among the parties involved contribute significantly to the effectiveness of knowledge transfer. As this knowledge is effectively integrated into the organization, it becomes an integral part of its intellectual assets.

Once the external knowledge has been seamlessly transferred, the organization's absorptive capacity takes center stage. Absorptive capacity refers to the organization's aptitude to understand, assimilate, and apply external knowledge (Ince et al., 2016). This involves merging the newly acquired knowledge with the organization's existing knowledge, processes, and cultural ethos. Organizations equipped with a robust absorptive capacity can extract more value from the acquired knowledge, as they have the mechanisms to interpret and internalize it effectively.

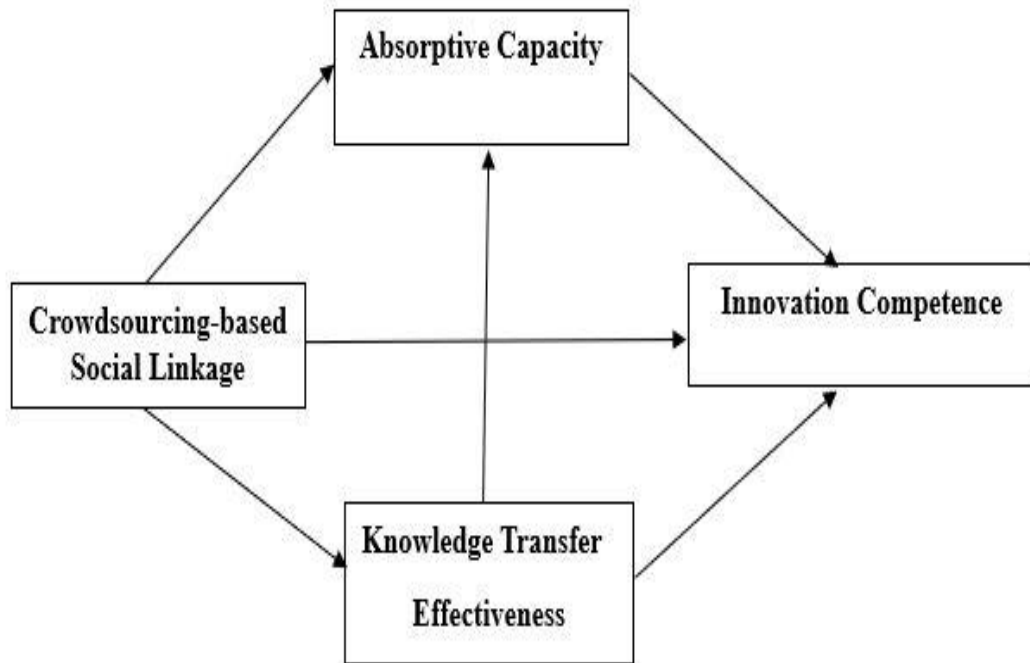
This serial mediation culminates in the ultimate outcome, namely innovation competence. As the organization adeptly transfers, absorbs, and applies knowledge, it nurtures the ability to innovate (Raheem and Amara, 2019). In practical terms, this implies the organization's capacity to leverage external knowledge for the development of novel products, services, processes, or business models. The presence of innovation competence enhances the organization's competitive edge and its adaptability in a dynamic business landscape. If the serial mediation concept gains empirical validation, it underscores the multifaceted process through which crowdsourcing-based social linkages contribute to innovation competence. Organizations should not only concentrate on forging robust external connections but also on effectively managing knowledge transfer and fostering the ability to absorb and apply the acquired knowledge. By mastering and refining these intermediate steps, organizations can enhance their overall innovation competence and solidify their competitive standing within their respective industries. Thus, it is postulated that the following hypothesis holds true:

***H4:** Knowledge transfer effectiveness and absorptive capacity in organization serially mediate the relation between crowdsourcing-based social linkages and innovation competence.*

6.4 Research Methodology

Figure 6.1 depicts the proposed relationships between crowdsourcing-based social linkage, the efficacy of knowledge transfer, absorptive capacity, and organizational innovation competence.

Figure 6.1: Research Model



6.4.1 Sample and Data Collection

The study collected data through a survey (**Appendix C**) targeted specifically at senior executives in Research and Development and innovation positions, including chief technology officers, chief innovation officers, open innovation directors, and Research and Development directors. These senior executives are responsible for shaping innovation strategies, setting directions for R&D initiatives, and overseeing the implementation of innovation-related activities. Their insights and perspectives are invaluable in comprehending the intricate dynamics of crowdsourcing-based social linkages and their impact on innovation competence. The research aimed to examine different industries of India that have employed crowdsourcing to engage with the crowd community and enhance their innovation capabilities. The respondents were chosen using convenience sampling method.

To gather the data, mail questionnaires were distributed, and Google Form links were shared on LinkedIn. The survey link was distributed to 500 open innovation practitioners, resulting in 350 responses (response rate of 70%). In accordance with the recommendation provided by Hair et al. (2021), a total of 50 questionnaires were eliminated from the analysis due to incomplete and consistently linear responses. To ascertain the adequacy of the sample size for testing the research model, an a priori sample size calculation was conducted to determine the necessary sample size for the

evaluated model. The "10-times rule" is a commonly employed technique for estimating the minimum sample size in PLS-SEM. This approach, based on the premise that the sample size should exceed 10 times the highest count of inner or outer model connections linked to any latent variable within the model, is widely recognized (Kock & Hadaya, 2018). Therefore, based on the 10-times rule, a minimum sample size of 350 would be recommended for SEM analysis with 12 latent variables and 35 observed variables. The sample size of 426 met the recommended minimum requirement for testing the model.

Within the group of respondents, 23.3% were employed in information technology companies, while the remaining respondents represented diverse service industries such as manufacturing, education, FMCG, e-commerce, and automobile. The largest portion of respondents (30%) were innovation experts working in Research and Development (R&D) departments, while others held positions in departments involved in crowdsourcing, such as purchase, sales, marketing, or occupied senior management roles within their respective companies. This distribution of respondents suggests that they are well-aligned with the objectives of the study. More details regarding the respondents' industries and job positions can be found in **Table 6.2**.

Table 6.2: Respondent's Distribution across Industries and Job Positions

Measure	Category	Frequency	%
Industry	Information Technology	70	23.33
	Manufacturing	58	19.33
	Education	56	18.67
	FMCG	50	16.67
	E-commerce	36	12
	Automobile	30	10
Respondents Job Position	R&D practitioners	90	30
	Senior level executives	64	21.33
	Purchase, sales, marketing	50	16.67
	Logistics and operations	96	32

Source(s): Primary data

6.4.2 Measurement Development

The construct measurement items (**Table 6.3**) utilized in this study were sourced from well-established and validated scales. A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was employed to rate the items. The scale for Crowdsourcing-based Social Linkage consisted of twelve items, which were adapted from the works of Chiu et al. (2006), Hsu & Hung (2013), and Wagner et al. (2014). The measurement items used to assess the effectiveness of knowledge transfer and absorptive capacity were obtained from Iyengar et al. (2015). Furthermore, the scales used to measure organizational innovation competence were derived from the work of Palacios et al. (2006).

To our knowledge, the aforementioned survey represents the most extensive investigation conducted thus far on how firms internally organize their crowdsourcing activities, which aligns perfectly with the primary focus of our research. Moreover, this survey incorporated pertinent measurement items that were specifically tailored to assess the constructs outlined in our study. It was carefully designed to target senior-level managers working in the domains of Research and Development (R&D) and innovation, making it highly suitable for our research objectives. To ensure the quality of the measures used, we initially conducted a pretest involving 50 Ph.D. scholars, which allowed us to refine the wording and practicality of the survey. In addition, in order to augment the precision of the measurements, a pilot study was undertaken involving a group of five practitioners who possess specialized knowledge in the field of crowdsourcing.

Table 6.3: Measurement Items for Study 5

Construct	Scales
Crowdsourcing-based social mechanism (CBSL)	1. The crowdsourcing platform of the organization enables the concurrent manifestation of innovative knowledge by a collective group (CBSL1). 2. The organization frequently employs a crowdsourcing platform to facilitate the dissemination of communications pertaining to innovation (CBSL2). 3. Within the organization's crowdsourcing platform, individuals have the opportunity to engage in discussions pertaining to innovation-related concerns amongst a collective audience (CBSL3). 4. The establishment of effective and efficient channels of innovation communication between organizations and external crowds is facilitated by the utilization of crowdsourcing platforms (CBSL4). 5. In the context of communication on a crowdsourcing platform, it is essential for both the organization and external crowd members to employ a standardized terminology (CBSL5). 6. The organization and the crowd establish a connection on a crowdsourcing platform characterized by clear and comprehensible communication patterns (CBSL6).

Knowledge Transmission (KTE)	7. Crowdsourcing platforms facilitate the engagement of both organizational entities and external participants in discussions pertaining to innovation-related matters (CBSL7). 8. The organization and crowds on crowdsourcing platforms can readily disseminate innovation-specific messages through the utilization of accessible narrative styles (CBSL8). 9. The innovation process on crowdsourcing platforms is characterized by the presence of a strong sense of mutual trust and respect between the crowds and the organization (CBSL9). 10. External crowds and organizations frequently engage in mutual consultation to improve their innovation performance on crowdsourcing platforms (CBSL10). 11. The collaboration between crowds and organizations is integral to the innovation process on crowdsourcing platforms (CBSL11).
Absorption capability (ABC)	1. Organizations acquire highly valuable and relevant knowledge pertaining to innovation through the utilization of crowdsourcing (KTE1). 2. Organizations have benefitted from the abundant contribution of innovation-related information by crowds (KTE2). 3. The organization acknowledges that external crowds possess valuable insights that are specific to innovation (KTE3). 4. The organization consistently obtains pertinent and applicable innovation-specific information from external crowds (KTE4). 5. The collaboration between crowds and the organization has greatly bolstered the organization's knowledge pertaining to innovation (KTE5). 1. The organization adopted efficient protocols for the identification and acquisition of new data and expertise that are specific to innovation (ABC1). 2. The organization has implemented suitable protocols to evaluate the collected data and knowledge pertaining to innovation (ABC2). 3. The organization has successfully implemented appropriate strategies for the integration of novel knowledge and information pertaining to innovation (ABC3). 4. Within the domain of innovation, the organization effectively integrates pre-existing knowledge with novel insights and expertise obtained from crowds (ABC4). 5. The organization effectively incorporates both internal and external data and knowledge into its innovation process (ABC5). 6. The organization exhibits a high level of competence in effectively utilizing knowledge pertaining to innovation (ABC6).
Innovation Competence (IC)	1. By utilizing crowdsourcing, the organization is able to establish knowledge management programs that facilitate the creation of valuable knowledge and technology, as well as the assimilation of insights from external entities (IC1). 2. By utilizing crowdsourcing, the organization adeptly cultivates a culture and implements organizational systems that effectively facilitate the acquisition, cultivation, and preservation of talent (IC2). 3. Through the implementation of crowdsourcing, the organization effectively fosters innovation in order to enhance its competitiveness by expanding its range of products and technologies. This approach surpasses the mere act of reacting to market demand or competitive forces (IC3). 4. The utilization of crowdsourcing capabilities by an organization effectively employs information technologies to augment the flow of information, encourage the sharing of knowledge, and facilitate communication among its members (IC4).

	5. By utilizing the method of crowdsourcing, the organization has established a highly effective framework to consistently gather pertinent and current data on competitors via competitive intelligence systems (IC5). 6. By utilizing the method of crowdsourcing, the organization adeptly establishes programs that prioritize the internal cultivation of technological competencies, as defined by the framework (IC6). 7. The utilization of crowdsourcing by the organization is accompanied by a clearly defined process for the documentation of organizational knowledge, procedures, and processes (IC7). 8. By utilizing crowdsourcing, the organization actively promotes and facilitates the involvement of its members in proposing initiatives and suggestions, while also embracing the exploration of innovative ideas to improve processes and products (IC8). 9. The utilization of crowdsourcing by the organization exemplifies a managerial approach that emphasizes creativity, placing greater importance on innovative approaches to problem-solving rather than relying solely on established precedents (IC9). 10. Through the utilization of crowdsourcing, the organization is empowered to obtain and enhance valuable knowledge that is in accordance with its specific requirements (IC10). 11. The organization demonstrates a willingness to adopt crowdsourcing as a means of sourcing ideas, thereby fostering an environment conducive to innovation and creativity (IC11). 12. By employing crowdsourcing, the organization demonstrates a level of adaptability in formulating protocols and systems that regulate conduct and interpersonal dynamics (IC12). 13. The utilization of crowdsourcing by an organization exemplifies a certain level of adaptability in the establishment of organizational structures and forms (IC13).
--	--

6.4.3 Common Method Bias

In order to address the possibility of common method bias, we conducted various statistical analyses as we only administered a single survey to collect data. Initially, Harman's one-factor test (Podsakoff et al., 2003) was conducted by performing a principal component analysis on all survey items. Subsequently, exploratory factor analysis revealed four factors with eigenvalues exceeding 1.0, collectively accounting for 60% of the total variance. These findings indicate that no single factor accounted for a majority of the variance, suggesting the absence of common method bias in our investigation. Additionally, we employed the correlation matrix method (Pavlou et al., 2007) to assess common method bias. Previous research suggests that intra-construct correlations exceeding 0.90 indicate the presence of common method bias. However, in our study, the highest correlation within a construct was 0.80, which is below the established threshold of 0.90. This suggests that common method bias is not a significant concern within this study.

6.5 Data Analysis and Results

The study model was validated in two steps: the measurement model and the structural model. To establish the validity of the measurement model, we adopted the Partial Least Squares (PLS) method, a component-based structural equation modeling technique. Utilizing SmartPLS 3.2.7 software, we executed this validation, generating 5000 bootstrap resamples to ensure robustness. It's crucial to acknowledge that PLS, despite its benefits, comes with certain limitations. For instance, PLS might exhibit overfitting tendencies when applied to small samples, potentially resulting in inflated model fit and unreliable parameter estimates. While it addresses multicollinearity concerns, PLS might not provide the same level of accuracy in estimating latent variable relationships as other methodologies. Additionally, PLS lacks the provision of traditional goodness-of-fit indices, potentially constraining the assessment of model fit. Furthermore, PLS assumes a reflective measurement model, which might not always be the most appropriate choice for intricate constructs.

However, despite these limitations, the selection of PLS for this study is well-justified based on its advantages and alignment with the research context. PLS is particularly adept at handling complex models encompassing both formative and reflective constructs, making it a suitable choice for predictive purposes and exploring models. Given the restricted sample size within this study, the preference for PLS over covariance-based techniques like LISREL and AMOS is warranted. This decision is informed by PLS's capacity to mitigate challenges linked to factor unpredictability and invalid solutions, rendering it effective in estimating intricate interaction effects.

6.5.1 Measurement Model

The analysis of Partial Least Squares Structural Equation Modeling (PLS-SEM) comprised two distinct phases, namely the measurement model and the structural model. The analysis of the measurement model primarily examined internal consistency, convergent validity, and discriminant validity, as delineated by Hair et al. (2017). **Table 6.4** displays the outcomes of the measurement model analysis. The Cronbach's alpha values ranged from 0.955 to 0.980, indicating high internal consistency, while the composite reliability values ranged from 0.966 to 0.982. Moreover, the Average Variance Extracted (AVE) values exceeded 0.50, demonstrating convergent validity. The item factor loadings ranged from 0.862 to 0.937, further supporting internal consistency and convergent validity.

To assess discriminant validity, we examined both Fornell and Larcker's criterion and the HTMT (heterotrait-monotrait) ratio proposed by Henseler et al. (2015). The results, presented in **Table 6.5** and **Table 6.6**, indicate the presence of convergent validity. Based on Fornell and Larcker's criterion, it is observed that the square roots of Average

Variance Extracted (AVE) values exhibit smaller magnitudes compared to the correlations observed between the pertinent variables. Furthermore, it is worth noting that the HTMT values do not surpass the threshold of 0.90, which serves as additional evidence supporting the convergent validity of the measures.

Table 6.4. Results of measurement model

Construct	Indicator	Item loadings >0.70	Cronbach's α (CA) >0.70	Composite Reliability (CR) >0.70	Average Variance Extracted (AVE) >0.50
CBSL	CBSL1	0.914	0.976	0.979	0.807
	CBSL2	0.908			
	CBSL3	0.873			
	CBSL4	0.926			
	CBSL5	0.881			
	CBSL6	0.918			
	CBSL7	0.902			
	CBSL8	0.882			
	CBSL9	0.862			
	CBSL10	0.897			
	CBSL11	0.918			
KTE	KTE1	0.936	0.955	0.966	0.849
	KTE2	0.918			
	KTE3	0.901			
	KTE4	0.914			
	KTE5	0.937			
ABC	ABC1	0.920	0.960	0.968	0.833
	ABC2	0.896			
	ABC3	0.905			
	ABC4	0.913			
	ABC5	0.935			
	ABC6	0.907			
IC	IC1	0.884	0.980	0.982	0.804
	IC2	0.873			
	IC3	0.869			
	IC4	0.872			
	IC5	0.899			
	IC6	0.914			
	IC7	0.920			
	IC8	0.912			
	IC9	0.881			
	IC10	0.920			
	IC11	0.912			
	IC12	0.895			
	IC13	0.906			

Table 6.5: Fornell and Larcker criterion

	CBSL	KTE	ABC	IC
CBSL	0.898			
KTE	0.875	0.921		
ABC	0.883	0.875	0.913	
IC	0.889	0.887	0.889	0.897

Table 6.6: Heterotrait and Monotrait (HTMT) criteria

	ABC	CBSL	IC
ABC			
CBSL	0.774		
IC	0.662	0.786	
KTE	0.874	0.748	0.760

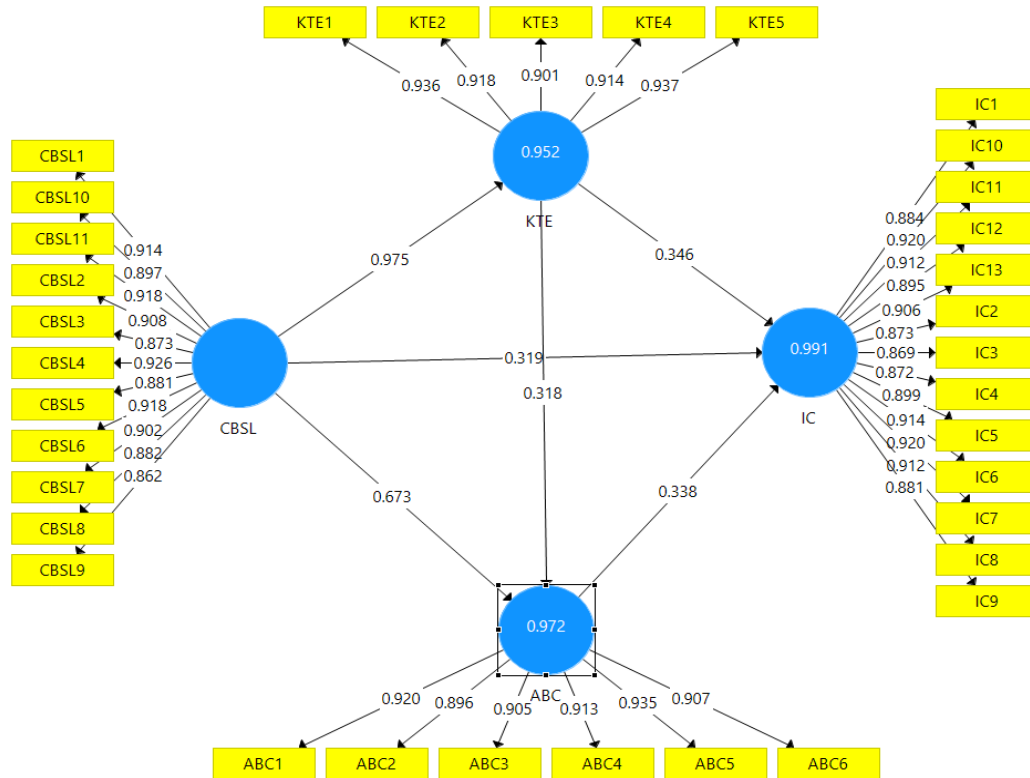
6.5.2 Structural Model

After validating the measurement model, the analysis proceeded to evaluate the structural model. Several indicators were analyzed, including path coefficients (β) to comprehend the relevance of the relationship, determination coefficients (R^2) to measure model variance, impact size (f^2) to assess the impact of the endogenous constructs, and Stone-Geisser's Q^2 value to assess predictive relevance of the model, following the guidelines provided by Hair et al. (2017). A summary of the results is presented in **Table 6.7**. The main focus was on examining the path coefficients and their corresponding t-values to assess the significance of the relationships.

Table 6.7: Structural Model Results

Relation	Beta	t values	P values	Confidence Intervals BC	R²	f²	q²
CBSL→KTE	0.975	288.784	0.000	[0.968, 0.981]	0.952	0.626	0.802
CBSL→ABC	0.673	12.859	0.000	[0.574, 0.782]	0.972	0.786	0.805
KTE→ABC	0.318	5.944	0.000	[0.208, 0.416]		0.176	
KTE→IC	0.346	12.844	0.000	[0.285, 0.390]	0.991	0.560	0.792
ABC→IC	0.338	8.097	0.000	[0.257, 0.418]		0.363	
H1: CBSL→IC	0.319	17.960	0.053	[-0.020, 0.252]			

Figure 6.2: Path Coefficient Analysis



The results of hypotheses testing using the structural equation model (Figure 6.2) indicated that crowdsourcing-based social linkage has a significant and positive impact on knowledge transfer effectiveness ($\beta = 0.975$, $p < 0.001$) and absorptive capacity ($\beta = 0.673$, $p < 0.001$). Additionally, knowledge transfer effectiveness was found to positively and significantly influence absorptive capacity ($\beta = 0.318$, $p < 0.001$) and innovation competence ($\beta = 0.346$, $p < 0.001$). Moreover, absorptive capacity positively influences innovation competence ($\beta = 0.338$, $p < 0.001$). However, the crowdsourcing-based social linkage was not found to have a significant impact on innovation competence ($\beta = 0.319$, $p > 0.001$). Therefore, Hypothesis 1 is not supported, whereas Hypotheses 2- 6 were proven entirely.

In addition, additional analyses were conducted to evaluate the structural model as a whole as well as the specific relationships within it. The evaluation of the structural model involved the examination of the coefficient of determination, R^2 , which measures the variance explained by the model. The predictive accuracy of the model was also assessed using the relevance measure, Q^2 . The values of R^2 and adjusted R^2 can be found in **Table 6.8**. Analyzing the R^2 values reveals that crowdsourcing-based

social linkage accounts for 95.2% of the variance in predicting knowledge transfer effectiveness, the antecedents account for 97.2% of the variance in predicting absorptive capacity, and the antecedents account for 99.1% of the variance in predicting innovation competence.

The effect sizes, f^2 , were examined to assess the individual impacts of the endogenous constructs variables, following the guidelines provided by Henseler et al. (2016) and Roldan et al. (2012). According to Hair et al. (2017), f^2 values of 0.01 indicate a small effect, 0.15 suggest a moderate effect, and 0.35 indicate a large effect. The f^2 values presented in **Table 6.8** indicate that knowledge transfer effectiveness ($f^2 = 0.560$) and absorptive capacity ($f^2 = 0.363$) have a large effect on innovation competence as its antecedents. Additionally, absorptive capacity has a large impact on crowdsourcing-based social linkage ($f^2 = 0.786$), and knowledge transfer effectiveness has a large effect on crowdsourcing-based social linkage ($f^2 = 0.626$).

Finally, the model's predictive capacity was assessed via the blindfolding procedure, with a particular focus on the predictive relevance metric, Q^2 . Table 6.7 exhibits positive Q^2 values, indicating the predictive significance of all endogenous variables and validating the model's precision in making predictions. The Q^2 value was obtained by utilizing the blindfolding technique outlined in the study conducted by Tenenhaus et al. (2005). According to Henseler et al. (2009), a Q^2 value greater than zero indicates that the explanatory latent constructs have predictive relevance.

6.5.3 Testing Mediating Effects

The present investigation integrates two interval variables within the research model. Baron & Kenny (1986) underscore the significance of scrutinizing the mediating functions of interval variables in research models. The present study aimed to examine the mediating effects of absorptive capacity and knowledge transfer effectiveness on the association between crowdsourcing-based social linkage and innovation competence. The present study employed a research model that incorporated two interval variables. Consequently, the analysis considered multiple serial mediation and evaluated both specific indirect effects and total indirect effects, utilizing the mediation analysis process steps outlined by Zhao et al. (2010). The study evaluated the indirect effects of absorptive capacity and knowledge transfer effectiveness on the relationship between crowdsourcing-based social linkage and innovation competence. **Table 6.8** displays that the indirect impacts of KTE and ABC on the correlation between CBSL and IC were observed to be statistically significant. Moreover, the study provided evidence in favor of the sequential mediation model, as it was observed that the indirect impact of CBSL on IC was significant through the sequential mediation of KTE and ABC (indirect effect = 0.105, $p = .000$). The findings suggest that the direct impact of CBSL on IC was not statistically significant. Therefore, it can be inferred that the mediator variables, namely KTE, ABC, and $KTE \rightarrow ABC$, fully mediate the

relationship between CBSL and IC. More specifically, the impact of CBSL on the IC can be created individually through both KTE and ABC. In addition, in order to have an impact on the IC with CBSL, it has also been determined that CBSL should shape KTE positively and then KTE should positively affect ABC. At this point, CBSL will increase the IC both in the individual case of KTE and ABC, and in the sequential state where KTE affects ABC.

Table 6.8: Serial Mediation Analysis Result

Relation	Specific indirect effect	P value	Total Indirect effect	P value	Confidence Interval BC		Total effect	Type of Mediation
					Lower	Upper		
CBSL→KTE→IC	0.338	0.000			0.228	0.382	0.989	Full mediation
CBSL→ABC→IC	0.228	0.000			0.176	0.283		Full mediation
CBSL→KTE→ABC→IC	0.105	0.000			0.057	0.154		Full mediation
CBSL→IC			0.670	0.000	0.250	0.399		

6.6 Discussion

The objective of this research study was to investigate how the formation of crowdsourcing-based social linkage between organizations and the crowd influences organizational innovation competence. Additionally, the study aimed to explore the role of knowledge transfer effectiveness and absorptive capacity as key mechanisms linking crowdsourcing-based social linkage and innovation competence. Furthermore, the researchers sought to examine the role of knowledge transfer effectiveness and absorptive capacity as sequential mediators that connect crowdsourcing-based social linkage to innovation competence. This study drew upon social capital theory and the organizational learning outcome performance model.

The interesting findings of the study indicate that social linkages based on crowdsourcing do not have a direct impact on innovation competence of the organization, which is in contrast to prior research (Palacios et al., 2016; Piyathananan et al., 2017). This discovery corroborates the existence of a third intermediary variable that intervenes between social connections established through crowdsourcing and the ability to innovate. The findings of the study suggest that the effectiveness of

knowledge transfer and the absorptive capacity of the organization play a mediating role in the relationship between innovation competence and crowdsourcing-based social linkages. The present findings exhibit partial conformity with the extant literature (Roberts et al., 2012; Iyengar et al., 2015).

In addition, the results of the study provided validation for the concept that the efficacy of knowledge transfer and the ability to absorb information within an organization plays a serial mediating role in the relation between innovation competence and social connections established through crowdsourcing. This discovery exhibits partial conformity with past scholarly works (Trantopoulos et al., 2017). This means that when organizations implement crowdsourcing as a sourcing model, a social linkage is formed between the organization and external stakeholders. This in turn results in augmentation of the efficacy of knowledge transfer and absorptive capacity, ultimately culminating in an enhancement of the organizational innovation competence.

While our investigation centered on the roles of knowledge transfer effectiveness and absorptive capacity as mediators between crowdsourcing-based social linkages and innovation competence, it's plausible that other internal practices within organizations might also impact innovation competence. For instance, factors like organizational culture, leadership styles, and employee engagement could potentially contribute to innovation outcomes. Future research could delve into these aspects to comprehensively comprehend their influence on the relationship under study. Furthermore, external factors that were not included in our current research could also play a role. Economic conditions, industry trends, and regulatory changes might influence the effectiveness of crowdsourcing-based social linkages and their subsequent impact on innovation competence. Incorporating these external factors in future studies could provide a more detailed perspective on the relationship.

6.6.1 Theoretical Implications

The utilization of crowdsourcing has gained popularity in innovative companies, with the belief that accessing external knowledge sources enhances an organization's innovation capability. However, empirical studies have produced mixed results regarding the impact of engaging in crowdsourcing. Some studies have provided evidence supporting the notion that crowdsourcing positively influences innovation capability (Ye & Kankanhalli, 2013; Lüttgens et al., 2014; Zhu et al., 2016), while others have found no effect or even detrimental effects on innovation capability (Wazny, 2017; Hanine & Steils, 2018; Vellera et al., 2022). These contradictory findings can be interpreted in various ways. One possible explanation is the variation in internal practices adopted by organizations to manage innovation. Consistent with previous research, we argue that companies need specific internal organizational practices to effectively leverage external knowledge (e.g., Zahay et al., 2018).

Crowdsourcing requires appropriate internal practices to establish successful engagement and collaboration with external partners, facilitating the absorption and integration of their knowledge into internal innovation processes (Zahay et al., 2018; Devece et al., 2019).

To unravel the relationship between crowdsourcing-based social linkages and their impact on innovation competence, we developed a model to investigate whether internal practices contribute to enhancing innovation outcomes for firms adopting crowdsourcing. Illustrated in **Figure 6.1**, our study aimed to determine whether the influence of crowdsourcing-based social linkages on innovation competence is direct or mediated by specific internal practices related to innovation management. Specifically, we focused on the roles of internal practices such as knowledge transfer effectiveness and absorptive capacity in leveraging the potential of external partner knowledge. These practices were introduced as mediators in the relationship between crowdsourcing-based social linkages and innovation competence. Our empirical analysis demonstrates that when internal practices like knowledge transfer effectiveness and absorptive capacity are introduced as mediating factors between crowdsourcing-based social linkages and innovation competence, the impact of crowdsourcing-based social linkages on innovation competence occurs indirectly, fully mediated by both knowledge transfer effectiveness and absorptive capacity.

The empirical investigation presented in this study underscores the importance of internal practices such as knowledge transfer effectiveness and absorptive capacity in ensuring the success of crowdsourcing initiatives and holds significant academic implications. While prior research has mainly emphasized the benefits of collaborating with external partners in crowdsourcing, the focus has often been on the rationale and mechanisms of establishing such partnerships. However, this historical emphasis overlooks the internal management of crowdsourcing activities, a facet acknowledged by Chesbrough's seminal work on open innovation (Chesbrough et al., 2006). The study's findings reveal that concentrating solely on the external partner relationship inadequately captures the impact of crowdsourcing-based social linkages on innovation competence. Thus, the study emphasizes the significance of considering internal practices that facilitate successful crowdsourcing endeavors and highlights their positive influence on innovation competence. Given that both knowledge transfer effectiveness and absorptive capacity fully mediate the influence of crowdsourcing-based social linkages on innovation competence, it can be concluded that ignoring the internal organizational aspects when evaluating crowdsourcing's impact might lead to biased results. This finding responds to Xu et al.'s (2015) call for more research on the relationship between crowdsourcing-based social linkages and innovation competence and emphasizes the need to incorporate internal practices into analyzing the impact of crowdsourcing activities on firms' innovation achievements. This research provides insights into the factors that contribute to the success or failure of specific crowdsourcing initiatives..

Up until now, the exploration of internal practices in the context of crowdsourcing activities has been limited, with only a handful of studies delving into this aspect (Xun & Xuehan, 2014; Xu et al., 2015; Zhu et al., 2016). By investigating the link between crowdsourcing-based social linkages and innovation competence, this study contributes novel insights to the literature by introducing two crucial internal practices that significantly affect crowdsourcing success. Furthermore, our findings expand the existing knowledge base by broadening the analysis to include a wider range of external partners, building on Xu et al.'s (2015) discovery of the indirect impact of embracing crowdsourcing with external partners on innovation capability. Additionally, our study complements the work of Boudreau & Lakhani (2013), who treated crowdsourcing and internal practices as separate variables in predicting innovation capability. However, our study goes further by examining the potential relationship between crowdsourcing-based social linkages and internal practices in shaping innovation competence outcomes. The present research explored the roles of knowledge transfer effectiveness and absorptive capacity as both single and serial mediators in the association between crowdsourcing-based social linkages and innovation competence, offering a comprehensive view of the complex connection between crowdsourcing-based social linkages, internal practices, and innovation competence.

6.6.2 Managerial Implications

The findings of this study also have important managerial implications. It highlights that successful crowdsourcing outcomes cannot be achieved overnight, and managers cannot solely focus on establishing crowdsourcing-based social linkages with external partners. In order to further enhance their innovation competence, managers who aim to implement crowdsourcing must ensure that their organization is adequately prepared and organized for this endeavor. Consequently, this study presents two fundamental insights for managers.

Firstly, solely focusing on establishing crowdsourcing-based social linkages with external partners is not enough to boost innovation competence. Managers need to recognize that the internal organization of the company plays a crucial role. They should focus on developing internal capabilities, such as absorptive capacity and processes for internal and external knowledge transfer, to effectively harness the benefits of crowdsourcing. To strengthen knowledge transfer effectiveness, organizations can foster a culture of open communication and establish structured learning initiatives. Cross-functional teams and knowledge mapping can boost absorptive capacity by integrating diverse insights. Aligning innovation strategy, establishing clear processes, and continuous monitoring are crucial. Additionally, forming dedicated crowdsourcing teams can effectively manage external partnerships and knowledge transfer. By implementing these strategies, managers can optimize their organization's crowdsourcing potential and drive innovation success.

Furthermore, the dynamic capabilities of crowdsourcing's internal organization, such as knowledge transfer effectiveness and absorptive capacity, have been identified by Iyengar et al. (2015). The development and cultivation of these capabilities over a period of time imply the notion of crowdsourcing maturity. The study's empirical findings shed light on the overlooked aspect of the internal organization of crowdsourcing within the academic domain. Scholars and managers have primarily concentrated on establishing partnerships without adequately considering the need for internal adaptations to meet the requirements of crowdsourcing. Hence, to achieve a balanced approach to crowdsourcing development, managers should simultaneously concentrate on building external partnerships while implementing internal organizational changes. This strategy involves aligning crowdsourcing efforts with overarching business objectives and evaluating the readiness of the organization's internal systems and processes. Managers can foster internal capabilities such as absorptive capacity and effective knowledge transfer mechanisms to harness the benefits of crowdsourcing. Encouraging cross-functional collaboration and establishing platforms for knowledge sharing are essential. When selecting external partners, managers should consider expertise and alignment with organizational goals. Clear communication channels and regular feedback mechanisms with partners can facilitate successful collaboration. To measure progress, implementing innovation metrics is crucial. Embracing crowdsourcing as an ongoing process allows managers to continually refine both external partnerships and internal practices. Ultimately, by adopting this balanced approach, managers can optimize innovation competence, ensuring sustained success and growth through effective crowdsourcing endeavors.

6.6.3 Policymaker Implications

The findings of this study hold significant implications not only for managers but also for policymakers. While the study primarily emphasizes the managerial aspects of successful crowdsourcing, there are notable implications that policymakers should consider. Policymakers play a crucial role in fostering an environment conducive to innovation and collaboration. They can promote innovation ecosystems by facilitating partnerships between businesses, research institutions, and the public sector, creating spaces for knowledge exchange. Additionally, investing in education and skill development programs that align with the demands of modern innovation can help build a capable workforce. Supporting research and development through grants and incentives encourages organizations to explore crowdsourcing and similar approaches. Policymakers can also establish strong intellectual property protection frameworks, ensuring that participants feel secure sharing ideas. Furthermore, regulations around data privacy and security can provide a trusted platform for collaboration. By encouraging public-private partnerships and international collaboration, policymakers can enhance the overall innovation landscape. Developing metrics to evaluate the impact of crowdsourcing initiatives and refining policies accordingly will contribute to a thriving innovation ecosystem. Ultimately, policymakers can create an environment that not only supports managerial efforts but also propels the adoption of crowdsourcing for innovation and problem-solving at a broader societal level.

In summary, managers and policymakers should understand that successful crowdsourcing requires internal preparedness and the development of capabilities related to the internal organization of crowdsourcing. The study emphasizes the importance of taking a comprehensive approach to crowdsourcing, considering both external collaborations and internal adaptations, in order to effectively boost innovation competence.

6.7 Limitations and Future Research

This study has several limitations that should be acknowledged. Firstly, further research is necessary to validate the findings obtained in this study. It is challenging to obtain a large sample of crowdsourcing-adopting companies, and external validation through surveys with larger sample sizes would be beneficial. Secondly, this study focused only on two internal practices and did not consider other factors such as organizational culture. To fully comprehend the impact of internal organization on crowdsourcing effectiveness, it is important to take into account all relevant practices. Thirdly, while the measures of innovation competence used in this study are widely accepted and have demonstrated reliability, future studies could enhance the validation of these measures by incorporating objective secondary data. This would help determine whether crowdsourcing-based social linkage has a stronger impact on Schumpeterian innovation competence or Continuous innovation competence. Fourthly, due to the cross-sectional nature of the data, establishing causal relationships between crowdsourcing-based social linkage, knowledge transfer effectiveness, absorptive capacity, and innovation competence presents challenges.

In order to establish causality, future investigations should utilize longitudinal and experimental methodologies. However, the acquisition of longitudinal data from senior managers who have busy schedules or their participation in experiments can pose challenges due to confidentiality considerations and corporate regulations. In instances of this nature, it is possible to conduct computational experiments or simulations to examine causality and investigate the interdependent connections between these constructs over a period of time. Finally, the notion of crowdsourcing maturity and dynamic capabilities posits that the management of crowdsourcing is a perpetual endeavor necessitating the continual enhancement of internal procedures. The present study employs a static analysis approach, and it is suggested that a dynamic analysis would be advantageous in elucidating the relationship between the evolution of internal practices and the effectiveness of crowdsourcing outcomes over time. Additionally, investigating diverse strategies for developing internal practices may shed light on their respective contributions to the success of crowdsourcing activities.

6.8 Summary

In this chapter, we investigated the intricate relationship between crowdsourcing-based social linkages and organizational innovation competence, drawing upon social capital theory and the organizational learning outcome performance model. Our findings revealed that while crowdsourcing-based social linkages do not directly impact innovation competence, the effectiveness of knowledge transfer and absorptive capacity act as crucial mediators in this relationship. Furthermore, these internal practices were found to sequentially mediate the impact of crowdsourcing-based social linkages on innovation competence. Despite encountering limitations, such as sample size constraints, our study offers valuable insights for managers and policymakers. Managers are encouraged to adopt a holistic approach to crowdsourcing, emphasizing internal organizational preparedness alongside external collaborations, while policymakers can contribute by fostering innovation ecosystems conducive to crowdsourcing. Overall, our research highlights the importance of internal capabilities in leveraging crowdsourcing for sustainable innovation and growth.

CHAPTER 7

CONCLUSION AND FUTURE RESEARCH

7.1. Introduction

This chapter focuses on summarizing the study's significant findings, with an emphasis on addressing the research questions outlined in Chapter 1. Additionally, the chapter discusses the study's contributions, both theoretically and practically, acknowledging its limitations and suggesting avenues for future research.

To address the research questions presented in Chapter 1, this study presents a holistic understanding of how crowdsourcing-based social linkages and internal practices contribute to innovation outcomes within organizations. The organization of this chapter includes five sections. Section 7.2 revisits the initial research questions and provides insight into how these questions were explored and answered throughout the study. Section 7.3 delves into the theoretical and practical implications of the study's findings. Following this, Section 7.4 outlines the limitations encountered during the research process and identifies areas for further investigation. Finally, Section 7.5 offers concluding remarks to summarize the key takeaways from the study.

7.2. Research Questions Revisited

Drawing from the thorough examination of existing literature, the research problems, gaps, and rationale outlined in Chapter 1 led to the formulation of five research questions: What are the adoption factors that need to be considered by practitioners before adopting crowdsourcing in organizations? Understanding these factors is crucial for organizations to make informed decisions about the implementation of crowdsourcing initiatives and ensure their success. What is the influence of crowdsourcing-based social linkages on organizational learning? Investigating this relationship will provide insights into how crowdsourcing facilitates the acquisition, sharing, and utilization of knowledge within organizations. What is the influence of crowdsourcing-based social linkages on innovation competence? Examining this relationship will shed light on how crowdsourcing contributes to the development of innovative capabilities within organizations. How does organizational learning influence the relationship between crowdsourcing-based social linkages and innovation competence? Exploring this mechanism will help elucidate the processes through which crowdsourcing influences organizational value co-creation.

7.2.1. What are the adoption factors that need to be considered by practitioners before adopting Crowdsourcing in Organizations?

This study addresses the pressing research question of identifying adoption factors essential for practitioners contemplating the integration of crowdsourcing in organizational contexts, considering both management and design perspectives. Crowdsourcing, recognized as a collaborative approach to problem-solving and innovation, has garnered traction across diverse industries, yet its successful adoption hinges on several critical factors. Utilizing a comprehensive methodology informed by established frameworks such as the Technological-Organizational-Environmental (TOE) framework and the Diffusion of Innovations theory, data was gathered through surveys involving organizational stakeholders. Analysis of both quantitative and qualitative data unveiled key adoption factors. Factors such as relative advantage, perceived cost reduction, perceived opportunity, compatibility, complexity, technology readiness, and top management support emerged as pivotal determinants. While relative advantage and perceived opportunity propelled adoption by offering economic efficiency and access to diverse skills and ideas, complexity posed a significant challenge due to the intricacies of managing diverse contributions and integrating crowdsourcing platforms. Top management support emerged as a critical catalyst, signaling commitment to innovation and providing necessary resources. These findings furnish valuable insights for practitioners, informing strategic decision-making and implementation strategies to maximize the benefits of crowdsourcing while mitigating potential challenges.

Additionally, this objective was approached from two distinct angles: the management and designing perspectives. The study delved into both realms to comprehensively understand the constituent elements and design principles associated with crowdsourcing initiatives across various phases. Through a thorough exploration, a novel strategic crowdsourcing framework was developed, offering practical guidance for organizations seeking to harness the potential of crowdsourcing effectively. Examining three key phases—preparation, execution, and post-execution—revealed critical insights into the design considerations at each stage. Clear goals, task specifications, motivation, interactivity, bidirectionality, and feedback mechanisms surfaced as essential elements for successful crowdsourcing implementation. Moreover, the study compared three crowdsourcing government initiatives, highlighting key findings and implications for practitioners. The proposed strategic framework serves as a roadmap, guiding practitioners through the complexities of designing and implementing crowdsourcing initiatives. It underscores the significance of considering various design elements and principles to optimize the outcomes of crowdsourcing endeavors. Overall, these studies contribute to informed decision-making and effective implementation of crowdsourcing initiatives in organizational contexts, addressing both management and design perspectives.

7.2.2. What is the influence of Crowdsourcing-based social linkages on Organizational Learning?

This study addresses the research question concerning the influence of crowdsourcing-based social linkages on organizational learning, specifically exploring how interactions between organizations and external crowds in crowdsourcing initiatives contribute to learning processes within organizations. Through the utilization of quantitative surveys and structural equation modeling for data analysis, the research delves into the nature and impact of these social linkages. The findings illuminate that crowdsourcing-based social linkages significantly influence organizational learning, granting organizations access to diverse perspectives, knowledge, and expertise. Notably, cognitive linkages characterized by shared understanding and knowledge exchange emerge as particularly influential in enhancing organizational learning. While structural and relational linkages also contribute to facilitating knowledge transfer, their impact is more indirect. The study emphasizes the crucial role of effective knowledge transfer mechanisms within organizations as mediators between crowdsourcing-based social capital and organizational innovation. These findings hold practical implications, suggesting that organizations can strategically leverage crowdsourcing initiatives to bolster their learning capabilities and innovation performance. By fostering interaction channels, developing shared codes and languages, and establishing co-creation processes, organizations can facilitate effective knowledge sharing and enhance absorptive capacity. Moreover, cultivating social linkages with external crowds can enrich organizational learning, thereby supporting sustained organizational growth and competitiveness.

7.2.3. What is the influence of Crowdsourcing-based social linkages on Innovation Competence?

The research problem addressed in the study revolves around understanding the influence of crowdsourcing-based social linkages on organizational innovation competence, particularly focusing on the mediation role of knowledge transfer effectiveness and absorptive capacity. By investigating this relationship, the study seeks to explore how crowdsourcing initiatives contribute to value co-creation within organizations. Utilizing a quantitative methodology, data collection involved surveys or structured instruments to measure variables related to crowdsourcing, knowledge transfer, absorptive capacity, and innovation competence. Contrary to previous findings, the research revealed that the direct impact of social connections formed through crowdsourcing on innovation competence is limited. Instead, the study highlighted the crucial mediating role played by knowledge transfer effectiveness and absorptive capacity in this relationship. Moreover, it found that these internal practices sequentially mediate the impact of crowdsourcing-based social linkages on innovation competence, emphasizing the importance of enhancing internal capabilities to maximize the benefits of crowdsourcing for innovation and value co-creation. Consequently, the research offers valuable insights for managers and policymakers. For managers, it informs strategic decision-making regarding the implementation of

crowdsourcing initiatives, emphasizing the importance of internal organizational preparedness alongside external collaborations. For policymakers, the study provides guidance on fostering innovation ecosystems conducive to crowdsourcing and value co-creation, thereby contributing to the advancement of innovation and collaboration at both organizational and societal levels.

7.2.4. How does Organizational Learning influence the relationship between Crowdsourcing-based social linkages and Innovation Competence?

The investigation into how organizational learning influences the relationship between crowdsourcing-based social linkages and innovation competence holds significant implications for understanding the role of value co-creation in this dynamic. By exploring how organizational learning processes interact with crowdsourcing-based social linkages to shape innovation competence, the study sheds light on the mechanisms through which value is co-created within organizations and with external stakeholders. Understanding these dynamics is crucial for organizations seeking to leverage crowdsourcing effectively to innovate and create value collaboratively.

The research question addresses the pivotal role of organizational learning in facilitating the integration of external knowledge and insights obtained through crowdsourcing into the organization's innovation processes. By examining how organizational learning moderates the relationship between crowdsourcing-based social linkages and innovation competence, the study provides insights into how organizations can effectively harness the collective intelligence of diverse stakeholders to drive innovation.

The findings from this research can help organizations develop strategies to foster a culture of continuous learning and knowledge sharing, enabling them to capitalize on the potential of crowdsourcing for innovation and value creation. By emphasizing the importance of organizational learning in enhancing innovation competence within the context of crowdsourcing, the study underscores the need for organizations to invest in building internal capabilities for knowledge integration and adaptation.

Overall, the research contributes to advancing our understanding of value co-creation processes in the context of crowdsourcing-based innovation and provides actionable insights for organizations looking to harness the collective wisdom of crowds to drive innovation and create sustainable competitive advantage.

7.3. Research Contributions

7.3.1. Theoretical Implications

The theoretical implications derived from the synthesis of the five studies in the thesis offer a comprehensive understanding of crowdsourcing as a strategic tool for innovation management.

First, the research delves into the historical progression of crowdsourcing within the context of innovation management, providing insights into its evolution and conceptualization. This historical analysis contributes to the broader body of knowledge on open innovation and highlights the intertwined nature of crowdsourcing and innovation.

Second, the research integrates established theoretical frameworks such as the TOE (Technological-Organizational-Environmental) framework and Diffusion of Innovation theory to explore adoption factors for crowdsourcing initiatives. By empirically validating the indirect effects of antecedents on crowdsourcing adoption determinants, the study contributes to the theoretical understanding of crowdsourcing adoption in organizations. This not only enriches existing literature but also provides a solid foundation for firms to comprehend and navigate the complexities of crowdsourcing adoption.

Third, the development of a strategic framework for designing crowdsourcing initiatives represents a significant theoretical implication by providing a structured approach rooted in theoretical foundations. By integrating phase-wise processes and design elements into a coherent framework, the study offers a theoretical basis for understanding the complexities of crowdsourcing design, thereby contributing to the theoretical discourse on value co-creation in organizational contexts.

Fourth, the exploration of the mechanism for value co-creation through crowdsourcing contributes theoretically by applying established organizational learning models and social capital theory to the context of crowdsourcing. By identifying and categorizing crowdsourcing-based co-creation mechanisms into structural, cognitive, and relational linkages, the research enhances theoretical understanding of knowledge transfer and absorptive capacity within the crowdsourcing paradigm, thereby enriching existing theoretical frameworks.

Finally, the investigation into the outcomes and impact of crowdsourcing on innovation capability offers theoretical implications by addressing inconsistencies in prior research findings. By emphasizing the role of internal organizational practices such as knowledge transfer effectiveness and absorptive capacity, the study advances theoretical understanding of the mechanisms through which crowdsourcing influences innovation outcomes. These theoretical insights provide a foundation for further scholarly inquiry into the complexities of crowdsourcing and its implications for innovation management theory.

7.3.2. Managerial Implications

The study's practical implications hold substantial guidance for organizations aiming to maximize the potential of crowdsourcing for innovation.

First, the exploration of the crowdsourcing, innovation, and value co-creation field underscores the strategic importance of integrating crowdsourcing into innovation processes. Managers can capitalize on crowdsourcing platforms to access a diverse range of expertise, accelerating idea generation and solution development. By embracing crowdsourcing, organizations foster a culture of open innovation and knowledge sharing, enhancing learning capabilities and expanding their knowledge base. Additionally, crowdsourcing helps mitigate information asymmetry, enabling more informed decision-making and reducing the risk of innovation project failures. Moreover, crowdsourcing initiatives facilitate the building of social capital and strengthen relationships with external stakeholders, paving the way for long-term partnerships and loyalty among key contributors.

Second, understanding the adoption factors for crowdsourcing initiatives is crucial for decision-makers steering organizational innovation strategies. Factors such as relative advantage, perceived cost reduction, and top management support play pivotal roles in shaping the success of crowdsourcing adoption. Decision-makers must recognize the benefits of crowdsourcing, such as enhanced problem-solving and cost savings, while also addressing complexities associated with managing diverse contributions. Aligning crowdsourcing initiatives with existing organizational structures and ensuring technology readiness are essential for successful integration.

Third, the proposed strategic framework for designing crowdsourcing initiatives offers practical guidance for organizations. By identifying common pitfalls early in the design phase, decision-makers can improve the likelihood of attaining desirable outcomes from crowdsourcing initiatives. Formulating post-implementation strategies and addressing concerns related to privacy, security, and intellectual property rights are critical steps in designing effective crowdsourcing projects.

Fourth, understanding the value co-creation mechanism of crowdsourcing highlights the importance of building social linkages, effective knowledge transfer, and absorptive capacity within organizations. Managers should focus on facilitating interaction channels, developing standard codes and languages, and fostering co-creation processes to enhance crowd-firm relationships and innovation performance. Strengthening knowledge transfer effectiveness and absorptive capacity creates a synergetic effect, further enhancing organizations' capacity to innovate and co-create value.

Finally, the outcome and impact of crowdsourcing on innovation competence emphasize the need for a balanced approach that considers both external partnerships and internal organizational changes. While establishing crowdsourcing-based social

linkages with external partners is essential, managers must also focus on developing internal capabilities such as absorptive capacity and effective knowledge transfer mechanisms. By aligning crowdsourcing efforts with overarching business objectives and continually refining both external partnerships and internal practices, organizations can optimize innovation competence and ensure sustained success and growth through effective crowdsourcing endeavors.

7.4. Limitations and Future Research Avenues

The study highlights several limitations that offer avenues for future research.

First, the study's exploration of internal practices, such as knowledge transfer effectiveness and absorptive capacity, as mediators between crowdsourcing-based social linkages and innovation competence, provides valuable insights. However, future research could delve deeper into the specific strategies and mechanisms organizations employ to enhance these internal practices in the context of crowdsourcing. Understanding how different approaches impact innovation outcomes would enrich our understanding of effective crowdsourcing management.

Second, while the study acknowledges the importance of considering external factors like economic conditions and regulatory changes, it does not thoroughly investigate their influence on crowdsourcing-based social linkages and innovation competence. Future research could conduct comparative analyses across different economic contexts and regulatory environments to assess how these factors shape the effectiveness of crowdsourcing initiatives.

Third, the study's reliance on cross-sectional data limits its ability to establish causal relationships between crowdsourcing-based social linkages, internal practices, and innovation competence. Employing longitudinal research designs and experimental methodologies could provide stronger evidence of causality and offer insights into the dynamic nature of these relationships over time.

Fourth, the study's focus on specific industries or sectors may restrict the generalizability of findings. Future research could adopt a cross-industry perspective to examine how crowdsourcing impacts innovation competence across diverse organizational contexts. Comparing findings across industries could identify sector-specific challenges and opportunities for leveraging crowdsourcing effectively.

Fifth, the study primarily employs a quantitative approach, potentially overlooking nuanced aspects of organizational dynamics and experiences with crowdsourcing. Incorporating qualitative methods, such as interviews or case studies, could provide richer insights into the complexities of managing crowdsourcing initiatives and their impact on innovation competence.

Sixth, while the study highlights the significance of internal organizational practices in ensuring the success of crowdsourcing endeavors, it does not extensively explore

the role of leadership styles and organizational culture. Future research could investigate how different leadership approaches and cultural norms influence the implementation and outcomes of crowdsourcing initiatives.

Seventh, the study's examination of crowdsourcing-based social linkages predominantly focuses on their direct and mediated effects on innovation competence within organizations. Future research could extend this investigation to explore the spillover effects of crowdsourcing initiatives on broader innovation ecosystems. Understanding how crowdsourcing contributes to knowledge diffusion, industry dynamics, and regional economic development would provide valuable insights for policymakers and industry stakeholders.

Eight, while the study emphasizes the importance of knowledge transfer effectiveness and absorptive capacity as mediators between crowdsourcing-based social linkages and innovation competence, it does not explore alternative mediation models or boundary conditions. Future research could investigate alternative pathways and moderators that may influence the relationship between crowdsourcing and innovation outcomes. This could include factors such as organizational size, industry type, and external network characteristics.

Finally, the study's focus on managerial and organizational perspectives leaves room for exploring the role of policymakers in fostering an environment conducive to crowdsourcing and innovation. Future research could examine how government policies, regulations, and support mechanisms influence the adoption and effectiveness of crowdsourcing initiatives at both the organizational and societal levels.

7.5. Concluding Remarks

The thesis explored the governance mechanism of value co-creation through crowdsourcing initiatives, providing valuable insights into the dynamics of organizational innovation competence. Through an in-depth exploration of crowdsourcing-based social linkages, internal practices, and innovation outcomes, this research has highlighted the complex interplay between external collaboration and internal organizational processes in driving innovation success.

At the heart of this thesis lies the recognition that crowdsourcing offers organizations a unique opportunity to harness external knowledge and expertise, fostering collaboration and co-creation with diverse stakeholders. By engaging with external partners through crowdsourcing platforms, organizations can tap into a wealth of resources, ideas, and perspectives, enriching their innovation endeavors and enhancing their competitive edge.

Central to the findings of this research is the pivotal role of value co-creation mechanisms in shaping the effectiveness of crowdsourcing initiatives. The study has underscored the importance of knowledge transfer effectiveness, absorptive capacity, and other internal practices in leveraging the potential of crowdsourcing-based social linkages, highlighting their role as mediators in the relationship between crowdsourcing and innovation competence.

As organizations navigate the increasingly complex and dynamic innovation landscape, the insights gleaned from this thesis offer actionable guidance for managers and policymakers alike. By emphasizing the need for a balanced approach to crowdsourcing development, one that encompasses both external collaborations and internal organizational adaptations, this research underscores the importance of fostering a culture of open innovation and collaboration.

Hence, the thesis contributes to our understanding of how organizations can effectively harness the power of crowdsourcing to drive innovation and value co-creation. By recognizing the importance of value co-creation mechanisms and internal organizational practices, organizations can unlock new pathways to innovation success, paving the way for sustainable growth and competitiveness in an ever-evolving global marketplace.

REFERENCES

- Abdoulmajid, A. (2022). Citation analysis: definitions and applications. *Iranian Journal of Information Processing and Management*, 22(3), 73-88.
- Abdul-Ghani, E., Hyde, K. F., & Marshall, R. (2011). Emic and etic interpretations of engagement with a consumer-to-consumer online auction site. *Journal of business research*, 64(10), 1060-1066.
- Acar, O. A. (2019). Motivations and solution appropriateness in crowdsourcing challenges for innovation. *Research Policy*, 48(8), 103716.
- Afuah, A., & Tucci, C. L. (2012). Crowdsourcing as a solution to distant search. *Academy of Management review*, 37(3), 355-375.
- Agi, M. A., & Jha, A. K. (2022). Blockchain technology in the supply chain: An integrated theoretical perspective of organizational adoption. *International Journal of Production Economics*, 247, 108458.
- Aitamurto, T. (2012). Crowdsourcing for democracy: A new era in policy-making. *Crowdsourcing for Democracy: A New Era In Policy-Making. Publications of the Committee for the Future, Parliament of Finland*, 1.
- Akbari, M., Khodayari, M., Khaleghi, A., Danesh, M., & Padash, H. (2021). Technological innovation research in the last six decades: a bibliometric analysis. *European Journal of Innovation Management*, 24(5), 1806-1831.
- Ali, O., & Shrestha, A. (2017). Analysis of the Total Cost of Ownership for Cloud Computing Technology Adoption: A Case Study of Regional Municipal Government Sector. *Australasian Conference on Information Systems*, 1–12.
- Allahbakhsh, M., Ignjatovic, A., Benatallah, B., Bertino, E., & Foo, N. (2012). Reputation management in crowdsourcing systems. In *8th International conference on collaborative computing: networking, applications and worksharing (CollaborateCom)* (pp. 664-671). IEEE.
- Allen, B. J., Chandrasekaran, D., & Basuroy, S. (2018). Design crowdsourcing: The impact on new product performance of sourcing design solutions from the “crowd”. *Journal of Marketing*, 82(2), 106-123.
- Al-Momani, A. M., Mahmoud, M., & Ahmad, M. S. (2018). Factors that influence the acceptance of internet of things services by customers of telecommunication companies in Jordan. *Journal of Organizational and End User Computing*, 4(30), 51–63.
- Al-Omoush, K. S., Orero-Blat, M., & Ribeiro-Soriano, D. (2021). The role of sense of community in harnessing the wisdom of crowds and creating collaborative knowledge during the COVID-19 pandemic. *Journal of Business Research*, 132, 765-774.
- Amrollahi, A. (2015). A process model for crowdsourcing: Insights from the literature on implementation. *ACIS 2015 Proceedings - 26th Australasian Conference on Information Systems*, 1–12.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin*, 103(3), 411.

- Andriopoulos, C., & Dawson, P. (2021). Managing Change, Creativity and Innovation. *Managing Change, Creativity and Innovation*, 1-100.
- Ansari, S., Munir, K., & Gregg, T. (2012). Impact at the ‘bottom of the pyramid’: The role of social capital in capability development and community empowerment. *Journal of Management Studies*, 49(4), 813-842.
- Ansell, C., & Gash, A. (2018). Collaborative platforms as a governance strategy. *Journal of Public Administration Research and Theory*, 28(1), 16-32.
- Anttiroiko, A. V. (2010). Innovation in democratic e-governance: Benefitting from Web 2.0 applications in the public sector. *International Journal of Electronic Government Research (IJEGR)*, 6(2), 18-36.
- Argote, L., & Miron-Spektor, E. (2011). Organizational learning: From experience to knowledge. *Organization science*, 22(5), 1123-1137.
- Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of informetrics*, 11(4), 959-975.
- Audretsch, D. B., Aldridge, T. T., & Sanders, M. (2011). Social capital building and new business formation: A case study in Silicon Valley. *International Small Business Journal*, 29(2), 152-169.
- Ayaburi, E. W., Lee, J., & Maasberg, M. (2020). Understanding crowdsourcing contest fitness strategic decision factors and performance: An expectation-confirmation theory perspective. *Information Systems Frontiers*, 22(5), 1227-1240.
- Bagherzadeh, M., Markovic, S., Cheng, J., & Vanhaverbeke, W. (2019). How does outside-in open innovation influence innovation performance? Analyzing the mediating roles of knowledge sharing and innovation strategy. *IEEE Transactions on Engineering Management*, 67(3), 740-753.
- Bala, M., & Verma, D. (2018). Governance to good governance through e-Governance: A critical review of concept, model, initiatives & challenges in India. *International Journal of Management, IT and Engineering*, 8(10), 244-269.
- Bapna, R., Gupta, A., Rice, S., & Sundararajan, A. (2017). Trust and the strength of ties in online social networks. *MIS quarterly*, 41(1), 115-130.
- Barney, J. (1991), “Firm resources and sustained competitive advantage”, *Journal of Management*, 17(1), 99-120.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, 51(6), 1173.
- Baruch, A., May, A., & Yu, D. (2016). The motivations, enablers and barriers for voluntary participation in an online crowdsourcing platform. *Computers in Human Behavior*, 64, 923-931.
- Bassi, H., Lee, C. J., Misener, L., & Johnson, A. M. (2020). Exploring the characteristics of crowdsourcing: An online observational study. *Journal of Information Science*, 46(3), 291-312.
- Bayus, B. L. (2013). Crowdsourcing new product ideas over time: An analysis of the Dell IdeaStorm community. *Management science*, 59(1), 226-244.

- Beatty, R. C., Shim, J. P., & Jones, M. C. (2001). Factors influencing corporate web site adoption: a time-based assessment. *Information & Management*, 38, 337–354.
- Belanger, F., & Carter, L. (2012). Digitizing government interactions with constituents: an historical review of e-government research in information systems. *Journal of the Association for Information Systems*, 13(5), 1.
- Benlian, A., & Hess, T. (2011). Opportunities and risks of software-as-a-service: Findings from a survey of IT executives. *Decision support systems*, 52(1), 232-246.
- Bigliardi, B., & Galati, F. (2016). Which factors hinder the adoption of open innovation in SMEs?. *Technology Analysis & Strategic Management*, 28(8), 869-885.
- Bjelland, O. M., & Wood, R. C. (2008). An inside view of IBM's' Innovation Jam'. *MIT Sloan management review*, 50(1), 32.
- Blohm, I., Zogaj, S., Bretschneider, U., & Leimeister, J. M. (2018). How to manage crowdsourcing platforms effectively?. *California Management Review*, 60(2), 122-149.
- Bloodgood, J. M. (2019). Knowledge acquisition and firm competitiveness: the role of complements and knowledge source. *Journal of Knowledge Management*, 23(1), 46-66.
- Boons, M., & Stam, D. (2019). Crowdsourcing for innovation: How related and unrelated perspectives interact to increase creative performance. *Research Policy*, 48(7), 1758-1770.
- Boons, M., & Stam, D. (2019). Crowdsourcing for innovation: How related and unrelated perspectives interact to increase creative performance. *Research Policy*, 48(7), 1758-1770.
- Bott, M., & Young, G. (2012). The role of crowdsourcing for better governance in international development. *Praxis: The Fletcher Journal of Human Security*, 27(1), 47-70.
- Boudreau, K. J., & Lakhani, K. R. (2013). Using the crowd as an innovation partner. *Harvard business review*, 91(4), 60-9.
- Boudreau, K. J., Lacetera, N., & Lakhani, K. R. (2011). Incentives and problem uncertainty in innovation contests: An empirical analysis. *Management Science*, 57(5), 843-863.
- Bourdieu, P. (1980). Le mort saisit le vif. *Actes de la recherche en sciences sociales*, 32(1), 3-14.
- Bozzon, A., Brambilla, M., Ceri, S., Mauri, A., & Volonterio, R. (2015). Designing complex crowdsourcing applications covering multiple platforms and tasks. *Journal of Web Engineering*, 443-473.
- Brabham, D. C. (2008), “Crowdsourcing as a model for problem-solving: An introduction and cases”, *Convergence*, 14(1), 75-90.
- Brabham, D. C. (2012). The myth of amateur crowds: A critical discourse analysis of crowdsourcing coverage. *Information, Communication & Society*, 15(3), 394-410.
- Brabham, D. C. (2013). Using crowdsourcing in government (pp. 1-42). IBM Center for the Business of Government.
- Brabham, D. C. (2015). Crowdsourcing in the public sector. Georgetown University Press.
- Brabham, D. C. (2019). Crowdsourcing the public participation process for planning projects. *Planning Theory*, 8(3), 242-262.

- Brem, A. M., Tucci, C. L., Brown, T., & Chen, J. (2023). Guest Editorial: The Age of Crowdsourcing and Crowdfunding for Technological Innovation: Where We Are, and Where to Go?. *IEEE Transactions on Engineering Management*, 70(9), 3015-3020.
- Bretas, V. P., & Alon, I. (2021). Franchising research on emerging markets: Bibliometric and content analyses. *Journal of Business Research*, 133, 51-65.
- Bücheler, T., & Sieg, J. H. (2011). Understanding science 2.0: Crowdsourcing and open innovation in the scientific method. *Procedia Computer Science*, 7, 327-329.
- Buecheler, T., Sieg, J. H., Fuchslin, R. M., & Pfeifer, R. (2010). Crowdsourcing, open innovation and collective intelligence in the scientific method: a research agenda and operational framework. In *The 12th International Conference on the Synthesis and Simulation of Living Systems, Odense, Denmark, 19-23 August 2010* (pp. 679-686). MIT Press.
- Bullinger, A. C., Neyer, A. K., Rass, M., & Moeslein, K. M. (2010). Community-based innovation contests: Where competition meets cooperation. *Creativity and innovation management*, 19(3), 290-303.
- Callon, M., Courtial, J. P., & Laville, F. (1991). Co-word analysis as a tool for describing the network of interactions between basic and technological research: The case of polymer chemistry. *Scientometrics*, 22, 155-205.
- Caloghirou, Y., Kastelli, I., & Tsakanikas, A. (2004). Internal capabilities and external knowledge sources: complements or substitutes for innovative performance?. *Technovation*, 24(1), 29-39.
- Certomà, C., & Rizzi, F. (2017). Crowdsourcing processes for citizen-driven governance. *Citizen empowerment and innovation in the data-rich city*, 57-77.
- Certoma, C., Corsini, F., & Rizzi, F. (2015). Crowdsourcing urban sustainability. Data, people and technologies in participatory governance. *Futures*, 74, 93-106.
- Chan, L., Xu, P., & Liu, D. (2020). Effect of crowd voting on participation in crowdsourcing contests. *Journal of Management Information Systems*, 37(2), 510-535.
- Chanal, V., & Caron-Fasan, M. L. (2008). How to invent a new business model based on crowdsourcing: the Crowdsprit® case. In *EURAM*.
- Chandler, D., & Kapelner, A. (2013). Breaking monotony with meaning: Motivation in crowdsourcing markets. *Journal of Economic Behavior & Organization*, 90, 123-133.
- Chandrasekaran, V., Rajan, S. V., Vasani, R. K., Menon, A., Bagavathi Sivakumar, P., & Shunmuga Velayutham, C. (2016). A crowdsourcing-based platform for better governance. In *Proceedings of the International Conference on Soft Computing Systems: ICSCS 2015, Volume 1* (pp. 519-527). Springer India.
- Chandy, R. K., & Tellis, G. J. (1998). Organizing for radical product innovation: The overlooked role of willingness to cannibalize. *Journal of marketing research*, 35(4), 474-487.
- Chang, H. H., & Chuang, S. S. (2011). Social capital and individual motivations on knowledge sharing: Participant involvement as a moderator. *Information & management*, 48(1), 9-18.

- Chang, Y. Y., Gong, Y., & Peng, M. W. (2012). Expatriate knowledge transfer, subsidiary absorptive capacity, and subsidiary performance. *Academy of Management journal*, 55(4), 927-948.
- Chatterjee, S., Rana, N. P., Dwivedi, Y. K., & Baabdullah, A. M. (2021). Understanding AI adoption in manufacturing and production firms using an integrated TAM-TOE model. *Technological Forecasting and Social Change*, 170, 120880.
- Chen, L., Xu, P., & Liu, D. (2020). Effect of crowd voting on participation in crowdsourcing contests. *Journal of Management Information Systems*, 37(2), 510-535.
- Chen, Y. S., Lin, M. J. J., & Chang, C. H. (2009). The positive effects of relationship learning and absorptive capacity on innovation performance and competitive advantage in industrial markets. *Industrial marketing management*, 38(2), 152-158.
- Chesbrough, H. (2003) Open innovation. Harvard University Press: Cambridge, MA.
- Chesbrough, H., & Crowther, A. K. (2006). Beyond high tech: early adopters of open innovation in other industries. *R&d Management*, 36(3), 229-236.
- Chesbrough, H., Vanhaverbeke, W., & West, J. (Eds.). (2006). *Open innovation: Researching a new paradigm*. Oxford university press, USA.
- Chidlow, A., Ghauri, P. N., Yeniyurt, S., & Cavusgil, S. T. (2015). Establishing rigor in mail-survey procedures in international business research. *Journal of world business*, 50(1), 26-35.
- Chin, W. W., Thatcher, J. B., Wright, R. T., & Steel, D. (2013). Controlling for common method variance in PLS analysis: the measured latent marker variable approach. In *New perspectives in partial least squares and related methods* (pp. 231-239). Springer New York.
- Chiu, C. M., Hsu, M. H. and Wang, E. T. (2006), "Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories", *Decision support systems*, 42(3), 1872-1888.
- Chiu, C. M., Liang, T. P., & Turban, E. (2014). What can crowdsourcing do for decision support?. *Decision Support Systems*, 65, 40-49.
- Choi, J. H., & Lee, J. S. (2016). Online social networks for crowdsourced multimedia-involved behavioral testing: an empirical study. *Frontiers in Psychology*, 6, 1991.
- Chong, A. Y. L., Lin, B., Ooi, K. B., & Raman, M. (2009). Factors affecting the adoption level of e-commerce: An empirical study. *Journal of Computer Information Systems*, 50(2), 13-22.
- Chou, S. W. (2021). Understanding crowdsourcing adoption based on IT managers' decision. *Information Technology and Management*, 22(4), 245-263.
- Christensen, I., & Karlsson, C. (2019). Open innovation and the effects of crowdsourcing in a pharma ecosystem. *Journal of Innovation & Knowledge*, 4(4), 240-247.
- Chung, T., Kim, K., & Shin, E. (2021). Together we create value: a study of a crowdsourcing community. *Internet Research*, 31(3), 911-930.
- Chwelos, P., Benbasat, I., & Dexter, A. S. (2001). Empirical test of an EDI adoption model. *Information systems research*, 12(3), 304-321.

- Clark, B. Y., Zingale, N., Logan, J., & Brudney, J. (2019). A framework for using crowdsourcing in government. In *Social Entrepreneurship: Concepts, Methodologies, Tools, and Applications* (pp. 405-425). IGI Global.
- Cobo, M. J., López-Herrera, A. G., Herrera-Viedma, E., & Herrera, F. (2011). An approach for detecting, quantifying, and visualizing the evolution of a research field: A practical application to the Fuzzy Sets Theory field. *Journal of informetrics*, 5(1), 146-166.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative science quarterly*, 128-152.
- Corral de Zubielqui, G., Lindsay, N., Lindsay, W., & Jones, J. (2019). Knowledge quality, innovation and firm performance: a study of knowledge transfer in SMEs. *Small Business Economics*, 53, 145-164.
- Cricelli, L., Grimaldi, M., & Vermicelli, S. (2022). Crowdsourcing and open innovation: a systematic literature review, an integrated framework and a research agenda. *Review of Managerial Science*, 16(5), 1269-1310.
- Cullina, E., Conboy, K., & Morgan, L. (2016). Choosing the right crowd: An iterative process for crowd specification in crowdsourcing initiatives. In *2016 49th Hawaii International Conference on System Sciences (HICSS)* (pp. 4355-4364). IEEE.
- Cupido, K., & Ophoff, J. (2014). A conceptual model of critical success factors for an e-government crowdsourcing solution. In *Proceedings of the 14th European Conference on e-Government: ECEG* (pp. 77-84).
- Dahlander, L., & Piezunka, H. (2014). Open to suggestions: How organizations elicit suggestions through proactive and reactive attention. *Research Policy*, 43(5), 812-827.
- Dahlander, L., & Piezunka, H. (2020). Why crowdsourcing fails. *Journal of Organization Design*, 9, 1-9.
- Damanpour, F. (1996). Organizational complexity and innovation: developing and testing multiple contingency models. *Management Science*, 42(5), 693-716.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.
- De Beer, J., McCarthy, I. P., Soliman, A., & Treen, E. (2017). Click here to agree: Managing intellectual property when crowdsourcing solutions. *Business Horizons*, 60(2), 207-217.
- De Coninck, B., Viaene, S., & Leysen, J. (2023). Antecedents of the intention to adopt crowdsourcing for innovation in government: Findings from Belgium and the Netherlands. *Government Information Quarterly*, 40(1), 101760.
- de Mattos, C. A., Kissimoto, K. O., & Laurindo, F. J. B. (2018). The role of information technology for building virtual environments to integrate crowdsourcing mechanisms into the open innovation process. *Technological forecasting and social change*, 129, 143-153.
- Dellarocas, C. (2010). Online reputation systems: How to design one that does what you need. *MIT Sloan management review*, 51(3), 33.
- Dellermann, D., Lipusch, N., Ebel, P., & Leimeister, J. M. (2020). The potential of collective intelligence and crowdsourcing for opportunity creation. *International Journal of Entrepreneurial Venturing*, 12(2), 183-207.

Deng, X. N., & Joshi, K. D. (2016). Why individuals participate in micro-task crowdsourcing work environment: Revealing crowdworkers' perceptions. *Journal of the Association for Information Systems*, 17(10), 3.

Desouza, K. C. (2012). Challenge. gov: using competitions and awards to spur innovation. *IBM Center for the Business of Government*. Retrieved October, 17, 2012 from <https://www.businessofgovernment.org>.

Devece, C., Palacios, D., & Ribeiro-Navarrete, B. (2019). "The effectiveness of crowdsourcing in knowledge-based industries: the moderating role of transformational leadership and organisational learning". *Economic research-Ekonomska istraživanja*, 32(1), 335-351.

Dholakia, U. M., Blazevic, V., Wiertz, C., & Algesheimer, R. (2009). Communal service delivery: How customers benefit from participation in firm-hosted virtual P3 communities. *Journal of service research*, 12(2), 208-226.

Di Vaio, A., Palladino, R., Pezzi, A., & Kalisz, D. E. (2021). The role of digital innovation in knowledge management systems: A systematic literature review. *Journal of business research*, 123, 220-231.

Diallo, A., & Thuillier, D. (2005). The success of international development projects, trust and communication: an African perspective. *International journal of project management*, 23(3), 237-252.

Diamantopoulos, A., & Siguaw, J. A. (2006). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. *British journal of management*, 17(4), 263-282.

Djelassi, S., & Decoopman, I. (2013). Customers' participation in product development through crowdsourcing: Issues and implications. *Industrial Marketing Management*, 42(5), 683-692.

Doan, A., Franklin, M. J., Kossmann, D., & Kraska, T. (2011). Crowdsourcing applications and platforms: A data management perspective. *Proceedings of the VLDB Endowment*, 4(12), 1508-1509.

Doan, A., Ramakrishnan, R., & Halevy, A. Y. (2011). Crowdsourcing systems on the world-wide web. *Communications of the ACM*, 54(4), 86-96.

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285-296.

Downs, J. S., Holbrook, M. B., Sheng, S., & Cranor, L. F. (2010, April). Are your participants gaming the system? Screening Mechanical Turk workers. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 2399-2402).

Dutil, P. (2015). Crowdsourcing as a new instrument in the government's arsenal: Explorations and considerations. *Canadian Public Administration*, 58(3), 363-383.

Dzikowski, P. (2018). A bibliometric analysis of born global firms. *Journal of business research*, 85, 281-294.

E.M. Rogers, Diffusion of Innovations, 5th Edition, Free Press, 2003.

- Eapen, A., & Krishnan, R. (2019). Transferring tacit know-how: Do opportunism safeguards matter for firm boundary decisions?. *Organization Science*, 30(4), 715-734.
- Ebrahimi, P., Shafiee, B., Gholampour, A., & Yousefi, L. (2018). Impact of organizational innovation, learning orientation and entrepreneurship on SME performance: The moderating role of market turbulence and ICT. *Competitiveness in Emerging Markets: Market Dynamics in the Age of Disruptive Technologies*, 447-480.
- Elkadi, H. (2013). Success and failure factors for e-government projects: A case from Egypt. *Egyptian Informatics Journal*, 14(2), 165-173.
- Enkel, E., Gassmann, O., & Chesbrough, H. (2009). Open R&D and open innovation: exploring the phenomenon. *R&d Management*, 39(4), 311-316.
- Estellés-Arolas, E., & González-Ladrón-de-Guevara, F. (2012). Towards an integrated crowdsourcing definition. *Journal of Information science*, 38(2), 189-200.
- Estellés-Arolas, E., Navarro-Giner, R., & González-Ladrón-de-Guevara, F. (2015). Crowdsourcing fundamentals: definition and typology. *Advances in crowdsourcing*, 33-48.
- Evans, R. D., Gao, J. X., Mahdikhah, S., Messaadia, M., & Baudry, D. (2015). A review of crowdsourcing literature related to the manufacturing industry. *Journal of Advanced Management Science*, 4(3), 224-321.
- F. P., & Fachinelli, A. C. (2017). Open innovation, crowdsourcing, and knowledge from the crowd: an exploratory study of sustainable company growth. *Global Business and Economics Review*, 19(4), 386-400.
- Featherman, M. S., & Pavlou, P. A. (2003). Predicting e-services adoption: a perceived risk facets perspective. *International journal of human-computer studies*, 59(4), 451-474.
- Fedorenko, I., & Berthon, P. (2017). Beyond the expected benefits: unpacking value co-creation in crowdsourcing business models. *AMS Review*, 7, 183-194.
- Ferreras-Méndez, J. L., Newell, S., Fernández-Mesa, A., & Alegre, J. (2015). Depth and breadth of external knowledge search and performance: The mediating role of absorptive capacity. *Industrial Marketing Management*, 47, 86-97.
- Forbes, H. and Schaefer, D. (2018), "Crowdsourcing in product development: Current state and future research directions", 579-588.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, 18(1), 39-50.
- Franke, N., Schreier, M., Kaiser, U. (2010). The "I designed it myself" effect in mass customization, *Management Science*, 56(1), 125-140.
- Freeman, R. E. (2010). *Strategic management: A stakeholder approach*. Cambridge university press.
- Freudenreich, B., Lüdeke-Freund, F., & Schaltegger, S. (2020). A stakeholder theory perspective on business models: Value creation for sustainability. *Journal of Business Ethics*, 166, 3-18.

- Fu, H. P., & Chang, T. S. (2016). An analysis of the factors affecting the adoption of cloud consumer relationship management in the machinery industry in Taiwan. *Information Development*, 32(5), 1741-1756.
- Furuholt, B., & Wahid, F. (2008, January). E-government Challenges and the Role of Political Leadership in Indonesia: the Case of Sragen. In *Proceedings of the 41st Annual Hawaii International Conference on System Sciences (HICSS 2008)* (pp. 411-411). IEEE.
- Galvagno, M., & Dalli, D. (2014). Theory of value co-creation: a systematic literature review. *Managing service quality*, 24(6), 643-683.
- Gandhi, V. (2016). Citizens need to participate more in making policy decisions related to their own surroundings. The Economic Times. Retrieved from <https://economictimes.indiatimes.com/blogs/et-commentary/citizens-need-to-participate-more-in-making-policydecisions-related-to-their-own-surroundings/accessed>
- Gangwar, H., Date, H., & Ramaswamy, R. (2015). Understanding determinants of cloud computing adoption using an integrated TAM-TOE model. *Journal of enterprise information management*, 28(1), 107-130.
- Gao, S., Jin, X., & Zhang, Y. (2021). User participation behavior in crowdsourcing platforms: Impact of information signaling theory. *Sustainability*, 13(11), 6290.
- García-Sánchez, E., García-Morales, V. J., & Bolívar-Ramos, M. T. (2017). The influence of top management support for ICTs on organisational performance through knowledge acquisition, transfer, and utilisation. *Review of Managerial Science*, 11, 19-51.
- Garrow, L. A., Chen, Z., Ilbeigi, M., & Lurkin, V. (2020). A new twist on the gig economy: conducting surveys on Amazon Mechanical Turk. *Transportation*, 47, 23-42.
- Gassmann, O., Friesike, S. and Daiber, M. (2014), "Crowdsourcing as an innovation tool", *Management of the Fuzzy Front End of Innovation* (pp. 75-87), Springer, Cham.
- Geiger, D., & Schader, M. (2014). Personalized task recommendation in crowdsourcing information systems—Current state of the art. *Decision Support Systems*, 65, 3-16.
- Gewald, H., & Dibbern, J. (2009). Risks and benefits of business process outsourcing: A study of transaction services in the German banking industry. *Information & Management*, 46(4), 249-257.
- Ghezzi, A., Gabelloni, D., Martini, A., & Natalicchio, A. (2018). Crowdsourcing: a review and suggestions for future research. *International Journal of management reviews*, 20(2), 343-363.
- Ghobakhloo, M., Arias-Aranda, D., & Benitez-Amado, J. (2011). Adoption of e-commerce applications in SMEs. *Industrial Management & Data Systems*, 111(8), 1238-1269.
- Gopalakrishnan, S., & Damanpour, F. (1994). Patterns of generation and adoption of innovation in organizations: Contingency models of innovation attributes. *Journal of engineering and technology management*, 11(2), 95-116.
- Government, D., & Development, S. (2020). E-Government Survey 2020.
- Goyal, S., Ahuja, M., & Kankanhalli, A. (2020). Does the source of external knowledge matter? Examining the role of customer co-creation and partner sourcing in knowledge creation and innovation. *Information & Management*, 57(6), 103325.

- Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: systematic review and recommendations. *The milbank quarterly*, 82(4), 581-629.
- Grimaldi, M., Vermicelli, S., & Cricelli, L. (2022). Investigating the role of crowdsourcing in improving the quality of production processes: a systematic literature review. *The TQM Journal*.
- Grimmelikhuijsen, S. G., & Meijer, A. J. (2015). Does Twitter increase perceived police legitimacy?. *Public administration review*, 75(4), 598-607.
- Grover, V., & Kohli, R. (2012). Cocreating IT value: New capabilities and metrics for multifirm environments. *Mis Quarterly*, 225-232.
- Gruner, R. L., & Power, D. (2017). What's in a crowd? Exploring crowdsourced versus traditional customer participation in the innovation process. *Journal of Marketing Management*, 33(13-14), 1060-1092.
- Gu, B. and Jarvenpaa, S. (2003), "Online discussion boards for technical support: the effect of token recognition on customer contributions, ICIS Proceedings", 24th International Conference on Information Systems, Seattle, Washington, 2003 (Paper 10).
- Hadaya, P., & Cassivi, L. (2012). Joint collaborative planning as a governance mechanism to strengthen the chain of IT value co-creation. *The Journal of Strategic Information Systems*, 21(3), 182-200.
- Hair Jr, J. F., Hult, G. T. M., Ringle, C. and Sarstedt, M. (2016), "A primer on partial least squares structural equation modeling (PLS-SEM) Sage Publications", Thousand Oaks, CA, USA.
- Hair Jr, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European business review*, 26(2), 106-121.
- Hair Jr, J., Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications.
- Hair, J., Hollingsworth, C. L., Randolph, A. B., & Chong, A. Y. L. (2017). An updated and expanded assessment of PLS-SEM in information systems research. *Industrial management & data systems*, 117(3), 442-458.
- Hallinger, P. (2013). A conceptual framework for systematic reviews of research in educational leadership and management. *Journal of Educational Administration*, 51(2), 126-149.
- Hamad, F., Farajat, S., & Hamarsha, A. (2018). Awareness and adoption of mobile technologies in the delivery of services in academic libraries in Jordan: a library staff perspective. *Global Knowledge, Memory and Communication*, 67(6/7), 438-457.
- Hameed, M. A., & Arachchilage, N. A. G. (2020). A conceptual model for the organizational adoption of information system security innovations. In *Security, Privacy, and Forensics Issues in Big Data* (pp. 317-339). IGI Global.
- Hammon, L., & Hippner, H. (2012). Crowdsourcing. *Business & Information systems engineering*, 4, 163-166.

- Hanine, S., & Steils, N. (2018). Crowdsourcing: A Double-Edged Sword Outsourcing Strategy. In *Positive and Negative Aspects of Outsourcing*. IntechOpen.
- Hansson, K., Aitamurto, T., Ludwig, T., Muller, M., & Hansson, I. K. (2016). Editorial for the Workshop “Toward a Typology of Participation in Crowd Work.”. In *Proceedings of the CSCW 2016 Workshop: Toward a Typology of Participation in Crowdwork* (Vol. 13, No. 1, pp. 5-11).
- Harzing, A. W., & Alakangas, S. (2016). Google Scholar, Scopus and the Web of Science: a longitudinal and cross-disciplinary comparison. *Scientometrics*, 106, 787-804.
- He, H. R., Liu, Y., Gao, J., & Jing, D. (2022). Investigating business sustainability of crowdsourcing platforms. *IEEE Access*, 10, 74291-74303.
- Hecker, S., Haklay, M., Bowser, A., Makuch, Z., Vogel, J., & Bonn, A. (2018). Innovation in open science, society and policy—setting the agenda for citizen science. *Citizen Science: Innovation in open science, society and policy*, 1-23.
- Heeks, R. (2010). “Do information and communication technologies (ICTs) contribute to development?”, *Journal of international development*, 22(5), 625-640
- Heeks, R., & Nicholson, B. (2004). Software export success factors and strategies in ‘follower’ nations. *Competition and Change*, 8(3), 267-303.
- Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial management & data systems*, 116(1), 2-20.
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In *New challenges to international marketing* (Vol. 20, pp. 277-319). Emerald Group Publishing Limited.
- Hetmank, L. (2013). Components and functions of crowdsourcing systems—a systematic literature review.
- Hilgers, D., & Ihl, C. (2010). Citizensourcing: Applying the concept of open innovation to the public sector. *International Journal of Public Participation*, 4(1).
- Hine, D. C., Parker, R., & Ireland, D. (2010). The knowledge exchange intermediary as service provider: a discussion and an Australian case. *The Service Industries Journal*, 30(5), 713-729.
- Hirth, M., Hoßfeld, T., & Tran-Gia, P. (2013). Analyzing costs and accuracy of validation mechanisms for crowdsourcing platforms. *Mathematical and Computer Modelling*, 57(11-12), 2918-2932.
- Hollebeek, L. D. (2019). Developing business customer engagement through social media engagement-platforms: An integrative SD logic/RBV-informed model. *Industrial Marketing Management*, 81, 89-98.
- Horton, J. J., Chilton, L. B. (2010). The labor economics of paid crowdsourcing, Proceedings of the 11th ACM conference on Electronic commerce, Cambridge, Massachusetts, USA.
- Hossain, M. (2015). Crowdsourcing in business and management disciplines: an integrative literature review. *Journal of Global Entrepreneurship Research*, 5, 1-19.

- Hosseini, M., Phalp, K., Taylor, J., & Ali, R. (2014, May). The four pillars of crowdsourcing: A reference model. In *2014 IEEE Eighth International Conference on Research Challenges in Information Science (RCIS)* (pp. 1-12). IEEE.
- Howe, J. (2006). The rise of crowdsourcing. *Wired Magazine*, 14(6), 1-4
- Howe, J. (2008). *Crowdsourcing: Why the power of the crowd Is driving the future of business*. New York: Random House.
- Hsu, H. Y., Liu, F. H., Tsou, H. T., & Chen, L. J. (2019). Openness of technology adoption, top management support and service innovation: a social innovation perspective. *Journal of Business & Industrial Marketing*, 34(3), 575-590.
- Hsu, J. S. C., & Hung, Y. W. (2013). Exploring the interaction effects of social capital. *Information & Management*, 50(7), 415-430.
- Hurni, H., & Wiesmann, U. (2014). Transdisciplinarity in practice. Experience from a concept-based research programme addressing global change and sustainable development. *GAIA-Ecological Perspectives for Science and Society*, 23(3), 275-277.
- Huston, L., & Sakkab, N. (2006). Connect and develop. *Harvard business review*, 84(3), 58-66.
- Ifinedo, P. (2011). An empirical analysis of factors influencing Internet/e-business technologies adoption by SMEs in Canada. *International journal of information technology & decision making*, 10(04), 731-766.
- Ikediego, H. O., Ilkan, M., Abubakar, A. M., & Bekun, F. V. (2018). Crowd-sourcing (who, why and what). *International Journal of Crowd Science*, 2(1), 27-41.
- Inkpen, A. C., & Tsang, E. W. (2005). Social capital, networks, and knowledge transfer. *Academy of management review*, 30(1), 146-165.
- Ishikawa, T. (2019). Why Inbound Open Innovation Practices are Driven in Japanese Manufacturing Firms: Technological Turbulence, Competitive Intensity. In *2019 8th International Conference on Industrial Technology and Management (ICITM)* (pp. 100-104). IEEE.
- Iyengar, K., Sweeney, J. R., & Montealegre, R. (2015). Information technology use as a learning mechanism. *MIS quarterly*, 39(3), 615-642.
- Jian, L., Yang, S., Ba, S., Lu, L., & Jiang, C. (2018). Managing the crowds: The effect of prize guarantees and in-process feedback on participation in crowdsourcing contests. *University of Connecticut School of Business Study*, (18-11).
- Jiang, X., Kim, A., Kim, K., Yang, Q., García-Fernández, J., & Zhang, J. J. (2021). Motivational antecedents, value co-creation process, and behavioral consequences in participatory sport tourism. *Sustainability*, 13(17), 9916.
- Johnson, J. S., Fisher, G. J., & Friend, S. B. (2019). Crowdsourcing service innovation creativity: Environmental influences and contingencies. *Journal of Marketing Theory and Practice*, 27(3), 251-268.
- Johnson, J. S., Fisher, G. J., & Friend, S. B. (2019). Crowdsourcing service innovation creativity: Environmental influences and contingencies. *Journal of Marketing Theory and Practice*, 27(3), 251-268.

- Kannangara, S. N., & Ugucioni, P. (2013). Risk management in crowdsourcing-based business ecosystems. *Technology Innovation Management Review*, 3(12).
- Kaufmann, N., Schulze, T., & Veit, D. (2011). More than fun and money. Worker Motivation in Crowdsourcing-A Study on Mechanical Turk. In *Amcis* (Vol. 11, No. 2011, pp. 1-11).
- Khan, Z., Ludlow, D., Loibl, W., & Soomro, K. (2014). ICT enabled participatory urban planning and policy development: The UrbanAPI project. *Transforming Government: People, Process and Policy*, 8(2), 205-229.
- Khazankin, R., Schall, D., & Dustdar, S. (2012). Predicting QoS in scheduled crowdsourcing. In *Advanced Information Systems Engineering: 24th International Conference, CAiSE 2012, Gdansk, Poland, June 25-29, 2012. Proceedings 24* (pp. 460-472). Springer Berlin Heidelberg.
- Kim, D. J., Ferrin, D. L., & Rao, H. R. (2008). A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents. *Decision support systems*, 44(2), 544-564.
- Kim, M., Song, J., & Triche, J. (2015). Toward an integrated framework for innovation in service: A resource-based view and dynamic capabilities approach. *Information Systems Frontiers*, 17, 533-546.
- Kim, S. H., Yun, H., & Yi, J. S. (2012). How to filter out random clickers in a crowdsourcing-based study?. In *Proceedings of the 2012 beliv workshop: Beyond time and errors-novel evaluation methods for visualization* (pp. 1-7).
- Kiran, B. S., & Sharma, R. (2021). Designing and Driving Crowdsourcing Contests in Large Public Service Organizations: Lessons from Deutsche Bahn and Indian Railways. *Research-Technology Management*, 64(3), 48-57.
- Kittur, A. (2010). Crowdsourcing, collaboration and creativity. *XRDS: crossroads, the ACM magazine for students*, 17(2), 22-26.
- Kittur, A., Nickerson, J. V., Bernstein, M., Gerber, E., Shaw, A., Zimmerman, J., ... & Horton, J. (2013, February). The future of crowd work. In *Proceedings of the 2013 conference on Computer supported cooperative work* (pp. 1301-1318).
- Knudsen, H. K., & Roman, P. M. (2004). Modeling the use of innovations in private treatment organizations: The role of absorptive capacity. *Journal of substance abuse treatment*, 26(1), 51-59.
- Koch, G., Füller, J., & Brunswicker, S. (2011). Online crowdsourcing in the public sector: how to design open government platforms. In *Online Communities and Social Computing: 4th International Conference, OCSC 2011, Held as Part of HCI International 2011, Orlando, FL, USA, July 9-14, 2011. Proceedings 4* (pp. 203-212). Springer Berlin Heidelberg.
- Kock, N., & Hadaya, P. (2018). Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods. *Information systems journal*, 28(1), 227-261.
- Kohler, T. (2015). Crowdsourcing-based business models: How to create and capture value. *California management review*, 57(4), 63-84.

- Kohler, T., & Chesbrough, H. (2019). From collaborative community to competitive market: The quest to build a crowdsourcing platform for social innovation. *R&D Management*, 49(3), 356-368.
- Kraus, S., Breier, M., & Dasí-Rodríguez, S. (2020). The art of crafting a systematic literature review in entrepreneurship research. *International Entrepreneurship and Management Journal*, 16, 1023-1042.
- Krupowicz, W., Czarnecka, A., & Grus, M. (2020). Implementing crowdsourcing initiatives in land consolidation procedures in Poland. *Land Use Policy*, 99, 105015.
- Kulkarni, A., Can, M., & Hartmann, B. (2012, February). Collaboratively crowdsourcing workflows with turkomatic. In *Proceedings of the acm 2012 conference on computer supported cooperative work* (pp. 1003-1012).
- L.G. Tornatzky, M. Fleischer, *The Processes of Technological Innovation*, Lexington Books, Massachusetts, 1990.
- Lampe, C. A. (2006). Ratings use in an online discussion system: The Slashdot case. Ann Arbor: University of Michigan (Doctoral dissertation).
- Lastovka, M. (2015). Crowdsourcing as new instrument in policy-making: making the democratic process more engaging. *European View*, 14(1), 93-99.
- Laursen, K., & Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. *Strategic management journal*, 27(2), 131-150.
- Leckel, A., Veilleux, S., & Piller, F. (2022). How spatial proximity facilitates distant search—a social capital perspective on local open innovation. *Industry and Innovation*, 29(7), 899-926.
- Lee, C. K., Chan, C. Y., Ho, S., Choy, K. L., & Ip, W. H. (2015). Explore the feasibility of adopting crowdsourcing for innovative problem solving. *Industrial Management & Data Systems*, 115(5), 803-832.
- Lehdonvirta, V., & Bright, J. (2015). Crowdsourcing for public policy and government. *Policy & Internet*, 7(3), 263-267.
- Lehner, O. M. (2016). Crowdfunding social ventures: a model and research agenda. *Routledge Handbook of Social and Sustainable Finance*, 139-160.
- Leimeister, J. M., Huber, M., Bretschneider, U., & Krcmar, H. (2009). Leveraging crowdsourcing: activation-supporting components for IT-based ideas competition. *Journal of management information systems*, 26(1), 197-224.
- Lenart-Gansiniec, R., & Sułkowski, Ł. (2020). Organizational learning and value creation in local governance: the mediating role of crowdsourcing. *The Learning Organization*, 27(4), 321-335.
- Levine-Clark, M., & Gil, E. L. (2021). A new comparative citation analysis: Google Scholar, Microsoft Academic, Scopus, and Web of Science. *Journal of Business & Finance Librarianship*, 26(1-2), 145-163.
- Levy, M. (2009). WEB 2.0 implications on knowledge management. *Journal of knowledge management*, 13(1), 120-134.

- Liao, S. H., Fei, W. C., & Chen, C. C. (2007). "Knowledge sharing, absorptive capacity, and innovation capability: an empirical study of Taiwan's knowledge-intensive industries". *Journal of information science*, 33(3), 340-359.
- Lim, J. E., Lee, J., & Kim, D. (2021). The effects of feedback and goal on the quality of crowdsourcing tasks. *International Journal of Human-Computer Interaction*, 37(13), 1207-1219.
- Linders, D. (2012). From e-government to we-government: Defining a typology for citizen coproduction in the age of social media. *Government information quarterly*, 29(4), 446-454.
- Liu, H. K. (2017). Crowdsourcing design: A synthesis of literatures. In Proceedings of the 50th Hawaii International Conference on System Sciences.
- Liu, Q., Zhao, X., & Sun, B. (2018). Value co-creation mechanisms of enterprises and users under crowdsource-based open innovation. *International Journal of Crowd Science*, 2(1), 2-17.
- Loef, J., Pine II, B. J., & Robben, H. (2017). Co-creating customization: collaborating with customers to deliver individualized value. *Strategy & Leadership*, 45(3), 10-15.
- Loukis, E., & Charalabidis, Y. (2015). Active and passive crowdsourcing in government. *Policy practice and digital science: Integrating complex systems, social simulation and public administration in policy research*, 261-289.
- Lu, B., Hirschheim, R., & Schwarz, A. (2015). Examining the antecedent factors of online microsourcing. *Information Systems Frontiers*, 17, 601-617.
- Lukensmeyer, C. J., & Torres, L. H. (2008). Citizensourcing: Citizen participation in a networked nation. *Civic engagement in a network society*, 207-233.
- Lusch, R. F., & Nambisan, S. (2015). Service innovation. *MIS quarterly*, 39(1), 155-176.
- Lüttgens, D., Pollok, P., Antons, D., & Piller, F. (2014). Wisdom of the crowd and capabilities of a few: internal success factors of crowdsourcing for innovation. *Journal of Business Economics*, 84, 339-374.
- Lykourantzou, I., Vergados, D. J., Papadaki, K., & Naudet, Y. (2013). Guided crowdsourcing for collective work coordination in corporate environments. In *Computational Collective Intelligence. Technologies and Applications: 5th International Conference, ICCCI 2013, Craiova, Romania, September 11-13, 2013, Proceedings 5* (pp. 90-99). Springer Berlin Heidelberg.
- Lynn, T., Liang, X., Gourinovitch, A., Morrison, J. P., Fox, G., & Rosati, P. (2018, January). Understanding the determinants of cloud computing adoption for high performance computing. In *51st Hawaii International Conference on System Sciences (HICSS-51)* (pp. 3894-3903). University of Hawai'i at Manoa.
- Mabad, T., Ali, O., Ally, M., Wamba, S. F., & Chan, K. C. (2021). Making investment decisions on RFID technology: an evaluation of key adoption factors in construction firms. *IEEE access*, 9, 36937-36954.
- Maiolini, R., & Naggi, R. (2011). Crowdsourcing and SMEs: Opportunities and challenges. *Information technology and innovation trends in organizations: ItAIS: The Italian Association for Information Systems*, 399-406.

- Maiolini, R., & Naggi, R. (2012). Reducing inertia and forwarding changes: crowdsourcing to reduce uncertainty. a theoretical model. In *Information Systems: Crossroads for Organization, Management, Accounting and Engineering: ItAIS: The Italian Association for Information Systems* (pp. 315-322). Heidelberg: Physica-Verlag HD.
- Maktabi, S. H., & Khazaei, A. (2014). The impact of organizational learning on organizational performance and organizational innovation: Evidence from Bank Industry of Iran. *International Journal of Economy, Management and Social Sciences*, 3(10), 569-573.
- Malik, B. A., Aftab, A., & Ali, N. (2019). Mapping of Crowdsourcing Research: A Bibliometric Analysis. *DESIDOC Journal of Library & Information Technology*, 39(1).
- Malodia, S., Dhir, A., Mishra, M., & Bhatti, Z. A. (2021). Future of e-Government: An integrated conceptual framework. *Technological Forecasting and Social Change*, 173, 121102.
- Malone, T. W., Laubacher, R., & Dellarocas, C. (2010). The collective intelligence genome. *MIT Sloan Management Review*, 51(3), 21.
- Marjanovic, S., Fry, C., & Chataway, J. (2012). "Crowdsourcing based business models: In search of evidence for innovation 2.0". *Science and public policy*, 39(3), 318-332.
- Martín-de Castro, G. (2015). Knowledge management and innovation in knowledge-based and high-tech industrial markets: The role of openness and absorptive capacity. *Industrial marketing management*, 47, 143-146.
- Massa, S., & Testa, S. (2017). Opening up innovation processes through contests in the food sector. *Business process management journal*, 23(6), 1290-1310.
- Mathauer, M., & Hofmann, E. (2019). Technology adoption by logistics service providers. *International Journal of Physical Distribution & Logistics Management*, 49(4), 416-434.
- McAllister, J. T., Lennertz, L., & Atencio Mojica, Z. (2022). Mapping a discipline: a guide to using VOSviewer for bibliometric and visual analysis. *Science & Technology Libraries*, 41(3), 319-348.
- McDermott, P. (2010). Building open government. *Government Information Quarterly*, 27(4), 401-413.
- Mehtälä, J., Kauranen, I., Karjalainen, J., & Nyberg, T. (2016, July). A crowdsourcing model for new idea development in the fashion industry. In *2016 IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI)* (pp. 29-36). IEEE.
- Meijer, A. J. (2014). New media and the coproduction of safety: An empirical analysis of Dutch practices. *The American Review of Public Administration*, 44(1), 17-34.
- Meng, L., Qamruzzaman, M., & Adow, A. H. E. (2021). Technological adaption and open innovation in SMEs: An strategic assessment for women-owned SMEs sustainability in Bangladesh. *Sustainability*, 13(5), 2942.
- Mergel, I. (2015). Opening government: Designing open innovation processes to collaborate with external problem solvers. *social science computer review*, 33(5), 599-612.

- Mergel, I. (2021). Open innovation in the public sector: drivers and barriers for the adoption of Challenge. gov. In *Digital Government and Public Management* (pp. 94-113). Routledge.
- Mergel, I., & Desouza, K. C. (2013). Implementing open innovation in the public sector: The case of Challenge. gov. *Public administration review*, 73(6), 882-890.
- Min, S., So, K. K. F., & Jeong, M. (2021). Consumer adoption of the Uber mobile application: Insights from diffusion of innovation theory and technology acceptance model. In *Future of tourism marketing* (pp. 2-15). Routledge.
- Minbaeva, D., Pedersen, T., Björkman, I., Fey, C. F., & Park, H. J. (2014). MNC knowledge transfer, subsidiary absorptive capacity and HRM. *Journal of international business studies*, 45, 38-51.
- Modaresnezhad, M., Iyer, L., Palvia, P., & Taras, V. (2020). Information Technology (IT) enabled crowdsourcing: A conceptual framework. *Information Processing & Management*, 57(2), 102135.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group*. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of internal medicine*, 151(4), 264-269.
- Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information systems research*, 2(3), 192-222.
- Moussawi, S., & Koufaris, M. (2013). The crowd on the assembly line: Designing tasks for a better crowdsourcing experience.
- Muhammed, S., & Zaim, H. (2020). Peer knowledge sharing and organizational performance: the role of leadership support and knowledge management success. *Journal of knowledge management*, 24(10), 2455-2489.
- Muhdi, L., Daiber, M., Friesike, S., & Boutellier, R. (2011). The crowdsourcing process: an intermediary mediated idea generation approach in the early phase of innovation. *International Journal of Entrepreneurship and Innovation Management*, 14(4), 315-332.
- Müller, J. M., Buliga, O., & Voigt, K. I. (2021). The role of absorptive capacity and innovation strategy in the design of industry 4.0 business Models-A comparison between SMEs and large enterprises. *European Management Journal*, 39(3), 333-343.
- Muntés-Mulero, V., Paladini, P., Manzoor, J., Gritti, A., Larriba-Pey, J. L., & Mijndhardt, F. (2012, August). Crowdsourcing for industrial problems. In *International Workshop on Citizen in Sensor Networks* (pp. 6-18). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Murotua, E., Iyawa, G. E., Ujakpa, M., Osakwe, J. O., Oduor, C. O., & Suresh, N. (2020). Open innovation in government services: an empirical view of citizens' participation. In *2020 IST-Africa Conference (IST-Africa)* (pp. 1-10). IEEE.
- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of management review*, 23(2), 242-266.
- Nakatsu, R. T., Grossman, E. B., & Iacovou, C. L. (2014). A taxonomy of crowdsourcing based on task complexity. *Journal of Information Science*, 40(6), 823-834.

- Nam, T. (2012). Suggesting frameworks of citizen-sourcing via Government 2.0. *Government Information Quarterly*, 29(1), 12-20.
- Nambisan, S., & Baron, R. A. (2010). Different roles, different strokes: Organizing virtual customer environments to promote two types of customer contributions. *Organization Science*, 21(2), 554-572.
- Naparat, D., & Finnegan, P. (2013). Crowdsourcing software requirements and development: A mechanism-based exploration of 'opensourcing'.
- Naroditskiy, V., Jennings, N. R., Van Hentenryck, P., & Cebrian, M. (2013). Crowdsourcing dilemma. *arXiv preprint arXiv:1304.3548*.
- Natalicchio, A., Petruzzelli, A. M., & Garavelli, A. C. (2017). Innovation problems and search for solutions in crowdsourcing platforms—A simulation approach. *Technovation*, 64, 28-42.
- Nazam, M., Hashim, M., Baig, S. A., Abrar, M., & Shabbir, R. (2020). Modeling the key barriers of knowledge management adoption in sustainable supply chain. *Journal of Enterprise Information Management*, 33(5), 1077-1109.
- Neto, F. R. A., & Santos, C. A. (2018). Understanding crowdsourcing projects: A systematic review of tendencies, workflow, and quality management. *Information Processing & Management*, 54(4), 490-506.
- Nevo, D., & Kotlarsky, J. (2020). Crowdsourcing as a strategic IS sourcing phenomenon: Critical review and insights for future research. *The Journal of Strategic Information Systems*, 29(4), 101593.
- Nevo, S., & Wade, M. (2011). Firm-level benefits of IT-enabled resources: A conceptual extension and an empirical assessment. *The Journal of Strategic Information Systems*, 20(4), 403-418.
- Ng, D. C., & Law, K. (2015). Impacts of informal networks on innovation performance: evidence in Shanghai. *Chinese Management Studies*, 9(1), 56-72.
- Nguyen, C., Oh, O., Kocsis, D., & Vreede, G. J. (2013). Crowdsourcing as Lego: Unpacking the building blocks of crowdsourcing collaboration Processes.
- Nieto, M., & Quevedo, P. (2005). Absorptive capacity, technological opportunity, knowledge spillovers, and innovative effort. *Technovation*, 25(10), 1141-1157.
- Nishikawa, H., Schreier, M., Fuchs, C., & Ogawa, S. (2017). The value of marketing crowdsourced new products as such: Evidence from two randomized field experiments. *Journal of Marketing Research*, 54(4), 525-539.
- Niu, X., & Qin, S. (2017). A review of crowdsourcing technology for product design and development. In *2017 23rd International Conference on Automation and Computing (ICAC)* (pp. 1-6). IEEE.
- Nkhoma, M. Z., Dang, D. P., & De Souza-Daw, A. (2013). Contributing factors of cloud computing adoption: a technology-organisation-environment framework approach. In *Proceedings of the European Conference on Information Management & Evaluation* (Vol. 2, No. 1, pp. 180-188).
- Nov, O., Ye, C., & Kumar, N. (2012). A social capital perspective on meta-knowledge contribution and social computing. *Decision Support Systems*, 53(1), 118-126.

- Oliveira, T., & Martins, M. F. (2010). Understanding e-business adoption across industries in European countries. *Industrial management & data systems*, 110(9), 1337-1354.
- Oliveira, T., & Martins, M. O. (2009, July). Determinants of information technology adoption in Portugal. In *International conference on e-business* (Vol. 1, pp. 264-270). Scitepress.
- Onağ, A. O., Tepeci, M., & Başalp, A. A. (2014). Organizational learning capability and its impact on firm innovativeness. *Procedia-Social and Behavioral Sciences*, 150, 708-717.
- O'reilly, T. (2007). What is Web 2.0: Design patterns and business models for the next generation of software. *Communications & strategies*, (1), 17.
- Ortiz, B., Donate, M. J., & Guadamillas, F. (2018). Inter-organizational social capital as an antecedent of a firm's knowledge identification capability and external knowledge acquisition. *Journal of Knowledge Management*, 22(6), 1332-1357.
- Ozcan, S., Boye, D., Arsenyan, J., & Trott, P. (2020). A scientometric exploration of crowdsourcing: research clusters and applications. *IEEE Transactions on Engineering Management*, 69(6), 3023-3037.
- Paik, J. H., Scholl, M., Sergeev, R., Randazzo, S., & Lakhani, K. R. (2020). Innovation contests for high-tech procurement. *Research-Technology Management*, 63(2), 36-45.
- Palacios, D., Garrigos, F., & Devece, C. (2006). The effect of innovation on intellectual capital. *International Journal of Innovation Management*, 10(1), 89-112.
- Palacios, M., Martinez-Corral, A., Nisar, A., & Grijalvo, M. (2016). Crowdsourcing and organizational forms: Emerging trends and research implications. *Journal of Business Research*, 69(5), 1834-1839.
- Palacios-Marqués, D., Gallego-Nicholls, J. F., & Guijarro-García, M. (2021). A recipe for success: Crowdsourcing, online social networks, and their impact on organizational performance. *Technological Forecasting and Social Change*, 165, 120566.
- Paredes, M. R., Barrutia, J. M., & Echebarria, C. (2014). Resources for value co-creation in e-commerce: a review. *Electronic Commerce Research*, 14, 111-136.
- Paul, J., & Criado, A. R. (2020). The art of writing literature review: What do we know and what do we need to know?. *International business review*, 29(4), 101717.
- Pavlidou, I., Papagiannidis, S., & Tsui, E. (2020). Crowdsourcing: a systematic review of the literature using text mining. *Industrial Management & Data Systems*, 120(11), 2041-2065.
- Pavlou, P. A., Liang, H., & Xue, Y. (2007). Understanding and mitigating uncertainty in online exchange relationships: A principal-agent perspective. *MIS quarterly*, 105-136.
- Pedersen, J., Kocsis, D., Tripathi, A., Tarrell, A., Weerakoon, A., Tahmasbi, N., ... & De Vreede, G. J. (2013, January). Conceptual foundations of crowdsourcing: A review of IS research. In *2013 46th Hawaii International Conference on System Sciences* (pp. 579-588). IEEE.
- Pee, L. G., Koh, E., & Goh, M. (2018). Trait motivations of crowdsourcing and task choice: A distal-proximal perspective. *International Journal of Information Management*, 40, 28-41.

- Pera, R., Occhiocupo, N., & Clarke, J. (2016). Motives and resources for value co-creation in a multi-stakeholder ecosystem: A managerial perspective. *Journal of business research*, 69(10), 4033-4041.
- Piezunka, H., & Dahlander, L. (2015). Distant search, narrow attention: How crowding alters organizations' filtering of suggestions in crowdsourcing. *Academy of Management Journal*, 58(3), 856-880.
- Piller, F. T. (2010), "Open innovation with customers: crowdsourcing and co-creation at Threadless", Available at SSRN 1688018.
- Pinto, L. F. S., & dos Santos, C. D. (2018). Motivations of crowdsourcing contributors. *Innovation and Management Review*, 15(1), 58–72.
- Piyathananan, B., Mathies, C., Patterson, P. G., & de Ruyter, K. (2018). Continued value creation in crowdsourcing from creative process engagement. *Journal of Services Marketing*, 32(1), 19-33.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of applied psychology*, 88(5), 879.
- Poetz, M. K. and Schreier, M. (2012), "The value of crowdsourcing: can users really compete with professionals in generating new product ideas?", *Journal of product innovation management*, 29(2), 245-256.
- Pollok, P., Lüttgens, D., & Piller, F. T. (2019). How firms develop capabilities for crowdsourcing to increase open innovation performance: The interplay between organizational roles and knowledge processes. *Journal of Product Innovation Management*, 36(4), 412-441.
- Porter, C. E., & Donthu, N. (2008). Cultivating trust and harvesting value in virtual communities. *Management science*, 54(1), 113-128.
- Potter, A., McClure, M., & Sellers, K. (2010, May). Mass collaboration problem solving: A new approach to wicked problems. In *2010 International symposium on collaborative technologies and systems* (pp. 398-407). IEEE.
- Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of interactive marketing*, 18(3), 5-14.
- Premkumar, G., & Roberts, M. (1999). Adoption of new information technologies in rural small businesses. *Omega*, 27(4), 467-484.
- Prpić, J., Shukla, P. P., Kietzmann, J. H., & McCarthy, I. P. (2015). How to work a crowd: Developing crowd capital through crowdsourcing. *Business Horizons*, 58(1), 77-85.
- Prpić, J., Taeihagh, A., & Melton, J. (2015). The fundamentals of policy crowdsourcing. *Policy & Internet*, 7(3), 340-361.
- Punel, A., Ermagun, A., & Stathopoulos, A. (2019). Push and Pull Factors in Adopting a Crowdsourced Delivery System. *Transportation Research Record*, 2673(7), 529–540.
- Putnam, R. D. (1995). Tuning in, tuning out: The strange disappearance of social capital in America. *PS: Political science & politics*, 28(4), 664-683.

- Qin, S., Van der Velde, D., Chatzakis, E., McStea, T., & Smith, N. (2016). Exploring barriers and opportunities in adopting crowdsourcing based new product development in manufacturing SMEs. *Chinese Journal of Mechanical Engineering*, 29, 1052-1066.
- Qing-liang, M., & Xin-hui, X. (2018). A dynamic decision model of users' sustained participation in crowdsourcing innovation. *International Journal of Services Operations and Informatics*, 9(3), 223-241.
- Qingliang, M., Yi, H., Xiaojun, C., & Qiaoyi, C. (2021). Value co-creation mechanisms of multi-agent participation in crowdsourcing innovation: A grounded theory study. *Journal of Intelligent & Fuzzy Systems*, 41(4), 4995-5006.
- Rai, A., Pavlou, P. A., Im, G., & Du, S. (2012). Interfirm IT capability profiles and communications for cocreating relational value: evidence from the logistics industry. *MIS quarterly*, 233-262.
- Ramaswamy, V., & Ozcan, K. (2018). What is co-creation? An interactional creation framework and its implications for value creation. *Journal of business research*, 84, 196-205.
- Ranade, G., & Varshney, L. R. (2012, July). To crowdsource or not to crowdsource?. In *Workshops at the Twenty-Sixth AAAI Conference on Artificial Intelligence*.
- Randhawa, K., Wilden, R., & West, J. (2019). Crowdsourcing without profit: the role of the seeker in open social innovation. *R&d Management*, 49(3), 298-317.
- Ranjan, K. R., & Read, S. (2016). Value co-creation: concept and measurement. *Journal of the academy of marketing science*, 44, 290-315.
- Rass, M., Dumbach, M., Danzinger, F., Bullinger, A. C., & Moeslein, K. M. (2013). Open innovation and firm performance: the mediating role of social capital. *Creativity and innovation management*, 22(2), 177-194.
- Ren, M. (2019). Why technology adoption succeeds or fails: An exploration from the perspective of intra-organizational legitimacy. *The Journal of Chinese Sociology*, 6, 1-26.
- Rhaiem, K., & Amara, N. (2021). Learning from innovation failures: a systematic review of the literature and research agenda. *Review of Managerial Science*, 15, 189-234.
- Richter, N. F., Sinkovics, R. R., Ringle, C. M., & Schlägel, C. (2016). A critical look at the use of SEM in international business research. *International marketing review*, 33(3), 376-404.
- Ritchey, T. (2011). General morphological analysis. In *Wicked problems—Social messes* (pp. 7-18). Springer, Berlin, Heidelberg.
- Roberts, D., Hughes, M., & Kertbo, K. (2014). Exploring consumers' motivations to engage in innovation through co-creation activities. *European Journal of Marketing*, 48(1/2), 147-169.
- Roberts, N., Galluch, P. S., Dinger, M., & Grover, V. (2012). Absorptive capacity and information systems research: Review, synthesis, and directions for future research. *MIS quarterly*, 625-648.
- Rocheska, S., Angeleski, M., Nikoloski, D., & Mancheski, G. (2014). Harnessing innovation potential of crowdsourcing. In *8th International Conference "Challenges of the Knowledge Society. Bucharest*.

- Rogers, E. M. (1983). Diffusion of innovations. Free Press.
- Roldán, J. L., & Sánchez-Franco, M. J. (2012). Variance-based structural equation modeling: Guidelines for using partial least squares in information systems research. In *Research methodologies, innovations and philosophies in software systems engineering and information systems* (pp. 193-221). IGI global.
- Roman, D. (2009). Crowdsourcing and the question of expertise. *Communications of the ACM*, 52(12), 12-12.
- Rosen, P. A. (2011). Crowdsourcing lessons for organizations. *Journal of Decision Systems*, 20(3), 309-324.
- Rouse, A. C. (2010). A Preliminary taxonomy of crowdsourcing. ACIS 2010 Proceedings - 21st Australasian Conference on Information Systems.
- Royo, S., & Yetano, A. (2015). "Crowdsourcing" as a tool for e-participation: two experiences regarding CO 2 emissions at municipal level. *Electronic Commerce Research*, 15, 323-348.
- Ruiz, É., & Beretta, M. (2021). Managing internal and external crowdsourcing: An investigation of emerging challenges in the context of a less experienced firm. *Technovation*, 106, 102290.
- Ruiz, É., Brion, S., & Parmentier, G. (2020). Absorbing knowledge in the digital age: The key role of integration mechanisms in the context of crowdsourcing for innovation. *R&D Management*, 50(1), 63-74.
- Saarijärvi, H., Kannan, P. K., & Kuusela, H. (2013). Value co-creation: theoretical approaches and practical implications. *European business review*, 25(1), 6-19.
- Sadoughi, F., Ali, O., & Erfannia, L. (2020). Evaluating the factors that influence cloud technology adoption—comparative case analysis of health and non-health sectors: A systematic review. *Health informatics journal*, 26(2), 1363-1391.
- Saldanha, F. P., Cohendet, P., & Pozzebon, M. (2014). Challenging the stage-gate model in crowdsourcing: The case of Fiat Mio in Brazil. *Technology Innovation Management Review*, 4(9).
- Saldanha, T. J., Mithas, S., & Krishnan, M. S. (2017). Leveraging customer involvement for fueling innovation. *MIS quarterly*, 41(1), 267-286.
- Sancho-Zamora, R., Hernández-Perlines, F., Peña-García, I., & Gutiérrez-Broncano, S. (2022). The impact of absorptive capacity on innovation: The mediating role of organizational learning. *International journal of environmental research and public health*, 19(2), 842.
- Santoro, G., Bertoldi, B., Giachino, C. and Candelo, E. (2018), "Exploring the relationship between entrepreneurial resilience and success: the moderating role of stakeholders' engagement", *Journal of Business Research*, Vol. 119, pp. 142-150.
- Santoro, G., Bertoldi, B., Giachino, C., & Candelo, E. (2020). Exploring the relationship between entrepreneurial resilience and success: The moderating role of stakeholders' engagement. *Journal of Business Research*, 119, 142-150.
- Sari, A., Tosun, A., & Alptekin, G. I. (2019). A systematic literature review on crowdsourcing in software engineering. *Journal of Systems and Software*, 153, 200-219.

- Sauerwein, C., Gander, M., Felderer, M., & Breu, R. (2016, March). A systematic literature review of crowdsourcing-based research in information security. In *2016 IEEE Symposium on Service-Oriented System Engineering (SOSE)* (pp. 364-371). IEEE.
- Saxton, G. D., Oh, O., & Kishore, R. (2013). Rules of crowdsourcing: Models, issues, and systems of control. *Information Systems Management*, 30(1), 2-20.
- Schäfer, S., Antons, D., Lüttgens, D., Piller, F., & Salge, T. O. (2017). Talk to Your Crowd: Principles for Effective Communication in Crowdsourcing A few key principles for communicating with solvers can help contest sponsors maintain and grow their base of participants. *Research-Technology Management*, 60(4), 33-42.
- Schemmann, B., Herrmann, A. M., Chappin, M. M., & Heimeriks, G. J. (2016). Crowdsourcing ideas: Involving ordinary users in the ideation phase of new product development. *Research Policy*, 45(6), 1145-1154.
- Schenk, E. and Guittard, C. (2009). Crowdsourcing: What can be Outsourced to the Crowd, and Why. In Workshop on open source innovation, Strasbourg, France, Dec, vol. 72, p. 3.
- Schenk, E., & Guittard, C. (2011). Towards a characterization of crowdsourcing practices. *Journal of Innovation Economics Management*, 7(1), 93-107.
- Schenk, E., Guittard, C., & Pénin, J. (2019). Open or proprietary? Choosing the right crowdsourcing platform for innovation. *Technological Forecasting and Social Change*, 144, 303-310.
- Schiavi, G. S., & Behr, A. (2018). Emerging technologies and new business models: a review on disruptive business models. *Innovation & Management Review*, 15(4), 338-355.
- Schlagwein, D., & Bjorn-Andersen, N. (2014). "Organizational learning with crowdsourcing: The revelatory case of LEGO." *Journal of the Association for Information Systems*, 15(11), 3.
- Schmidt, T., & Rammer, C. (2006). The determinants and effects of technological and non technological innovations—Evidence from the German CIS IV. *Zentrum für Europäische Wirtschaftsforschung (ZEW), Mannheim*.
- Schulze, A., & Hoegl, M. (2008). Organizational knowledge creation and the generation of new product ideas: A behavioral approach. *Research policy*, 37(10), 1742-1750.
- Schulze, T., Seedorf, S., Geiger, D., Kaufmann, N. and Schader, M. (2011), “Exploring task properties in crowdsourcing—An empirical study on Mechanical Turk”.
- Scopus (2020), “Scopus content coverage guide”, [WWW Document]., available at: https://www.elsevier.com/_data/assets/pdf_file/0007/69451/Scopus_ContentCoverage_Guide_WEB.pdf (accessed on 15 January 2022)
- Scuotto, V., Del Giudice, M., Bresciani, S., & Meissner, D. (2017). Knowledge-driven preferences in informal inbound open innovation modes. An explorative view on small to medium enterprises. *Journal of Knowledge Management*, 21(3), 640-655.
- Scupola, A., & Nicolajsen, H. W. (2021). Enterprise Crowdsourcing and Organizational Culture: Lessons From an Engineering Consultancy. *International Journal of E-Services and Mobile Applications (IJESMA)*, 13(2), 1-20.

- Seltzer, E., & Mahmoudi, D. (2013). Citizen participation, open innovation, and crowdsourcing: Challenges and opportunities for planning. *Journal of Planning Literature*, 28(1), 3-18.
- Sethi, R., & Iqbal, Z. (2008). Stage-gate controls, learning failure, and adverse effect on novel new products. *Journal of Marketing*, 72(1), 118-134.
- Shah Alam, S., Ali, M. Y., & Mohd. Jani, M. F. (2011). An empirical study of factors affecting electronic commerce adoption among SMEs in Malaysia. *Journal of business economics and management*, 12(2), 375-399.
- Shahadat, M. H., Nekmahmud, M., Ebrahimi, P., & Fekete-Farkas, M. (2023). Digital Technology Adoption in SMEs: What Technological, Environmental and Organizational Factors Influence in Emerging Countries?. *Global Business Review*, 09721509221137199.
- Sharma, A. (2010). Crowdsourcing Critical Success Factor Model: Strategies to harness the collective intelligence of the crowd. *London School of Economics (LSE), London*, 1-22.
- Shergadwala, M., Forbes, H., Schaefer, D., & Panchal, J. H. (2020). Challenges and research directions in crowdsourcing for engineering design: An interview study with industry professionals. *IEEE Transactions on Engineering Management*, 69(4), 1592-1604.
- Shirky, C. (2008). *Here comes everybody: The power of organizing without organizations*. Penguin.
- Sieg, J. H., Wallin, M. W., & Von Krogh, G. (2010). Managerial challenges in open innovation: a study of innovation intermediation in the chemical industry. *R&D Management*, 40(3), 281-291.
- Simula, H., & Ahola, T. (2014). A network perspective on idea and innovation crowdsourcing in industrial firms. *Industrial Marketing Management*, 43(3), 400-408.
- Singh, A., & Kaushik, A. (2020). Platform for citizen engagement for good governance in India: a case study of MyGov. in. *Civic Engagement Frameworks and Strategic Leadership Practices for Organization Development* (pp. 48-66). IGI Global.
- Siren, A., & Knudsen, S. G. (2017). Older adults and emerging digital service delivery: A mixed methods study on information and communications technology use, skills, and attitudes. *Journal of aging & social policy*, 29(1), 35-50.
- Sivarajah, U., Irani, Z., & Weerakkody, V. (2015). Evaluating the use and impact of Web 2.0 technologies in local government. *Government information quarterly*, 32(4), 473-487.
- Skafi, M., Yunis, M. M., & Zekri, A. (2020). Factors influencing SMEs' adoption of cloud computing services in Lebanon: An empirical analysis using TOE and contextual theory. *IEEE Access*, 8, 79169-79181.
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of business research*, 104, 333-339.
- Soliman, K. S., & Janz, B. D. (2004). An exploratory study to identify the critical factors affecting the decision to establish Internet-based interorganizational information systems. *Information & Management*, 41(6), 697-706.

- Springer, N. (2018). *An Analysis of James Surowiecki's The Wisdom of Crowds: why the Many are Smarter Than the Few and how Collective Wisdom Shapes Business, Economics, Societies, and Nations*. Taylor & Francis.
- Srivastava, P., & Mostafavi, A. (2018). Challenges and opportunities of crowdsourcing and participatory planning in developing infrastructure systems of smart cities. *Infrastructures*, 3(4), 51.
- Srivastava, S., Sultan, A., & Chashti, N. (2017). Influence of innovation competence on firm level competitiveness: an exploratory study. *Asia Pacific Journal of Innovation and Entrepreneurship*, 11(1), 63-75.
- Stewart, O., Lubensky, D., & Huerta, J. M. (2010, July). Crowdsourcing participation inequality: a SCOUT model for the enterprise domain. In *Proceedings of the ACM SIGKDD Workshop on Human Computation* (pp. 30-33).
- Straub, D., Boudreau, M. C., & Gefen, D. (2004). Validation guidelines for IS positivist research. *Communications of the Association for Information systems*, 13(1), 24.
- Subramaniam, M., & Youndt, M. A. (2005). The influence of intellectual capital on the types of innovative capabilities. *Academy of Management journal*, 48(3), 450-463.
- Sun, Y., Fang, Y., & Lim, K. H. (2012). Understanding sustained participation in transactional virtual communities. *Decision Support Systems*, 53(1), 12-22.
- Surowiecki, J. (2004). The wisdom of crowds: Why the many are smarter than the few and how collective wisdom shapes business, economies, societies and nations. *Economies, Societies and Nations*, 296(5).
- Sutanonpaiboon, J., & Pearson, A. M. (2006). E-commerce adoption: perceptions of managers/owners of small-and medium-sized enterprises (SMEs) in Thailand. *Journal of Internet Commerce*, 5(3), 53-82.
- Tabachnick, B., & Fidell, L. (2001). *Using Multivariate Statistics* (4th Edition): Boston.
- Taeihagh, A. (2017). Crowdsourcing: a new tool for policy-making?. *Policy Sciences*, 50, 629-647.
- Täuscher, K. (2017). Leveraging collective intelligence: How to design and manage crowd-based business models. *Business Horizons*, 60(2), 237-245.
- Teece, D. J. (1993). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy*, 22(2), 112-113.
- Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M., & Lauro, C. (2005). PLS path modeling. *Computational statistics & data analysis*, 48(1), 159-205.
- Terwiesch, C., & Xu, Y. (2008). Innovation contests, open innovation, and multiagent problem solving. *Management science*, 54(9), 1529-1543.
- Thiesse, F., Staake, T., Schmitt, P., & Fleisch, E. (2011). The rise of the “next-generation bar code”: an international RFID adoption study. *Supply Chain Management: An International Journal*, 16(5), 328-345.
- Thuan, N. H., Antunes, P., & Johnstone, D. (2016). Factors influencing the decision to crowdsource: A systematic literature review. *Information Systems Frontiers*, 18, 47-68.

- Thuan, N. H., Antunes, P., & Johnstone, D. (2017). A process model for establishing business process crowdsourcing. *Australasian Journal of Information Systems*, 21.
- Tokarchuk, O., Cuel, R., & Zamarian, M. (2012). Analyzing crowd labor and designing incentives for humans in the loop. *IEEE Internet Computing*, 16(5), 45-51.
- Toledo, L. A., & Leon, F. H. A. D. (2019). Crowdsourcing as production model that uses collective intelligence, the collaborative culture and the formation of communities. *Innovation & Management Review*, 16(4), 344-356.
- Toufaily, E., Zalan, T., & Dhaou, S. B. (2021). A framework of blockchain technology adoption: An investigation of challenges and expected value. *Information & Management*, 58(3), 103444.
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British journal of management*, 14(3), 207-222.
- Trantopoulos, K., von Krogh, G., Wallin, M. W., & Woerter, M. (2017). External knowledge and information technology. *MIS quarterly*, 41(1), 287-300.
- Tripopsakul, S. (2018). Social media adoption as a business platform: an integrated TAM-TOE framework. *Polish Journal of Management Studies*, 18(2), 350-362.
- Tsai, W., & Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of management Journal*, 41(4), 464-476.
- Van Eck, N., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *scientometrics*, 84(2), 523-538.
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of marketing*, 68(1), 1-17.
- Vega-Vazquez, M., Revilla-Camacho, M. Á., & Cossío-Silva, F. J. (2013). The value co-creation process as a determinant of customer satisfaction. *Management Decision*, 51(10), 1945-1953.
- Vellera, C., Jouny-Rivier, E., & Hemonnet-Goujot, A. (2023). Crowdsourcing innovation challenges: How participants react when their ideas are rejected. *Creativity and Innovation Management*, 32(1), 158-173.
- Venturini, K., & Verbano, C. (2017). Open innovation in the public sector: Resources and performance of research-based spin-offs. *Business Process Management Journal*, 23(6), 1337-1358.
- Vianna, F. R. P. M., Graeml, A. R., & Peinado, J. (2020). The role of crowdsourcing in industry 4.0: A systematic literature review. *International Journal of Computer Integrated Manufacturing*, 33(4), 411-427.
- Vignieri, V. (2021). Crowdsourcing as a mode of open innovation: Exploring drivers of success of a multisided platform through system dynamics modelling. *Systems Research and Behavioral Science*, 38(1), 108-124.
- Von Hippel, E. (2005). Democratizing innovation: The evolving phenomenon of user innovation. *Journal für Betriebswirtschaft*, 55, 63-78.

- Von Hippel, E. (2009). Democratizing innovation: the evolving phenomenon of user innovation. *International Journal of Innovation Science*, 1(1), 29-40.
- Vragov, R., & Kumar, N. (2013). The impact of information and communication technologies on the costs of democracy. *Electronic Commerce Research and Applications*, 12(6), 440-448.
- Vukovic, M. (2009, July). Crowdsourcing for enterprises. In *2009 congress on services-I* (pp. 686-692). IEEE.
- Wade, M., & Hulland, J. (2004). The resource-based view and information systems research: Review, extension, and suggestions for future research. *MIS quarterly*, 107-142.
- Wagner, H. T., Beimborn, D., & Weitzel, T. (2014). How social capital among information technology and business units drives operational alignment and IT business value. *Journal of Management Information Systems*, 31(1), 241-272.
- Wang, C. H. (2014). A longitudinal study of innovation competence and quality management on firm performance. *Innovation*, 16(3), 392-403.
- Wasko, M. M., & Faraj, S. (2005). Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. *MIS quarterly*, 35-57.
- Wazny, K. (2017). "Crowdsourcing" ten years in: A review. *Journal of global health*, 7(2).
- Wexler, M. N. (2011). Reconfiguring the sociology of the crowd: exploring crowdsourcing. *International Journal of Sociology and Social Policy*, 31(1/2), 6-20.
- Whitla, P. (2009). Crowdsourcing and its application in marketing activities. *Contemporary Management Research*, 5(1).
- Wiertz, C., & de Ruyter, K. (2007). Beyond the call of duty: Why customers contribute to firm-hosted commercial online communities. *Organization studies*, 28(3), 347-376.
- Wilson, M., Robson, K., & Botha, E. (2017). Crowdsourcing in a time of empowered stakeholders: Lessons from crowdsourcing campaigns. *Business Horizons*, 60(2), 247-253.
- Winkelbach, A., & Walter, A. (2015). Complex technological knowledge and value creation in science-to-industry technology transfer projects: The moderating effect of absorptive capacity. *Industrial Marketing Management*, 47, 98-108.
- Wirtz, B. W., & Daiser, P. (2018). A meta-analysis of empirical e-government research and its future research implications. *International Review of Administrative Sciences*, 84(1), 144-163.
- Wooten, J. O., & Ulrich, K. T. (2017). Idea generation and the role of feedback: Evidence from field experiments with innovation tournaments. *Production and Operations Management*, 26(1), 80-99.
- Wu, Y. U. N., Cegielski, C. G., Hazen, B. T., & Hall, D. J. (2013). Cloud computing in support of supply chain information system infrastructure: understanding when to go to the cloud. *Journal of supply chain management*, 49(3), 25-41.
- Xie, X., Zou, H., & Qi, G. (2018). Knowledge absorptive capacity and innovation performance in high-tech companies: A multi-mediating analysis. *Journal of business research*, 88, 289-297.

- Xu, Y., Ribeiro-Soriano, D. E., & Gonzalez-Garcia, J. (2015). Crowdsourcing, innovation and firm performance. *Management Decision*, 53(6), 1158-1169.
- Xun, D., & Xuehan, G. (2014). The effect of absorptive capacity on innovation performance: Empirical research on the mediating effects of knowledge transfer efficiency. *BioTechnology: An Indian Journal*, 10(7), 1735-1740.
- Yan, J., Leidner, D. E., Benbya, H., & Zou, W. (2019). Social capital and knowledge contribution in online user communities: One-way or two-way relationship?. *Decision Support Systems*, 127, 113131.
- Yang, M., & Han, C. (2021). Stimulating innovation: Managing peer interaction for idea generation on digital innovation platforms. *Journal of Business Research*, 125, 456-465.
- Yang, X., & Li, G. (2016). Factors influencing the popularity of customer-generated content in a company-hosted online co-creation community: A social capital perspective. *Computers in Human Behavior*, 64, 760-768.
- Yang, Y., Dong, C., Yao, X., Lee, P. K., & Cheng, T. C. E. (2021). Improving the effectiveness of social media-based crowdsourcing innovations: roles of assurance mechanism and innovator's behaviour. *Industrial Management & Data Systems*, 121(2), 478-497.
- Ye, H. J., & Kankanhalli, A. (2015). "Investigating the antecedents of organizational task crowdsourcing". *Information & Management*, 52(1), 98-110.
- Ye, H. J., & Kankanhalli, A. (2017). Solvers' participation in crowdsourcing platforms: Examining the impacts of trust, and benefit and cost factors. *The Journal of Strategic Information Systems*, 26(2), 101-117.
- Ye, H., & Kankanhalli, A. (2013). Leveraging crowdsourcing for organizational value co-creation. *Communications of the Association for Information Systems*, 33(1), 13.
- Yli-Renko, H., Autio, E., & Sapienza, H. J. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic management journal*, 22(6-7), 587-613.
- Zahay, D., Hajli, N., & Sihi, D. (2018). Managerial perspectives on crowdsourcing in the new product development process. *Industrial Marketing Management*, 71, 41-53.
- Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of management review*, 27(2), 185-203.
- Zhang, X., Chen, M., & Ji, G. (2019). Factors influencing the crowd participation in knowledge-intensive crowdsourcing. *ACM International Conference Proceeding Series*, 186-194.
- Zhao, X., Lynch Jr, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of consumer research*, 37(2), 197-206.
- Zhao, Y., & Zhu, Q. (2014). Evaluation on crowdsourcing research: Current status and future direction. *Information systems frontiers*, 16, 417-434.
- Zhen, Y., Khan, A., Nazir, S., Huiqi, Z., Alharbi, A., & Khan, S. (2021). Crowdsourcing usage, task assignment methods, and crowdsourcing platforms: a systematic literature review. *Journal of Software: Evolution and Process*, 33(8), e2368.

- Zheng, H., Li, D., & Hou, W. (2011). Task design, motivation, and participation in crowdsourcing contests. *International Journal of Electronic Commerce*, 15(4), 57-88.
- Zhou, K., Yang, C., Li, L., Miao, C., Song, L., Jiang, P., & Su, J. (2023). A folksonomy-based collaborative filtering method for crowdsourcing knowledge-sharing communities. *Kybernetes*, 52(1), 328-343.
- Zhu, H., Sick, N., & Leker, J. (2016). How to use crowdsourcing for innovation?: A comparative case study of internal and external idea sourcing in the chemical industry. In *2016 Portland International Conference on Management of Engineering and Technology (PICMET)* (pp. 887-901). IEEE.
- Zhu, K., Dong, S., Xu, S. X., & Kraemer, K. L. (2006). Innovation diffusion in global contexts: determinants of post-adoption digital transformation of European companies. *European journal of information systems*, 15, 601-616.
- Zhu, Y., Li, Y., Wang, W., & Chen, J. (2010). What leads to post-implementation success of ERP? An empirical study of the Chinese retail industry. *International Journal of Information Management*, 30(3), 265-276.
- Zogaj, S., Leicht, N., Blohm, I., Bretschneider, U., & Leimeister, J. M. (2015). Towards successful crowdsourcing projects: evaluating the implementation of governance mechanisms. *Available at SSRN 3140601*.
- Zou, L., Zhang, J., & Liu, W. (2015). Perceived justice and creativity in crowdsourcing communities: Empirical evidence from China. *Social Science Information*, 54(3), 253-279.
- Župič, I. (2013). Social media as enabler of crowdsourcing. In *Social media in human resources management* (pp. 243-255). Emerald Group Publishing Limited.
- Zwass, V. (2010). Co-creation: Toward a taxonomy and an integrated research perspective. *International journal of electronic commerce*, 15(1), 11-48

APPENDICES

Appendix A: Survey Questionnaire of Study 2

This questionnaire is addressed to the senior executives in Research and development departments.

PART I: Participant Demographics

1. Industry: Please indicate the industry your organization belongs to.
 - ☐ FMCG
 - ☐ Automobile
 - ☐ Information Technology
 - ☐ Education
 - ☐ Manufacturing
 - ☐ E-commerce

2. Respondent's Job Position: What is your current job position in the organization?
 - ☐ Information system managers
 - ☐ Other IS department managers
 - ☐ Business operations manager
 - ☐ Administration
 - ☐ Other (Please specify)_____

3. Organizational Size: How would you categorize the size of your organization?
 - ☐ Small
 - ☐ Medium
 - ☐ Large

PART II. Perceived Opportunity

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Crowdsourcing offers numerous benefits	1	2	3	4	5
Crowdsourcing is effective in accomplishing tasks	1	2	3	4	5
Crowdsourcing enhances the overall competitive edge	1	2	3	4	5

PART III. Perceived Cost Reduction

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Crowdsourcing cuts task-solving expenses	1	2	3	4	5
Crowdsourcing allows our company to economize on task execution	1	2	3	4	5
Crowdsourcing offers a more cost-effective approach than alternatives such as internal task handling or engaging external solvers	1	2	3	4	5

PART IV. Relative Advantage

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using crowdsourcing helps manage organization operations more efficiently.	1	2	3	4	5
Crowdsourcing makes operations better in quality.	1	2	3	4	5
Crowdsourcing allows you to do specific tasks more quickly.	1	2	3	4	5
Using crowdsourcing results in novel ideas and opportunities.	1	2	3	4	5
Crowdsourcing helps boost organization's productivity.	1	2	3	4	5

PART V. Complexity

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Engaging in crowdsourcing demands significant mental effort.	1	2	3	4	5
The process of crowdsourcing can be frustrating.	1	2	3	4	5
The utilization of crowdsourcing is deemed too intricate for organization operations.	1	2	3	4	5
The skills necessary for adopting crowdsourcing are considered too complex for the organization employees.	1	2	3	4	5
Engaging in crowdsourcing demands significant mental effort.	1	2	3	4	5

PART VI. Compatibility

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The utilization of crowdsourcing aligns with the current IT infrastructure within my organization.	1	2	3	4	5
The integration of crowdsourcing aligns with the processes and operations of my organization.	1	2	3	4	5
The adoption of crowdsourcing aligns with our preferred work practices.	1	2	3	4	5
The application of crowdsourcing aligns with the preferences of our clients	1	2	3	4	5

PART VII. Technology Readiness

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The organization has sufficient resources and budget allocated for adopting new technology	1	2	3	4	5
The organization knows how crowdsourcing can be used to support operations.	1	2	3	4	5
Organizations have enough internal expertise available to implement crowdsourcing.	1	2	3	4	5
Organizations have availability of appropriate level of IT infrastructure	1	2	3	4	5

PART VIII. Top Management Support

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The Top Management of organization is supportive of implementing crowdsourcing.	1	2	3	4	5
The top management of organizations demonstrates robust leadership and actively participates in the process.	1	2	3	4	5
The top management of organizations is open to undertaking the financial and organizational risks associated with adopting crowdsourcing.	1	2	3	4	5

PART IX. Organizational Culture

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Organizations have positive attitude towards adopting new technologies	1	2	3	4	5
Organizations encourage innovative thinking	1	2	3	4	5
Organizations embrace external experimentation and take risks	1	2	3	4	5
Organizations promote collaboration and knowledge sharing	1	2	3	4	5

PART X. Organizational Size

1. The total workforce size within organizations.
 - Less than 20
 - 20-50
 - 51-100
 - 101-200
 - 201-500
 - 501-1000
 - More than 1000
2. The yearly financial volume or revenue generated by the organization.
 - Less than 1million
 - 1-3 million
 - 3-5 million
 - 5-10 million
 - More than 10 million

PART XI. Technological turbulence

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The technology landscape within the industry is evolving at a rapid pace.	1	2	3	4	5
Significant opportunities arise in the industry due to technological shifts.	1	2	3	4	5
Many new product ideas are now possible due to technological breakthroughs.	1	2	3	4	5
The technology landscape within the industry is evolving at a rapid pace.	1	2	3	4	5

PART XII. Competitive pressure

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Not adopting crowdsourcing may lead to customer loss to competitors.	1	2	3	4	5
Crowdsourcing is crucial for strategic marketplace competitiveness.	1	2	3	4	5
Crowdsourcing enhances our competitive advantage.	1	2	3	4	5

PART XIII. Crowdsourcing adoption

- What is the current status of your organization's involvement in crowdsourcing adoption?
 - not considering at present,
 - currently in the evaluation phase (e.g., conducting pilot studies),
 - evaluated but not planning to adopt,
 - evaluated and planning to adopt, or
 - already adopted crowdsourcing services, infrastructure, or platforms.

2. If your organization anticipates future adoption of crowdsourcing, how do you envision this happening?

- a timeline of more than 5 years,
- between 2 and 5 years,
- between 1 and 2 years,
- less than 1 year,
- to already having adopted crowdsourcing services, infrastructure, or platforms

Appendix B: Survey Questionnaire of Study 4

This questionnaire is addressed to the middle and senior level managers in Information Technology industry

PART I: Participant Demographics

1. Gender: Please select your gender.
 - ☐ Female
 - ☐ Male
2. Age: Please indicate your age group.
 - ☐ Under 20
 - ☐ 20-30
 - ☐ 30-40
 - ☐ Over 40
3. Position: What is your current position in the organization?
 - ☐ Middle-level manager
 - ☐ Senior-level manager
4. IT Firm: Which IT firm do you belong to? Please select from the following list or specify if not listed.
 - ☐ Wipro
 - ☐ IBM
 - ☐ Philips
 - ☐ Deloitte
 - ☐ TCS
 - ☐ Infosys
 - ☐ Cognizant
 - ☐ HCL technologies
 - ☐ Genpact

- Tata Group
- Capgemini
- Microsoft
- Dell
- Google
- Apple
- Other (Please specify) _____

PART II. Crowdsourcing-based Structural linkage

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The organization's crowdsourcing platform enables crowds to express their innovative knowledge simultaneously	1	2	3	4	5
The organization regularly uses a crowdsourcing platform to share innovation-related communications	1	2	3	4	5
A community of crowds can discuss innovation-related concerns on the organization's crowdsourcing platform	1	2	3	4	5
The organization and its external crowds can communicate through crowdsourcing platforms to ensure an effective and efficient innovation process	1	2	3	4	5

PART III. Crowdsourcing-based Cognitive linkage

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
When communicating on a crowdsourcing platform, the organization and its external crowd members utilize the same terminology	1	2	3	4	5
The organization and its crowds connect on a crowdsourcing platform using a comprehensible communication pattern	1	2	3	4	5
The organization and its external crowds can use a crowdsourcing platform to discuss innovation-related issues	1	2	3	4	5
The organization and its crowds can post innovation-specific messages on crowdsourcing platforms using easily accessible narrative styles	1	2	3	4	5

PART IV. Crowdsourcing-based Relational linkage

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
During the innovation process in crowdsourcing platforms, crowds and the organization have a high mutual trust and respect	1	2	3	4	5
External crowds and organizations routinely consult one other for improved innovation performance in crowdsourcing platforms	1	2	3	4	5
During the innovation process in crowdsourcing platforms, crowds and the organization work closely together.	1	2	3	4	5

PART V. Knowledge Transfer Effectiveness

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Crowds offer organizations critical and practical innovation-related knowledge	1	2	3	4	5
Crowds have provided organizations with an abundance of innovation-related information	1	2	3	4	5
External crowds are seen as a valuable source of innovation-specific information by the organization	1	2	3	4	5
External crowds frequently provide the organization with relevant innovation-specific information	1	2	3	4	5
Overall, crowd-firm interactions have improved the firm's innovation-related knowledge	1	2	3	4	5

PART VI. Absorptive Capacity

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The organization has established excellent procedures for identifying and acquiring new innovation-specific data and expertise	1	2	3	4	5
The organization has suitable procedures in place to examine the innovation-specific data and knowledge gathered	1	2	3	4	5
The organization has suitable procedures in place to integrate new innovation-specific knowledge and information	1	2	3	4	5
In innovation, the organization may successfully integrate current knowledge with new information and expertise gained from crowds	1	2	3	4	5
The organization can effectively incorporate internal and external data and knowledge into the innovation process	1	2	3	4	5
The organization is good at putting innovation-related knowledge to use	1	2	3	4	5

PART VII. Innovation Performance

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The organizations' merchandise quality can be improved through innovation	1	2	3	4	5
Through innovation, the organization can speed up the commercialization of new products	1	2	3	4	5
The organization improved innovation performance have the potential to generate a significant profit	1	2	3	4	5

Appendix C: Survey Questionnaire of Study 5

This questionnaire is addressed to the senior executives in Research and Development and innovation positions

PART I: Participant Demographics

1. Industry: Please indicate the industry you are associated with.
 - Information Technology
 - Manufacturing
 - Education
 - FMCG
 - E-commerce
 - Automobile
2. Job Position: Select your job position within the organization.
 - R&D practitioners
 - Senior-level executives
 - Purchase, sales, marketing
 - Logistics and operations

PART II. Crowdsourcing-based social mechanism

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The crowdsourcing platform of the organization enables the concurrent manifestation of innovative knowledge by a collective group	1	2	3	4	5
The organization frequently employs a crowdsourcing platform to facilitate the dissemination of communications pertaining to innovation	1	2	3	4	5
Within the organization's crowdsourcing platform, individuals have the opportunity to engage in discussions pertaining to innovation-related concerns amongst a collective audience	1	2	3	4	5
The establishment of effective and efficient channels of innovation communication between organizations and external crowds is facilitated by the utilization of crowdsourcing platforms	1	2	3	4	5
In the context of communication on a crowdsourcing platform, it is essential for both the organization and external crowd members to employ a standardized terminology	1	2	3	4	5
The organization and the crowd establish a connection on a crowdsourcing platform characterized by clear and comprehensible communication patterns	1	2	3	4	5
Crowdsourcing platforms facilitate the engagement of both organizational entities and external participants in discussions pertaining to innovation-related matters	1	2	3	4	5
The organization and crowds on crowdsourcing platforms can readily disseminate innovation-specific messages through the utilization of accessible narrative styles	1	2	3	4	5
The innovation process on crowdsourcing platforms is characterized by the presence of a strong sense of mutual trust and respect between the crowds and the organization	1	2	3	4	5

External crowds and organizations frequently engage in mutual consultation to improve their innovation performance on crowdsourcing platforms	1	2	3	4	5
The collaboration between crowds and organizations is integral to the innovation process on crowdsourcing platforms	1	2	3	4	5

PART III. Knowledge Transmission

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Organizations acquire highly valuable and relevant knowledge pertaining to innovation through the utilization of crowdsourcing	1	2	3	4	5
Organizations have benefitted from the abundant contribution of innovation-related information by crowds	1	2	3	4	5
The organization acknowledges that external crowds possess valuable insights that are specific to innovation	1	2	3	4	5
The organization consistently obtains pertinent and applicable innovation-specific information from external crowds	1	2	3	4	5
The collaboration between crowds and the organization has greatly bolstered the organization's knowledge pertaining to innovation	1	2	3	4	5

PART IV. Absorption capability

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The organization adopted efficient protocols for the identification and acquisition of new data and expertise that are specific to innovation	1	2	3	4	5
The organization has implemented suitable protocols to evaluate the collected data and knowledge pertaining to innovation	1	2	3	4	5
The organization has successfully implemented appropriate strategies for the integration of novel knowledge and information pertaining to innovation	1	2	3	4	5
Within the domain of innovation, the organization effectively integrates pre-existing knowledge with novel insights and expertise obtained from crowds	1	2	3	4	5
The organization effectively incorporates both internal and external data and knowledge into its innovation process	1	2	3	4	5
The organization exhibits a high level of competence in effectively utilizing knowledge pertaining to innovation	1	2	3	4	5

PART V. Crowdsourcing-based social mechanism

For each of the following statements express your views on a scale of 1 - 5, where 1- Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
By utilizing crowdsourcing, the organization is able to establish knowledge management programs that facilitate the creation of valuable knowledge and technology, as well as the assimilation of insights from external entities	1	2	3	4	5
By utilizing crowdsourcing, the organization adeptly cultivates a culture and implements organizational systems	1	2	3	4	5

that effectively facilitate the acquisition, cultivation, and preservation of talent					
Through the implementation of crowdsourcing, the organization effectively fosters innovation in order to enhance its competitiveness by expanding its range of products and technologies. This approach surpasses the mere act of reacting to market demand or competitive forces	1	2	3	4	5
The utilization of crowdsourcing capabilities by an organization effectively employs information technologies to augment the flow of information, encourage the sharing of knowledge, and facilitate communication among its members	1	2	3	4	5
By utilizing the method of crowdsourcing, the organization has established a highly effective framework to consistently gather pertinent and current data on competitors via competitive intelligence systems	1	2	3	4	5
By utilizing the method of crowdsourcing, the organization adeptly establishes programs that prioritize the internal cultivation of technological competencies, as defined by the framework	1	2	3	4	5
The utilization of crowdsourcing by the organization is accompanied by a clearly defined process for the documentation of organizational knowledge, procedures, and processes	1	2	3	4	5
By utilizing crowdsourcing, the organization actively promotes and facilitates the involvement of its members in proposing initiatives and suggestions, while also embracing the exploration of innovative ideas to improve processes and products	1	2	3	4	5
The utilization of crowdsourcing by the organization exemplifies a managerial approach that emphasizes creativity, placing greater importance on innovative approaches to problem-solving rather than relying solely on established precedents	1	2	3	4	5
Through the utilization of crowdsourcing, the organization is empowered to obtain and enhance valuable knowledge that is in accordance with its specific requirements	1	2	3	4	5

The organization demonstrates a willingness to adopt crowdsourcing as a means of sourcing ideas, thereby fostering an environment conducive to innovation and creativity	1	2	3	4	5
By employing crowdsourcing, the organization demonstrates a level of adaptability in formulating protocols and systems that regulate conduct and interpersonal dynamics	1	2	3	4	5
The utilization of crowdsourcing by an organization exemplifies a certain level of adaptability in the establishment of organizational structures and forms	1	2	3	4	5

Effective Governance Through Crowdsourcing: A Strategic Framework for Empowered Participation

Divya Mishra  and Nidhi Maheshwari 

Abstract—Crowdsourcing in governance has gained widespread popularity and has become a powerful tool to leverage the collective intelligence of citizens for the nation's social welfare. Despite the growing importance of transforming government–citizen relationships, the design aspect is highly unstructured and fragmented. Thus, an in-depth understanding of the notion is essential, given its expanding importance in practice. This article aims to identify and describe elements and design principles phase-wise to improve the government's potential to derive value from crowdsourcing initiatives for civic participation and collaborative governance. Synthesizing all elements and principles in a strategic crowdsourcing framework is a novel conceptual configuration that contributes to the overall understanding of designing crowdsourcing initiatives in the government sector. The article adopts a systematic literature review and a morphological analysis technique to identify and synthesize all the elements and principles of designing crowdsourcing initiatives. Three crowdsourcing initiatives of the government sector were investigated to evaluate the framework in a practical setting and comprehend its efficacy. Government agencies can ensure enhanced interactivity and bidirectionality by emphasizing the nuances of elements and design principles for executing crowdsourcing initiatives that create epistemic and economic value.

Index Terms—Crowdsourcing designing, design principles, strategic crowdsourcing framework, systematic literature review.

I. INTRODUCTION

WEB 2.0 emergence has led to a revolution in information and hyper-connectivity, resulting in transparency, empowered participation of citizens in policy decisions, and changing the relationship between citizens and government [1]. Second-generation Web tools like social media and networking sites [2], [3] provide a participatory and social virtual platform to collaborate and network with stakeholders [4]. Therefore, public agencies have started incorporating novel technologies to encourage citizen participation in collaborative governance. Challenge.gov platform of the USA [5] and MyGov India's portal [6] included disenfranchised citizens in solving complex problems of society and policy designing, which has opened a vista of the digital transition of government from thin democracies to strong democracies [7]. The involvement of citizens in

government policy-making and improvement leads to a participatory governance scenario in a country, reducing the chances of policy failure [8] and achieving the three pillars of open government: transparency, participation, and collaboration [9].

The “crowd” (i.e., citizens) is the heart of any governance system. Therefore, every government machinery needs active and empowered citizens to execute the policies successfully. There was a surge of interest to leverage the crowd's collective intelligence to enrich public participation in governance and get work done with an amateur crowd. This phenomenon of using the collective intelligence of citizens to produce something together [10], [11], [12], [13] is known as crowdsourcing. Crowdsourcing practices used by the government to tap the collective intelligence of citizens are also known as citizensourcing [17], [71]. Crowdsourcing or citizensourcing mainly refers to a participative online activity where the government engages in a top-down management process to obtain bottom-up creative input from citizens in a virtual community. The government uses citizensourcing to get citizens' diverse ideas, opinions, and suggestions, thereby establishing a continuous contact loop. It was seen as an enabler of increased and improved governance via enriched engagement (e-participation) [14], involvement of democratic communities (inclusive e-governance and e-inclusion) [15], increased accountability, transparency in delivery, and standard of government services and through democracy (e-democracy) [16]. This phenomenon of citizen sourcing has changed the perspective of the government on the public from “users and choosers” to “makers and shapers” of government policies and decisions [17]. The widespread adoption of new phenomena resulted in the addition of democratic principles from by the people, for the people, and of the people to with the people, and from the people [18].

Although crowdsourcing can change the reality of governance in many developing countries, the outcomes are not very satisfactory [19], [20]. The literature shows that crowdsourcing in the public sector is still in its infancy since e-government success stories are limited [21], [22], [23], [24], [25], [26], [27], [28], [29], [30]. The failure rate of e-government initiatives, specifically in developing nations, is alarming, as Furuholt and Wahid [31] reported that more than 60% of projects have not achieved the desired outcome. Of these failures, 35% were categorized as total failures, and 50% were classified as partial failures due to nonattainment of goals or detrimental outcomes. These failures lead to unbearable losses in the form of valuable resources, loss of status, financial crisis, and many political impediments [18]. This implies that crowdsourcing can be a double-edged sword as it has enormous potential to improve citizen–government relationships, reduce administrative costs [32], [33], and improve the efficiency and effectiveness of government services [34], [35]. In contrast, it may also lead to adverse effects if unmanaged well.

Manuscript received 22 December 2021; revised 7 March 2022, 8 May 2022, 20 July 2022, and 1 September 2022; accepted 20 October 2022. Date of publication 16 January 2023; date of current version 16 February 2024. Review of this manuscript was arranged by Department Editor E. Viardot. (Corresponding author: Divya Mishra.)

The authors are with the University School of Management and Entrepreneurship, Delhi Technological University, New Delhi 110042, India (e-mail: divyamishra919@gmail.com; nidhimaheshwari@dtu.ac.in).

Color versions of one or more figures in this article are available at <https://doi.org/10.1109/TEM.2022.3218188>.

Digital Object Identifier 10.1109/TEM.2022.3218188

0018-9391 © 2023 IEEE. Personal use is permitted, but republication/redistribution requires IEEE permission. See <https://www.ieee.org/publications/permissions/index.html> for more information.

Authorized licensed use limited to: DELHI TECHNICAL UNIV. Downloaded on November 23, 2024 at 08:27:01 UTC from IEEE Xplore. Restrictions apply.

Crowdsourcing a wellspring of value co-creation: an integration of social capital and organisational learning mechanisms

Crowdsourcing
and value
creation

Divya Mishra and Nidhi Maheshwari
*University School of Management and Entrepreneurship (USME),
Delhi Technological University, Delhi, India*

Received 19 April 2022
Revised 2 July 2022
25 October 2022
Accepted 27 October 2022

Abstract

Purpose – With the advent of Internet technologies, shorter product life cycles and increasing competition, organisations have started looking for innovation sources outside the organisational boundaries. The external community of crowds can be used as a valuable source of co-creation in a company's innovation process to generate value. Despite its growing popularity, organisations often face difficulty capturing value from crowdsourcing due to the lack of proper mechanisms behind crowdsourcing-based value co-creation between a crowd and an organisation and their impact on organisational learning and innovation performance. The present study seeks to understand the crowdsourcing-based co-creation mechanism that influences knowledge transfer effectiveness and the organisation's absorptive capacity, resulting in improved innovation performance.

Design/methodology/approach – The model was empirically tested using online survey data received from 300 managers of IT firms. Partial least squares structural equation modelling was used to test the model.

Findings – The empirical results reveal that crowdsourcing-based value co-creation causes structural, cognitive and relational linkages between a crowd and a firm, among which crowdsourcing-based cognitive linkage contributes more to organisational value capture. Further, an organisation's effective knowledge transfer and absorptive capacity play an important role in influencing the crowdsourcing-based co-creation organisational learning-innovation performance framework.

Originality/value – This is the first and foremost study that has developed an integrated model using social capital dimensions to understand the entire mechanism behind crowdsourcing-based value co-creation between a crowd and an organisation and their impact on organisational learning and innovation performance. The study provides organisations with theoretical and practical implications of using crowdsourcing as a value co-creation tool and its effects on enhancing organisational learning and value capture.

Keywords Crowdsourcing, Value co-creation, Social capital, Organisational learning, Organisational value capture, Innovation performance

Paper type Research paper

1. Introduction

Emerging disruptive technologies are becoming a key for companies to survive, stay competitive and cope with the flexibility and high dynamics of the innovation process. Taking the first-mover advantage in advanced technologies requires adopting responsive and agile innovation strategies. Henceforth, advances in information technologies have resulted in "crowdsourcing," which involves crowds' collective intelligence to innovate and reach a broader spectrum of people (Heeks, 2010; Bullinger *et al.*, 2010), which adds richness and depth to the innovation process. Crowdsourcing has gained management's attention as a co-creation tool for companies to engage the virtual community of the crowd to solve a problem and innovation needs of the organisation (Afuah and Tucci, 2012; Boudreau and Lakhani, 2013).

High-tech firms have started leveraging crowds collective intelligence to share knowledge, optimise cost and involve in continuous innovation and co-creation that is rare, valuable, non-substitutable and inimitable (Barney, 1991; Teece, 1993). Organisations engage with the



Kybernetes
© Emerald Publishing Limited
0368-492X
DOI 10.1108/K-04-2022-0580

Crowdsourcing-based social linkage and organizational innovation competence: knowledge transfer effectiveness and absorptive capacity as serial mediators

Divya Mishra and Nidhi Maheshwari

Abstract

Purpose – The purpose of this research is to examine the impact of crowdsourcing-based social connections on the development of innovation competence (IC). The conflicting results in existing studies regarding the influence of crowdsourcing-based social linkage on IC necessitate a thorough investigation into this relationship.

Design/methodology/approach – The research uses a sample of 300 senior managers from various industries in India. The data is analyzed using partial least squares (PLS), a component-based approach to structural equation modeling.

Findings – The results of the analysis indicate that knowledge transfer effectiveness and absorptive capacity (ABC) play a significant role as mediators in the relationship between social linkages based on crowdsourcing and IC. This suggests that the effectiveness of knowledge transfer and the organization's ability to absorb and apply new knowledge are crucial factors in leveraging crowdsourcing-based social connections for enhanced innovation capabilities.

Practical implications – The findings of this study hold crucial implications for managerial practices. The research highlights that successful crowdsourcing outcomes necessitate more than mere establishment of external social linkages. Managers must recognize that internal organizational readiness plays an equally critical role. This study offers two key managerial insights: first, exclusive focus on external linkages is inadequate; internal capabilities such as ABC and optimized knowledge transfer processes must be actively nurtured. Second, the concept of "crowdsourcing maturity" is introduced, emphasizing the evolving dynamic capabilities over time. Managers are urged to adopt a balanced approach, aligning external partnerships with internal adaptability, to fully optimize IC.

Originality/value – This research contributes to the existing body of knowledge by shedding light on the mediating variables that influence the conversion of crowdsourcing-based social linkage into improved IC. By considering the role of knowledge transfer effectiveness and ABC, the study provides insights into the mechanisms through which social linkages based on crowdsourcing can impact innovation capabilities. These findings offer valuable implications for organizations seeking to leverage crowdsourcing for innovation purposes and enhance their overall IC.

Keywords Crowdsourcing-based social linkage, Organizational innovation competence, Knowledge transfer effectiveness, Absorptive capacity, Mediating variables

Paper type Research paper

Divya Mishra and Nidhi Maheshwari are both based at the University School of Management and Entrepreneurship (USME), Delhi Technological University, Delhi, India.

1. Introduction

In today's highly competitive business environment, organizations can gain a competitive edge by developing product or service innovations that are directly relevant to their target market. Following the crowdsourcing model, an organization can enhance its innovation competence (IC) by intentionally expanding its horizons and incorporating external knowledge into its innovation processes (Afuah and Tucci, 2012). Using crowdsourcing

Received 10 July 2023
Revised 26 August 2023
14 October 2023
Accepted 7 December 2023

The past, present, and future of crowdsourcing and innovation: A bibliometric analysis and future research agenda

Information Development
1–22
© The Author(s) 2024
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/02666669241238430
journals.sagepub.com/home/idv



Divya Mishra 

Delhi Technological University

Nidhi Maheshwari

Delhi Technological University

Abstract

This research article addresses the current status and emerging trends in the literature at the intersection of crowdsourcing and innovation. While separate reviews exist for crowdsourcing and innovation individually, a comprehensive literature review specific to their intersection is lacking. Therefore, this study conducts a bibliometric meta-analysis of the extensive body of literature in the field of innovation and crowdsourcing, aiming to fill this research gap. The analysis encompasses all articles in Elsevier's Scopus database that incorporate relevant terms in their titles, abstracts, or keywords, resulting in a sample of 180 articles. VosViewer and Bibliometrix package in R are employed for the analysis. The analysis reveals three key research clusters, including the role of crowdsourcing in fostering organizational innovation, crowdsourcing-based social capital formation and its impact on organizational value creation, and the role of crowdsourcing platforms in facilitating engagement between the crowd and the organization. Adopting a holistic perspective, this research contributes new insights into the interconnections between crowdsourcing and innovation research fields. Additionally, the analysis provides clarity on research content, evolutionary context, and reveals emerging research trends in this domain.

Keywords

Bibliometric review, crowdsourcing, innovation, co-occurrence analysis, co-citation analysis, thematic analysis

Submitted: 8 August, 2023; Accepted: 23 February, 2024.

Introduction

In the contemporary business landscape, innovation has transitioned from being merely advantageous to becoming a vital component for organizational survival (Boons and Stam, 2019; Brem et al., 2023; O'Leary, 2020). This shift has prompted organizations to explore novel approaches to engage external stakeholders in their research and development endeavors, leading to the emergence of crowdsourcing as a means of expanding the innovation funnel. Crowdsourcing, which involves tapping into the collective intelligence and diverse expertise of individuals to achieve shared objectives, has garnered widespread attention

as a promising avenue for promoting innovation (Cricelli et al., 2022; Rass et al., 2013; Schlagwein and Andersen, 2014).

Despite the growing interest in crowdsourcing, managing innovation within organizations remains a complex task (Andriopoulos and Dawson, 2021; Scuotto et al., 2017). While digital technologies and

Corresponding author:

Divya Mishra, University School of Management and Entrepreneurship, Delhi Technological University, East Delhi Campus, Vivek Vihar Phase 2, Block E, Delhi 110095, India.
Email: divyamishra919@gmail.com

Elucidating the determinants of crowdsourcing adoption for organisation value creation

Divya Mishra and Nidhi Maheshwari
*University School of Management and Entrepreneurship (USME),
Delhi Technological University, Delhi, India*

Elucidating the
determinants of
crowdsourcing

Received 5 January 2024
Revised 3 March 2024
14 April 2024
Accepted 17 April 2024

Abstract

Purpose – This research paper aims to provide a comprehensive overview of the determinants influencing organisations' decisions to adopt crowdsourcing. By synthesising existing literature, it seeks to identify critical factors that act as enablers or inhibitors in the adoption process and propose a framework for understanding crowdsourcing adoption within organisational contexts.

Design/methodology/approach – This study employed a systematic literature review methodology to examine the determinants influencing organisations' decisions to adopt crowdsourcing. The review encompassed research articles from the Web of Science and Scopus databases, spanning 2006 to 2021. Additionally, morphological analysis was conducted to categorise the identified determinants into three distinct contexts: technological, organisational and environmental. This methodological approach facilitated a comprehensive exploration of the factors shaping crowdsourcing adoption within organisational settings, allowing for a nuanced understanding of the phenomenon across different dimensions.

Findings – The study identifies 12 determinants influencing crowdsourcing adoption, categorised into technological, organisational and environmental dimensions. These determinants include technological compatibility, organisational readiness, top management support, crowd readiness and availability of third-party platforms. While some determinants primarily act as enablers, others exhibit dual roles or serve as inhibitors depending on contextual factors.

Research limitations/implications – The findings offer valuable insights for scholars, practitioners, and organisational leaders seeking to leverage crowdsourcing as a strategic tool for innovation and competitiveness. The assessment scale of drivers and barriers developed in this research offers a systematic approach for evaluating the factors influencing crowdsourcing adoption, providing a nuanced understanding of innovation adoption dynamics. Theoretical implications include advancements in morphological analysis methodology and a nuanced understanding of innovation adoption dynamics. Managerial implications highlight strategies for enhancing organisational readiness, leveraging leadership support and mitigating adoption risks. Overall, the study provides a foundation for future empirical research and practical guidance for organisations planning to adopt crowdsourcing initiatives.

Originality/value – This research contributes significantly to crowdsourcing by presenting an integrated and theoretically grounded framework. By consolidating adoption determinants from diverse contexts, this study clarifies the understanding of crowdsourcing adoption. The framework offers practical value to managers and decision-makers, equipping them with a structured approach to assess and navigate the challenges associated with effectively adopting crowdsourcing. As such, this study contributes to advancing crowdsourcing practices and supports more informed managerial decision-making in innovation and knowledge sourcing.

Keywords Crowdsourcing adoption, Systematic literature review, Morphological analysis, Determinants, TOE framework, Enablers, Inhibitors

Paper type Research paper

Data availability statement: Our manuscript has no associated data.

Declaration of competing interest: The authors state that they do not have any known competing financial interests or personal relationships that could have influenced the work reported in this paper.



International Journal of
Organizational Analysis
© Emerald Publishing Limited
1934-8835
DOI: 10.1108/IJOA-01-2024-4175

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

Divya Mishra
Ph.D. Research Scholar
University School of Management and
Entrepreneurship,
Delhi Technological University, Delhi

Dr. Nidhi Maheshwari
Associate Professor
University School of Management and
Entrepreneurship,
Delhi Technological University, Delhi

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

Eliva Press

Certificate of publication for the book titled:

**Crowdsourcing a Source of Value Co-Creation
Mechanism and Its Impact on Organizations**

Authored by:

Divya Mishra

ISBN 9789994985265

ELIVA
Press

PLAGIARISM REPORT

Similarity Report

PAPER NAME

Plag report-Thesis_Divya Mishra_2K20-P
HDUSME-05.docx

WORD COUNT

77575 Words

CHARACTER COUNT

491491 Characters

PAGE COUNT

251 Pages

FILE SIZE

3.9MB

SUBMISSION DATE

May 2, 2024 10:42 PM GMT+5:30

REPORT DATE

May 2, 2024 10:45 PM GMT+5:30

● 3% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

- 1% Internet database
- 1% Publications database
- Crossref database
- Crossref Posted Content database
- 2% Submitted Works database

● Excluded from Similarity Report

- Bibliographic material
- Quoted material
- Cited material
- Small Matches (Less than 14 words)
- Manually excluded sources