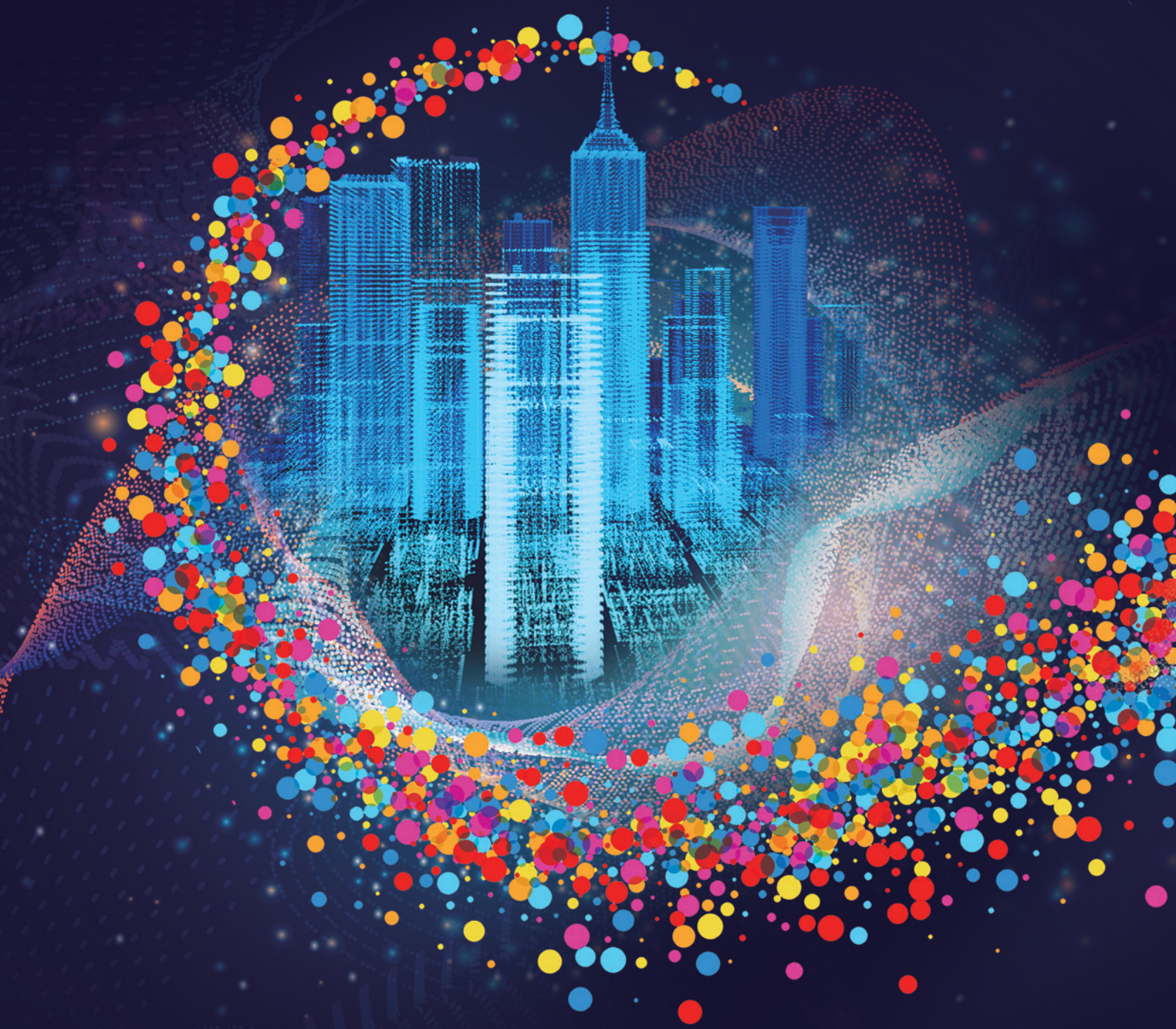
Harnessing

Crowdsourcing for Public Sector Innovation

Lessons from Six APO Members



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HARNESSING CROWDSOURCING FOR PUBLIC SECTOR INNOVATION

LESSONS FROM SIX APO MEMBERS

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HARNESSING CROWDSOURCING FOR PUBLIC SECTOR INNOVATION:
LESSONS FROM SIX APO MEMBERS

Prof. Helen K. Liu served as the chief expert of this research project and volume editor.

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FOREWORD

In an increasingly digital and interconnected world, leveraging crowdsourcing for innovation and enhancing citizen engagement has emerged as a transformative approach for the public sector. This research report, *Harnessing Crowdsourcing for Public Sector Innovation: Lessons from Six APO Members*, offers a timely, in-depth exploration of crowdsourcing applications and best practices in the Republic of China, India, Malaysia, Pakistan, Thailand, and Turkiye.

This comprehensive publication is the outcome of structured research guided by Professor Helen K. Liu of the Department of Political Science and the Graduate Institute of Public Affairs at National Taiwan University, the Republic of China, supported by dedicated national experts from the participating APO member economies. Through detailed member-specific analyses, the report identifies effective crowdsourcing models and practices, highlights structural and operational challenges, and presents practical recommendations for enhancing the implementation and impact of public sector crowdsourcing. Each member analysis provides valuable insights into successful approaches, including strategies to promote innovation, improve public service delivery, and increase transparency and citizen trust.

Critically, this research evaluates how crowdsourcing initiatives can significantly transform governance processes, enhance citizen-government collaboration, and foster more inclusive and responsive public administration. The findings serve as a practical guide for policymakers, public administrators, and civic leaders aiming to adopt or expand crowdsourcing practices, ensuring robust public participation and innovative governance solutions.

The APO remains committed to advancing productivity, innovation, and sustainable development across the Asia-Pacific region. We extend our heartfelt gratitude to Professor Liu and all contributors, whose rigorous research and actionable insights have made this vital publication possible.

Dr. Indra Pradana Singawinata
Secretary-General
Asian Productivity Organization
Tokyo

CHAPTER 1: OVERVIEW

CROWDSOURCING IN THE PUBLIC SECTOR ACROSS SIX MEMBERS: CONTEXTS, METHODOLOGIES, AND LESSONS LEARNED

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Research Background

Governments across Asia are increasingly adopting crowdsourcing to enhance productivity, improve service quality, and meet citizen expectations. A country-level assessment of how governments in APO member economies use crowdsourcing will support the development of innovative and effective governance strategies while improving citizen participation in the long run.

Crowdsourcing is a participatory approach conducted online, where individuals collectively contribute to problem-solving, service delivery, innovation, and information generation. Many governments have recognized its applicability and potential in policymaking, policy deliberation, open innovation, and citizen engagement. For instance, crowdsourcing has proven valuable in in urban planning, enabling direct interaction between government agencies and citizens to gather preferences and knowledge (Brabham, 2009; Certomà et al., 2015; Seltzer & Mahmoudi, 2013). Evidence suggests that governments can produce policy innovations, deliver improved public services at reduced costs, and enhance citizen engagement through crowdsourcing.

Technological Advancement as a Driver

With rapid technological advancements, government needs are increasingly seeking a variety of external stakeholders and adopting diverse technologies to modernize public services and stimulate industries. Therefore, crowdsourcing, open innovation, and citizen sciences are becoming essential tools for navigating the fast-evolving technological landscape. For instance, NASA has launched competitions to tap into space-related technologies and identify academic institutions with relevant talent and resources at minimal costs (Liu, 2021).

Over the past decade, various innovations have been introduced to facilitate the collection of public opinions and streamline requests for assistance. These include initiatives, such as wiki planning (Liu, 2016), participatory budgeting (Johnson et al., 2023), 311 municipal reporting systems (Zhao et al., 2023), and Responsible Territorial Policymaking (Bidstrup et al., 2024). Technological advancements also enable governments, citizens, and private entities to co-create content efficiently. For instance, the United States of America (USA) federal government encourages its agencies to utilize a collaborative code developing platform like GitHub (Mergel 2015). Additionally, technologies, such as AI, hybrid

intelligence, blockchain, open platforms, the internet of things (IoT), wearable devices, and big data are transforming the Open Data Ecosystem (Zuiderwijk et al., 2014; Styrin et al, 2017; Liu, 2025), as demonstrated in European cities (Van Loenen et al., 2021).

Despite the advantages of crowdsourcing and the opportunities presented by the latest technological development, the challenge lies in effectively engaging the public to gather high-quality information and services during the co-production process to achieve organizational values. Government crowdsourcing should consider input legitimacy, throughput legitimacy, and output legitimacy (Nederhand & Edelenbos, 2022). For instance, Lodge and Wegrich (2015) found that despite a notable increase in participation, the initiative failed to inspire meaningful deliberation among participants.

In this research, APO members will assess and analyze their governments' crowdsourcing initiatives to identify key strategies for strengthening these efforts while ensuring public trust and maintaining accountability.

Research Issues and Objectives

Crowdsourcing has been adopted as an important policy tool in the public sector, as effective initiatives can reduce administration costs, improve service efficiency, and strengthen the relationship between government and citizens (Brabham, 2015). For instance, since 2015, the Obama administration requested all federal agencies to designate at least one officer to coordinate crowdsourcing and citizen science projects. Scholarly studies and practical reports have highlighted numerous crowdsourcing successes, such as "Next Stop Design" (Brabham, 2015), "Peer to Patent" (Noveck, 2009), "Challenges.gov" (Mergel, 2015), and other recent federal initiatives (Bowser & Shanley, 2013).

Theoretically, calling on the public to address societal challenges via technology is not a new concept in public administration. Foundational literature on public engagement and co-production provides a theoretical framework for understanding crowdsourcing in the public sector (Brabham, 2015; Nam, 2012; Mergel, 2015, and Desouza & Bhagwatwar, 2014; Prpić et al., 2015). Crowdsourcing represents an ongoing effort to make governments more transparent and inclusive through internet communication technologies (ICT).

However, debates persist on whether technology genuinely enhances the public's capacity and self-sufficiency to solve societal challenges. For instance, research on ICT (Linders, 2012) and direct engagement (Nabatchi & Amsler, 2014) continues to question the inclusion, capacity, and value of citizen engagement in addressing public issues. Scholars of citizen and public engagement have therefore called for better-designed engagement processes (e.g., Bryson et al., 2013; Fung, 2015; Liu, 2016). This study will contribute to these discussions by examining the adoption of crowdsourcing in the public sector through case studies.

The objective of this research is to identify successful crowdsourcing initiatives that foster innovation and citizen engagement that can serve as benchmarking standards and guidelines for other countries.

The main objectives of the project are to:

i) **Assess** applications of crowdsourcing methods in spurring innovation and increasing citizen engagement in the delivery of public services.

ii) **Identify** crowdsourcing approaches and successful factors that drive innovation and enhance productivity performance of the public sector.

iii) **Analyze** lessons learned from crowdsourcing applications in APO members to improve existing policies and programs.

Research Methodology

Governments can adopt crowdsourcing in various ways, depending on the stage of citizen involvement and the nature of the tasks undertaken. This report presents six case studies to illustrate the diverse types of crowdsourcing that enable the co-production of public policies.

TABLE 1.1

STRUCTURED MODEL FOR COMPARATIVE CASE ANALYSIS IN CROWDSOURCING IN THE PUBLIC SECTOR

Components	Descriptions
Situation	• Provide an overview of the context in which the crowdsourcing initiative was implemented, including relevant background details about the organization, community, or government entity involved • Situation analysis is the process of evaluating the internal and external environment of the organization(s) to assess capabilities, personnel, operations, and work environment • Conducting a situation analysis helps the organization(s) identify its strengths and weaknesses, enabling a better understanding of how to compete effectively in the marketplace • A situation analysis comprises several components: the organization (including vision, strategy, and goals), product/services, policy goals, opportunities, service analysis, stakeholder analysis, partnerships, and the prevailing legal environment
Issues/Problems	• Issues/Problems outline the challenges the public organization(s) aims to address through crowdsourcing • Issues/Problems refer to current or anticipated challenges faced by the organization(s) • Objectives and goals of the crowdsourcing initiative: - Clearly outline the primary objectives and goals of the crowdsourcing project - Explain the expected outcomes and how they align with the organization's mission or strategic goals
Solution	• Solution is the series of methods or high-level plans chosen to design crowdsourcing for innovation and citizen engagement, and it can be regarded as a process by which the organization(s) achieves the desired crowdsourcing model • Solutions can be proposed from various perspectives, including strategy, organization, process, people, activities, culture, and technology • Design: Describe the design and approach of the crowdsourcing initiative, specifying the type of crowdsourcing used: - Complementary crowdsourcing in service implementation - Complementary crowdsourcing in policy design - Supplementary crowdsourcing in service implementation - Supplementary crowdsourcing in policy design • Describe the process of engaging participants, including recruitment strategies and participation incentives • Implementation: Provide details on the implementation process, including timelines, key activities, and the tools or platforms utilized • Highlight/Discuss any challenges faced during implementation and the measures taken to address them
Results	• Results refer to the performance outcomes that are achieved through the adoption of crowdsourcing by the organization(s) • Outcomes and impact: Present the results of the crowdsourcing initiative and assess whether it has achieved its policy goals. Use qualitative and quantitative data to support the findings • Discuss the impact of the project on the organization, participants, the broader community, policy decision-making, services, and innovation • Evaluation: Assess the success of the initiative in achieving its objectives, highlighting the metrics or indicators used to measure success • Discuss any unintended outcomes or lessons learned during the process
Key Success Factors	• Key Success Factors (KSFs) are elements deemed essential for an organization to identify and resolve the issues or challenges related to crowdsourcing • Analyze the key factors that contributed to the success or failure of the crowdsourcing initiative • Discuss significant challenges encountered and the strategies used to overcome them • Best practices and recommendations: Share best practices and offer recommendations for other organizations considering similar crowdsourcing initiatives • Suggest potential improvements or future directions for the project • Summarize the key points of the case study and restate the significance of the findings • Highlight the broader implications of the case study for public administration and crowdsourcing in the public sector

This research employs a case analysis approach to examine crowdsourcing initiatives in each member economy. The respective national experts select representative cases and analyze them using a common, standardized framework to ensure consistency across all studies.

One comprehensive and systematic way to analyze specific cases in a comparative study is to use a structured format. Following established models, such as Yin's case study methodology (2009) and Choi's (2024), a model for the case analysis is proposed. The model comprises five components to enable a standardized framework for consistent representation and analysis of the various crowdsourcing cases in the public sector. Table 1.1 presents the overall structure of the model.

In particular, each national expert provides analyses of public-sector organizations successfully transitioning to crowdsourcing, focusing on: (i) models and best practices; (ii) implementation factors; (iii) impacts on citizen participation; (iv) challenges and lessons learned; (v) future trends, such as emerging technologies or regulatory developments.

These cases also explore how crowdsourcing is planned and executed in public agencies, highlighting components and achievements of best practices. The analysis identifies key factors and strategies for successful implementation and the influence of crowdsourcing outcomes on public policy and decision-making. Additionally, challenges encountered, lessons learned, and future trends, such as integrating new technologies and regulations, are also examined.

The research methodology adheres to Yin's (2004) case study approach, where evidence and information for each case were collected through documents, interviews, and web content analysis. Desk research and data collection techniques were employed to analyze findings and develop a report for publication.

Each national expert are to compile and analyze relevant data and information (e.g., literature, reports, policy documents) and prepare a preliminary report based on the standardized research framework before the coordination meeting.

Report Structure

Chapter 1 provides a general introduction to the study, outlining the research background, issues, objectives, and methodology. It also introduces a standardized case analysis structure for analyzing crowdsourcing initiatives in the public sector.

In Chapter 2 through Chapter 7, each presents a case study highlighting successful crowdsourcing initiatives in Asia. These chapters are organized in alphabetical order by member economies: Republic of China, India, Malaysia, Pakistan, Thailand, and Turkiye. Each chapter is a self-contained case study developed around the common theme of crowdsourcing. This format allows readers to engage with the report as a whole or focus on specific chapters of interest. Efforts have been made to ensure consistency in presentation and analysis across all chapters while also granting national experts some degree of autonomy in applying the analysis framework and interpreting their findings.

Chapter 8 concludes the report with a summary of its key findings, overarching lessons learned, research limitations, and suggestions for further study.

TABLE 1.2

A SUMMARY ON CROWDSOURCING INITIATIVES IN THE PUBLIC SECTOR

Crowdsourcing Initiative	APO Member	Research Level	Responsible Agency	Duration	Description
Taipei City Dashboard Open-Source Hackathon	Republic of China	Municipal	Department of Information Technology of Taipei City	2023–present	Highlights how the success of the Taipei City Dashboard Open-Source Hackathon contributes to improving government decision-making, optimizes public-service design, and promotes crowdsourcing initiatives.
MyGov.in	India	State	Ministry of Electronics and Information Technology (MeitY)	2014–present	Examines crowdsourcing in the public sector through the usage and challenges of MyGov.in, India's flagship citizen engagement platform, offering suggestions to improve platform impact and policy development.
Transformasi Nasional (TN50)	Malaysia	State	National Front	2017–20	Investigates crowdsourcing efforts in Malaysia, focusing on how TN50 has facilitated a bottom-up approach to top policymaking by gathering ideas and concerns from the nation, especially the youth, to encourage nation-building.
Pakistan Citizen Portal (PCP)	Pakistan	State	National Information Technology Board, Government of Pakistan	2018–22	Explores how the Citizen Portal (PCP), an innovative crowdsourcing initiative in Pakistan's public sector, enhances public-service delivery, transparency, and citizen involvement.
Traffy Fondue	Thailand	Municipal	Bangkok Metropolitan Administration	2013–present	Highlights how public crowdsourcing through online petitions improves public services, citizen engagement, and city management via Traffy Fondue, an online platform developed by Bangkok Metropolitan Administration.
Teknofest	Turkiye	State	Ministry of Industry and Technology	2018–present	Investigates how Teknofest, an innovation competition held in Turkiye, crowdsources solutions to public sector challenges while promoting science and technology festivals on a grand scale.

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CHAPTER 2: REPUBLIC OF CHINA

OPEN INNOVATION IN ACTION: TAIPEI'S OPEN-SOURCE HACKATHON AND ITS IMPACT ON PUBLIC DECISION-MAKING

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Abstract

This research focuses on how the Taipei City Dashboard Open-Source Hackathon reflects the development of open-source innovation implemented in the Republic of China (ROC). Open source refers to the strategy of making technology, its development process, and dissemination available for public examination, adjustment and sharing. To address policy-making issues and encourage citizen participation, Taipei City's Department of Information Technology has been organizing hackathons to attract citizens' skills and technologies since 2023. By integrating the competition results of the hackathon and interview with its organizer, the study highlights its significant contributions to improving government decision-making processes, optimizing public-service design, and popularizing crowdsourcing initiatives. The key success factors of this project include clearly aligned values, attractive high rewards, a conducive environment, and well-planned sustainability measures. The findings from this case study can guide other cities with interests to establish a leading position domestically and internationally in applying open-source innovation to public decision-making.

Introduction

The concept of open source, which allows projects to be viewed, used, modified, and shared for any purpose, originated in the private sector. Its members initiated the open innovation model to engage external networks of outsiders and facilitate knowledge exchange and innovation with external actors. Owing to its increasing significance, governments worldwide are increasingly adopting the concept of open source (Cheah & Ho, 2021). The open-source model has become important in the public sector because it helps different systems work together, saves money, and prevents governments from relying on single vendors. Additionally, open source helps eliminate redundant efforts and encourages innovation from the public (Scholl, 2005; DeNardis, 2010; Lundell et al., 2021). Lewis (2007) tracked down governmental policies and identified 364 government policy initiatives related to open source, demonstrating its widespread adoption in public sectors.

With the vision of establishing a limited government and encouraging robust communication channels with citizens, the commissioner of the Department of Information Technology launched a project that allows both efficient governmental responses and innovative input from the public. The Taipei City

Dashboard Open-Source Hackathon, organized by the department, thus became a recent example of an open-source initiative at the municipal level. It attracts talent, cultivates vitality in the city's information system, and is deemed a pioneer of crowdsourcing among the ROC's municipal governments. The case of Taipei City allows global decision-makers to better understand how an open-source hackathon can effectively facilitate crowdsourcing in the public sector and harness creative ideas from external contributors. Other cities and countries can learn from this experience and investigate the key successful factors of this initiative to achieve similar results.

A primary focus of this case analysis is to understand how the Taipei City government successfully motivates the public to participate by identifying the drivers of hackathon involvement and designing the right incentives to increase participation rates and the quality of contributions. Comparisons between the Taipei City Dashboard Open-Source Hackathon and other similar events regarding features, resources, and the composition of the organizing team will be discussed in the following segments.

Focus and Scope of Case Study

This research focuses on the implementation of open-source innovation at the municipal level and seeks results that can be applied to both domestic city governments and other international open-source initiatives. Existing research has made great progress in understanding open-source innovation, particularly in Western societies. However, recent studies have shifted their attention to Asia, driven by its vast population and talent pool, and uncovered distinct differences in the motivations behind contributions.

Studying the Taipei City Dashboard Open-Source Hackathon offers valuable insights into designing open-source projects and observing their contribution in advancing crowdsourcing in Asia. Moreover, the unique characteristics of the hackathon merit further examination. Unlike most hackathons that are organized by private units, the Taipei City Dashboard Open-Source Hackathon is among the few conducted by a city government department. Furthermore, the Commissioner of the Taipei City Department of Information Technology, Shih-Lung Chao, is not a typical bureaucrat but a professional with expertise in hackathon-related fields. The analysis will explore the factors that differentiate the Taipei City Dashboard Open-Source Hackathon from other hackathon events in the ROC and provide recommendations for successfully initiating hackathons within the public sector.

Literature Review

Open Government Data Policies and Development in the ROC

Open Government Data (OGD) initiatives aim to improve the utilization of government data and sources for research by making it more accessible to the public (Dixon, 2010; Mergel & Desouza, 2013; Noveck, 2009). These OGD initiatives allow citizens to participate, stimulate innovation in the private sector, and make governments more accountable (Mergel & Desouza, 2013; Noveck, 2009). The development of OGD initiatives in the ROC is similar to that of Western countries, such as the United States of America and United Kingdom, originally involving individuals known as "Civic Hackers" who edited, utilized, and shared government data online to improve its practicability. An early example is the open data project called "Hopendata.org", launched in 2010 to provide access to the ROC's map information (Hsiao, 2012).

Although the ROC initiated the Freedom of Government Information Law in 2005 and the Operational Principle of Government Open Data for Executive Yuan's Agencies in 2013 to legalize the publication of Public Sector Information (PSI), the overlapping of these two regulations caused confusion and redundancy (Huang et al., 2016). To address these issues, the Executive Yuan, the country's highest executive body, launched the Open Government Data Platform (data.gov.tw) to raise government

transparency, enhance public service, and create opportunities for the nation's Information Technology Sector (Research, Development and Evaluation Commission, 2013).

Taipei was one of the first municipal governments in the ROC to initiate such policies. In 2011, the Taipei City Government created the website "Data.Taipei", allowing all city departments to upload their data for public use. However, in the early stages of service, the data on the website were unformatted, forming a barricade for developers (Huang et al., 2016). "Data. Taipei" served as one of Taipei City's open government services, allowing citizens and programmers to have access to data of all departments. To encourage the use of open data on this website, the Taipei City Government collaborated with various information technology-related competitions (Data.Taipei, n.d.). Among them were the 2012 application design competition "APP Star: Battle for Hegemony", which offered monetary incentives to participants and required the use of Taipei open data in their projects (Chang, 2012).

Since 2023, the Taipei City Department of Information Technology has independently organized a new form of hackathon named Taipei City Dashboard Open-Source Hackathon. The event offers monetary prizes of up to NTD750,000 (approximately USD23,000) for the winner, further promoting innovation and engagement (Taipei Codefest, n.d.).

Crowdsourcing Policies and Development in the ROC

The open source movement in the ROC has been active for years, supported by numerous communities dedicated to promoting open government and open data. For instance, the Open Culture Foundation (OCF) has assisted groups, such as Python Taiwan User Group, Taiwan Wikimedia Community, gov.tw (a collaborative community of self-organized contributors, including software developers, designers, and netizens, who work to improve the ROC's civil society through technology), and many others. By supporting these communities with executive processes, OCF has empowered civil society and help introduce open-source principles to ordinary citizens (Cheng et al., 2020).

Examples of OGD in the ROC

In recent years, the ROC government has launched several initiatives to promote OGD applications. The Ministry of Economic Affairs (MOEA) has encouraged nongovernmental sectors to apply OGD by organizing open data competitions, such as supporting the Chiayi County and Hsinchu City governments in hosting hackathons (Lee, 2018). As governments worldwide become increasingly invested in the concept of "Smart City", numerous efforts have been made to improve cities' efficiency, service, and competitiveness. Lee (2017) identified various hackathons held in the ROC that are themed or related to the "Smart City" concept, including the Smart City Hackathon, Make NTU Hackathon, and Tainan Intelligence Hackathon: Smart City & Smart Medical Care. Table 2.1 lists Open Government Data Hackathons in the ROC for the past 10 years that are either organized or sponsored by the public sector.

TABLE 2.1

OPEN GOVERNMENT DATA HACKATHONS ORGANIZED OR SPONSORED BY THE PUBLIC SECTOR IN THE ROC FOR THE PAST 10 YEARS

Event	Organizer/Sponsor	Year	Results
Taiwan Presidential Hackathon	Executive Yuan, ROC (Central government)	2018 2019 2020 2021 2022	• Each year, the top five "Outstanding Teams" of the Presidential Hackathon are selected and the awards are presented by the President • Several proposals from these outstanding teams are recognized by the government, allowing them to apply for funding to further their projects or be directly incorporated into government policy plans
Smart City Hackathon	MOEA, ROC (Central government)	2016	• This hackathon is aimed at exploring future applications for smart cities • A total of 100 creative projects were produced, and 26 winning projects were carefully selected by 24 judges

Event	Organizer/Sponsor	Year	Results
Make NTU Makerathon	Department of Information Technology (Central government), Taipei City Government (Municipal government)	2016 2017 2018 2019 2020 2021 2022 2023 2024	• Make NTU upholds the spirit of "We need it, we make it," encouraging participants to identify problems in their daily lives and combine their knowledge and skills with existing software and hardware technologies • Emphasizing the maker spirit, ideas are brought to life and contribute to society through their abilities
Tainan Intelligence Hackathon	Tainan City Government (Municipal government)	2014 2017 2022 2024	• The Tainan Smart City Hackathon is centered on the theme of people-first and smart city applications • Focuses on three major areas - smart epidemic prevention, smart tourism, and smart transportation • Start-ups, students, industries, and private organizations form teams and participate in proposing solutions using AI-driven applications
2017 Taichung City Smart City Week & Creative Design Competition	Taichung City Government (Municipal government)	2017	• The "2017 Taichung Smart City Week and Creative Design Competition" aims to select outstanding smart city planning ideas and technologies through an open proposal competition • The scope includes smart transportation, smart machinery, and smart agriculture • Winning teams will be awarded cash prizes and their innovative proposals will be implemented
2017 Taoyuan Open Data Competition/2022 Power Taoyuan Hackathon	Taoyuan City Government (Municipal government)	2017 2022	• The "2017 Taoyuan Open Data Competition" aims to promote and make active use of the open data provided by the Taoyuan City Government. Through the competition, it seeks to showcase value-added applications of open data, share industry experiences, and facilitate policy exchanges • The event encourages the creation of innovative and valuable applications, enhancing the usability of open data. Feedback from participants will help make open data more user-friendly, mobile-accessible, and optimized for search
Taipei City Dashboard Open-Source Hackathon	Department of Information Technology, Taipei City (Municipal government)	2023 2024	• Opens the "Taipei City Dashboard" - originally an internal data tool used by city staff - to the public for collaborative use and brainstorming. In the past, city officials used the Taipei City Dashboard to assist in decision-making • Prizes up to NTD300,000

Source: Lee (2018).

Open-source Initiative Abroad and in Taipei

Global Experience

Lewis (2007) identified 364 government open-source policy initiatives, indicating the increasing significance and adoption of open source in the public sector. This trend is largely driven by the widespread use of open-source software in the private sector. Governments increasingly turn to open source for its ability to enhance system interoperability, reduce costs, and avoid vendor lock-in while also minimizing redundancy and fostering innovation (Scholl, 2005; DeNardis, 2010; Lundell et al., 2021).

Scholl (2005), using the Washington State's Judicial Information System as an example, emphasized the importance of system interoperability standards, including scalability, processes of establishment, open-source systems adaptation, and vendor independence. Lundell et al. (2021) highlighted the crucial role of interoperability in the successful implementation of e-government initiatives, as it accelerates short-term deployment and supports the sustainable management of digital resources. Open source also simplifies government IT by introducing smooth integration of new solutions that reduces the time and effort required to review and manage multiple applications (Lundell et al., 2021).

The public sector also benefits from open source by avoiding redundant coding efforts across agencies with similar functions. DeNardis (2010) argues that governments should leverage their procurement processes to advance open standards and open source. This perspective supports national innovation policy, ensures interoperable government information systems, and addresses political imperatives related to citizen access. By adopting open standards, governments are uniquely positioned to spark market competition and drive innovation.

Co-creation and Deliberation: From the Cathedral to the Bazaar

In the case of organizing the Taipei Open Source Hackathon, the Department of Information Technology explores the potential for expanding crowdsourcing services from a programming perspective, aiming to promote the transformation of open source projects from adhering to an official main version to promoting derivative versions. The difference between the two code-development models, as defined by Raymond (2001), can be used to explain the impact of this shift:

i) **The Cathedral model** - In this model, the city government's version serves as the primary framework, with all other projects developed based on its backbone. The city government monitors these innovations and incorporates them back into the main version to optimize it (Raymond, 2001). The advantage of this approach is that the project can continue to advance and is less likely to be abruptly discontinued. However, the downside is that progress may be slow, and the project's sustainability relies heavily on the maintenance organization.

ii) **The Bazaar model** - In contrast, the Bazaar Model involves releasing the project to the community as soon as it is developed, without designating a main version (Raymond, 2001). The goal of this approach is for each new result produced through open source to exist independently.

Case Analysis through the Model

Situation

The Department of Information Technology launched the Taipei City Dashboard Open-Source Hackathon to drive innovation within the city's municipal information network. The initiative targets four key areas of open innovation. First, the agency promotes open data by providing access to datasets and application programming interfaces (APIs). Second, it embraces open-source technology by making the original source code and development kits available on GitHub. Third, participants of the hackathon are encouraged to contribute ideas for specification designs and front-end visual components. Lastly, the department aims to build a thriving open-source community through GitHub, fostering ongoing collaboration and development.

Issues/Problems

The Department of Information Technology aims to leverage open source code to solve various problems faced in policy implementation and maximize the benefits of open government.

Reducing Costs and Redundancy

In the past, following the growing trend of digitalization, various government departments developed their own online platforms, such as websites or applications, to disseminate information and manage public complaints. However, this phenomenon led to fragmentation in user engagement and inefficiency in resource allocation. To reduce platform maintenance overhead and minimize public confusion, the Department of Information Technology seeks to encourage public sectors to open their source code of these fragmented platforms and consolidate key government functions into a unified platform with a broader user base. This consolidation would increase the visibility and accessibility of information while ensuring seamless communication between the government and citizens.

Avoiding Vendor Lock-in and Enhance Interoperability

Platforms developed solely within the public sector or in collaboration with a limited number of vendors tend to suffer from narrow perspectives, limited functionality, and poor compatibility. To

address these issues, the Taipei City Government is committed to open-sourcing its platforms, allowing a broader community to inspect, contribute, and improve them. This approach ensures that information channels remain vendor-independent and compatible with diverse software and components, mitigating the limitations posed by relying on a small group of partners.

Encouraging Innovation

Stimulating citizen-driven innovation and opinion input is an important step in ensuring government functions evolve to meet public expectations. From the perspective of establishing a limited government, institutions should take on fewer tasks and allow decision-making to rest largely with the public. However, citizens with the necessary skills and ideas to help often lack channels to share their proposals. Without receiving direct input from the public, the government struggles to fully understand citizens' needs and may not always be best positioned to address them. Therefore, the Department of Information Technology must find a way to call for individuals who are passionate about digital public governance by creating a reciprocal community. This initiative not only serves to encourage public participation but also develop services that effectively align with people's needs.

Solutions

Recruitment

i) **Explicit incentives** - The organizer offers a high monetary award that is exceptionally attractive among domestic and even international hackathons, reflecting the event's value and significance. Rather than merely distributing rewards, the organizer aims to "purchase" new service components from citizen communities. The substantial prize pool also implies an obligation for participants to meet certain standards. From the early stages of the competition, teams are required to design their products according to the organizer's specifications, ensure seamless integration, and complete all necessary steps to implement their designs immediately. This contractual relationship avoids the risks of system incompatibility.

ii) **Implicit incentives** - In addition to offering generous rewards to winners, the organizer recognized that although every participant is a potential winner, only a limited number will actually receive awards. It becomes essential that the competition itself appeals to everyone. Relying solely on the winner-focused incentives to attract participants might deter less confident citizens from signing up for fear of losing, or discourage previous contenders from competing again for already experiencing loss. To address this, the organizer prioritizes creating and engaging competition experience by optimizing the event’s workflow, offering personalized services, and creating a positive atmosphere on site.

Selection

In 2024, 202 participants across 45 teams registered for the hackathon, with half of the teams being screened out. To ensure a clear understanding of requirements, meaningful contributions, and active participation, a well-designed selection standard was implemented. Several attempts were made in advance of the main event to achieve the goals above:

i) **Two-step interview** - The organizer conducts a two-step interview process to: (i) assess whether the registered team’s core values align with those of the organizer; and (ii) verify whether the team has sufficient engineering foundation, such as past projects and technical proofs, as the competition does not permit idea-only presentations and results are evaluated solely based on actual output. Application materials are thoroughly reviewed, followed by a face-to-face interview to ensure that teams with strong engineering backgrounds and innovative concepts are not overlooked due to weaker documentation skills.

ii) **Fully accessed pre-course** - The two-day competition requires participants to prepare in advance by focusing on technical proficiency and theme development. Before the event, they are expected to become familiar with the Taipei City Dashboard documents, GitHub repository, demos, and conduct an in-depth exploration of the Taipei Urban Intelligence Center. Participants are also encouraged to study related dashboard sites in advance to better understand the operational and

development methods. A further requirement is to research one of the six policy areas of the Taipei Urban Intelligence Center.

While it is essential to screen out unqualified teams, the ultimate goal of the event is to promote the platform and encourage all participants to continue developing and publishing their designs, even in the absence of competitions or prizes in the future. To achieve this goal, all teams are invited to attend classes, participate in workshops, and listen to tutorials as soon as they send in applications. Even if teams do not pass the interviews and advance to the final round, they can still gain foundational skills and a preliminary understanding of the platform, which can serve as a basis for future development.

iii) **Skill requirements** - The competition is designed to align participants' skills with tasks to ensure meaningful contributions. Eligibility requires team participation and basic technical proficiency with no age restrictions (though minors under 18 must have legal guardian consent). Key required skills in the competition include basic to intermediate front-end development, data visualization, and project management.

The collaborative framework is thoughtfully structured. For example, the Department of Information Technology, the main organizer, organizes a social innovation hackathon focused on themes, such as gender equality, maternal and childcare issues, and urban resilience. The agency also outlines four specific crowdsourcing tasks: (i) open data; (ii) open source code and development kits; (iii) visual design; and (iv) community-building.

Competition Design

The competition offers monetary rewards:

- NTD300,000 (approximately USD9,100) for the champion
- NTD150,000 (approximately USD4,550) for the first runner-up
- NTD100,000 (approximately USD3,040) for the second runner-up
- NTD50,000 each (approximately USD1,500) for all merit award winners

Furthermore, the winning teams have the opportunity to collaborate with the agency. First, the winners provide written documentation of their results, including explanations and example scenarios for each component. They must also integrate their designs into the official software platform. After reviewing, the projects will be implemented. During the award ceremony, new components were integrated into the original city dashboard, demonstrating how crowdsourcing solutions effectively address public sector challenges. The new dashboard is made accessible for all citizens to view at any time.

The first hackathon laid the foundation for the city dashboard by creating two fully functional themed templates and 12 brand-new components (Taipei Codefest, 2024). The second competition further refined the public services and disaster prevention features.

At the award ceremony, the Department of Information Technology expressed its commitment to continually improve the project management model and introduce different themes for each event to foster ongoing innovation. If the initiative continues, the city dashboard can evolve from a mere internal decision-making tool into an interactive platform for citizen participation. In the future, Taipei City aims to expand the scope of open-source resources, integrate existing public service information, promote innovative applications, lead the trend in citizen-driven science and technology, and ultimately build a co-creative Taipei City (Department of Information Technology, 2023).

On-site Observations

At the event, each team is assigned a table, where team members engage in close discussions and task divisions. Most participants work on laptops to write their codes, creating a highly intense and competitive atmosphere throughout the event. Nonparticipants are prohibited from moving around the

venue or making loud noises to ensure a focused environment. During the duration of the competition, the organizer provides unlimited food and snacks, along with a massage chair area for participants to relieve their fatigue.

Results

Since the competition centered on the "Taipei City Dashboard" and the organizer assigned specific themes, most outputs from the participating teams focused on optimizing the digital services of the Taipei City Government. The projects emphasized the integration, processing, and analysis of information, complemented by simple and user-friendly visualizations to cater to the public.

The work of the winning teams was notably user-centric, practical, and creative, such as using color schemes and layouts that were friendly to the visually impaired, displaying useful public facilities on dashboard maps, and evacuating simulations under various conditions.

These projects provided new solutions for government digital services. In addition to the tangible results from the participating teams, this event also fostered public engagement in government-provided services, helping more people understand how data governance works. It served as an innovative example of government and citizens working together to improve public services, offering valuable insights for the central government and other local governments.

Winners of the Taipei City Dashboard Open-Source Hackathon, 2023

Under one of the three themes, Friendly Environment for Maternity and Parenting, Energy Conservation and Sustainable Development, and Diverse Online Social Platforms, all participants showcased professional expertise and efficient teamwork. In 2023, during the first successfully held Taipei City Dashboard Open-Source Hackathon, seven out of 55 teams were selected as awardees, including four student teams and three industry teams. Despite the early stage of open-source development in the ROC and the limited editable dashboard functions, all participants made significant contributions during 32 hours of intense competition. Most of the winning teams chose "Friendly Environment for Maternity and Parenting" as their project theme.

Through intense competition, participants presented many groundbreaking projects that addressed the most pressing issues they decided on. In the 2023 competition, the winning team, OPEN POSSIBLE from Taiwan Mobile Co., Ltd., introduced a new themed dashboard focused on creating a friendly environment for maternity and parenting, an issue that has received widespread attention in the country. The dashboard integrates key information for new parents, including the geolocations of obstetrics and gynecology clinics, breastfeeding rooms, postpartum care centers, childcare centers, and playgrounds, all presented in colorblind-friendly palettes and layouts (Li, 2024).

The runner-up team from Chung Yuan Christian University, choosing "Energy Conservation and Sustainable Development", tackled water resources challenges that are of great concern to the nation. The winner optimized the city dashboard by cross-referencing data on rainfall distribution, flood simulations, and water usage maps for various elementary schools (Chung Yuan Christian University, 2023). Their innovative data map allows citizens to track and examine public water usage and green energy facilities.

The third-place winner approached environmental issues from another perspective. A student team jointly formed by the Department of Information Management and the Department of Economics at the National Taiwan University combined flood simulation maps and permeable pavement data of Taipei City to develop a layer filtering function, allowing users to simulate flooding scenarios under different rainfall conditions to help with disaster management (Li, 2024).

The four Merit Award teams each optimized the dashboard's capacity of presenting important topics and conveying decisions by introducing new features, incorporating valuable charts, and enhancing the visual representation of data. Their proposals addressed user experience issues and helped the dashboard become more versatile as a citizen information platform. For example, the team from the Department of Electrical Engineering at National Taiwan University created a 3D data map to provide

a clearer view of public service centers. Team Data Palette from Chunghwa Telecom Co., Ltd. developed backend APIs and created 11 new components to the dashboard (Taipei Codefest, 2024).

Table 2.2 shows the awarded teams' content, highlighting their skills, aims, and final contributions.

TABLE 2.2

WINNERS OF THE TAIPEI CITY DASHBOARD OPEN-SOURCE HACKATHON, 2023

Winner Ranking	Team Name	Theme	Content
1	OPEN POSSIBLE, Taiwan Mobile	Friendly Environment for Maternity and Parenting	• Integrate information of medical institutions (obstetrics and gynecology, specialized disease screenings), breastfeeding rooms, postpartum care centers, childcare subsidies. and playgrounds • Colorblind-friendly palettes and layouts
2	Department of Information Management, Chung Yuan Christian University	Energy Conservation and Sustainable Development	• Cross-reference data on rainfall distribution, flood simulations, and water usage maps for various elementary schools • Examine public water and green energy facilities and display the results on the dashboard data map
3	We Are 112A, Department of Information Management & Department of Economics, National Taiwan University	Energy Conservation and Sustainable Development	• Combine flood simulation maps and permeable pavement data of Taipei City to develop a layer filtering function • Allows users to simulate flooding scenarios under different rainfall conditions to help with disaster management
Merit Award	Mosquito Lamp, Department of Electrical Engineering, National Taiwan University	Friendly Environment for Maternity and Parenting	• Optimize the dashboard by displaying data in multiple dimensions and presenting the information in a creative way in addition to providing hospital locations
Merit Award	Data Palette, Chunghwa Telecom	Friendly Environment for Maternity and Parenting	• Provide essential information from pregnancy through post-childbirth that is beneficial for both citizens and the government • Develop back-end APIs and create 11 essential components, including regional pricing for maternity homes, distribution of childcare centers, and cost of regional kindergartens
Merit Award	Wee Win, Vpon Big Data	Friendly Environment for Maternity and Parenting	• Integrate the open data, including population growth rate, migration rate, and fertility rate, to predict future population numbers by age group in various regions. Present the results with a 3D population pyramid chart • Collect information of empty classrooms and enrollment numbers in elementary and junior high schools to look for potential free spaces for public childcare facilities
Merit Award	Department of Electrical Engineering, National Taiwan University	Friendly Environment for Maternity and Parenting	• Present complex statistical data, such as Taipei's maternity subsidies, in a user-oriented format • Integrate numerous existing dashboard features using advanced data processing techniques and customized charts to provide algorithm-based maps

Source: Department of Information Technology (2023).

Winners of the Taipei City Dashboard Open-Source Hackathon (Spring), 2024

In spring of 2024, responding to the increasing demands from both the government and public, the Department of Information Technology held a second hackathon, this time opening more editable components and functions. Making it to the finals were 13 teams. By optimizing the city dashboard, each team came up with more effective solutions to one of the five topics: emergency operation,

disaster prevention, climate change issues, traffic safety, and public service. They understood problem priorities and urgent needs from the public perspective. Their designs and presentations helped the government to receive direct insights into people's demands and how to meet them.

The 2024 hackathon champion was a student team from the Department of Electrical Engineering at National Taiwan University, who focused on optimizing the Emergency Operation Center feature of the city dashboard. The team created a highly interactive disaster response interface to help the public identify high-risk areas and avoid potential dangers. They also developed an alert system with push notification service, enabling citizens to report nearby disasters and receive timely updates.

The runner-up was an industry team from Vpon Big Data for their contribution to the City Disaster Prevention module. They identified and highlighted high-risk areas using soil liquefaction level and building age as indicators. They also analyzed potential challenges in rescue and evacuation, integrating and providing this information to the public sector as a reference for improving disaster prevention policies.

The third place went to Team Data Explorer from Foxconn Technology, which aimed to take concrete actions to educate and motivate citizens to address climate change issues. They utilized existing data and reports on open-source platforms to help users understand the current environmental crisis and explore actionable solutions, encouraging collective participation in achieving net-zero emissions goals.

The four Merit Award winners built on the framework of the previous competition by adding more components and enhancing the functionality of the Public Services and Traffic Safety section of the dashboard. Team Unleashed Tiger from Taipei Veterans General Hospital integrated map information with parking violation reports, providing these as indicators for police deployment (Taipei Veterans General Hospital, 2024). Their solution addressed issues, such as police shortages and cumbersome reporting processes. Table 2.3 illustrates the theme and content of the awarded projects.

TABLE 2.3

WINNERS OF THE TAIPEI CITY DASHBOARD OPEN-SOURCE HACKATHON (SPRING), 2024

Winner Ranking	Team Name	Theme	Content
1	(´ཀ`」 ∠), Department of Electrical Engineering, National Taiwan University	Emergency Operation Center	• Create a highly interactive disaster response dashboard to help the public identify high-risk areas, stay alert, and avoid potential dangers • Develop an alert system and Push Notification Service, allowing citizens to actively report and be informed about nearby disasters in a timely manner
2	Weeeee Chill, Vpon Big Data	City Disaster Prevention	• Use soil liquefaction levels and building age as indicators to identify high-risk areas • Analyze potential challenges in rescue and evacuation. Provide the information to the public sector as a reference for improving disaster prevention policies
3	Data Explorer, Foxconn Technology	Climate Change Issues	• Utilize existing data and reports to help users understand climate change and participate in environmental protection projects to achieve net-zero emissions goals
Merit Award	Department of Information Management, Chung Yuan Christian University	Traffic Safety	• Create four new components: civic activity centers, recycling stations, roadway restrictions, and convenience services • Enhance the system by adding "safe" features and customized landmarks, and optimize overall system performance of the dashboard

Winner Ranking	Team Name	Theme	Content
Merit Award	Unleashed Tiger, Taipei Veterans General Hospital	Public Service	• Prioritize pedestrian safety by integrating map information with the number of parking violation reports • Provide indicators for police deployment to address issues, such as insufficient police officer shortages and cumbersome reporting processes
Merit Award	Happy Spinach, Industry collaboration	Public Service	• Provide a centralized query platform for parents, allowing citizens to immediately look up for essential information on child healthcare, medical services, and childcare services
Merit Award	Hacker GO, Industry collaboration	Public Service	• Display real-time construction information for Taipei City and live images of key road sections • Integrate regional school locations and schedules and display them on the map to provide transportation details for students

Source: The News Center (2024).

Impact on Services

Having hosted only two hackathons so far, this open source project remains in its early stages and the full potential of the project has yet to unfold. Currently, the city dashboard is primarily used for internal decision-making within the public sector, with its applications largely limited to administrative officers and officials. For example, water maps are utilized for disaster prevention. However, starting in 2025, the dashboard will be deployed to various administrative centers and district offices. As a website rather than an application, it can be easily accessed by any computer with a browser.

The future goal of this project is to establish an open source "standard" that can be referenced both domestically and internationally, where any data visualization platform using open source would be able to reference the Taipei City dashboard as its foundation. The source codes will be made available to the public, enabling developers to build upon existing frameworks to achieve two key objectives: (i) standardizing the framework to enhance supervision and accelerate growth; and (ii) allowing users to improve and provide feedback, thereby enhancing the original version.

While the core spirit of open source is not unique to the ROC, Taipei City has the potential to become a pioneer in integrating this concept within government departments to facilitate public administration. The goal is to create a publishing platform similar to an app store, where the city government acts as the final reviewer rather than providing direct assistance. This would establish a development ecosystem in which individuals with skills and ideas to design their own projects.

Change in Administrative Concepts Caused by Crowdsourcing

In the 2023 spring competition, Taiwan Mobile took first place by addressing visual presentation issues through improvements to the dashboard. With a significant number of colorblind individuals in the ROC, it is crucial to ensure that the interface is accessible to all passengers, including those with visual impairments. This design initiative has transformed citywide promotional materials and enhanced information inclusiveness.

Students from the Department of Electrical Engineering at National Taiwan University proposed the idea of enabling citizens to not only receive information, but also provide it. They questioned why the dashboard functions only as a display for government information and whether the public could take a more active role by taking the initiative to update data. For instance, during a disaster, locals could directly upload related information and share it. In addition to visually presenting official information, there is potential for individuals to serve as data providers, transforming the dashboard into a two-way communication platform.

Spread of the Open-source Concept

In addition to information background professionals selected in Taipei City, the organizer invited ICT executives from other city governments in the ROC to serve as judges, promoting the value of open source. The success of the hackathons has attracted interest from other municipalities, such as leading cities like Taoyuan, to develop their own city dashboards based on Taipei's open-source model.

Emergence of Spontaneous Participatory Communities

Competitions with attractive prizes, manageable difficulty levels, and clear goals have inspired the higher education sector to offer relevant courses at university level. Several institutions, such as Chung Yuan University, have introduced courses to guide students in participating in Codefest and other forms of hackathons held within the country. Student communities have also invited officials to conduct classes using the city dashboard as the primary teaching resource.

In addition to the official hackathon held annually, the organizer assists many private groups, such as the Student Computer Federation, in organizing similar events. The government provides technical support and observes the values and outcomes pursued by the nonpublic sector, which was not explored previously. Following the success of the official event, numerous surrounding activities have also formed a new crowdsourcing ecosystem.

Key Success Factors

Based on case observation and analysis, this project has achieved significant success, continues to attract participants, and expanded in scale due to a number of key factors:

i) Well-designed events with high monetary awards

The substantial prize pool establishes a clear value proposition for participants, effectively incentivizing engagement by positioning the competition as an attempt to "purchase" service components from citizens. Participants are given a clear understanding of the services required to win, making them more willing to comply with the organizer's rules and requirements. This well-communicated collaboration ensures that the components developed can be more easily integrated into the dashboard and implemented effectively.

ii) Clear rules and detailed guidance

The success of previous events have boosted public confidence and encouraged more individuals to take on the challenge. Detailed support is provided to participants who are eager to compete but may lack technical foundation. For example, students from Chung Yuan University, initially hesitant due to their lack of confidence in engineering skills, utilized the coding assistance offered by the organizer. In a short period, they enhanced their technical abilities and ultimately secured second place, winning NTD150,000 with their innovative ideas.

iii) Integrating promotion of crowdsourcing initiatives

The organizer invites officials from other counties and cities to serve as judges, helping to publicize and expand the project's reach. The upcoming collaboration with New Taipei City is set for 2025. In addition, the hackathons focused on tangible engineering output over superficial conceptual slogans, aligning with the original spirit of hackathons. This focus has helped cultivate a strong reputation for the event within the ICT sector.

iv) Well-planned environment

The on-site process must be thoroughly planned to prevent unprofessional problem management. Moreover, the competition environment should be kept quiet, comfortable, and convenient to win the favor of participants. A significant investment in enhancing the experience for all participants is crucial to attracting new competitors and retaining previous ones, even when they do not win. In addition to providing the dashboard as a publishing platform for the winning team, the organizer also looks forward to cooperating with nonwinning teams.

v) Open preparatory course and mature feedback system

As participants are required to follow specific design specifications and frameworks, the organizer conducts workshops and official instructive sessions to prepare them for the competition and facilitate idea exchanges. Other than ensuring effective idea contribution, it is crucial to also establish a feedback system and collect the participants' opinions in detail. In some cases, participants have questioned the criteria used to select teams for the final round. Concerns were raised that certain teams were favored for their conceptual ideas over practical execution, which frustrated teams with strong engineering backgrounds. With an instant feedback session, the organizer promptly sought to better understand how the engineering community perceives each competition challenge. Moving forward, the evaluation system will be clarified, ensuring that judges strictly adhere to the established criteria.

Discussion and Policy Recommendation

Discussion

This case study analyzes the success of the Taipei City Dashboard Open-Source Hackathon as a crowdsourcing initiative led by the public sector. With the vision of establishing a streamlined yet responsive government, the Department of Information Technology of Taipei City observed and attempted to solve a series of challenges within the government, including fragmented information platforms, excessive application development costs, low interdepartmental compatibility, high dependence on certain vendors, and the difficulty of receiving direct citizen inputs. With the support of the existing technical architecture, the initiators successfully improved the code for open source, making it easy for the public to understand, access, and modify. Under these premises, the Department of Information Technology opened the codes of its city dashboard, both as an internal decision-making tool and a public information platform, as a hackathon competition theme for citizens to identify major issues and propose effective solutions.

During the event, the organizer prepared participants with sufficient motivation and favorable conditions to engage in innovative activities during the two-day competition. This was achieved through rigorous screening, efficient process planning, and attractive reward mechanisms. The newly designed components also created a ripple effect on other public administration concepts in the country, including increasing attention to certain undervalued issues and making information platforms more accessible to disadvantaged groups. Requiring the use of free software and open source code also enabled the citizen proposals to be compatible and independent of vendor influence. Aside from the winners, the activity of other participants not only publicized the crowdsourcing activities to officials in other cities but were also given the skills and motivation to organize spontaneous crowdsourcing communities. Subsequent analysis of case results show that the hackathon directly addressed the challenges the Department of Information Technology of Taipei City had aimed to solve, including reducing development costs, enhancing compatibility, and improving citizen communication.

The event's success and its continued expansion proves that crowdsourcing can play a pivotal role in decision-making and policy development. Its success factors, including highly attractive incentives, careful program planning, effective publicity, and an immediate feedback system, can be a model that is generally applied to crowdsourcing initiatives in other countries.

Policy Recommendations

Organizing the first open-source hackathon, the Department of Information Technology at the Taipei City Government gained experience in recruitment, skill development, and task allocation while creating tangible outcomes and value. The commissioner shared a vision that useful apps and services could now be adopted across departments, city governments, or even global communities through open source codes. However, the commissioner also acknowledges the challenges of establishing such initiative and shares the following recommendations for ensuring the sustainability and implementations of such crowdsourcing projects:

i) Ensure sufficient internal and external incentives

The government must maintain the long-term attractiveness of the event's rewards. The current prize pool is highly attractive to student teams, and it is crucial to prevent reductions in funding as the number of sessions increases. For industry participants, exposure of their work, increased popularity, and connections with relevant people have also become important incentives. For any crowdsourcer, internal incentives, such as the thrill of participating in the competition and satisfaction of receiving recognition for their designs can be further strengthened through event design and followed-up collaborations.

ii) Implement effective publicity relation strategies

The government should promote crowdsourcing from the institutional level as a tool for decision-making and problem-solving. The results of the case analysis show that officials from other municipal governments, such as New Taipei City, after serving as judges in the Taipei City Dashboard Open-Source Hackathon, found that the city dashboard and the competition itself were conducive to communication between the government and citizens. These indicated their willingness to emulate or collaborate. To build on this success, the government should aim to establish the event as a blueprint for domestic crowdsourcing and encourage the exchange of ideas among officials at all levels during such events.

iii) Prepare end-of-term backup plans

As an official with a technical background rather than political background, the commissioner remains politically neutral but acknowledges the role of the current political officer and cannot foresee the city government's ongoing investment in the project after the end of term. Public sectors must be prepared for transitions of power and prepare simple and practical plans for future management of such events. Should a new city government no longer prioritize the project, the initiators should be ready to advocate for its continuation and maintain momentum by engaging communities at the citizen level.

iv) Pave the way for a crowdsourcing "bazaar"

The Department of Information Technology seeks to foster crowdsourcing activities that can continue to thrive even without policy support. Up to 2024, the GitHub open source code used in establishing the city dashboard has been cited over 300 times for further research, indicating multiple communities' growing interest in this project and extending their studies based on it. The department is actively working on assisting citizen-initiated projects to grow independently, eventually reducing its role as an initiator over time. In a highly anticipated Bazaar Model, new crowdsourced designs should evolve as independent projects rather than branches of a centralized, government-led "main" version.

The result of the competition has proven to be effective. Winning teams came up with implementable project designs, enhancing the functionality of the dashboard as a platform for information exchange.

Conclusion

This research focuses on how the success of Taipei City Dashboard Open-Source Hackathon reflects the evolution of open-source innovation implemented in the ROC. To address policy-making issues and encourage citizen input, the Department of Information Technology of Taipei City launched hackathons to harness citizens' skills and technological expertise. As discussed in the lessons learned, key factors in attracting participants and promoting open innovation include clearly aligned values, attractive rewards, a conducive environment, and well-planned sustainability strategies. The findings of this case study will help Taipei City to further apply open-source innovation in other departments

and provide valuable insights to other cities or countries seeking to implement similar governmental open-source and crowdsourcing initiatives.

Furthermore, to improve sustainability, a transformation is necessary. The Taipei City Government serves as the initiator, not the owner, of the project. Therefore, it hopes to attract enthusiastic volunteers for mutual support. The internal administrative system is also well-prepared to engage more communities, moving beyond purely internal operations or collaborations with existing manufacturers. Currently, the competition is generating spontaneous outcomes and is progressing toward a fully project-based, feature-rich open source codebase.

To encourage public participation in the development of the city dashboard, the initiator must first establish a foundational coding framework that citizens can build upon. Preparations for the Taipei City Dashboard Open-Source Hackathon have been laid long before its official announcement. A crowdsourcing project in the field of ICT cannot be created from scratch in a short period of time; previous directors laid the groundwork for the city dashboard and its applications, leaving a foundation for their successors to refactor. Although the front-end system of the city dashboard appears unchanged, the backend source code has been rewritten to ensure easier maintenance and accessibility. This solid foundation allows the code to be opened to the public for editing and optimization. Subsequently, the government worked on creating explanatory documents and setting design goals, allowing it to evolve into a fully open-source initiative.

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CHAPTER 3: INDIA

CROWDSOURCING FOR CITIZEN ENGAGEMENT: A CASE STUDY OF MYGOV.IN IN INDIA

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Abstract

This case study examines the use of crowdsourcing in the public sector through MyGov.in, India's flagship platform for citizen engagement launched in 2014. MyGov.in has successfully engaged over 25 million registered users, generating more than 100,000 ideas and 800,000 comments across various national campaigns, including the Swachh Bharat Mission and Digital India. The Swachh Bharat Mission saw participation from 17 million citizens, contributing to policy changes and service improvements in sanitation. However, challenges remain, such as the digital divide, with rural areas experiencing less than 30% participation compared to 60% in urban areas. This report explores these challenges and offers evidence-based policy recommendations, such as improving digital infrastructure, enhancing feedback mechanisms, and leveraging new technologies to increase long-term citizen engagement. Strengthening technological access in rural regions and implementing sustainable, user-friendly solutions will be essential to maximizing the platform's impact on governance and policy development.

Introduction

The research topic selected for this case analysis is the exploration of crowdsourcing in India's public sector, focusing on MyGov.in, the government's flagship citizen engagement platform operated by the Ministry of Electronics and Information Technology (MeitY). Crowdsourcing, defined as soliciting services, ideas, or content from a large group of people, is increasingly leveraged by governments to spur innovation, improve service delivery, and enhance citizen participation in governance. In India, MyGov.in plays a central role in this approach, enabling citizens to actively contribute to policymaking, participate in public consultations, and offer suggestions for various government initiatives. Since its launch in 2014, MyGov.in has attracted over 25 million registered users and generated more than 100,000 ideas and 800,000 comments across various campaigns.

FIGURE 3.1

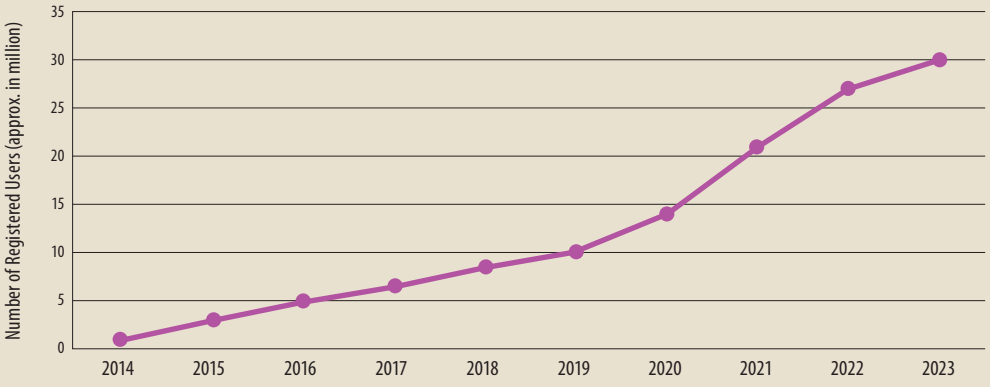
GOVERNMENT OF INDIA'S MAIN WEBSITE INTERFACE PROMOTING "NUTRITION MONTH: NOURISHED GIRLS, EMPOWERED WOMEN"

Source: www.mygov.in.

The significance of researching crowdsourcing in India arises from the country's growing need for inclusive, transparent, and participatory governance. In a country with over 1.4 billion people, creating channels for widespread public involvement is crucial for improving policy outcomes, generating innovative solutions to local and national challenges, and fostering trust between the government and its citizens. MyGov.in serves as a model platform that demonstrates how technology can be leveraged to democratize decision-making processes and encourage collaborative governance. Its success in mobilizing citizens for major national initiatives highlights its potential for scalable and meaningful impacts on governance.

FIGURE 3.2

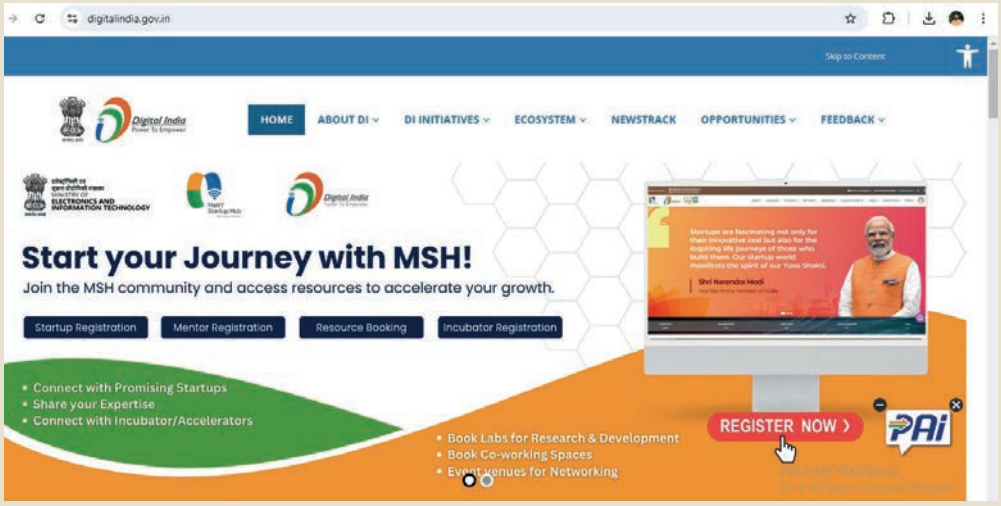
REGISTERED USERS OF MYGOV.IN FROM 2014 TO 2023



The research focuses on key issues, such as assessing the effectiveness of crowdsourcing initiatives on MyGov.in, understanding how citizen inputs influence policy decisions, and identifying challenges in sustaining citizen engagement over time. For instance, while campaigns like the Swachh Bharat Mission have successfully engaged over 17 million participants, sustaining long-term engagement remains a challenge, especially in rural areas where internet penetration is below 30%. This study also seeks to evaluate the scalability and adaptability of MyGov.in's crowdsourcing model across different regions and policy domains in India.

FIGURE 3.3

DIGITAL INDIA MAIN WEBSITE INTERFACE ENCOURAGING PUBLIC PARTICIPATION



Source: Digital India (www.digitalindia.gov.in) (2023).

The main objectives of this case analysis are:

i) To evaluate how MyGov.in has utilized crowdsourcing to drive innovation and foster civic engagement.

ii) To examine the success factors and challenges of major campaigns, such as Swachh Bharat Mission and Digital India.

iii) To provide insights on policy recommendations that can further strengthen the effectiveness of crowdsourcing in public governance.

The focus of this analysis is on the operational and strategic dimensions of crowdsourcing through MyGov.in, with specific attention to campaigns that have had significant social and political impacts. Notable examples include initiatives like Startup India have seen active citizen participation, contributing to the creation of over 50,000 ideas to support entrepreneurs. While the scope is primarily limited to national-level campaigns, it also explores how local and regional governance structures have adapted these initiatives to address specific contexts.

Ultimately, this case analysis will shed light on the potential of crowdsourcing as a tool for inclusive governance, offering lessons that could be valuable to other countries exploring similar citizen engagement platforms. By understanding the challenges and successes of MyGov.in, this study aims to provide a comprehensive framework for optimizing citizen-driven innovation in the public sector.

Focus and Scope of Case Study

The subject of this case analysis is MyGov.in, India's principal platform for citizen engagement and crowdsourcing, which empowers citizens to contribute ideas, provide feedback, and propose solutions on national issues. This research examines on how crowdsourcing initiatives through MyGov.in have been structured, implemented, and leveraged to enhance public participation, drive innovation, and build trust in governance. MyGov.in has been instrumental in shaping policies, such as Swachh Bharat Mission, Digital India, and Startup India by enabling citizen contributions. This study evaluates the effectiveness of these key campaigns and examines the platform's role in facilitating large-scale civic engagement.

The campaigns are as the following:

i) **Swachh Bharat Mission (Clean India Mission)** - Launched in 2014, Swachh Bharat Mission aimed to improve sanitation across India. Through MyGov.in, millions of citizens shared ideas for cleanliness drives and sanitation policies, contributing to more efficient policy implementation. This crowdsourced approach enhanced community ownership in sanitation efforts, as highlighted by Gupta (2021), who notes the significant impact of citizen engagement in the success of the mission.

ii) **Digital India** - Launched in 2015, Digital India's goal is to digitize the country. MyGov.in facilitated crowdsourced input on digital infrastructure and internet accessibility, making the policy more inclusive. Citizens' feedback helped shape digital literacy and e-governance services across both rural and urban India. As Liu (2017) suggests, crowdsourcing proved instrumental in developing more inclusive and transparent policies.

iii) **Startup India** - Launched in 2016, Startup India focused on promoting entrepreneurship. Through MyGov.in, entrepreneurs contributed ideas that shaped policies, such as tax exemptions and reforms to improve ease of doing business. Crowdsourced input led to data-driven policy responsiveness, which aligns with Sharma's (2019) findings that crowdsourcing enhances policy adaptation based on real-time feedback from citizens.

FIGURE 3.4

MYGOV.IN OFFICIAL LOGO

Source: www.mygov.in.

Focus

The general problem addressed in this case analysis is how to harness the collective intelligence of citizens in a country as diverse and populous as India. MyGov.in serves as a service platform with crowdsourcing as one of its main functions. As a large-scale digital crowdsourcing platform, it navigates issues, such as inclusivity, digital access, transparency, and sustained engagement. This analysis examines how these challenges have been addressed and identifies areas for improvement.

The central focus is on assessing how crowdsourcing through MyGov.in has influenced public policy, identifying the success factors that contribute to the platform's effectiveness, and evaluating the overall impact on governance in India.

Scope

The scope of this research is to analyze major campaigns initiated on MyGov.in, such as the Swachh Bharat Mission and Digital India, along with other significant efforts that have utilized crowdsourcing. The analysis will focus on campaigns that attracted large-scale public participation and investigate how citizen contributions were integrated into policy decisions. While the primary focus is on national-level campaigns, the research also considers how regional and local governance structures have adapted these initiatives to suit their contexts, ensuring wider reach and inclusivity.

The factors influencing this case analysis include:

- **Digital infrastructure** - This factor examines how access to the internet and technology affects the reach and effectiveness of MyGov.in, especially in rural areas where internet penetration is lower
- **Citizen participation** - This aspect looks at what motivates public engagement, the demographic distribution of participants, and barriers to widespread involvement
- **Policy impact** - This angle evaluates how crowdsourced ideas and feedback have been used to shape public policies or improve service delivery, highlighting tangible outcomes of civic contributions
- **Sociopolitical context** - This component, considering the diversity in India in terms of language, literacy, and socioeconomic factors, analyzes how these elements affect the success of digital crowdsourcing platforms in reaching all segments of the population

FIGURE 3.5

MYGOV.IN'S CITIZEN ENGAGEMENT PLATFORM

Source: www.mygov.in.

The public sector is the primary focus of this case analysis, with MyGov.in serving as the subject. This platform plays a pivotal role as a digital intermediary between citizens and the government, offering a unique opportunity to study crowdsourcing in a large, democratic setup. MyGov.in provides valuable insights into how a government can systematically and effectively operationalize crowdsourced ideas on a national scale, making it a model for analyzing public-sector innovation through citizen engagement.

Literature Review

Crowdsourcing as a mechanism for public engagement and innovation has gained significant traction in the last decade, with numerous governments adopting this model to enhance decision-making and public service delivery. Globally, crowdsourcing has become integral to modern governance, empowering citizens to contribute directly to policies. In India, MyGov.in stands out as a pioneering effort in integrating crowdsourcing into governance. Since its inception in 2014, the platform has engaged over 25 million registered users, generating 100,000 ideas and over 800,000 comments. This literature review synthesizes existing research on crowdsourcing in governance, with a focus on India and comparative global experiences.

Crowdsourcing in Governance: Global Perspective

Brabham (2015) highlights the transformative potential of crowdsourcing in the public sector, emphasizing that it can democratize policymaking by allowing citizens to contribute directly to decision-making. He cites global examples, such as Iceland's crowdsourced constitution and Finland's traffic law reforms, demonstrating that crowdsourcing fosters greater transparency and collaboration between governments and citizens.

Liu (2017) highlights that crowdsourcing enables co-production of public services, creating opportunities for citizens to help shape services and promoting more transparent and accountable governance. Similarly, Taeihagh (2017), identifies crowdsourcing as an essential tool for public policy by enabling governments to gather diverse perspectives from citizens, thereby improving the effectiveness of policies and strengthening public trust.

Research by Afuah & Tucci (2012) shows that crowdsourcing offers governments a cost- effective way to innovate by leveraging the "wisdom of the crowd." They note the importance of inclusivity, emphasizing that crowdsourcing platforms must provide equal access to social, economic, and geographic groups to prevent bias in contributions. For example, platforms like NYC 311 have successfully crowdsourced feedback on urban issues, highlighting the importance of addressing local contexts and encouraging broad participation.

Crowdsourcing in India: MyGov.in's Experience

India's MyGov.in platform has become the focus of various studies on digital governance. Mehta (2020) underscores that MyGov.in represents a successful example of using technology to engage citizens; however, it also reveals challenges, such as digital literacy, internet accessibility, and sustaining participation. While urban areas, with 65% internet penetration, actively engage in MyGov. in, rural areas, where internet penetration is only 35%, face significant barriers to participation.

Research by Sharma (2019) highlights the digital divide between urban and rural areas, demonstrating that this disparity restricts participation and undermines the platform's reach and inclusivity. The platform's success in gathering ideas is often hindered by limited internet penetration in rural regions, which constitutes approximately 70% of India's population. This reflects a broader challenge of achieving equitable participation across different socioeconomic demographics.

Gupta (2021) shows that MyGov.in has positively impacted major campaigns, including the Swachh Bharat Mission and Digital India, with over 17 million participants contributing ideas for sanitation and 200,000 citizens engaging in digital policy feedback. These campaigns exemplify how crowdsourcing can drive large-scale public involvement in national initiatives. However, Jain (2020) argues that while such campaigns have successfully mobilized public participation, there are significant gaps in integrating crowdsourced inputs into actual policy decisions. This disconnect often leads to dissatisfaction among contributors, particularly regarding the perceived lack of transparency in how their inputs are utilized.

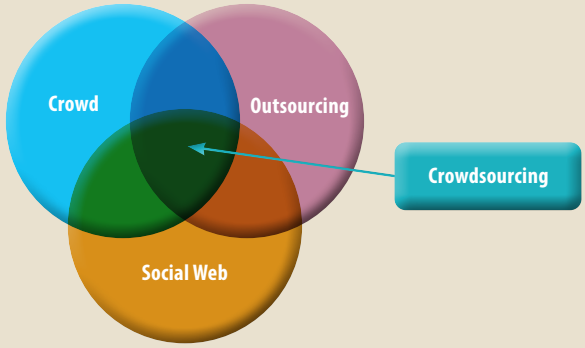
Theoretical Approaches to Crowdsourcing

Several theoretical frameworks support the study of crowdsourcing in public governance. Open Innovation Theory (Chesbrough, 2003) suggests that governments can benefit from external contributions to innovate and improve public performance. This approach is applied in public-sector crowdsourcing platforms like MyGov.in, which has gathered ideas on infrastructure development, digital services, and environmental sustainability.

Collaborative Governance Theory (Ansell & Gash, 2007) provides another perspective to understand crowdsourcing. It posits that successful collaboration between governments and citizens is rooted in trust, transparency, and mutual benefit. This theory is particularly relevant to MyGov.in's model, which relies on citizen-government trust to drive active engagement, especially in areas like social welfare and environmental policy. For instance, the *Beti Bachao Beti Padhao* (Save the Daughter, Educate the Daughter) initiative garnered 500,000 contributions through MyGov.in, enabling more informed policy decisions to advance gender equality.

FIGURE 3.6

THREE DEFINING ELEMENTS OF CROWDSOURCING



Source: Onook & Kishore (2013).

Gaps in Existing Research

Despite extensive research on the benefits of crowdsourcing in governance, several critical gaps persist. One significant gap is the long-term sustainability of citizen engagement. While studies often focus on initial participation, less attention is given to how active involvement is sustained over time. For example, although 17 million people participated in the Swachh Bharat Mission, less than 20% of users remain active on the platform after their initial contributions.

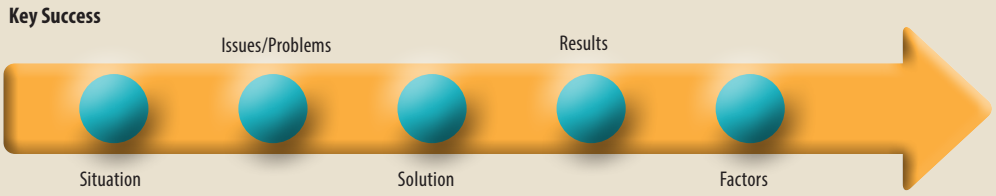
Another gap is the lack of comparative studies analyses of crowdsourcing platforms in different countries. Studies that compare how crowdsourcing in developing nations like India contrasts with developed nations are scarce. Additionally, research on the transparency of decision-making processes, particularly in the India context, is limited. The feedback loop between the government and citizens, specifically on how citizens are informed of the outcomes of their contributions, remains largely underexplored. Addressing these gaps is essential for building trust and ensuring sustained engagement on platforms like MyGov.in.

Case Analysis through the Model

This section provides a structured analysis of MyGov.in, the Indian government's crowdsourcing initiative, using a standardized framework. The analysis covers five core components: situation, issues/problems, solutions, results, and key success factors.

FIGURE 3.7

FIVE CORE COMPONENTS OF MODEL



Situation

MyGov.in was launched in 2014 as a platform for citizen engagement, allowing the Indian government to crowdsource ideas, feedback, and solutions for addressing national and local governance challenges. The platform operates under the Ministry of Electronics and Information Technology (MeitY) and aims to foster a participatory democracy by involving citizens in policymaking and service delivery. This initiative was established to address the need for greater public participation in decision-making processes while leveraging the country's growing digital infrastructure.

India, with its 1.4 billion population, encompassing diverse socioeconomic demographics, required an innovative approach to bridge the gap between government institutions and citizens. MyGov.in was implemented as part of a broader vision to engage citizens in governance under the Digital India initiative. The platform provides multiple channels, including discussions, polls, and competitions, through which individuals can contribute ideas and actively participate in government campaigns.

Key components of the situation analysis:

- **Vision:** To establish a transparent and participatory system where citizens can directly contribute to government initiatives
- **Strategy:** Use of digital technology to reach a vast and diverse population while creating a continuous feedback loop between citizens and government
- **Opportunities:** Potential to collect innovative solutions, gauge public sentiment, and co-create policies with real-time citizen inputs
- **Stakeholders:** Involves the government, citizens, private-sector partners, and NGOs

Issues/Problems

Several challenges arose with the implementation of crowdsourcing via MyGov.in. These include:

i) **Digital divide** - While 65% of urban households have access to the internet, only 35% of rural households are connected, limiting participation from rural areas and restricting the diversity of inputs. This disparity in internet penetration hinders broader citizen involvement and restricts the diversity of input, which is crucial for a genuine representative crowdsourcing initiative. As Sharma (2019) points out, overcoming the digital divide is critical for ensuring that crowdsourcing platforms like MyGov.in can engage citizens from all regions, especially in rural areas where digital access is still limited.

ii) **Engagement retention** - Although initial participation in MyGov.in campaigns is high, with millions of citizens contributing to national initiatives, less than 20% of users remain engaged after the first few months. Sustaining interest over time, particularly for nonurban populations, has proven challenging. Liu (2017) highlights the need for continuous incentives, such as rewards for

sustained engagement, and improvements in platform accessibility, such as offline features, are essential to keep citizens engaged long-term. Without these measures, there is a risk that initial enthusiasm will wane, leading to reduced participation over time.

iii) **Policy integration** - Although citizens contribute ideas and feedback via MyGov.in, integrating these inputs into actionable policies remains a significant challenge. Bureaucratic barriers and the absence of clear mechanisms for transforming crowdsourced ideas into policies exacerbate this issue. As Gupta (2021) notes, the absence of a transparent process in policy integration often frustrates citizens, who feel their contributions are not being effectively considered. This lack of transparency also reduces trust in the platform, as citizens are unsure of how their inputs influence real-world decision-making processes.

iv) Objectives and goals of MyGov.in

- **Primary objectives** - To crowdsource solutions and gather feedback on various government initiatives; to enhance public participation and improve transparency in governance
- **Expected outcomes** - A participatory form of governance where policies reflect the voices of citizens across diverse demographics; improved service delivery and greater accountability in public administration

Solution

The MyGov.in platform focuses on a combination of complementary and supplementary crowdsourcing in both service implementation and policy design. It provides a digital space where citizens can suggest solutions, share opinions, and participate in nationwide discussions. These contributions are then used to inform policy formulation and improve government programs. MyGov.in's role in complementing existing government initiatives is evident through its collaborative approach, leveraging crowdsourced input to enrich the policy design process and improve service delivery.

Complementary Crowdsourcing in Policy Design

Initiatives like the Swachh Bharat Mission (Clean India), which saw participation from 17 million citizens, leveraged crowdsourced ideas to shape sanitation policy and public awareness campaigns. For example, citizens suggested innovative ways to improve waste management systems and offered ideas for public awareness campaigns that were integrated into official messaging. These inputs were crucial for shaping local sanitation strategies, demonstrating how MyGov.in complements existing policy design process by making it more inclusive and community-driven.

Complementary Crowdsourcing in Service Implementation

The Digital India initiative gathered feedback from 200,000 citizens on improving rural internet connectivity and expanding e-governance services. Crowdsourced inputs included suggestions for enhancing the digital infrastructure in rural areas, where internet penetration was low. The feedback helped inform BharatNet's expansion plans to connect over 250,000 *gram panchayats* (village councils) to the internet. This feedback-driven approach shows how crowdsourcing complements existing initiatives by providing real-time data and citizen-led solutions, improving the effectiveness of public service delivery.

Participant Engagement

i) **Recruitment strategies** - These include large-scale awareness campaigns through social media, television, and radio, ensuring the platform reaches different demographics. For example, the government uses social media platforms, like Facebook, X (formerly Twitter), and Instagram to promote MyGov.in initiatives, often using targeted ads and hashtags like #CleanIndia for the Swachh Bharat Mission. These campaigns encourage citizens to participate in cleanliness drives and submit their ideas for sanitation improvements. Additionally, the government partners with television networks to run advertisements during popular programs, and broadcasts radio messages on stations, like All India Radio, making the platform more accessible to rural and semi-urban populations who may not have regular internet access.

ii) **Participation incentives** - These include recognition for outstanding contributions, awards, and the opportunity for winners to interact with government officials. For instance, in the Swachh Bharat Mission, MyGov.in hosted a Clean India Contest, where citizens submitted innovative ideas for waste management. Winners received recognition from government ministers, and their ideas were directly incorporated into sanitation policies. This not only incentivized engagement but also provided participants with a tangible way to influence policy.

FIGURE 3.8

INITIATIVES LED BY THE SWACHH BHARAT MISSION

Source: www.mygov.in.

Implementation Process

i) **Campaign structure** - Campaigns on MyGov.in follow a structured process. The government first identifies key areas for public consultation or crowdsourcing (e.g., environmental issues, digital literacy). These areas are then presented to the public through the platform, where citizens can submit ideas, feedback, or participate in contests. A committee of experts evaluates submissions, and the most impactful ideas are incorporated into policy frameworks.

ii) **Platform design** - The infrastructure design of MyGov.in enables large-scale citizen engagement. Built as a modular digital platform, it comprises several features, including a centralized dashboard for campaign management, a submissions portal for ideas and feedback, and an analytics system to process citizen input. The platform is hosted on a secure government cloud (MeghRaj), ensuring reliability and scalability to handle high traffic during major campaigns. Advanced data analytics tools help evaluate citizen inputs, providing actionable insights for policymakers. Accessibility features, such as multilingual support and mobile-friendly interfaces, ensure inclusivity across diverse demographics. Integration with social media platforms amplifies campaign outreach and facilitates real-time interaction with users. This robust design supports MyGov.in's mission of fostering transparent, participatory governance.

Challenges Addressed

i) **Digital infrastructure** - The lack of widespread internet connectivity, particularly in rural areas, has been a significant challenge for MyGov.in. To address this, the government launched the BharatNet project, which aims to connect over 250,000 *gram panchayats* (village councils) to high-speed internet. This initiative serves as the backbone for expanding digital connectivity in underserved regions, enabling more citizens to access MyGov.in and participate in its campaigns. For example, rural communities are now able to contribute to discussions on initiatives like the Swachh Bharat Mission and Digital India. Additionally, the government has collaborated with private telecom providers to expand mobile data networks and offer affordable internet plans, which bridges the digital divide. However, challenges remain in ensuring digital literacy and maintaining infrastructure in remote areas, which are critical for sustaining long-term participation.

ii) **Transparency** - Transparency is a cornerstone of MyGov.in's design, addressing citizen concerns about how their contributions are used. The platform publishes progress reports for major campaigns, such as the Clean India Contest under the Swachh Bharat Mission, which include updates on the implementation of citizen-suggested waste management solutions. Contributions are also highlighted on the platform's dashboard, showcasing impactful ideas and recognizing contributors through awards and public acknowledgment. These measures foster trust and accountability that encourage sustained participation. Future enhancements could include real-time tracking of policy integration and a more detailed feedback loop, allowing citizens to see the direct impact of their contributions on governance decisions.

Results

Outcomes and Impact

MyGov.in has successfully driven massive participation in various campaigns, demonstrating its potential to enhance citizen engagement and policy effectiveness.

For example, the Swachh Bharat Mission (SBM) mobilized 17 million citizens, resulting in the submission of over 100,000 actionable ideas for improving sanitation infrastructure and awareness. These contributions directly influenced the construction of 110 million toilets across India, achieving the mission's goal of eliminating open defecation by 2019. Additionally, community-driven solutions proposed via MyGov.in, such as local waste management strategies and sanitation awareness programs, were integrated into government campaigns. Surveys indicate a 98% reduction in open defecation across rural India, showcasing the transformative impact of citizen engagement.

Similarly, the Digital India (2023) initiative, shaped by input from over 200,000 participants on MyGov.in, significantly shaped policies aimed at improving digital literacy and rural internet connectivity. Citizen suggestions led to the formulation of programs like PMGDISHA *(Pradhan Mantri Gramin Digital Saksharta Abhiyan,* or Prime Minister's Rural Digital Literacy Campaign), which has trained over 60 million individuals in digital skills. Furthermore, feedback from MyGov.in informed the expansion of the BharatNet project, connecting over 200,000 *gram panchayats* to high-speed internet by 2023. This initiative has not only reduced the digital divide but also enabled e-governance services to reach remote areas. Plans to extend BharatNet (2023) to 250,000 *gram panchayats* by 2024 were underway, further facilitating broad-based participation.

Campaigns like Startup India also benefited significantly from MyGov.in. Contributions from 50,000 entrepreneurs and stakeholders helped shape policies, such as tax exemptions for start-ups, resulting in the registration of over 80,000 start-ups by 2023. The platform has been instrumental in identifying barriers, such as complex compliance procedures, and proposing solutions to improve the ease of doing business in India. This is reflected in the country's rise in the Ease of Doing Business rankings from 142 in 2014 to 63 in 2020.

Overall, MyGov.in has established itself as a critical tool for inclusive governance, enabling the government to harness crowdsourced solutions that directly improve public service delivery, reduce inequities, and build trust in governance.

FIGURE 3.9

INITIATIVES ON GENDER EQUALITY "BETI BACHAO, BETI PADHAO: CARING FOR THE GIRL CHILD"

Source: www.mygov.in.

Impact on Policy and Community

i) **Decision-making** - MyGov.in has been proven effective in ensuring that citizen voices significantly influence public decision-making, particularly in areas like social welfare, digital infrastructure, and environmental policy. For example, Swachh Bharat Mission that shaped sanitation strategies after receiving over 17 million citizens contributed actionable ideas (Gupta, 2021). Similarly, the Digital India initiative incorporated feedback from 200,000 participants, leading to targeted investments in rural broadband and digital literacy programs (Liu, 2017). These outcomes align with Brabham's (2015) observation that crowdsourcing democratizes policymaking by creating direct channels for public input.

ii) **Service delivery** - Crowdsourcing through MyGov.in has improved the efficiency of government programs by addressing public needs through citizen-suggested solutions. For instance, inputs from the Clean India Contest were used to develop community-led waste management systems, enhancing service delivery in both urban and rural areas. As Sharma (2019) highlights, platforms like MyGov.in enable governments to co-create solutions, reducing the gap between policy objectives and citizen expectations. Additionally, contributions to Digital India led to the expansion of e-governance services, enabling streamlined service delivery to remote areas.

iii) **Evaluation** - The platform has successfully achieved its engagement objectives, with over 25 million registered users contributing 800,000 comments and 100,000 ideas across campaigns. Metrics, such as active participation rates, the frequency of submissions, and the implementation of crowdsourced ideas, are used to measure success (Gupta, 2021). However, as noted by Taeihagh (2017), long-term engagement remains a challenge in digital platforms. Continuous improvements, such as enhancing multilingual interfaces and providing regular updates on the status of citizen contributions, are essential to ensure broad inclusivity and sustained interest.

Unintended Outcomes

While MyGov.in has largely succeeded, unintended outcomes highlight the digital divide in India. Urban areas show significantly higher engagement, with over 65% of urban households having access to the internet, compared to only 35% of rural households (Telecom Regulatory Authority of India (TRAI), 2023). This stark disparity limits participation from rural regions, where low digital literacy and poor connectivity remain significant barriers (Sharma, 2019). For instance, campaigns like Digital India received most contributions from metropolitan cities while participation from Tier-2 and Tier-3 towns and villages was comparatively minimal.

To bridge this gap, initiatives like the BharatNet project and the Prime Minister's Rural Digital Literacy Campaign (PMGDISHA) are being implemented. BharatNet (2023) has connected over 200,000 *gram panchayats* to high-speed internet as of 2023, with plans to expand to 250,000 by 2024, enabling more rural households to access digital services. Similarly, PMGDISHA has trained 60 million rural individuals in basic digital skills, a critical step toward improving rural participation on platforms like MyGov.in. These efforts align with Liu's (2017) argument that addressing accessibility barriers is essential for achieving equitable participation across diverse demographics.

Key Success Factors

i) **Widespread awareness** - MyGov.in's success is largely attributed to the government's robust outreach campaigns across multiple media channels, including social media platforms, television advertisements, and community radio broadcasts, ensuring widespread visibility and participation. Hashtags like #MannKiBaat and #SwachhBharat on X (formerly Twitter) gained millions of impressions, driving more users to engage with campaigns. Additionally, government collaboration with private media partners has amplified the reach of MyGov.in to rural and urban populations alike.

ii) **Incentivizing engagement** - Offering recognition and rewards for participants has been a significant motivator. The Clean India Contest saw top contributors being awarded certificates and had their ideas showcased during high-profile events, such as public address forums by government officials. This not only kept users motivated but also fostered a sense of ownership in national initiatives.

iii) **Technological infrastructure** - Continuous investments in digital infrastructure in the BharatNet project and the development of a mobile-friendly platform have enabled broader participation from regions with varying levels of internet connectivity. The introduction of multilingual interfaces and support for regional languages has further enhanced inclusivity, allowing users from diverse linguistic backgrounds to contribute effectively.

Challenges and Overcoming Them

The platform continues to face challenges, such as low engagement from rural areas due to limited digital literacy and inconsistent internet access. Overcoming these challenges requires long-term strategies, including:

i) **Deploying offline engagement tools** - Incorporating hybrid models where offline community centers, such as Common Service Centers (CSCs), act as intermediaries to facilitate participation from digitally underserved regions. These centers can provide hands-on training and act as submission hubs for MyGov.in initiatives.

ii) **Enhancing rural digital infrastructure** - Expanding the BharatNet initiative to cover the remaining 50,000 *gram panchayats* by 2024 is a critical step. Additionally, launching localized digital literacy drives, similar to PMGDISHA, with a focus on rural women and youth, can further bridge the digital divide.

Best Practices and Recommendations

i) **Transparent feedback mechanism** - Governments should adopt a real-time feedback loop, allowing users to track how their contributions are being incorporated into policies or service frameworks. For example, MyGov.in could introduce a dashboard that maps user ideas to specific policy actions, enhancing trust and transparency.

ii) **Continuous engagement** - To sustain user interest, MyGov.in should offer regular updates on the status of crowdsourced ideas through newsletters, app notifications, and/or social media. Providing gamified elements, such as badges for consistent contributors or leaderboards for top ideas, can keep users engaged. Additionally, organizing regional workshops to discuss the outcomes of campaigns could create a deeper sense of connection and recognition for participants.

Summary of Key Points and Broader Implications

MyGov.in demonstrates that crowdsourcing can be a powerful tool for engaging citizens in governance, enhancing transparency, and fostering innovation. Initiatives like the Swachh Bharat Mission, which mobilized over 17 million citizens with contribution of 100,000 actionable ideas for sanitation policies, showcased how citizen input can directly influence public policy. Similarly, in the Digital India initiative incorporated feedback from 200,000 participants, which helped shape critical policies on rural internet connectivity and digital literacy. This resulted in 60 million individuals being trained under PMGDISHA and the connection of 200,000 *gram panchayats* under the BharatNet project. These examples illustrate how crowdsourced solutions have improved public service delivery and supported national goals.

The platform has also enhanced transparency through progress reports and recognition of citizen contributions. For instance, contributors to the Clean India Contest were publicly acknowledged, with their solutions integrated into waste management policies, fostering trust in the governance process.

The broader implication is that crowdsourcing platforms like MyGov.in can serve as scalable models for inclusive governance in large democracies. By leveraging diverse perspectives, such platforms can bridge the urban-rural divide, as seen by targeted initiatives like BharatNet and regional digital literacy drives. These efforts ensure that voices from underserved regions meaningfully contribute to shaping public policies and improving service delivery. Furthermore, MyGov.in's emphasis on recognition and inclusivity sets a global precedent for participatory governance models, adaptable to countries seeking to enhance civic engagement through technology-driven solutions.

Discussion and Policy Recommendation

Discussion

The analysis of MyGov.in reveals several critical outcomes in the application of crowdsourcing for public sector innovation and citizen engagement. Through MyGov.in, the Indian government has successfully harnessed public input on an unprecedented scale, with over 25 million registered users contributing to more than 100,000 ideas and 800,000 comments (MyGov.in, 2024). This extensive engagement has contributed to more responsive governance and inclusive decision-making.

By using the platform, citizens have been able to directly contribute to policies and initiatives like the Swachh Bharat Mission and Digital India, with the Swachh Bharat Mission alone mobilizing 17 million participants (MyGov, 2024). These contributions have significantly shaped national policies, demonstrating the power of crowdsourcing in fostering collaboration between the government and its citizens.

A key finding of the study is that crowdsourcing, when implemented with robust digital infrastructure, can significantly enhance public engagement in governance. MyGov.in's success is a testament to how digital platforms can transform governance by fostering transparency and collaboration between

citizens and the state. However, challenges, such as the digital divide, sustainability of engagement, and transparency of decision-making processes remain significant.

This case study confirms Brabham's (2015) and Liu's (2017) observations that crowdsourcing can democratize policymaking and enhance citizen participation. At the same time, it also highlights gaps in the literature, particularly regarding the long-term sustainability of citizen engagement and the integration of crowdsourced ideas into policy decisions, challenges that are especially relevant to India's context.

Public Participation

Digital platforms like MyGov.in have demonstrated their ability to drive mass participation in key government initiatives, particularly in urban areas, where internet access is significantly higher (65%, compared to 35% in rural areas). For instance, MyGov.in has over 25 million registered users, with campaigns like Swachh Bharat Mission engaging 17 million participants and Digital India gathering input from 200,000 contributors (MyGov.in, 2024). These statistics illustrate how internet access translates into tangible actual engagement. However, while urban areas boast high contribution rates, rural engagement remains limited due to lower internet penetration and digital literacy levels.

Policy Influence

Although crowdsourcing campaigns attract considerable public input, the integration of these inputs into actual policy frameworks lacks transparency, leading to a disconnect between public contribution and policy action. For example, in the Digital India initiative, citizen feedback influenced the BharatNet project, which aims to connect 250,000 *gram panchayats* to high-speed internet, and the PMGDISHA program, training 60 million individuals in digital literacy. However, only a small fraction of the 200,000 suggestions received were incorporated into policy, leaving many contributors without a clear understanding of how their input was used.

Digital Divide

The disparity between urban and rural participation remains a significant challenge. While urban contributors form the majority of participants due to higher internet penetration (65% of households), rural households, with only 35% connectivity, experience lower engagement rates (TRAI, 2023). Initiatives like BharatNet and PMGDISHA are bridging this divide by expanding internet infrastructure and providing digital training, yet rural participation still lags behind. Addressing this gap is essential for achieving equitable citizen engagement.

Sustaining Engagement

While MyGov.in has been successful in generating initial enthusiasm, with campaigns like the Clean India Contest attracting widespread participation, retaining long-term engagement remains a challenge. This is largely due to the absence of a robust feedback mechanism and limited recognition for ongoing contributions. To address this, the platform could introduce regular updates on the status of crowdsourced ideas, gamification elements (e.g., leaderboards, badges), and incentives, such as awards for consistent contributors. These strategies could foster continued participation and build stronger connections between citizens and governance processes.

Policy Recommendations

To enhance the effectiveness of crowdsourcing platforms like MyGov.in and to address the identified challenges, the following policy recommendations are proposed:

i) **Expand digital access and literacy** - The government must invest in expanding digital infrastructure in rural areas to bridge the digital divide. This includes crucial initiatives like the BharatNet project, which aims to connect 250,000 *gram panchayats* with high-speed internet. Additionally, implementing digital literacy programs and subsidizing internet access for marginalized communities can ensure a broader and more diverse pool of participants, thus enhancing inclusivity.

ii) **Strengthen feedback and transparency mechanisms** - A critical limitations of crowdsourcing platforms is the lack of transparency in how citizen inputs are incorporated into policy decisions. Governments should establish transparent feedback loops, where citizens are regularly updated on how their contributions are being used. Regular progress reports and explanations for why certain suggestions may not be feasible will help build trust, improve accountability, and ensure sustained long-term engagement.

iii) **Incentivize continued engagement** - While initial campaigns generate high levels of participation, sustained long-term engagement remains a challenge. Introducing incentives, such as recognition programs, awards, or certifications for continued contributions can encourage repeat participation. This would foster a sense of ownership among contributors and motivate them to stay actively involved in the long run.

iv) **Improve inclusivity of crowdsourcing campaigns** - Special efforts should be made to design campaigns that appeal to diverse demographic groups. This includes addressing language barriers, making the platform mobile-friendly, and ensuring accessibility for people with lower literacy levels. For example, adding support for regional languages and voice-based interfaces can encourage greater participation from rural populations, where literacy rates may be lower.

v) **Institutionalize crowdsourcing in governance** - Crowdsourcing platforms like MyGov.in should be institutionalized as a permanent feature of the Indian governance system. This would formalize its role in policy design and evaluation, ensuring every major government initiative includes a dedicated crowdsourcing component, which allows citizens to provide input at multiple stages of the policy process. Institutionalizing crowdsourcing will provide a structured approach for citizen-government collaboration.

vi) **Leverage data analytics to inform policy** - The vast amount of data collected through MyGov.in can be effectively utilized through advanced data analytics. These tools can help identify trends, preferences, and emerging issues from citizen contributions, enabling more targeted and informed policymaking. For example, analyzing contributions from 17 million participants in Swachh Bharat could reveal trends that could further improve sanitation policies.

Limitations and Weaknesses

i) **Digital divide** - The platform's reach is constrained by the digital divide, limiting participation from rural and marginalized communities. Although platforms like BharatNet are working to improve rural access, full digital inclusion remains a challenge.

ii) **Integration of crowdsourced ideas** - The study was limited by a lack of data on the long-term impact of crowdsourced ideas on policy. While initial participation metrics are available, there is insufficient information on how crowdsourced ideas have been integrated into policy and their long-term impact on governance.

iii) **Comparative insights** - The absence of comparative data from other countries limits the applicability of findings beyond India. Comparative studies would offer valuable insights into how different governments implement and sustain crowdsourcing initiatives.

iv) **Exclusion on nondigital users** - Overreliance on digital platforms as the primary means of engagement excludes citizens who lack access to digital devices or internet connectivity, raising concerns about inclusivity.

v) **Sustainability of engagement** - The lack of strong follow-up mechanisms for contributors can also lead to disillusionment over time, reducing engagement sustainability.

Conclusion

This case analysis sought to answer the main research question: How can crowdsourcing be effectively utilized to enhance public governance and citizen engagement in India through MyGov.in? The detailed examination of MyGov.in highlights the significant potential of crowdsourcing to democratize governance, improve transparency, and establish direct channels for citizen participation in policymaking. The platform's success in mobilizing millions of citizens for campaigns like Swachh Bharat Mission (with 17 million participants) and Digital India (with contributions from 200,000 citizens) demonstrates that large-scale digital engagement can have a profound impact on national initiatives.

The research process involved analyzing MyGov.in's operational structure, identifying its challenges, and evaluating the outcomes, thus providing insights into both strengths and areas for improvement. A key contribution of this research is its exploration of how digital platforms can enhance innovation in governance by involving citizens in co-creating policies and services. MyGov.in serves as a case study that showcases how crowdsourcing can foster trust, transparency, and civic responsibility when designed with inclusivity and accessibility in mind.

However, this research also brought to light several challenges, including the digital divide, where only 35% of rural households having internet access compared to 65% in urban areas, and the difficulty of sustaining long-term engagement. Additionally, the lack of transparency in the process of integrating crowdsourced ideas into policies remains an issue, creating a disconnect between citizen input and tangible policy changes. These factors limit the full potential of crowdsourcing in India, particularly for marginalized groups facing barriers to digital access and participation.

New Knowledge Contributed

i) The study revealed that while crowdsourcing can engage citizens in governance, sustaining participation requires long-term strategies, such as improved feedback mechanisms, recognition programs, and digital literacy initiatives to address barriers faced by underrepresented groups.

ii) Crowdsourcing in governance can be more effective if complemented by clear pathways for incorporating public contributions into policies, supported by transparent decision-making processes. Providing regular updates on how citizen input is used would enhance trust and long-term participation.

iii) The study identified the critical need for a data-driven approach to continuously monitor and evaluate the impact of crowdsourced solutions on public services and policies, emphasizing its critical requirement for future research.

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CHAPTER 4: MALAYSIA

THE PROMISE AND PERIL OF TN50: CROWDSOURCING AND POLITICAL CHANGE IN MALAYSIA

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Abstract

Crowdsourcing is an approach that enables governments to generate new ideas and address complex problems. It offers new perspectives and insights on a wide range of issues, with implementations spanning from local municipalities to national policies. In Malaysia, the focus on crowdsourcing has primarily been within the gig economy, particularly in hiring technical services rather than involving the public in planning and structuring. This reflects the traditional top-down decision-making approach prevalent in the Malaysian government, where policies are formulated within a parliamentary democracy framework. Historically, policymaking has been dominated by a single party for the past six decades, prior to the current shift in government, which inherited leadership post-colonialism. Crowdsourcing, which involves the public in policymaking thought process, is virtually unheard of in Malaysia.

However, in 2017, the sixth Malaysian Prime Minister, Najib Razak, introduced *"Transformasi Nasional"* (TN50/National Transformation), marking the conception of a crowdsourcing initiative in the country. This was an effort to crowdsource aspirations, ideas, opinions, and concerns of the nation, especially from the youth, for nation-building and policymaking. TN50 was designed to be implemented in phases over several years. The first phase involved town hall sessions and gatherings with diverse groups, including youths, activists, medical practitioners, entrepreneurs, and many more, to collect ideas and aspirations in the respective areas. These collated information were later discussed by academicians and government officials in the second phase. Unfortunately, TN50 was halted during its formative phase due to political instability and looming scandals, ending the six-decade reign of the ruling party. This initiative provides an insight into what could have been a transformative shift in Malaysian politics, which has been tainted by distrust and manipulation. This report highlights the potential of crowdsourcing while emphasizing the importance of the right timing, public sentiment, and political stability for its success.

Introduction

Crowdsourcing is a method of gathering information and input from the public to address problems and is widely used in the gig economy and various industries. It enables a broader and more diverse evaluation of issues, and has been applied in policymaking and evaluation. More importantly, it allows the involvement and engagement of citizens through innovative, cost-effective solutions. This allows insights into overlooked or underrepresented problems. While crowdsourcing may appear common at lower local municipal level, integrating it into national policies is a rarity and can be a colossal task.

In Malaysia, *"Transformasi Nasional"* (TN50) stands out as a significant example of large-scale crowdsourcing within the government. This government inaugural project was initiated in 2017 by Malaysia's sixth prime minister, Najib Razak. It aimed to gather public aspirations and ideas to shape national policies until 2050. TN50 was envisioned to transform Malaysia into a reformed nation within three decades (2050 National Transformation, 2017).

This initiative aimed to create a blueprint crafted by the youth across all backgrounds, in charting a vision for the country's future. The effort saw the participation of 500 youth leaders alongside Najib Razak, where a new era of bold and youth-driven policies were to drive the future of Malaysia. It involved collecting and compiling public ideas and opinions across various sectors through a series of events, including dialogues, surveys and roadshows conducted at universities and town halls nationwide. The series of meetups involving the youths and the government, planned over months and years, aimed to outline aspirations and plans for shaping Malaysia's by 2050 (Lee, 2017). The Ministry of Youth and Sports spearheaded this effort, compiling and assessing the gathered aspirations to form a blueprint for Malaysia's future.

The initial period aimed to establish the nation's spirit and philosophy of the nation in constructing its version of national foundation. In the following year, an assessment was to have been conducted on the compiled ideas and suggestions across categorized areas and sectors, involving experts and academicians. This was then to be further refined in 2019 into a documented blueprint outlining the aspirations of Malaysian youth and the voices of the people.

However, it was short-lived due to a change in government in 2018. As a result, TN50 remained in its formative phase and never reached the implementation stage. This initiative lasted only a year, during which aspirations were gathered before being abruptly halted. Nevertheless, given that TN50 is a large-scale effort in crowdsourcing aspirations and ideas, especially among the youth, it warrants analysis to extract its objectives, methods, and aims. Such an initiative is rare in Malaysia due to its demographic and multiracial complexities, making TN50 a significant effort despite its premature conclusion.

This leads to two key research questions: (i) how has crowdsourcing been implemented in Malaysia; and (ii) how did TN50 attempt to establish a bottom-up approach to policymaking? This report will investigate these questions, analyze the TN50 initiative, and identify lessons learned and potential improvements for future government initiatives.

Focus and Scope of Case Analysis

The focus on this report is analyzing TN50 as a national-level crowdsourcing model by the Malaysian government. It examines the initiative's nature, background, and context as well as detailing its stages and objectives. The report will also explore the scale and extent of the effort, aiming to understand its successes and shortcomings.

However, this report is a literature-based research. It relies on existing publications and relevant accounts of information, which proves to be limited due to the change in government. Nevertheless, it attempts to provide insights into the nuances of TN50's implementation and how it can be improved. This is particularly relevant when dealing with the previous government, which initiated TN50, as it is now part of the current coalition. It is pertinent to understand these dynamics for identifying lessons and best practices for future policymaking.

Methodology

The research employs three-pronged approach:

i) **Library research** - The research involves a descriptive evaluation of original publications on crowdsourcing in Malaysia. This evaluation includes a critical appraisal of sources, primarily from government websites, to provide insights into policymaking efforts.

ii) **Data collection** - This important aspect of the methodology is carried out by examining the central rationale and objectives behind the government's crowdsourcing initiatives.

iii) **Comparative approach** - The approach is utilized to analyze and contrast the objectives, models, results, and contextual nuances of crowdsourcing outcomes.

All aspects of this study are conducted within a desk relying heavily on documented and published primary sources.

Literature Review

In analyzing "Multi-perspectives Crowdsourcing Ecosystem in Malaysia" by Norjansalika Janom, crowdsourcing is described as a widely used method and is an established industry where corporations engage the public in various tasks in exchange for monetary incentives (Janom et al., 2020). The Malaysian government has also sought to integrate this industry economically in providing newer avenues and opportunities for the public. This approach enables the utilization of multiple skill sets and the establishment of a gig economy. For instance, the government-linked company, Malaysia Digital Economy Corporation (MDEC), initiated programs like "eREZEKI", a platform offering crowdsourcing opportunities to Malaysians.

This paper highlights government and industry involvement in crowdsourcing, though it remains in its formative phase. It primarily focuses on generating digital job opportunities rather than policy development. There is limited use of crowdsourcing to gather public opinions or facilitate policy construction, warranting further investigation into its micro- and macro-level applications in policymaking and the reasons for its limited favorability.

With the lack of crowdsourcing in Malaysian policymaking, the government information booklet *"Masa Depan Negaraku"* (My Nation's Future) by the Ministry of Communication and Multimedia becomes one of the main references for understanding TN50 (Jabatan Penerangan Malaysia, Kementerian Komunikasi dan Multimedia Malaysia, 2017). TN50 was a significant effort and a potential game-changer for the then-government of Najib Razak. It aimed to further build on the fourth prime minister, Dr. Mahathir Mohammad's Vision 2020, complemented by youth participation and grassroots involvement. This grand master plan was divided in stages, starting with a broadcasted nation-wide road tour addressing major areas and segments of administrations, including, youth, economy, industry, and entertainment.

Introduced in 2018, the blueprint lacked detailed strategies for materializing the aspirations. Nevertheless, it served as a framework for collecting nationwide responses, which were later distilled and discussed by professionals, academics, and officials. However, the lack of detailed planning must be assessed within the context and nuances of the political climate at the time.

The analysis of TN50 is, however, further limited by its premature halt following Najib Razak's deposition. As his brainchild, TN50 came to an end, leaving little written about its implementation. However, in "Malaysia's Transformasi Nasional 2050 Brings Bold New Style, but to What End?", Lee Hwok Aun critiques the bottom-up approach, suggesting it could be exploited as a political instrument.

TN50, in Malaysia, is a new method of policymaking. It can be identified as a means for popular endorsement and political milage. Yet, being in its formative phase, it lacked solidification and was full of uncertainties, compounded by a government heavily tainted on a scandal that ultimately let to its downfall. There were many challenges that included conflicting aspirations and the difficulty of balancing formalized quantitative targets with popularity-boosting decisions. This raises questions about the feasibility of crowdsourcing in the country like Malaysia, where policymaking is traditionally top-down and thus politically driven.

Nevertheless, there are some scholarly works on TN50 which highlight the importance of understanding and documenting the concerns of the youth as a basis for analysis. *"TN50 Generasi Muda: Suara Kepimpinan Masa Hadapan"* (TN50 Youth Generation: Voices of Future Leadership) by Sudin et al. (2017) discusses TN50's aim to position Malaysia among the top 20 nations in economy, innovation, and prosperity. They strongly believe the TN50's approach encourages youth leadership in areas like politics. TN50 allows thoughts to be shared, which fosters discourse of dialectical process and addresses root issues. The youth needs to be exposed to differences in policies and political opinions for a shift at the helm; they must be allowed to take charge and make decisions, and TN50 enables for such process to take place. However, the paper lacks raw data on the ground, evidence of implemented policies, and insights into conflicting aspirations, as it was written during the formative period of TN50.

In "National Transformation Plan 2050 (TN50) vs Environmental Ethics: Towards Achieving Sustainable Development Goals,", Abas et al. highlights TN50's focus on sustainable development as part of the central theme in policymaking (Abas et al 2018). They compared TN50's development from the New Economic Policy in 1970 and the Vision 2020 in 1991 to a project emphasizing environmental protection and sustainable futures. It features advancements in biotechnology, renewable energy, and eco-friendly building designs. These, however, remain broad themes rather than specific policies, reflecting the initiative's early stage of development.

Case Analysis through the Model

Situation

The selection of TN50 as a case study in crowdsourcing focuses on a governmental model designed to outline policies and shape the future of 30 million Malaysians over the period of the next three decades. This ambitious initiative would have eventually stumbled on a multitude of challenges as it sought to spearhead national transformation. To better understand the motivation and intention behind its conception, a background history is needed for context.

Malaysia is a multiracial nation with a long history of colonial rule. Before its formation in September 1963, through the amalgamation of Sabah and Sarawak from Borneo with Peninsular Malaysia's nine states, the country has experienced extensive interactions with colonial powers, including the Portuguese, Dutch, British, and Japanese, for centuries.

The formation of Malaysia brought together diverse stakeholders who were united by shared struggles against the colonial rule. The population consisted of diaspora communities that had migrated due to colonialism and indigenous groups who fought against the invaders before agreeing to this independence. Decades of governance with such a diverse demographic led to a predominantly top-down approach, often accompanied by several major tensions. One major turning point was the May 1969 riots, where the Malays and Chinese rioted and violently fought against one another and caused multiple casualties. This led the county going under a state of emergency, and becoming a turning point in the nation's education policy. The government reshaped the education policy with the objective to foster national unity. Any attempt to gather public aspirations during that period might have risked escalating racial tensions and further marginalizing minority communities. As a result, Malaysia has always had a top-down ruling. The complexity in racial- and religion-dominated politics also added to such ruling.

Additionally, the state of Sabah and Sarawak, physically separated from Peninsular Malaysia, comprises multiple ethnic groups with distinct demands and beliefs. Sarawak alone has approximately 64 ethnic groups, each with unique concerns. Understanding these complexities highlights the need for a deeper analysis of TN50 as a crowdsourcing-based policy model. The study examines TN50 through three key aspects: its crowdsourcing model and designs, the factors contributing to successful crowdsourcing implementation, and challenges and lessons drawn from public-sector crowdsourcing.

TN50 was aimed at achieving a radical transformation for the nation from its conception until 2050. It envisioned a collaborative effort involving the people to collectively build the future. The initiative sought a national transformation in the aspect of economy, society, and the mindset of the people. TN50 objectively aimed to position Malaysia among the top 20 developed countries, adopting a bottom-up approach. This vision was built upon identified challenges, especially as the 2020 approached. It served as a continuation of the earlier Vision 2020, introduced by Dr. Mahathir Mohamad, the fourth Malaysian Prime Minister, in 1991. Vision 2020 aimed to project Malaysia as a modern and advanced nation while retaining its traditional framework. Mahathir called for the establishment of a unified Malaysian race, creating a liberated, secure, and developed Malaysian society. He emphasized fostering a democratic society, ensuring morality, cultivating a liberal and tolerant society, building a scientific and progressive community, and promoting a just, economically capable, competitive, and caring society (Mohamad, 1991). These goals were set to address the challenges of the 1990s leading up to 2020.

However, as Malaysia approached 2020, several new challenges emerged, prompting the creation of TN50 to sustain the aspirations of Vision 2020. Some of the challenges listed were the increasing trend of urbanization. It was expected that 80% of the world population will be living in the city by 2030, alongside the growth of highly populated urban centers. Additionally, concerns over resource scarcity, food security, and reliance on technological advancement, including AI, were highlighted, alongside the potential reduction in job opportunities. Malaysia also faced the prospect of becoming an aging nation, with a growing elderly population. The growing influence of extremism and shifting global political dynamics were also noted as possible threats, if left unaddressed.

To tackle these challenges, the government proposed brief solutions while encouraging public participation and input. For urbanization, the government proposed the construction of the East Coast Railway, which connects the entire peninsula with high speed trains. The government also introduced agencies, such as the Sustainable Energy Development Authority (SEDA) to ensure sustainable and sufficient sources of energy. The Digital Free Trade Zone (DFTZ) and the Malaysian Global innovation and Creativity Centre (MaGIC) were established to address rapid technological advancement.

TN50 also aimed to raise the retirement to 60 and planned for pension schemes within the private sector to support the aging population. Additionally, TN50 focused on expanding networking with emerging nations, such as PR China through initiatives like the One Belt One Road project and further investments with Saudi-owned Aramco. To counter extremist influences, the middle way approach (Wasatiyyah) was introduced. These were some of the plans enlisted by the government to address future challenges and possible threats in the future while sustaining the goals of Vision 2020.

TABLE 4.1

LIST OF TN50 SOLUTIONS

Proposed Solutions in TN50	
Economic solutions	Construction of East Coast Railway
	Formation of agencies, such as the Sustainable Energy Development Authority (SEDA)
	Digital Free Trade Zone (DFTZ)
	Malaysian Global innovation and Creativity Centre (MaGIC)
Public services	Increment of retirement to 60
	Pension schemes within the private sector
Geopolitical relations	Involvement in One Belt One Road
	Investment in Aramco
Counter extremism	Wasatiyyah approach (Islamic middle ground)

Nevertheless, this is where the public got involved with their aspiration and thoughts. Dialogues were held, primarily targeting the youth. Upon its conception in January 2017, a nationwide tour was conducted in each state, engaging youth and youth-centered organization while also open to the public. The tour ran from February to May 2017. During these dialogues, a total of 585,000 youth participated, and 26,000 responses were gathered.

The roadshow itself was divided into different groups and discussion topics. For instance, two separate sessions were held in the same locality in Sabah, namely, "Dialog TN50 KLDM Kadazan Dusun Murut" in Penampang in March 2017 and "Siri Dialog TN50 Sabah" in Kota Kinabalu in February 2017. The former session focused on the largest ethnic in Sabah, the Kadazan Dusun Murut, while the latter addressed Sabah in general. During the roadshow, massive interactive booths and exhibitions were set up, with personnel explaining the program's objectives. This was followed by a dual-formatted dialogue, where first, a moderator facilitated a town-hall style discussion by presenting scenarios, and second, a traditional upfront speaker addressed the audience. Concurrently, there were also interviews and forums that were broadcasted on major television news channels and online platforms to share aspirations.

Toolkits, such as leaflets of previous policies, were provided. These materials listed problems, analyzed them, and proposed policies, along with a roadmap for TN50. The main themes and topics of discussion were shared prior to town hall sessions. For instance, a town hall at Universiti Malaya was publicized by administrators with pre-shared topics and themes. Online links were provided to collect aspirations as the dialogues could only accommodate a limited number of participants. The first five roadshow locations included Sabah, Kedah, Perak, Terengganu, and Johor, with a participation of 700–1,000 youths in each session. These roadshows were conducted using the town hall format.

Upon completion of the first phase, a dialogue known as the "Circle of the Future" commenced. Previously gathered aspirations were discussed with 10 youth representatives and three subject matter specialists, based on respective themes and areas of concern. This was aimed to facilitate deeper discussion of contrasting opinions and clashing thoughts, guided by expert objectivity. These sessions took place from March to September 2017. Concurrently, forums and debates on the analyzed aspiration were conducted by youth and experts. Smaller sessions were also held with specific community segments, such as activists, women's rights groups, groups with disabilities, soldiers, and artists.

Subsequently, the collected aspirations were compiled into a full report and presented on Malaysia Day on 19 September 2018.

Issue/Problems

In addressing the issues and challenges of 2020 and the decades ahead, TN50 was introduced. The problems and issues were outlined in the previous section, serving as the rationale behind the introduction and creation of TN50. Some of the listed challenges, include increasing reliance on technology, the rise of AI, and the resulting lack of jobs, which prompted the introduction of TN50. However, this section also aims to highlight the difficulties faced when implementing crowdsourcing in national policymaking. It seeks to emphasize that large-scale crowdsourcing is not straightforward and requires innovative solutions for effective implementation.

The effort to advance TN50 is monumental and will reshape the trajectory of the nation. The scale and complexity of this endeavor meant it required careful consideration of multiple factors, which must be thoroughly analyzed and studied. What may not pose an issue in crowdsourcing on an economic gig for a municipal or city-level initiative is vastly different from the challenges at a national policymaking level.

For TN50 to succeed, a stable political environment was essential to ensure its implementation and enforcement. However, TN50 was faced with political turmoil, namely, multiple lurking scandals, perceived incompetence in the ruling government, and ongoing economic challenges. The aim of applying crowdsourcing through TN50 was clear: to provide a platform for the opinions, aspirations, and views of the youth and the general public to be heard and acted upon. It also aimed to harness

expertise and diverse perspective to incorporate a grassroots approach. These aspects were further elaborated through examples from 2015 to 2018, which illustrated the difficulties faced by TN50 despite its innovative and ambitious vision. On top of that, there were also unfavorable political scenarios for Najib and the ruling government that further complicated the plan. Ultimately, the inability to control factors shaping the government's image and public segment made it challenging to carry out TN50 effectively.

In implementing TN50, challenges arose that were specific to the then government and main political actors. It created a perception that a particular period and individual, such as Najib, were to be blamed and that removing them would solve the problem and enable the implementation of policymaking crowdsourcing. This, however, was a false belief, as the issue extended beyond figures and regimes. The problem laid deeper than Najib, and overcoming him alone would not ensure smooth crowdsourcing, especially at such a colossal scale. Nevertheless, it was pertinent to clarify the issues and problems faced by the 2018 Malaysian government in implementing a public-driven policy. TN50 was primarily tainted by poor governance, politically driven narratives, and fundamental sustainability issues.

The common narrative for the public on the failure of TN50 revolved around the overwhelming image of corruption in the government led by Najib. While this notion was not completely incorrect, the inability to fully understand the issue reflected an inability to address challenges of implementing crowdsourcing at a national level. First, it is important to address the most widely held public belief about the downfall of Najib and, by extension, TN50 (Beech et al., 2018). Najib was drowning in the scandal involving MYR2.6 billion (approximately USD681) linked to the 1Malaysia Development Board (1MDB), a government investment fund. Notably, the funds were deposited into Najib's bank account, which he claimed were donations from the Middle East (Najib Razak was found guilty on seven charges in the 1MDB scandal, 2020).

He was also tainted by alleged ties to the murder of Altantuya Shaariibuu, a 28-years old Mongolian translator in 2006. She was kidnapped, shot, and killed using military grade explosives (Jolley, 2023). Najib faced further backlash due to the removal of several political figures, including Dr. Mahathir Mohamad, who was his former mentor. Mahathir, who retired in 2003, returned in 2015 and became highly critical of Najib and his administration. He publicly criticized Najib over the 1MDB scandal and Altantuya's murder, which damaged Najib's reputation significantly. In response, Mahathir was removed from his positions as advisor of Petronas, Malaysia's petroleum corporation, and chairman of Proton, the national car company (Nadzri, 2018). Mahathir's son, Mukhriz, who was then chief minister of Kedah, was also dismissed. Najib further ousted Muhyiddin Yassin, deputy prime minister and deputy president of United Malays National Organisation (UMNO), and Shafie Apdal, minister of rural and regional development and vice president of UMNO, both of whom had criticized Najib's scandals. This revealed a fearful Najib, intolerant of criticism, and highlighted how TN50, despite its potential, was insufficient to address these deep-rooted issues.

The situation was made worse when Najib introduced several draconian and authoritarian measures that contradicted his later efforts to promote crowdsourcing through TN50. First was the introduction of the National Security Act in 2016, which allowed the prime minister to declare a state of emergency and assume complete control over the security forces. This was compounded by the passing of the Anti-Fake News Act , which aimed to prevent the spread of news deemed fake (Nadzri, 2018). These actions were starkly opposite to the promise of TN50, making it difficult to belief the initiative was nonpolitical.

TN50 aimed to collect the opinions and aspirations of the youth and the general public. However, its success was heavily influenced by the prevailing political climate, which shaped public responses and translated into the aspirations gathered. During Najib's regime, cash handouts known as Bantuan Rakyat 1Malaysia (BR1M) were distributed to the public right from 2012. In addition to doubling the amount, there was an annual salary increment for public servants after years of stagnation before the 2018 election. These actions led to TN50 being perceived as politically driven and used as a personal tool. Furthermore, the government's tight control over traditional media, with the introduction of the

anti-fake news law, pushed political discourse to alternative portals and platforms, such as Facebook Live and Whatsapp (Nadzri, 2018). This shift garnered significant traction and ultimately contributed to the government's downfall, as the negative effects of controlling traditional campaigning became evident. For instance, Mahathir's Facebook Live session attracted 200,000 views, compared to Najib's 5,000 views on the final day before the election.

Economically, TN50 faced huge challenges in its implementation due to the financial realities and sustenance difficulties. Najib's administration grappled with the high cost of living (Nadzri, 2018) with stagnant incomes and soaring housing prices. These issues were exacerbated by the introduction of goods and services tax (GST) amid high cost of living and cuts to subsidies on basic necessities, such as sugar, flour, and cooking oil. Despite the rationale behind these measures, the public perception was far from ideal, making it difficult for TN50 to gain traction.

TN50's vision of empowering the youth and public to express their aspiration and shape the nation's future over the next 30 years seemed murky, given the lack of confidence and the long list of unresolved issues. These problems made it difficult for TN50's implementation, rendering the initiative nonoptimal for an effort that required the trust and involvement of the grassroots. Years of authoritarian and politically driven policies by the same individual now offering change and opportunities further undermined the initiatives credibility.

Solution

The key aims of TN50 was to ensure the engagement of youths in shaping Malaysia's future by 2050. TN50 hoped to achieve a radical transformation by fostering ongoing discourse, especially among the youth, to address current and future challenges. This initiative began with a series of dialogues, also known as national discourses, to map the direction of the nation on a new "canvas", a concept symbolizing a fresh start. During its initial phase in 2017, youth were engaged to spark awareness of their role in nation-building and to highlight the available avenues for participation. This groundwork was intended to evolve into concrete milestones and concrete goals by 2018, with the involvement of experts to address global challenges and megatrends.

Several objectives were outlined, such as increasing the nation's GDP to MYR2 trillion within eight years and positioning Malaysia among the top 20 nations in innovation and creativity indexes. With such broad and ambitious targets, TN50 planned phases of discussions and dialogues from 2017 to 2019, culminating in a blueprint to be released in 2020. This blueprint would then be updated every two to three years to reflect ongoing changes (Jabatan Penerangan Malaysia, Kementerian Komunikasi dan Multimedia Malaysia, 2017).

Some of the challenges addressed in TN50 include the growing population and how it will impact the environment and issues of food security. Higher life expectancy was expected to drive up the cost in healthcare while major migratory trends from rural to urban areas would create an overflowing of demands in terms of basic needs in an overpopulated economic region. Additionally, the production and service industries were anticipated to shift toward greater reliance on AI and fully automated system. Privacy concerns arising from the advancement of science and technology was also highlighted as critical areas of focus. Furthermore, the rise of economic powerhouses, like PR China, India, and Indonesia, alongside rampant climate change, necessitates adaptation and preparation. The intention behind TN50 was to create preemptive blueprint that incorporates the aspirations and inclusivity of the youth (Jabatan Penerangan Malaysia, Kementerian Komunikasi dan Multimedia Malaysia, 2017).

This was to be implemented by recording the aspirations and suggestions in accordance to specific themes and specific major areas. Some of the focused themes include:

- Healthy, safe, and efficient environment
- Active and inclusive lifestyle
- Sustainable ecosystem

- Inclusive society
- Global influence
- Competitive economy and workforce
- Effective workforce

The modus operandi for implementing TN50 involved organizing town halls where discussions were held at district, state, and national levels. Additionally, an online survey was conducted via a dedicated online platform to ensure broader reach and participation. Experts and individuals from stakeholders groups were identified to facilitate focused group discussions in specific themes and areas.

Replicating such crowdsourcing efforts is challenging but feasible, as demonstrated by the solution listed above. This approach involves identifying problems within a defined timeframe and engaging relevant stakeholders to provide input and opinions on addressing these issues. Aspirations and suggestions are collected within a period of one year and later analyzed by academicians to inform the implementation of policies. These inputs are then categorized and divided into different sessions according to themes and subject matter.

However, the proposed solutions listed here will also address challenges in implementing national policymaking through crowdsourcing. It is worth mentioning that such effort are heavily influenced by various political dynamics, power structures, and the nation's economic conditions. Addressing problems and viewing crowdsourcing as a solution for policymaking without acknowledging these aspects is bound to result in a messy outcome, as seen with TN50. The nuances and context of implementing large-scale policies through crowdsourcing are extensively discussed in the problems and issues sections to provide a clearer understanding. Thus the introduction of solutions focusing on organization, stakeholder involvement, strategy, and most importantly, narrative are developed.

In assessing the limitation posed by political instability, TN50 was brought to a standstill after a year of gathering aspirations and conducting public dialogues. This shows the importance of a stable political environment for the successful implementation of national policymaking through crowdsourcing. The scandals surrounding Najib Razak, especially with the 1MDB controversy, made it difficult to separate the importance of the initiative from the political baggage. The need to address the failure of vision 2020 and introduce a renewed overarching theme to tackle legitimate challenges was often perceived as a political tool for personal gain, given the deeply rooted narrative of the ruling government. A failure to address this narrative will hinder the implementation efforts like TN50. While complete political stability is difficult to achieve, crowdsourcing must be conducted in a timely manner to avoid speculation of entablement with ongoing issues, such as 1MDB. Otherwise, it risks exacerbating the perception that crowdsourcing is merely a cover-up or a political tool.

Additionally, it is vital to establish a narrative of change prior to the introduction of crowdsourcing. Despite the appointment of a charismatic and promising minister, Khairy Jamaluddin, as the face and coordinator of TN50, this was insufficient to counter the years of damages caused by Najib's administration. Najib Razak was seen as insensitive to the plight of the people and self-centered, particularly with the ousting of political competitors. Most of his policies prior to TN50, such as the introduction of GST and stagnant salary grade, contradicted the initiative's goals. Years of top-down, contradictory policies made the implementation of a bottom-top approach like TN50 nearly impossible. For large-scale crowdsourcing efforts to succeed, a believable and people-centric narrative must be established as part of this process.

Results

Achievements

According to then Prime Minister, Najib Razak, TN50 was deemed as the Malaysian Dream.

"We have a dream…we Malaysia have a dream and TN50 is our dream." (Babulal & Annan, 2018).

Just as Vision 2020 was the ideal that inspired Malaysians to dream of the future and captured the possibilities of a progressing nation, TN50 aimed to continue this legacy with an unprecedented level of inclusivity never seen before. Despite being in its formative phase and short-lived, several efforts signaled promising support and rallying from the public. Khairy Jamaluddin, the then Youth and Sports Minister, attended nearly 135 dialogues, while Najib Razak participated in 11 major dialogues, engaging for hours to gather grassroots concerns and ideas. Khairy emphasized that these efforts laid the fundamentals for nation-buildings in the years to come.

"Khairy said the National Transformation 2050 (TN50) Youth Canvas will be the "foundation-document" that would be used to chart the country's policies and priorities, from this year on. The canvas was also a document that would be updated every year so that it remains relevant with time and serves its purpose. Khairy shared six themes identified in the document which covered youth aspirations dealing with issues relating to the globe, equitability, sustainability, unity responsibility and attentiveness." (Lee, 2017)

Close to 2 million Malaysians were engaged in preparing the National Transformation 2050 (TN50) Youth Canvas (Babulal & Adnan, 2018). In total, about 135 dialogues were conducted, involving diverse groups ranging from student activists to town halls dedicated to professionals in the film industry. Approximately 100,000 participants attended, contributing 60,000 aspirations, which were further analyzed and critiqued by experts from numerous fields.

Based on an interview with Khairy Jamaluddin, the success of TN50 was measured by its ability to gather aspirations aimed at shaping visions for the future. The involvement of 2 million youths went beyond expectations, with many showing spirited enthusiasm in getting involved. Some of the major issues highlighted included challenges in heavily subsidized healthcare, threats of food security, and the nation's readiness to embrace the Fourth Industrial Revolution (IR4.0) (Khairy Jamaluddin, 2018). This was shocking as Khairy did not expect the youth to be so passionate, noting that most concerns were pertaining future threats over the next three decades. This demonstrated the active involvement and interest of a significant portion of Malaysia's younger population. He emphasized that the youth's concerns extended beyond material development, where they focused on the sustainability of current development and demanded greater attention to rural areas, such as Sabah and Sarawak (East Malaysia, Borneo). These concerns reflected a desire for immediate change, with many expressing fatigue over rhetoric and were eager to contribute to tangible solutions.

The inclusion of the youth allowed their voice to be heard, marking a departure from past practices. According to Khairy Jamaluddin, accessibility to education was another growing concern as well as the frequent calls to reduce the disparities between urbanized and less developed regions (Khairy Jamaluddin, 2018). During the engagement of over 100 town hall sessions, Khairy often acted as a moderator, allowing participants to steer the direction of discussions. The topics frequently raised included housing affordability, job opportunities, and global challenges, with participants seeking solutions. This had shown how such sessions had a balance of philosophical and ethical considerations and the everyday struggles of survival highlighted the session's ability to capture a wide spectrum of opinions for further analysis.

Although the collected data remains unavailable for public viewing due to the project's discontinuation, the engagement is a bright indicator of the youth's interest, participation, and engagement. This model, despite the lack of documented information and data, serves as a promising example to emulate if given the opportunity and time.

Key Success Factors (KSF)

Challenges and Lessons in Public-sector Crowdfunding

TN50 served as a platform of hope and reformation, where the voices of the youth were heard and valued. It aimed to bring change during a complex and unstable period, marked by the declining popularity of the government. Despite the positive reception of TN50, it was insufficient to overshadow the ongoing tainted scandals. What appeared as a timely transition from Vision 2020 to a much-needed, well-intentioned effort was also arguably perceived as a political tool.

"Political leaders are also prominently involved, actively rallying support for the ruling coalition while engaging with audiences at TN50 events. With the 14th General Elections looming, TN50 evidently plays a role in enhancing the ruling coalition's popularity, especially among young voters." (Lee, 2017).

This was done during a period when Barian Nasional's (BN or the National Front is a political coalition of Malaysia) popularity was at its all-time low (Malaysiakini, 2015). Having ruled for 60 years as the only political party since independence, political ups and downs were inevitable. However, the prospect of a complete shift in the political landscape and the downfall of BN seemed unthinkable at the time. That highlights the profound impact of the ongoing 1MBD scandal, which had affected and clouded the mood of the masses.

"Since international public disclosure in 2015 of former Malaysian premier Najib Razak's purported siphoning of billions of ringgits from 1MDB, the scandal continues to be a trending topic on Malaysian social media. The online discourse of 1MDB evolved from heated posts discussing Najib's culpability and criticism of his Barisan Nasional administration, into support to the opposition Pakatan Harapan coalition, particularly in the run-up to the 14th Malaysian General Elections (GE14) that was held on 9th May 2018. Pakatan Harapan's win, following the social media support, exemplifies the power of a netizen-fuelled 5th estate." (Taylors University, Malaysia et al. 2020).

Thus TN50 became a missed opportunity following the change in government, but more importantly, it symbolized a message of distrust and political maneuvering by Najib Razak, despite its pioneering approach to inclusivity. It ultimately ended up being viewed as an instrumental rationality, tainted by efforts to mask the nation's anger and distrust. This led society to instinctively reject the initiative, regardless of its potential benefits. Undeniably, TN50 had potential and was worth pursuing, despite its rough edges and a work in progress. However, within the context of the 1MDB scandal, it was destined to fail from the outset.

The biggest challenge lies in addressing the nuances of implementing a large-scale policy involving crowdsourcing. It cannot be approached like models used at a municipal or town level. On a smaller scale, predictions and numbers can be generated with fewer influences and confounding factors. However, analyzing a model involving 30 million people with complex demographics requires preparation of the surrounding even before initiating the model.

TN50 also focuses mainly on aspirations and visions, which will eventually lead into tangible, hard targets in later phases. This approach, however, may create loopholes for engineered policies that cater to popular agendas, settling for superficial goals, such as higher GDP (Lee, 2017).

Generally, TN50 preceded the 2018 election and only managed to outline vague overarching transformation plans without detailed specifics. These plans, of course, required more time to develop, but the initiative ended prematurely. Nevertheless, political involvement in shaping policies is inevitable but must be minimized and prioritized the people's interest.

Discussion and Policy Recommendation

Despite the emphasis on firm targets, aspirations remain the foundation for formulating TN50. However, beyond generalities, a comprehensive national transformation will inevitably encounter tensions, even conflicts, among aspirations. The extent to which TN50 contributes to this process depends on its ability to go beyond cataloguing aspirations, toward synthesizing values and priorities, and outlining clear choices for Malaysia.

Few will dispute the principles of inclusive and sustainable development, but these terms can translate into different sets of priorities. For some, a core aspiration of inclusiveness equates with dismantling pro-Bumiputera affirmative action while for others, the very same programs may be viewed as instruments that preserve inclusion. On education, TN50's most recurrent theme, policy discourses could make a more useful contribution by enquiring how receptive Malaysians are to dissent and how appreciative they are of diverse opinion, rather than reiterating the established view that the nation needs an education system that cultivates critically minded and competitive youth. Beyond the readily agreeable ideal of sociopolitical stability, at least two main positions can be contrasted. For some Malaysians, stability entails regime maintenance while for others, it hinges on institutional strength, such as fair elections, independent courts, media freedom, and effective, accountable administration. TN50 presented an opportunity to seek nationwide perspectives on these important matters.

Undoubtedly, a government will want to craft transformative policies in a positive, even celebratory, spirit. TN50 evoked optimism and positive feelings, but will it accept forward-looking ideas arising from dissatisfaction with the status quo? A stirring launch video at mytn50.com invited contributions, provided they are "constructive and productive", which usually means opinion punctuated with praise.

Expectedly, as a program under the BN administration, TN50 invested far more in its flagship economic and social policies while treading softly on political reforms and institutional change. Dialogue sessions have been prefaced with reminders of the government's achievements and public expenditures, particularly in infrastructure, welfare payments, and steady economic growth. Under the banner of governance, the focus falls on efficient, responsive administration while the problems of stagnating real wages, corruption, the justice system, civil liberties, and fairness of elections seem displaced to the margins.

Policy Recommendations

Impact on Society, Policy Decision-making, Services, and Innovations

Moving forward, policymaking has always been a tricky area, requiring a balance of grassroots involvement and realistic realpolitik decisions. However, TN50 has shown a glimpse whereby involvement of the youth is much needed, and they are more than ready to participate. Yet, it is not as simple as executing a populist maneuver; it requires consistent check and balance. Policymaking should not be treated as a vehicle for political advancement but must prioritize the people's needs. Every leader or prime minister has a notion where they need to rebrand and establish an image and identity. Whether well-executed and ingrained in the minds of the people, like Vision 2020, or perceived as rhetorical and self-fulfilling, the focus often shifts away from serving the masses. Continuity in philosophies and fundamentals is rarely consistent or prioritized.

Looking at the current government, "Malaysia MADANI" is the central theme underpinning its establishment. MADANI is seemed as a new approach in navigating uncertainty and is built on six pillars which are rooted in the trust of the people and the government. (Pejabat Perdana Menteri, 2024).

The MADANI government under Prime Minister Anwar Ibrahim is still newly formed, and implementation of policies is still in its early stages. It claims to be driven by a reformation agenda, given Anwar's experience as a political prisoner and his longstanding role as a reformist figure. The government has also shown glimpses of policies that focuses on aiding the less affluent. Some of the key initiatives include the Income Initiative *(Inisiatif Pendapatan Rakyat)*, Progressive Salary Policy (DGP), and Targeted Diesel Subsidy *(Subsidi Bersasar)*, which shows an effort to correct the

misspending of the previous governments and channeling aid to the most needy (Jabatan Perdana Menteri, 2024). These efforts reflect a government for the people, though it continues to operate in a top-down manner typical of Malaysian governance.

This is a critical period for Anwar, who came into power after a period of uncertainty that witnessed a post-election deadlock lasting five days (Lorcan Lovett 2024). He secured victory by narrowly defeating Muhyiddin Yassin's coalition, led by then Prime Minister Ismail Sabri Yaakob, during a period marked by backdoor governments and newly formed coalitions. This context makes it challenging for the current government to avoid acting swiftly and demonstrate results. Thus crowdsourcing is something that can be implemented on a smaller scale as a pilot initiative or introduced in the coming years when the economy and political situation are more stable. The focus must remain nonpolitical and planned meticulously. This will require time as TN50 has shown that such efforts require years of commitment and a stable government.

Further important considerations are current political dynamics, with factions increasingly leaning toward religion and race. This trend has grown more pronounced, with major opposition coalitions, namely, Perikatan Nasional claiming to safeguard Muslims and Malay interests. Despite this challenges, crowdsourcing is possible if given adequate time, resources, and genuine social engagement. It might benefit from being led by a nonpolitical entity, involving both the government and opposition. Ultimately, policymaking cannot exist in silos; it must bridge grand schemes with grassroots involvement to achieve meaningful progress.

Conclusion

TN50 represents a pioneering bottom-to-top effort, which is the first of its kind in Malaysia. It is an effort aimed at gathering the aspirations and thoughts of the masses to steer the future of Malaysia. It seeks to shape policies for the next three decades while addressing upcoming challenges. Additionally, it breaks away from the top-down policymaking approach that has dominated Malaysia for the past six decades. However, implementing such a model requires analyzing lessons from TN50 beyond its structural framework. There is a need to understand and dissect the contextual factors outlined in this report, given the scale and complexity of Malaysia's demography. In conclusion, TN50 can be successfully implemented with a thorough understanding of political nuances.

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CHAPTER 5: PAKISTAN

ENHANCING PUBLIC ENGAGEMENT IN DIGITAL GOVERNANCE: INSIGHTS FROM PAKISTAN'S CITIZEN PORTAL EXPERIENCE

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Abstract

This study examines crowdsourcing in Pakistan's public sector through the case of the Pakistan Citizen Portal (PCP). Launched in 2018 by Prime Minister's Performance Delivery Unit (PMDU), the PCP aimed to enhance public service delivery, transparency, and citizen involvement. This study investigates how this new initiative spurred governance innovation by allowing individuals to express concerns, propose new policies, and receive government responses. A qualitative case analysis is used to evaluate the portal's effectiveness using primary and secondary data.

The findings show that the PCP restored public trust in government institutions and improved complaint resolution rates. However, following the administration transition in 2022, the government lost interest in the platform, which led to reduced public involvement, diminished systemic trust, and decreased effectiveness. Sustainable success requires political commitment, technological integration, and public awareness. The initiative faced challenges, such as political shifts, bureaucratic resistance, and the digital divide.

This study emphasizes the critical role of consistent government backing in crowdsourcing, which can be a significant instrument for enhancing public administration and policymaking. Policy recommendations focus on strengthening public trust, expanding public access to digital technology, and utilizing data analytics to bolster crowdsourcing initiatives. The study concludes that while the PCP demonstrated crowdsourcing's potential in its early stages, long-term success depends on ongoing development, political will, and widespread participation. To maximize public-sector crowdsourcing platforms, future studies should explore the wider effects of crowdsourcing in various situations and the integration of cutting-edge technologies.

Introduction

As digital technologies gain traction, businesses of all sizes are constantly creating and experimenting with novel sourcing strategies. One of the most popular approaches is "crowdsourcing," in which companies leverage the internet to harness the power of a virtual "crowd" to perform designated organizational tasks (Saxton et al., 2013). Crowdsourcing shares many technological features with social media, which fosters online communities where users can connect based on shared interests. Nonetheless, crowdsourcing is fundamentally different from social media platforms. Crowdsourcing

involves sophisticated mechanisms, such as compensation, copyright protection, and other regulations to manage online communities, in addition to engaging a diverse range of contributors (Saxton et al., 2013). In a nutshell, crowdsourcing is the process of managing a community through web-based collaborative tools to leverage the knowledge and abilities of the community to accomplish a predetermined business purpose. This is in contrast to social media sites, which emphasize the social components of community through digital communication without any copyright protection.

With the opportunity to engage with individuals from a variety of cultural and socioeconomic backgrounds, crowdsourcing will propel businesses into the modern era of innovation and revolution. The ideas gathered through crowdsourcing from this diverse "crowd" help organizations solve issues and achieve strategic goals. In today's highly competitive landscape, organizations need to devise novel strategies that set them apart from their competitors to emerge successfully. Rather than generating ideas with a limited group of individuals, crowdsourcing leverages technological capabilities in the form of digital platforms to access a vast repository of expertise, skills, and resources. It offers a cost-effective, efficient, and timely access to millions of people while promoting innovation and interaction. As a strategy, vision, or opportunity, crowdsourcing has the potential to enhance business success significantly.

This research attempts to improve governance and public service delivery using crowdsourcing methodologies. Crowdsourcing uses many people's expertise, recommendations, and efforts to solve problems, generate ideas, and provide services using digital platforms. It improves public-sector governance by increasing inclusion, transparency, and responsiveness to public interests and concerns. As digital platforms become more accessible and widely used, crowdsourcing has gained traction as an effective tool for participatory governance, shifting interactions between governments and citizens from conventional top-down approaches to more collaborative, bottom-up engagement. In Pakistan, a country facing governance challenges, crowdsourcing offers a unique opportunity to bridge the gap between the public and the government gap. For detailed examples, see the section "Best Practices of Crowdsourcing in the Public Sector".

Research Gap

A deeper investigation into this study serves many purposes. First, while crowdsourcing is widely used in the commercial sector, its application in the public sector is still in its infancy, particularly in underdeveloped countries such as Pakistan. There is a dearth of research on how Pakistan's governance system has leveraged crowdsourcing for effective implementation in enhancing government and service delivery. Second, the challenges Pakistan's public sector has to deal with are exacerbated by corruption, incompetence, and declining public trust in government institutions. Through crowdsourcing, the public may be actively involved in the governance process, thereby increasing transparency and accountability.

Scope of Study

This case study examines how crowdsourcing has been used and the ways it has impacted Pakistan's public sector, focusing particularly on the PCP. The Pakistani government launched the PCP as a flagship project to improve public-service delivery, boost transparency, and encourage citizen engagement through crowdsourcing. The portal functions as an online forum where people can lodge grievances, provide feedback, and recommend improvements to governmental services. The primary goal of this analysis is to tackle the broader question of how crowdsourcing can be effectively utilized in the public sector to enhance governance and service delivery in Pakistan.

The scope of this case analysis is determined by various crucial factors, such as the study's geographical, institutional, sectoral, and temporal dimensions. These factors will help in delineating the limitations and scope of the analysis as well as pointing out the elements that may impact the case study.

Geographical Scope

With particular attention to variations on the usage and effectiveness of the PCP across different provinces (Punjab, Sindh, Balochistan, and Khyber Pakhtunkhwa) and between urban and rural regions, the study investigates the nationwide implementation across Pakistan. This regional perspective is essential for understanding how crowdsourcing works in Pakistan's diverse socioeconomic and cultural landscape.

Institutional Scope

From an institutional standpoint, the study evaluates the effectiveness of the PCP across federal, provincial, and municipal government departments and agencies. The research investigates how different sectors, including energy, law enforcement, transportation, and municipal services, have integrated the portal into their daily operations. Specifically, the study considers organizations, such as the Punjab Police, Water and Power Development Authority (WAPDA), Water and Sanitation Agency (WASA), Pakistan International Airlines (PIA), Federal Board of Revenue, District Administration, Health, Education, and Sanitation Departments as well as Pakistan Post, railways, metro bus service, and motorway police (Asghar, 2022). The analysis assesses how the portal has impacted their responsiveness, efficiency, and overall public service delivery.

Sectoral Scope

The study focuses on the public sector, emphasizing critical areas, such as health, education, law enforcement, and municipal services, which involve high levels of public interaction. These areas are particularly vital because they directly affect people's daily lives and provide a meaningful framework for evaluating the PCP's effectiveness in handling public complaints and improving service quality.

Temporal Scope

The study covers the period from the launch of PCP in October 2018 to the present. This timeframe allows for a comprehensive assessment of the portal's performance over a reasonable length of time, taking into account any improvements or modifications made in response to public feedback and evolving governance criteria.

Literature Review

First appearing in an article for Wired magazine, Jeff Howe defined crowdsourcing as "the act of delegating a task that is normally completed by a single agent (often an employee) to a large, ambiguous group of people using an open invitation" (Saxton et al., 2013). As a web-based business model, crowdsourcing leverages anybody on the internet to generate innovative and creative ideas (Li & Hongjuan, 2011). Many diverse sectors have successfully made use of crowdsourcing by using people's expertise and power. Wikipedia is arguably one of the most well-known examples. In addition, crowdsourcing has been applied in the fields of business and marketing, environmental sciences, medicine, and sociology. In recent times, it has gained traction in the field of information systems analysis and design, where users contribute by evaluating software, updating models as well as helping the program develop and maintained (Hosseini et al ., 2014).

In Pakistan, crowdsourcing is still in its infancy stages but is rapidly expanding. The nation has witnessed a surge in digital literacy and internet penetration. According to the Pakistan Social and Living Standards (PSLM) survey 2019–20 (Kemp, 2024), 33% of the households have internet facility and 46% of individuals own mobile phones. The advent of digital transformation has opened up new avenues for crowdsourcing projects, ranging from microtasking platforms to civic involvement. Popular platforms, such as Rozee.pk and Upwork, provide freelance and crowdsourcing opportunities to many talented workers in Pakistan. Through these sites, companies and individuals worldwide are able to hire Pakistani freelancers for a variety of jobs, including data entry, design, IT services, and content development.

Crowdsourcing presents a plethora of prospects for developing economies like Pakistan. It is a cost-effective model that is able to tap into global talent pool, generating an unlimited array of ideas and solutions. In a country where cost efficiency is a concern, especially for rising industries and businesses, this model can be a game-changer for those who know how to use it well. Entrepreneurs and businesses, whether struggling or well-established, can use crowdsourcing to gather ideas, create plans, and pinpoint inefficiencies in their company processes.

In Pakistan, there are numerous successful crowdsourcing initiatives. One of the largest NGOs in the nation, the Edhi Foundation, is a prime example. The organization has been dependent on people's voluntary contributions for many years. It is among the top 10 crowdfunding platforms in Pakistan and a globally recognized example of successful crowdsourcing. Other notable examples include the Transparent Hands, the first crowdfunding platforms in the healthcare sector, which provides free surgical treatments to the underprivileged; the Care Foundation, which played a crucial role in supporting relief efforts for flood-affected areas in 1988; and The Citizens Foundation (TCF) Pakistan, dedicated to providing education to the impoverished (The Institute of Chartered Accountants of Pakistan, 2019).

A telecommunications company recognized for its adaptable approach in Pakistan is ZONG, which is a standout example of corporate crowdsourcing. The company utilized crowdsourcing by announcing via print and electronic media, inviting the public to suggest a name for the company. In the month-long campaign, the public audience submitted and voted on potential names, ultimately selecting "ZONG" based on popular opinion. This initiative not only engaged customers but also helped build strong brand loyalty even before the company officially launched (Saady et al., 2021).

No public or private organizations can fully meet every citizen's demand for services that are customized, and the era of "one size fits all" solutions to complicated societal issues are long gone. Instead of being passive customers, citizens are now empowered individuals who demand more personalized services and options from state institutions. These services may come from diverse civic providers or resemble private-sector offerings (Bovaird, 2007). To address these demands, governments worldwide are experimenting with new ways to engage citizens and using digital tools or other technologies to make it easier. Many governments have long embraced open government and e-government initiatives, leveraging ICT to reduce waste, boost accountability, and promote transparency with their constituents (Colasanti et al., 2021).

Best Practices of Crowdsourcing in the Public Sector

Based on literature, crowdsourcing originated and is primarily utilized in the private sector. When applied to the public sector, it is referred to as citizen-sourcing, defined as "a new partnership between the public and the government, founded on many cutting-edge private sector practices and principles" (Hilgers & Ihl, 2010; Lukensmeyer & Torres, 2008). Crowdsourcing isn't just for developed nations; developing countries must also put in place the right instruments to manage growth and change effectively. In such cases, crowdsourcing can be a valuable tool in the planning process for sustainable urban development (Abubakar, 2018). Contrary to popular belief, crowdsourcing has quietly gained traction in developing nations, often outperforming developed ones in key areas (Lynch, 2012). It is proven most useful in public consultation, election observation, constitution writing, and in ensuring that the voices of various ethnic and minority groups are heard. More specifically, crowdsourcing has been used to manage natural catastrophes in Pakistan, civil wars in Libya, and violent acts and violations of human rights in Kenya.

Although the rise of crowdsourcing in Asia is not well known, the region has embraced the practice more than any other, hosting many of the world's largest and most influential crowdsourcing platforms as well as reaping the greatest benefits compared to any other nation in the world. The trend is expected to triple in the following five years. India, often regarded as the "King of Crowdsourcing" for some years, demonstrated this by using crowdsourcing to design its currency symbol (Lynch, 2012).

In Pakistan, the government used a crowdsourcing technique for six months called "Increasing Women's Participation in General Elections in 2013 and Beyond". The project's primary goal was to increase the number of female voter turnout as well as targeting women in pre- and post-election campaigns. To support effective election campaigning, a comprehensive crowdsourcing framework was put into place, and 60 community-based organizations were trained in education. In addition, to further increase women's participation, male and female students from respected educational institutions conducted awareness campaigns through theatre productions, student voting drives, and competitions (The Institute of Chartered Accountants of Pakistan, 2019).

Crowdsourcing may assist governments and civil society by empowering citizens and promoting decentralization and democratization. Thus it is one of the most important factors in improving governance and enhancing government accountability to the people (Bott et al., 2011).

An example of effective government crowdsourcing in Pakistan is the Pakistan Citizen's Portal (PCP), a smartphone application that was introduced by the government in 2018 to enhance communication between the populace and the government. By using the app, anyone may file grievances, provide comments, and suggest improvements to various government operations. Following its launch, the platform received millions of complaints and suggestions, leading to the resolution of numerous issues. The citizens could track the status of their complaints, allowing them to experience government transparency and accountability. Overall, the project strengthened public trust in governance and encouraged greater civic participation (Federal Board of Revenue Govt of Pakistan).

Crowdsourcing research in public institutions suggests that when properly designed, it has the potential to boost government legitimacy, service efficiency, citizen satisfaction and loyalty, brand awareness, and civic engagement (Basto et al., 2010). Additionally, crowdsourcing has the potential to significantly increase the productivity of public servants (Brabham, 2012). The potential of crowdsourcing projects is predicted to be further enhanced by developments in ICT, as technology acts as a bridge between citizens and governments. The ability of crowdsourcing to engage large populations has spurred interest in its successful application for public engagement. In the public sector, crowdsourcing allows governments to tap into citizen's collective intelligence in the way of ideas, suggestions, and solutions while also enhancing public participation (Brabham, 2009).

E-government is the use of technology to deliver services and information, facilitating digital interactions between governments and various stakeholders, including citizens. However, many e-government initiatives have failed, either being shelved or failing to meet their objectives. Many of these programs continue to be one-way communication channel, with an emphasis on G2C (government-to-citizen) interactions that primarily function as informative instruments (Cloete, 2012).

A prime example of a failed crowdsourcing-based initiative is the Safe City Project in Islamabad. It attempted to improve law enforcement and public safety but did not produce appreciable results. The multibillion-dollar Islamabad Safe City Project, which was launched in 2016 to monitor key structures, points of entry and exit, highways, commercial districts, and a substantial tracts of the residential areas in the capital city, became a white elephant when the Islamabad police reverted to using traditional security methods. According to police officials, the system neither prevented a single crime nor led to any arrest. Additionally, two project-related scanners vanished without a trace, highlighting serious mismanagement (Chaudhary, 2022).

Three main elements make up crowdsourcing: the crowd, the organization, and a platform that serves as a "host for the activity throughout its life cycle" by connecting the other two. In this context, the government represents the organization component, citizens are referred to as members of the crowd, and technology serves as the platform and is a key facilitator. For such systems to be sustainable and effective, participants in a crowdsourcing system must have a seamless and engaging user experience (Cupido & Ophoff, 2014).

The Wisdom of Crowds Theory

Surowiecki's "The Wisdom of Crowds" asserts that many people can come up with more creative ideas and make better decisions as a group than a few specialists. The book describes how groups of people, or crowds, can solve certain types of problems far more effectively than individuals or specialists (Surowiecki, 2004). This theory serves as the foundation for crowdsourcing, in which a variety of people collaborate toward a common goal.

A classic example of the wisdom of crowds is the traditional jelly-beans-in-a-jar competition. In this experiment, participants estimate the number of jelly beans in the jar; the one who guesses closest wins a prize, which is usually the filled jar itself. Even while each prediction varies greatly, the average estimate is consistently highly accurate. Usually, the average estimate turns out better than almost every individual assumption.

Case Analysis through the Model

To meet the needs of Pakistani citizens nationwide, the National Information Technology Board (NITB) sought to bridge the communication gap between the government and Pakistani citizens by launching the first Citizen's Portal (National Information Technology Board, Government of Pakistan, n.d.). The PCP was chosen for this case study due to its significance as a flagship government initiative. It was a major step toward Pakistan's objectives of integrating its people into political procedures and digitizing public service delivery. Given its widespread use and potential to influence other public services, the site serves as an ideal subject for this analysis. Through an analysis of the PCP, this case study seeks to provide valuable insights into the opportunities and challenges of using crowdsourcing in the public sector as well as offering lessons that may be applied to similar projects in Pakistan and beyond.

Methodology: Case Analysis Research Design

The study is based on publicly available reports, scholarly articles, government documents, and user evaluations. However, limited access to internal data from government organizations may restrict the depth of research in certain areas. PCP's usability and accessibility vary across different regions, depending on technological infrastructure, such as internet penetration and smartphone availability. Crucial elements are also public awareness, readiness to engage with the portal, and general digital literacy that significantly impact its effectiveness. Since this directly influences public service satisfaction and citizen confidence, a key focus area of this study is how quickly government officials address comments and concerns raised through the portal.

Examining public involvement and crowdsourcing via PCP, this study uses a qualitative case study technique. This study methodology is particularly appropriate for a thorough analysis of a single example of crowdsourcing in governance, therefore allowing an in-depth exploration of PCP's operations, outcomes, and broader societal impact. Another advantage of the case study method is the ability to combine qualitative and quantitative data, which helps to get a complete evaluation of PCP's effectiveness.

Techniques for Collecting Data

The following data sources are used in the study:

- **Secondary data** - The majority of the data used in this case analysis is from secondary sources, including government documents, peer-reviewed articles, news, and official statistics obtained from PCP. The data includes the number of reports lodged, the percentage of cases resolved, and citizen satisfaction levels (Government of Pakistan, 2023). These sources enable to compare and evaluate the success rate of PCP and provide meaningful information on its strategic impact

- **Qualitative insights** - There are various report styles used in collecting qualitative data. This qualitative information provides a deeper understanding of the ‘‘voice of the citizen,’’ the

governmental responses, and the platform's impact on civil society. This qualitative data complements quantitative findings, offering a deeper understanding of user experiences and governmental accountability

Data Analysis

This case study applies analytical and descriptive data analysis with focus on key performance indicators and broader societal effects.

- **Descriptive analysis** - This part of the analysis tries to understand the logarithmic specification of PCP. This involves quantitative analysis, where aspects, such as: (i) the rate at which complaints are resolved are compared with several other factors; and (ii) the time taken to resolve the complaints, and (iii) the level of citizen satisfaction. This descriptive data is analyzed and the portal's effectiveness assessed in achieving its intended goals and objectives

- **Thematic analysis** - Secondary data in the form of qualitative information is reviewed using a theme analysis. To understand how the implementation of PCP influences society and the trust they have for its themes are explored, such as accountability, power of the citizens, and government openness. The thematic analysis also helps in finding challenges and limitations of the platform, including bureaucratic opposition within government institutions and the digital divide

Situation

Background and Context

The PCP, launched by the PMDU on 28 October 2018, under Prime Minister Imran Khan, is a citizen-centric crowdfunding initiative designed to facilitate direct communications between the public and government agencies at both federal and provincial levels. The primary goal of PCP is to promptly handle citizen grievances by referring them to the relevant support offices located throughout Pakistan. Additionally, the portal allows citizens to provide feedback on government officials' performance (giving them an opportunity to improve) and boost government departments' ability to manage all complaints successfully (National Information Technology Board, Government of Pakistan, n.d.).

Notably, the app was developed locally, demonstrating a shift from an outdated colonial bureaucratic system to a more transparent and accountable governance model, holding politicians, public servants, and government officials responsible for their actions (ARY News, 2018). Before the portal's introduction, there was little direct communication between the public and the government, resulting in numerous issues of corruption and unresolved inefficiencies.

Situation Analysis

- **Internal environment** - For ease of convenience for residents, lawmakers, and Pakistanis living abroad, PCP incorporates a wide range of 20 distinct built-in categories that are linked to 3,796 offices. To access the app's various functions, users must first complete the registration process. In addition, users can rate and provide feedback on the app's complaint resolution process. If the users are dissatisfied, they can escalate the issue to the relevant authorities (National Information Technology Board, Government of Pakistan, n.d.).

  The goal of the government's crowdsourcing initiative was to improve policy and decision-making processes while fostering greater transparency and a citizen-centric governance paradigm. The key objective of the plan was to bring in more accountability, responsiveness, and transparency in public service delivery. The government allotted funds to make sure the portal was integrated with government agencies and easy to use

- **External environment** - Pakistani citizens have long expressed dissatisfaction with government services, frequently claiming a lack of accountability, bureaucratic inefficiency, and corruption as the main causes of their complaints. With rising smartphone adoption and a tech-driven atmosphere, PCP was introduced to provide citizens with more access to digital services. However, widespread

acceptance faced challenges, including low digital literacy in rural areas and mistrust of government initiatives

Challenges and Lessons from Public-Sector Crowdsourcing

Obstacles Faced by Organization

PCP presented the government with some obstacles throughout the implementation and adoption of crowdsourcing. Among them were:

i) **Lack of trust** - Many residents were first dubious about the portal, fearing that their complaints and grievances would be ignored or even lead to negative consequences.

ii) **Digital divide** - The absence of internet and smartphone access for residents in rural areas caused uneven platform adoption in various geographic areas. According to a report on the country's digital population, Pakistan's internet penetration rate hit 54% in 2021, with 46% of Pakistanis regularly accessing the internet. However, urban areas accounted for 66% of users, compared to 47% in rural areas, highlighting a significant digital gap (The Express Tribune, 2021).

iii) **Bureaucratic resistance** - When it came to resolving complaints, government departments were initially reluctant to embrace reforms and did not work together. According to Radio Pakistan, Prime Minister Imran Khan noticed in November 2019 that government offices were failing to assist citizens with their concerns on PCP. The Prime Minister's Office noted that numerous complaints had been mismanaged, frequently settled without a thorough investigation or adequate answers, and handled by irrelevant personnel, which resulted in further delays. As a response, all ministries and departments were mandated to form performance review committees and provide reports within 30 days (Dawn.com, 2019).

iv) **Data management** - A well-coordinated system was required to manage the large volume of complaints, classify them accordingly, and guarantee suitable answers. In November 2021, a report submitted to Prime Minister Imran Khan disclosed that 58 officers from Sindh, Punjab, and Khyber-Pakhtunkhwa were found to have falsified data about complaints made on PCP (The Express Tribune, 2021).

Objectives and Goals

The main objectives and goals of PCP are:

- To establish a direct line of communication between the people and the government
- To encourage accountability and openness in government services
- To compile opinions and recommendations for enhancing public services and policies
- To allow the organizations to address and resolve the complaints of registered citizens/members in the most appropriate and timely way possible
- To ensure that complaints and suggestions are sent to the relevant officers/offices within the organization or other organizations (if unrelated)
- To respond and inform the members/citizens at every stage of the complaint redressal process
- To ensure that complaints are resolved effectively, offering the best possible relief to the complainant (Prime Minister's Performance Delivery Unit, 2019)

Expected Outcomes

The portal was anticipated to boost public trust in government institutions, lower corruption, and improve service delivery. It aligned with the government's goal of establishing a more responsive governance structure focused on the people's needs.

Solution

Crowdsourcing Models and Designs

i) **Design and approach** - PCP employed complementary crowdsourcing model for both policy design and service execution. In terms of approach, the portal's strategy was to do away with conventional bureaucratic obstacles by giving people direct access to government services without the need for middlemen. Referrals from public personnel or representatives were not necessary for citizens to communicate with government officials. The system also encouraged government responsiveness by including capabilities for tracking service delivery in real time. The portal also ran public awareness efforts to inform people about its capabilities and encourage increased citizen engagement in governance.

The portal also encouraged public participation in identifying service delivery issues and suggesting recommendations for policies. The portal documented the settlement of complaints after they were sent to the appropriate government authorities. The settlement process' level of satisfaction could potentially be rated by the public (ARY News, 2018).

ii) **Engagement strategies** - The government launched an awareness campaign across traditional and digital media to promote the portal. Public service announcements emphasized the ease of use and benefits of using the portal to file grievances and provide suggestions. The PMDU provided guidance on how to use the portal effectively by utilizing a variety of public awareness tools, especially social media (Prime Minister's Performance Delivery Unit, 2019).

In September 2019, as reported by Radio Pakistan, the Prime Minister's Office issued a directive requiring all federal ministries and divisions to display PM's Portal banners at office entry points, waiting areas, and service delivery centers to raise awareness. As part of their civic obligation, the notification also requested ministries and divisions to include youth volunteers, businesses, individuals, telecom companies, charities, and social media activists in promoting the campaign (ARY News, 2019).

Rewards for participation included recognition from governmental organizations and, occasionally, awards for insightful recommendations that influenced policy changes. In September 2020, PCP launched its helpline and web services. With the opening of the portal, the Prime Minister's Office announced that over 80 million individuals could now lodge complaints, a significant increase from the previously 30.5 million users (Radio Pakistan, 2020; The Nation, 2020).

The government recognized accessibility challenges, especially those who were physically incapable and unable to read or write. A manual complaint filing system was introduced on the portals dashboards in October 2020. According to the official statement, the service was designed for: (i) individuals without smartphones or internet access; (ii) physically disabled individuals; (iii) illiterate citizens; (iv) women, widows, and senior citizens; and (v) people whose nearest service center or relevant offices was located far from their residence (Shahzad, 2020).

Implementation

i) **Timeline** - Following its launch in October 2018, the platform quickly gained popularity. Millions of complaints were filed in its first year. Within just three and a half months, the app had over 100,000 downloads, resolved over 15,000 complaints in the first month of its release, and has been ranked sixth among top app on the Google Play Store. Out of 4,646 mobile applications submitted by 87 countries, PCP was rated as the second-best government app at the World Government Summit in Dubai in February 2019 (The News International, 2019).

ii) **Key activities** - PCP's key activities included the introduction of a robust complaint-handling system that enables users to file, follow, and address grievances related to public sector services and government agencies. Through the site, the general public could also submit suggestions and recommendations to government departments and agencies. A crucial role of public grievance

redressal was to guarantee that complaints were handled promptly via a transparent process involving the relevant authorities.

The portal's structured reporting system is another application feature that enhances transparency. It allows users to view the status of their complaints, whether pending, rejected, or resolved. Effective governance is further promoted by performance statistics, categorized by department, district, province, and city by increasing accountability and transparency (Viewcast, n.d.).

Every complaint was given a default timeframe by the system of 20 to 41 days, starting from the day it was received by a government agency. Although the priority of addressing complaints could change depending on the urgency of the matter, organizations were required to address them within this timeframe. Resolving cases involving multiple institutions, additional clarifications or detailed investigations sometime require longer processing times. While citizens were receiving updates on every step of the complaint procedure, they had to wait until the designated timetable (e.g., 20 days) for a tangible resolution. However, the 20–41 day timeframe does not guarantee resolution, only a timely and appropriate response based on the nature of the complaint (Prime Minister's Performance Delivery Unit, n.d.). In addition, the portal also: (i) gathers public feedback on policies and services to guide future governance; (ii) tracks departmental and public servants performance in responding to grievances and recommendations; and (iii) conducts public awareness campaigns to educate the public on how to efficiently use the portal.

iii) **Key features** - From the perspective of a citizen, PCP empowered individuals by: (i) providing a tool for social accountability and allowing free registration via mobile app or web access; (ii) allowing easier and direct access for people to register complaints, recognize problems as social obligations, and make recommendations by enabling them to establish long-term accounts with government agencies; (iii) eliminating the need for references from public workers or officers when filing cases while allowing direct engagement and connectivity with relevant agencies or officers without requiring physical presence; (iv) offering free, unlimited submission time, frequent updates, and real-time tracking of complaint statuses.

From an organizational standpoint, the portal was expected to: (i) raise awareness of critical public concerns and assisted in identifying gaps in the current service delivery systems, which contribute with effective policy-making; (ii) enable organizations to gather insightful public suggestions on important issues; (iii) promote performance and governance accountability across public institutions by tracking officer and organizational efficiency (Prime Minister's Performance Delivery Unit, 2020).

iv) **Reasons for rejecting queries and complaints** - Certain complaints, requests, or suggestions made through the dashboard could be immediately dismissed under specific circumstances, unless they pertain to the execution of a court order. Others include (Prime Minister's Performance Delivery Unit, 2020):

- Topics covered by national security laws, family or domestic matters, and political issues are also not allowed
- Complaints involving strategy, foreign relations, or national security are not addressed
- Complaints submissions that are illegal, offensive, disparaging, or immoral, including sexual material are rejected
- Complaints about seniority, postings, and promotions are dropped, unless they involve pension or salary interruption that are dismissed
- Submissions with ambiguous, imprecise, or insufficient details, or those deemed irrelevant to complaints or service delivery, are likewise disqualified
- Job-seeking inquiries are denied unless they involve violations of merit in the recruitment process

- Sensitive topics about religion, ethnicity, or hate speech are excluded
- In cases of duplicate complaints, where the same complainant submitted multiple submissions regarding the same problem, only the primary complaint is addressed
- Accusations of malpractices or corruption that are filed under incorrect categories are rejected

v) **Platforms and tools** - PCP is equipped with tools designed to streamline the process of filing complaints and submitting suggestions. Users can add attachments (one at a time), monitor the status of complaints, and get updates on the resolution process. One of its standout features is the hierarchical complaint resolution process, which ensures unresolved issues are escalated to higher authorities. To further expedite resolution process, departments could be prompted to act within a predetermined timeframe by including a reminder option (Viewcast, n.d.). The platform is accessible both as a web portal and a mobile app. For citizens unable to register on PCP, complaints could still be filed through the following channels:

- More than 5,000 government agencies nationwide are connected to PCP to address citizen concerns. These agencies accept complaints via phone calls, emails, letters, and in-person visits, in addition to the smartphone app. Citizens without access to the app could physically visit relevant government offices and use the PMDU Dashboard to file complaints
- Complaints could be emailed to pmdu@pmo.gov.pk, provided they include the complainant's name, phone number, ID card number, and any other necessary information or attachments
- Complaints are also sent via PMDU Pakistan's official Facebook page, where all necessary details have to be included (Prime Minister's Performance Delivery Unit, n.d.)

Results

Outcomes and Impact

Quantitative Results

PCP is managed by the Prime Minister's Performance Delivery Unit (PMDU), which reported that 45% of users were satisfied with its functionality. There had been a significant increase in the number of registered users. As of December 2021, monthly data from the PMDU revealed that 4.4 million complaints had been filed, of which 215,000 were from overseas Pakistanis and 4.2 million from residents within the country. Punjab led with 2.2 million registered users, followed by Khyber Pakhtunkhwa at 600,000 users and Sindh at 500,000. Additionally, 77,000 individuals from the Capital Territory of Islamabad and 51,000 from Balochistan registered as well.

According to the PMDU reports, four million complaints had been handled. The method was described by Prime Minister Imran Khan as an extraordinary undertaking, surpassing the efforts of any previous administration. With a 90.91% complaint resolution rate, PCP has emerged as the most effective instrument for addressing public grievances and serving as the voice of the Pakistani people (Raza, 2021).

Figures 5.1–5.3 present data as of 20 September 2023, detailing complaints, resolutions, feedback, and the number of user registration. At that time, the total registered used reached 4,167,932 members, comprising 92.47% of whom were classified as inland residents, 7.13% overseas residents, and 0.4% foreigners.

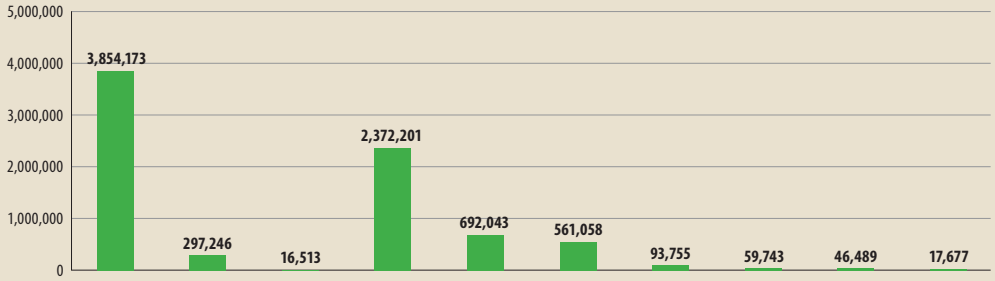
Provincially, user registration in Khyber Pakhtunkhwa was at 692,043 (16.6%), Sindh had 561,058 (13.46%), and Punjab had the largest number of registered members at 2,372,201 (56.92%). A total of 5,404,589 complaints had been filed in total with inland inhabitants accounting for the majority (94.82%) of the complaints.

Punjab contributed 31.81% of the complaints while the federal government accounted for 50.85%. Data revealed that 98.67% of all complaints had been resolved, with the Federal Government, Punjab, and

Khyber Pakhtunkhwa achieving resolution rates above 99%. At 88.93%, Sindh's resolution rate was marginally lower. Feedback statistics as of this date showed that 46.78% of users had expressed satisfaction, with 1,442,666 positive reviews out of 3,084,122 total.

FIGURE 5.1

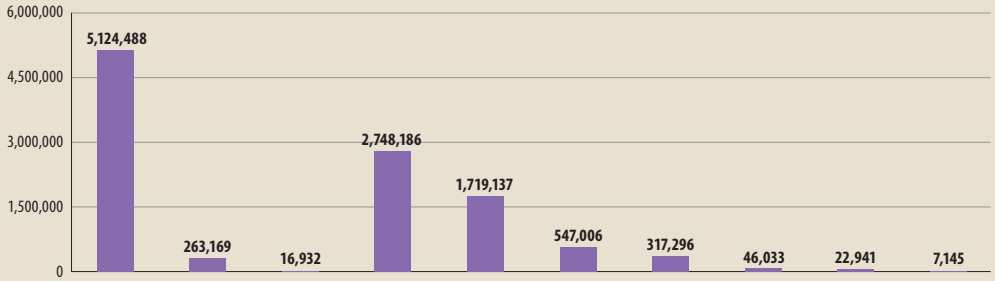
TOTAL AND PROVINCE-WISE DISTRIBUTION OF REGISTERED MEMBERS/CITIZENS



Source: Government of Pakistan (2023).

FIGURE 5.2

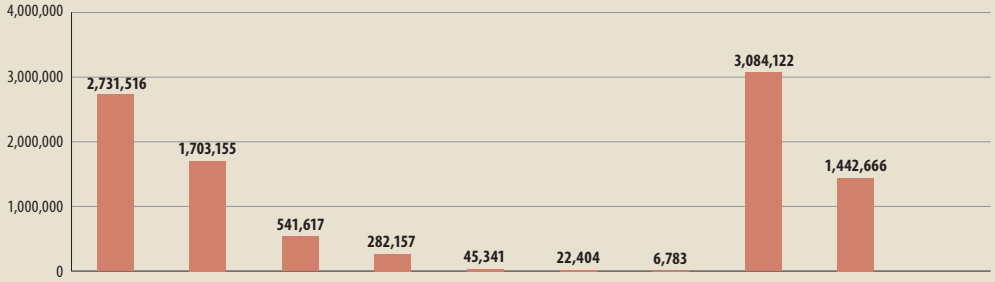
DISTRIBUTION OF TOTAL COMPLAINTS: FEDERAL AND PROVINCIAL LEVELS



Source: Government of Pakistan (2023).

FIGURE 5.3

OVERALL DISTRIBUTION OF RESOLUTION AND FEEDBACK



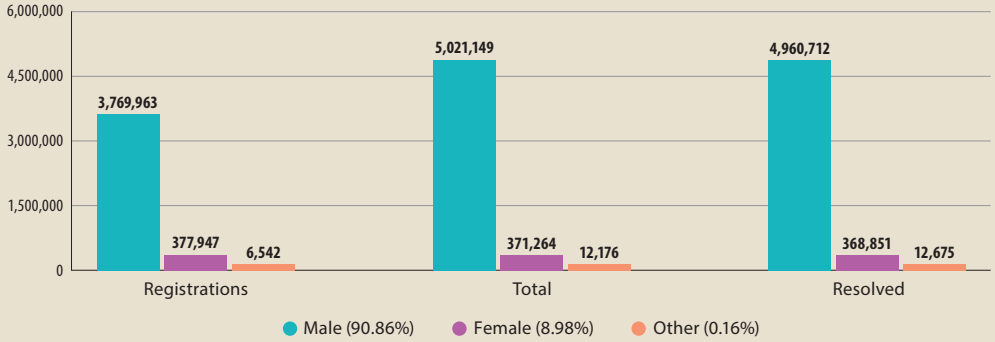
Source: Government of Pakistan (2023).

Figure 5.4 provides a gender-based breakdown of complaints and registrations made on PCP. Male users made up a whopping 90.86% of all registrations, totaling 3,769,963 individuals. The collective filed complaints amounted to 5,021,149, of which 4,960,712 were resolved, resulting in a 46.75% satisfaction rate.

Female users represented 8.98% of registrations, with 377,947 individuals filing, 371,264 complaints, of which 368,851 were resolved, yielding a 47.3% satisfaction rate. A satisfaction rate of 49.24% was recorded for the "Other" category, which accounted for 0.16% of registrations (6,542 individuals), with 12,176 complaints filed and 12,675 resolved, as detailed in Table 5.1.

FIGURE 5.4

BREAKDOWN OF GENDER-BASED PARTICIPATION IN PCP



Source: Government of Pakistan (2023).

TABLE 5.1

SUMMARY OF TOTAL LODGED COMPLAINTS AND RESOLUTION ACCORDING TO GENDER

Sr. No	Gender (%)	Registrations	Total Complaints	Resolved	Satisfaction (%)
1	Male (90.86)	3,769,963	5,021,149	4,960,712	46.75
2	Female (8.98)	377,947	371,264	368,851	47.30
3	Other (0.16)	6,542	12,176	12,675	49.24

Source: Government of Pakistan (2023).

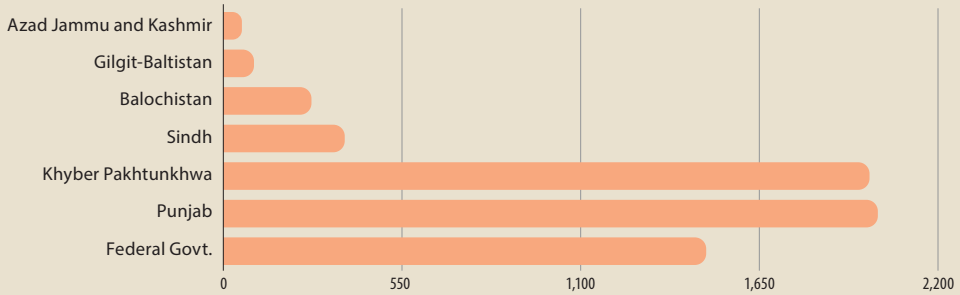
PCP integrated around 11,223 officials' dashboards from 6,285 departments in various provinces and governments. The breakdown is as follows:

- Punjab: 2,013 departments and 3,450 officer dashboards
- Federal Government: 1,488 departments and 2,555 officer dashboards
- Khyber Pakhtunkhwa: 1,986 departments and 2,718 officer dashboards
- Balochistan: 273 departments and 715 officer dashboards
- Sindh: 376 departments and 1,389 officer dashboards
- Gilgit-Baltistan: 91 departments and 227 officer dashboards
- Azad Jammu and Kashmir: 58 departments and 169 officer dashboards

Figure 5.5 provides a visual presentation of department integration.

FIGURE 5.5

TOTAL NUMBER OF DEPARTMENTS AND OFFICER DASHBOARDS



Source: Government of Pakistan (2023).

Qualitative Results

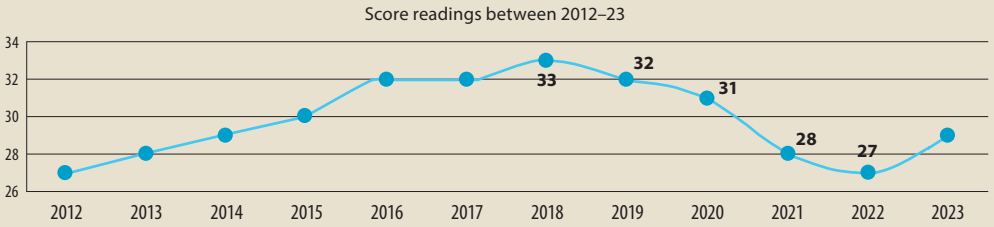
The initiative greatly increased the public confidence in the government. Citizens felt empowered, knowing they had a direct channel to influence policy and hold public servants accountable. Government departments also reported decreased corruption and improved efficiency. The PCP has enhanced accountability, transparency, and public engagement, all of which have led to better governance.

The efficiency and effectiveness of the site is demonstrated by its high satisfaction rates and ability to resolve problems. One example of complaint that was successfully resolved involved Gudi Bibi, a 61-year-old retired sanitary worker from a women's university in Rawalpindi. Although she retired a year ago, she had not received her pension. Following the submission of her complaint to PCP on Thursday, the issue was promptly resolved by the next day. Initially, the university administration contended that she had no legal entitlement to the dues as her employment had been unlawful. However, PCP questioned how her employment could have continued for a period of 32 years if her appointment was illegal. Gudi Bibi received a check valued at PKR179,078 on Friday (Raza, 2021). Furthermore, this narrative not only depicted the impact of PCP on individuals but also provided a comprehensive account of a successful resolution.

Figure 5.6 illustrates the extent to which improvements in Pakistan's Corruption Perception Index augment the portal's endeavors to further combat corruption.

FIGURE 5.6

PAKISTAN'S CORRUPTION PERCEPTION INDEX



Source: Transparency International Pakistan.

Evaluation

All three primary objectives of PCP, enhancing service delivery, promoting transparency, and increasing public participation, were accomplished. Success was measured through metrics, such as the number of resolved complaints, user satisfaction ratings, and the execution of policy suggestions. The result was a change in the bureaucracy's culture toward greater responsiveness and transparency. For instance, the Foundation University Islamabad's Director of Quality Assurance and Administrative Focal Person for PCP stated that complaints from students about the range of topics were immediately addressed. By November 2023, 347 citizen complaints had been filed, and every one of them had been satisfactorily resolved, yielding an impressive satisfaction percentage of more than 70% (Foundation University Islamabad, n.d.).

Factors in Successful Crowdsourcing Implementation

Strong Political Leadership

The prime minister's supervision and active involvement were critical to the portal's success. PCP effectively managed a whole wide range of complaints. For example, energy & power (841,115 total, 838,230 resolved) and municipal services (782,302 total, 766,978 resolved) had the highest number of complaints, as shown in Table 5.2.

The portal's effectiveness in resolving public issues across several sectors is seen in the high-resolution rates of other noteworthy categories, such as education, transport & communications, and human rights, as reflected in Table 5.2. The Citizen Portal received complaints on diverse issues, including illegal occupancy, and those involving the Punjab Police, Water and Power Development Authority (WAPDA), Water and Sanitation Agency (WASA), Pakistan International Airlines (PIA), Federal Board of Revenue, District Administration, Health, Education, and Sanitation Departments as well as Pakistan Post, railways, metro bus service, and motorway police (Asghar, 2022).

TABLE 5.2

COMPLAINT STATUS AND RESOLUTION RATES ACCORDING TO CATEGORY

Sector	Total Complaints	Resolved
Energy & power	841,115	838,230
Municipal services	782,302	766,978
Education	474,776	468,862
Transport & communications	356,149	352,823
Human rights	305,010	299,554
Law & order	291,032	287,732
Health	226,264	218,828
Corruption/malpractice	137,190	132,694
Development projects	136,637	134,283
Prime Minister's Youth Program (PMYP)	123,040	121,400
Poverty alleviation and social safety	121,169	120,747
Land revenue	117,466	114,820
Banking	113,025	112,103
Federal Investigation Agency (FIA)/Cyber crime	92,603	90,909
Excise & taxation	78,287	76,860
Media	72,055	71,536
Licenses, certificates, & registrations	62,842	61,799
National Database & Registration Authority (NADRA)	57,659	57,025
Farmer/agriculture	57,167	56,084
Overseas Pakistani/Call Sarzameen	54,720	54,342

Sector	Total Complaints	Resolved
Land grabbing/encroachment	52,601	49,324
Environment & forest	40,292	39,673
Immigration & passport	26,650	26,248
Investments	22,109	21,978
Cantonment Boards Services	20,684	20,251
Capital Development Authority (CDA)	16,369	15,943
Disaster/emergency	16,038	15,393
Provincial development authorities	15,369	14,858
Utility Stores (USC)	14,554	14,424
Securities and Exchange Commission of Pakistan (SECP)	9,634	9,454
Federal Board of Revenue (FBR)	7,774	7,573
Sehat Insaf Card	6,956	6,891
Auditor General of Pakistan (AGP)	6,537	6,259
State Life Insurance Corporation of Pakistan (SLICP)	5,694	5,621
Controller General of Accounts (CGA)	5,441	5,082
Scholarships	4,790	4,630
KP Citizen Portal	3,957	3,957
Naya Pakistan Housing	3,263	3,214
Public Service Commissions (PSC)	2,265	2,081
Fisheries & livestock	829	789
Federal Employees Benevolent & Group Insurance Fund	464	337
Special Technology Zones Authority	282	259
Engineering/manufacturing (EDB)	209	162

Source: Government of Pakistan (2023).

Technology Integration

The platform's user-friendly interface and mobile accessibility contributed to its widespread adoption. The app's intuitive user interface design made it easy for people who were not tech-savvy. Users could swiftly highlight issues with several departments, and prompting officials to act swiftly. Even though the site occasionally experienced small glitches, such as periodic error warnings and problems with media uploads, these did not outweigh the portal's overall efficiency and usefulness (Viewcast, n.d.).

By the start of 2024, Pakistan had over 111 million internet users, representing 45.7% of the population. Furthermore, 71.7 million people used social media, making up about 29.5% of the nation's population. Additionally, 188.9 million mobile phone connections (77.8% of the population) were in use. According to additional Kepios data, the number of internet users in Pakistan rose by 24 million (+27.1%) between January 2023 and January 2024 (Kemp, 2024).

Public Awareness Campaigns

Effective awareness campaigns played a key role in the national adoption and visibility of the portal. Figure 5.7 illustrates a social media campaign designed to encourage people to use PCP to file complaints. It emphasizes the portal's major accomplishments and reinforces the government's commitment to enhancing citizen engagement and improving service delivery.

FIGURE 5.7

SOCIAL MEDIA AWARENESS CAMPAIGNS AND ADVERTISEMENTS

Source: Consulate General of Islamic Republic of Pakistan Frankfurt am Main; Pakistan Embassy Sweden.

Bureaucratic Reforms

The portal's effectiveness was aided by educating and rewarding public servants for giving priority to citizen concerns. The PMDU conducted interactive workshops for senior police officers to participate and improve their complaints-handling capabilities through the Pakistan Citizen's Portal. The purpose of these workshops was to provide authorities with information on fair policy development and efficient grievance management (Radio Pakistan, 2021).

The "Escalated Complaints" method is one example of the most impactful reforms implemented through PCP. Under this mechanism, if a complaint is not resolved within 20 days, it is escalated to higher management. If the issue persists after 41 days, it enters "Super Escalation," making it visible to top officials, including the Prime Minister's Office. This procedure assures accountability and emphasizes the prompt resolution of concerns (Jahanzaib, 2023).

Effects of Crowdsourcing on Public Involvement in Decision-Making

As demonstrated by PCP, crowdsourcing has transformed public engagement in government and decision-making. Established in 2018, the portal sought to establish a direct line of communication between citizens and government agencies, allowing them to express their grievances, suggest enhancements, and track government performance. The government is now more responsive,

transparent, and inclusive as a result of this initiative's significant impact on citizen engagement in governance.

Addressing Grievances

Populations in both urban and rural areas actively engage with PCP by reporting complaints, raise issues, and provide feedback on key sectors, such as security, health, education, and municipal services. The escalation of unresolved complaints hold top officials accountable for negligence.

Numerous instances of citizen relief were emphasized in the form of success stories, such as actions taken against police misbehavior, interventions in situations when government authorities failed to cooperate, and in one case, the rescue of an abductee. Additional cases include resolving incidents of blackmail, disciplining police officials who conspired in a sexual assault case, and repatriating a Pakistani national stranded in Saudi Arabia following the bankruptcy of his company (Dawn.com, 2019).

Encouraging Transparency and Accountability

One of the portal's most important contribution was to promote accountability and transparency in government operations. Users were allowed to track the progress of their complaints in real-time while authorities, by departments and regions, were held responsible by making performance statistics publicly available. This transparency strengthened trust between the government and citizens, ultimately encouraging greater public participation.

Policy Development

User feedback on the website directly influenced the development of policies, particularly municipal services and interventions in the public sectors, such as enhancing public health, education, and other domains. Feedback from citizens resulted in the passage of several policies, including:

- Adoption of Standard Operating Procedures (SOPs) for individuals with missing fingerprints
- Settlement of outstanding stipends for approximately 29,000 interns who had been inadequately compensated by a previous administration
- Exemption of Pakistanis living abroad from withholding tax

Additionally, policies addressing the needs of women and individuals with disabilities were formulated, therefore demonstrating the direct impact of public involvement on the administrative processes (Dawn.com, 2019). Moreover, promoting social responsibility via the platform increased civic participation. The tangible successes resulting from their efforts enabled individuals to participate more actively in governance. Utilizing this participation, a more democratic society wherein citizens engaged in policy development as well as in the provision of services was promoted. Moreover, the platform was particularly beneficial for marginalized and remote communities, bridging the communication gap between the people and the government. It provided these individuals with a readily available platform to engage with lawmakers and express their concerns, hence fostering public-government confidence and cooperation.

Crowdsourcing's Impact on Governance

The PCP's achievements and the challenges it faced provided valuable insights into the broader application of crowdsourcing in governance. Crowdsourcing has demonstrated the ability to:

- **Enhance service delivery** - By leveraging user feedback, governments can quickly detect inefficiencies and make necessary improvements to service delivery
- **Encourage transparency** - Open environments created by crowdsourcing platforms allow citizens to track the progress of their concerns, enhancing the transparency and accountability of governments
- **Empower citizens** - Through the use of crowdsourcing technology, citizens can exert influence on policy-making and decision-making processes, increasing their role in governance

One example of citizen-driven change involves a user putting in a complaint about the lack of accommodations for families of out-of-town patients hospitalized at Pakistan Institute of Medical Sciences (PIMS) and polyclinic hospitals. As a result, a shelter home was constructed in Peshawar More to provide shelter for the destitute and underprivileged. The complaint, registered as 1095886, led to a tangible improvement in service delivery (Raza & Ali, 2021).

The findings of this study are consistent with previous research that emphasized the significance of crowdsourcing in public sector accountability and participatory governance. Crowdsourcing on digital platforms has the potential to reduce administrative expenses, enhance public satisfaction, and improve the level of government responsiveness.

However, the study also corroborates assertions made in previous papers emphasizing the deficiencies of digital crowdsourcing projects, particularly in areas with unequal internet access or prevailing public skepticism toward government initiatives. To ensure the long-term viability of crowdsourcing in governance, it is essential to tackle these issues.

Discussion and Policy Recommendation

Discussion of Results

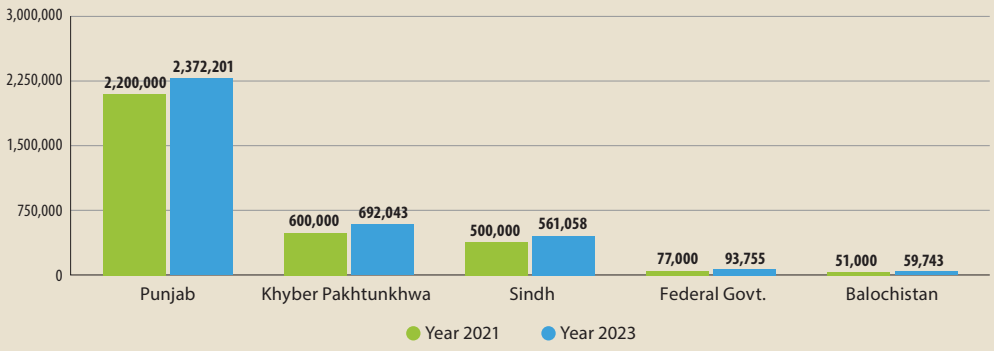
Citizenship involvement in governance has been eased significantly, facilitated by crowdsourcing initiatives such as PCP. Key findings from the research indicate that the proper working of the portal has effectively addressed various governance challenges, including limited access to policy formulation, slow delivery of services, and weak accountability. However, the quantitative results of evaluating the initiative reveal the general impact on the society, particularly in fostering openness and trust in government.

The report also reveals that PCP's success is largely attributed to the Prime Minister's Office's active participation and the strategic integration of digital technology. By allowing people to propose policy changes, the platform redefined the traditional relationship between the government and the public, empowering individuals to directly influence public affairs.

However, challenges emerged following the government transition in 2022. Reports from Punjab-based government sources indicated that citizens' complaints were no longer addressed due to the new administration's lack of interest in the online citizen portal. In the past, the site had promptly resolved issues, strengthening public trust in the government (Asghar, 2022).

FIGURE 5.8

REGISTERED MEMBERS/CITIZENS ACCORDING TO PROVINCE



Source: Raza (2021); Government of Pakistan (2023).

In 2023, Pakistan's Corruption Perception Index rose to 29 from 27, indicating a higher level of perceived corruption compared to the previous year (Transparency International Pakistan, n.d.). In the beginning, this case study showed a successful model, with high public engagement and confidence in the portal. However, after the government changed, many users reported that the new administration's lack of interest had rendered the portal inactive. Despite ongoing public concerns, the responses did not receive any feedback, and data showed that the number of registered users had remained stagnant after the new government came into power, as shown in Figure 5.8.

The main issue is that under the previous administration, public trust in the government fueled active engagement with the portal. In contrast, the current administration's lack of focus has eroded people's trust, which led to a decline in participation. Although complaints continue to come in, PCP's overall effect has diminished, as they are frequently ignored.

Elaboration on the Transition after 2022

Although there were concerns about the political transition, PCP continued to operate beyond 2022. Established during the tenure of then Prime Minister Imran Khan, PCP had already developed into a popular and widely used platform for public grievances, making it difficult for any new administration to shut it down. It continued to serve basic functions as a platform where citizens could file complaints, report back and request assistance from government bodies, and keep track of the progress of their complaints. However, the portal's effectiveness depended on the new administration's commitment to its maintenance and responsiveness.

There were reports of the portal's efficiency declining after 2022, as government accountability and transparency became more prominent with political changes. Some government departments appeared to be less responsive to complaints and issues during this transition.

Digital governance saw increased adoption across various public service sectors after 2022. Although there is no direct substitute for PCP, some government agencies have begun implementing digital alternatives for specific services.

These initiatives often sought to enhance governmental transparency, eliminate bureaucratic inefficiencies, and foster more digital citizen involvement.

For example, the Punjab government, led by CM Maryam Nawaz, has initiated the "Maryam Ki Dastak" initiative to enhance service delivery to all residents via a unified smartphone application. This approach seeks to provide a full array of assistance directly to the populace, therefore obviating the need for repeated trips to various government departments (Maryamdastak, 2024).

The "Dastak Doorstep Delivery App", created by the Punjab Information Technology Board (PITB), enables citizens to access a range of services, including birth certificates, copies of first information reports (FIRs), marriage certificates, learner's driving licenses, vehicle ownership transfers, property tax payments, e-stamping, international driving license renewals, police character certificates, tenant registrations, token tax payments, and general police verifications, among others.

The Maryam Ki Dastak project has substantially assisted diverse societal groups, including women, the elderly, individuals with illnesses, and working folks, by eliminating the need for office visits or endure lengthy waits. The initiative's scope has been expanded to include Lahore, Rawalpindi, Faisalabad, Gujranwala, Multan, Bahawalpur, Dera Ghazi Khan, Sargodha, Sahiwal, Okara, and Pakpattan. Citizens can now utilize government services from home using the Dastak Doorstep Delivery App or by dialing 1202 (Business Recorder, 2024).

Conclusion

The goal of this study is to investigate how crowdsourcing via the Pakistan Citizen Portal (PCP) may improve public involvement and spur innovation in governance. The results unequivocally show that

crowdsourcing is an effective strategy for enhancing public trust, service delivery, and government accountability. Crowdsourcing encourages more public participation in governance by giving people a platform to express their problems, make proposals for policies, and monitor government actions. PCP is an effective example of how governments may use citizen feedback to address inefficiencies, innovate, and modify policies to better serve the public.

The paper is based on an in-depth analysis on the execution, efficiency, and wider societal impact of PCP. The evidence underpinning the effectiveness of PCP pertains to quantitative data on complaint resolution rates and qualitative insights into the contribution of the platform to increased public trust. Moreover, a critical consideration of the existing literature on public engagement and crowdsourcing has highlighted both potential benefits and risks associated with these processes.

The study in focus highlights that the PCP, although addressing core governance issues, such as inefficiency and lack of transparency, also had to confront challenges, such as bureaucratic resistance and irregular digital access. The aforementioned challenges put forward a deeper understanding of how the optimization of crowdsourcing strategies may lead to enhanced impact on governance. This study contributes to the academic knowledge of crowdsourcing, with particular regard to citizen engagement and government processes, by demonstrating the potential of crowdsourcing to drive innovation in public administration.

The PCP's role is a very good example of how public contributions can be used to deal with ineffectiveness in governmental services and help introduce policy changes. The implementation of citizen oversight in grievances and the assessment of governmental reactions results in a level of accountability that was previously absent. However, for crowdsourcing initiatives to be fully effective, they must overcome key challenges, such as the digital divide and bureaucratic resistance. These contributions highlight that the nature of crowdsourcing platforms has to be tailored to particular regional contexts if such means are to be ever accessible, credible, and part of the broader democratic frameworks.

Ultimately, the success of implementation demonstrated the potential of crowdsourcing to dramatically enhance public involvement, transparency, and service quality. Good rates of complaint resolution and strong customer satisfaction scores helped to support this success.

Policy Suggestions

Based on the study's findings, several policy recommendations are proposed to enhance the efficiency of crowdsourcing initiatives in governance:

i) **Increasing digital access** - To ensure that all the residents in underdeveloped and rural areas have equal access to crowdsourcing platforms like the PCP, the government must invest in the improvement of IT infrastructure in these regions. Additionally, digital literacy programs should be developed and implemented to help citizens navigate and use these platforms effectively.

ii) **Increasing public trust** - Often, it is necessary to build peoples' trust in government-run crowdsourcing websites. Transparency in how public input is collected, processed, and incorporated into policy development can help earn and maintain credibility. It can be further enhanced by recognizing and publicizing the achievements of the platforms. For instance, commuters and travelers on the Islamabad Motorway frequently complained about traffic congestion, particularly from heavy transport vehicles during peak hours. As a result, the Islamabad Motorway authorities have banned the entrance of heavy transport vehicles during business hours, which benefits thousands of commuters every day (Raza & Ali, 2021). By ensuring that citizens' grievances are acknowledged, dealt with, and publicly resolved, PCP builds trust among the public.

iii) **Leveraging data analytics** - Governments could also incorporate data analytics technologies, like AI and machine learning, into crowdsourcing platforms to significantly improve the process of complaints classification, trend analysis, and predictive governance that are likely to occur to

solve grievances better. This would enable governments to identify patenting challenges and respond more quickly and efficiently. The PCP, for example, includes a feedback flagging option that will automatically notify administrators when a positive or negative comment is received regarding the status of a resolved complaint (Prime Minister's Performance Delivery Unit, 2020).

iv) **Institutionalizing crowdsourcing in policy development** - The government could consider institutionalizing crowdsourcing within policy formation processes. Establishing formal channels for incorporating public suggestions into decision-making is urgently needed, especially in critical sectors, such as healthcare, education, and infrastructure. For example, a citizen complained that their vehicle was transferred using fake signatures by the Excise Department, ICT. In response, the department made biometric fingerprint verification mandatory for vehicle registration and transfer. Additionally, National Database & Registration Authority (NADRA) was involved to enable owners and sellers to complete biometric verification at their e-Sahulat centers nationwide, ensuring a more secure and transparent process (Raza & Ali, 2021).

v) **Building capacity for government officials** - To help government employees overcome bureaucratic resistance, training courses should be designed to inform them on the advantages of crowdsourcing and its role in responsive governance. Additionally, rewarding departments that actively engage with and address public concerns can further incentivize responsiveness.

vi) **Multi-stakeholder collaboration** - To enhance the development and use of crowdsourcing systems, governments should collaborate with businesses, academic institutions, and civil society organizations. The platform's user population, creativity, and availability of resources may all see an uptick with these collaborative endeavors.

Elaboration on the Sustainability of the Platform Due to Political Transition

During political changes, the sustainability of PCP depends on several important factors:

i) **Nonpartisan civic service** - For the PCP to endure, it must be viewed as a nonpartisan civic service rather than a political tool. Using it within the government context can also shield it from being dismantled by future governments.

ii) **Strong legal framework** - A robust legal framework is essential for the portal's longevity. Legislative support can prevent future governments from altering or removing the portal without parliamentary consent.

iii) **Legislative backup** - Establishing a legal body to support the portal's work and ensuring legislative backup can prevent the total shutdown of the portal by a future unfavorable government.

iv) **Independent technological infrastructure** - Protecting the portal's technological infrastructure as an independent chain is important. It ensures the portal will always remain functional and secure from state politics, preventing dysfunction.

v) **Public demand and high usage rates** - The portal's effectiveness and impartiality in addressing citizen concerns can drive public demand for its continuation. High usage rates can safeguard it from being discontinued by subsequent regimes.

vi) **Political will for transparency and accountability** - Political willingness to promote transparency and accountability is crucial. A government that values these principles is more likely to support the portal while those that do not may neglect it.

vii) **Continuous funding and financial stability** - Continuous funding is necessary for the portal's operation and upgrades. A stable financial model, possibly through multiyear budget allocations, is essential to avoid operational difficulties during political transitions.

viii) **Adaptability to evolving needs** - The PCP's ability to evolve with new governmental goals and citizen demands is crucial for its sustainability. Flexibility ensures it remains relevant amid shifting political landscapes.

In conclusion, for PCP to persist, expand, and remain effective through political transitions, it must be institutionally autonomous, legally endorsed, technologically sound, and widely accepted by the public. By integrating it into the governance culture, the portal can continue to strengthen citizen-government relations, even as political leadership changes.

Study Weaknesses and Limitations

For the most part, this research provides valuable insights into the effectiveness of crowdsourcing in governance through the PCP case study. However, there are several drawbacks. First, since the case study was conducted in a solitary setting, the findings cannot be extended to other circumstances. Furthermore, while quantitative data on user satisfaction and the resolution of complaints were collected, a more comprehensive qualitative investigation of citizen experiences would provide a more in-depth understanding of the platform's impact. The broad data collected does not fully capture the internal processes or challenges involved in the actual implementation of the PCP, which is another weakness. Future studies should incorporate qualitative data, such as interviews with the public authorities, private individuals, and other stakeholders, to provide an improved and more nuanced perspective on the crowdsourcing project.

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CHAPTER 6: THAILAND

PUBLIC CROWDSOURCING FOR CIVIC EMPOWERMENT: LESSONS FROM THE BANGKOK METROPOLITAN ADMINISTRATION

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Abstract

This research focuses on public crowdsourcing through online petitions, specifically examining its role in improving public services, citizen engagement, and city management via the Traffy Fondue platform used by the Bangkok Metropolitan Administration. Public crowdsourcing is a strategy for promoting participatory public policy, improving public services, and fostering civic engagement, policy, and innovation. The research aims to explore how public crowdsourcing has been planned and implemented by the Bangkok Metropolitan Administration, identifying the main factors contributing to successful crowdsourcing implementation. It compares these factors with other local administrations in Thailand and investigates the outcomes and impacts of public crowdsourcing on citizen participation and public policy or services in Bangkok. Additionally, the research proposes policy recommendations for promoting the use of public crowdsourcing in Thailand.

Introduction

For several years, the Thai government has attempted to develop and improve their public services to respond to the demands of its people and solve their problems. During former Prime Minister Yingluck Shinawatra's government (2011–14), the focus was on enhancing digital infrastructure and promoting technology-driven initiatives. This period saw the beginning of increased interest in digital platforms and collaborative tools, setting the stage for the growth of crowdsourcing. The prominent example of a priority project during this time was "Thai Innovation Fund," which promoted innovations in Thailand. The fund primarily sought to support start-ups and small- to medium-sized enterprises (SMEs) by providing financial resources, facilitating access to capital, and encouraging research and development (R&D) efforts. These initiatives were designed to move Thailand toward a more innovation-driven economy, reducing its reliance on traditional industries (Thawesaengskulthai et al., 2024).

Even though it was not a pure crowdsourcing platform, the Thai Innovation Fund aimed to foster innovation and collaborative problem-solving by engaging with the public and encouraging input from various stakeholders. Additionally, the government administration worked on enhancing digital infrastructure and promoting technology adoption, which indirectly supported the growth of crowdsourcing platforms and collaborative tools. This created a more conducive environment for digital engagement and innovation, laying the groundwork for the expansion of crowdsourcing in subsequent years.

During the then-government of General Prayuth Chan-o-cha (2014–23), significant advancements were made in digital initiatives through the Digital Economy and Society Development Plan (2016–36). The Digital Thailand Plan aims for long-term development and sustainability through digital technology, aligning with the country's 20-year strategy. This plan supports digital innovation and the use of technology to enhance government services, stimulate the economy, and promote a quality, equitable society. It sought to position Thailand as a leading digital nation on the global stage (Office of the National Digital Economy and Society Commission, 2022).

As part of this strategy, the government promoted smart city projects and other digital platforms that facilitate crowdsourcing. A notable example of these initiatives is the "Smart City" projects, which are to be developed as part of the Digital Economy and Society Development Plan. These projects aim to leverage technology and innovation to improve urban living and public services.

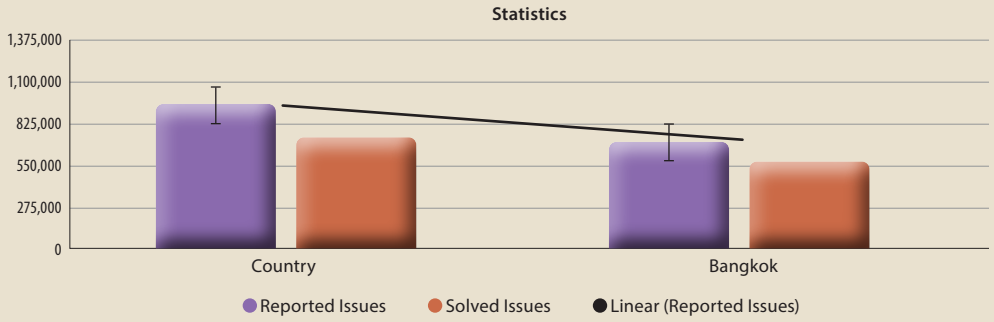
The Smart City Projects involve utilizing digital platforms and crowdsourcing methods to gather input from citizens, address urban challenges, and enhance city management. The priority smart cities are Phuket and Chiang Mai. Phuket's vision as a Smart City is to be a "livable city for sustainable tourism." To achieve this, the city has initiated strategies focusing on a smart economy and a smart living community, boosting the digital industry and urban living through technology and innovation. The project emphasizes improving infrastructure, environmental sustainability, public safety, smart governance, economic development, traffic management, high-speed public internet, green initiatives, and enhanced public services (Siddhichai, 2021). Crowdsourcing plays a crucial role by engaging residents and tourists in providing real-time data and feedback, which helps optimize city operations and services. In Phuket, the primary crowdsourcing platform is Traffy Fondue. This platform allows residents and visitors to report real-time issues related to traffic, waste management, public safety, and other urban services. The data collected is then utilized by city authorities to enhance and optimize city management and services, making Phuket more efficient and responsive to the needs of its citizens.

Notably, an example of a successful initiative is Bangkok Smart City, which was launched in 2018 as part of the 20-year Development Plan for Bangkok Metropolis (2013–32). Managed by the Bangkok Metropolitan Administration, the project has seen success with the implementation of the Traffy Fondue, a public crowdsourcing tool for city solutions. This platform has significantly improved public services, especially since Chadchart Sittipunt was elected Bangkok Governor in 2022. The Bangkok Metropolitan Complaint Center 1555 (Traffy Fondue) is responsible for managing this initiative. Traffy Fondue helps the Bangkok Metropolitan Administration to improve traffic management, public safety, and environmental sustainability. The government has engaged with the public through digital platforms and feedback mechanisms to incorporate their suggestions into city planning and development. Additionally, the Public Participation Platforms have supported the development of platforms that allow citizens to contribute ideas and report issues. These platforms are designed to collect crowdsourced data and feedback to enhance public services and address community needs more effectively. These efforts reflect a broader trend of integrating technology and crowdsourcing into various aspects of governance and public participation in Thailand.

As of now, Traffy Fondue is utilized by 15,401 agencies across 77 provinces and 753 districts for public issue reporting. This platform is in use by 1,916 municipalities and 2,186 local administrative organizations. Key partner agencies supporting Traffy Fondue include the Department of Local Administration, the Department of Disaster Prevention and Mitigation, the Research and Development Fund for Broadcasting, Television, and Telecommunications, the Office of the Health Promotion Fund, and the Office of the Prime Minister. From June 2022 to July 2024, a total of 947,769 complaints were registered, with 733,372 (77%) successfully resolved. The average problem-solving time is 3.8 days (or 91 hours), reflecting a fourfold increase in response speed since 2022. Public satisfaction stands at an average of 3.95 out of 5. In Bangkok alone, citizens have reported over 765,058 issues, with 608,091 (79%) resolved. The most common complaints involve safety, sidewalks, roads, traffic congestion, lighting, and cleanliness. Overall, nearly 80% of the public (208,924 people) expressed satisfaction with the problem-solving efforts of the Bangkok Metropolitan Administration (BMA) (Traffy Fondue Information Centre, 2024).

FIGURE 6.1

TOTAL COMPLAINTS ACROSS THE COUNTRY AND BANGKOK IN 2024

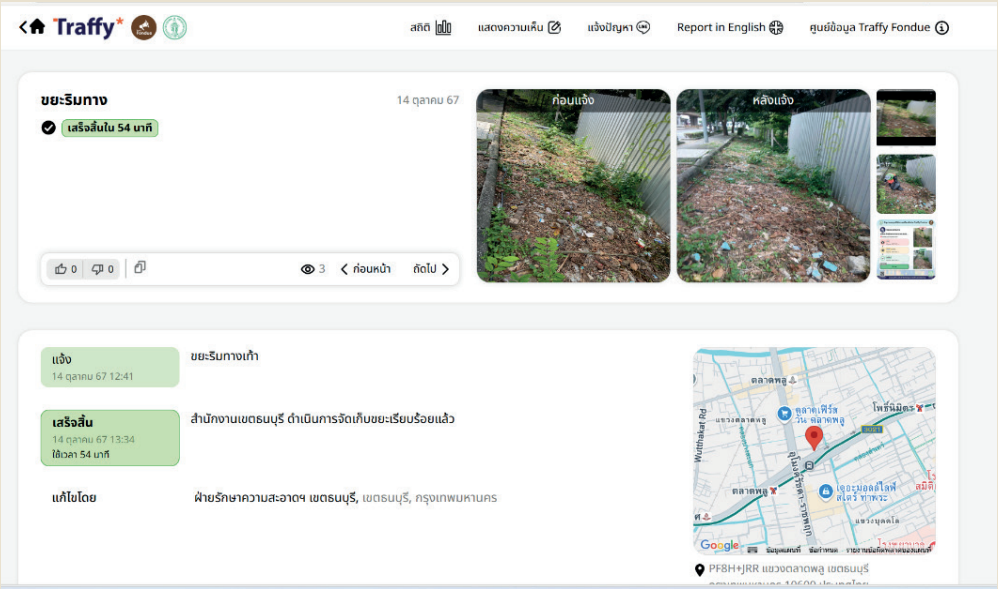


Source: Traffy Fondue Information Centre (2024).

The Traffy Fondue platform was initiated in 2013 by the National Electronics and Computer Technology Center (NECTEC), a unit under the National Science and Technology Development Agency, which falls under the purview of the Ministry of Higher Education, Science, Research, and Innovation of Thailand. The Traffy Fondue is a platform designed to facilitate communication between citizens and responsible agencies regarding city issues. Through a mobile application, residents can directly report issues they encounter, such as cleanliness problems, sidewalk damage, lighting issues, road damage, or floods, enabling swift resolution. Reports are made with sufficient information, such as photos and location maps, to allow agencies to act immediately.

FIGURE 6.2

EXAMPLE OF ISSUE REPORTING IN THONBURI DISTRICT, BANGKOK METROPOLITAN



Source: Traffy Fondue Bangkok (2024).

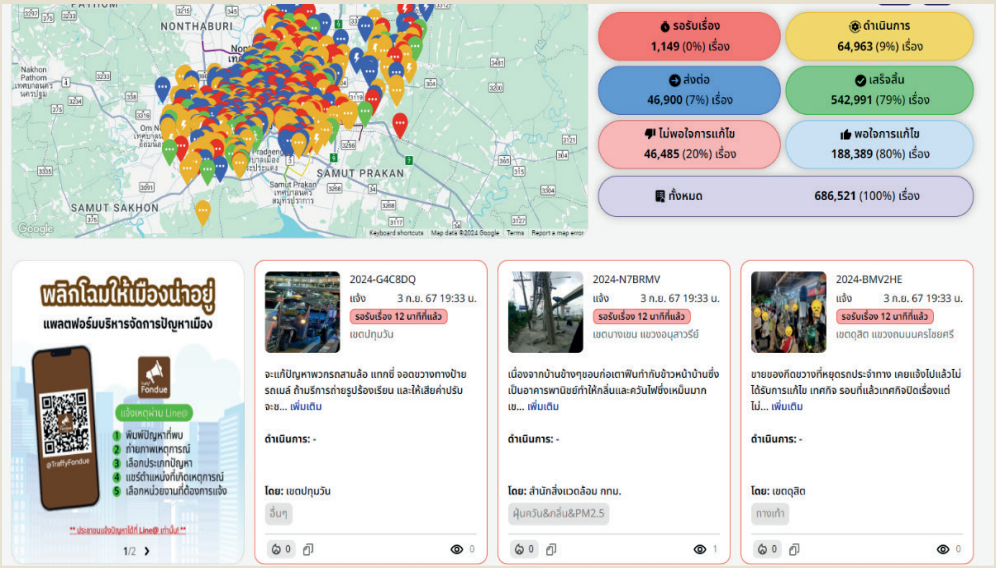
An example of issue reporting is highlighted in Figure 6.2, where a citizen reported litter by the roadside at 12:41 p.m on 14 October 2024, providing a photo and indicating the location. The issue was resolved at 1:34 p.m. on the same day.

At the same time, responsible agencies can provide information and update citizens on the status of problem resolution. The platform also includes management and tracking systems for issues as well as statistical data services to assist with budgeting and workforce planning. Both public and private sector agencies can create groups to receive and manage their own problem reports. The platform allows users to submit reports via a website or mobile application, such as Line application which is a very popular social media application in Thailand. Users can describe issues, such as traffic congestion, road damage, or any other public service problems, and attach photos for better clarity. The platform then aggregates this information and routes it to the appropriate government agencies or municipal offices for resolution.

Traffy Fondue utilizes crowdsourcing by gathering the collective inputs from the public to identify and address urban issues. The data collected from users helps authorities prioritize and respond to problems more effectively. The platform has been used to enhance public service delivery by providing a direct channel for citizen feedback. It supports real-time reporting and tracking of issues, contributing to improved urban management and better responsiveness from local governments. In recent years, the Traffy Fondue has expanded its scope to include various public service issues beyond traffic, such as infrastructure maintenance, waste management, public policy, flood issue, and social and municipal services. It has also integrated with other government initiatives and digital platforms to broaden its impact. The platform has been promoted for use across all local administration of Thailand, with cooperation between NECTEC and the Department of Local Administration under the Ministry of Interiors.

FIGURE 6.3

BANGKOK TRAFFY FONDUE PLATFORM



Source: Traffy Fondue Bangkok (2024).

The Traffy Fondue platform, specifically tailored for the BMA, plays a key role in improving urban management and addressing public issues in Bangkok. It has been integrated into broader smart city initiatives in Bangkok, aligning with efforts to use technology to enhance urban living and governance.

Under this platform, Bangkok residents can report various issues, such as traffic congestion, road damage, and other public service problems directly to municipal authorities (Figure 6.3).

The Traffy Fondue platform facilitates communication between the public and the BMA. Citizens can use the Traffy Fondue mobile application or website to report problems, express opinions, and provide feedback to the BMA. They can submit detailed descriptions, upload photos, and specify the location of issues. Reports are collected, categorized, and routed to the appropriate municipal departments or agencies for resolution. Users can track the status of their reports and receive updates on progress or resolutions. The Traffy Fondue website provides real-time updates on reported issues and their resolution status.

This platform helps the local government in collecting data and improving public services. It enhances citizen engagement in urban management by making it easier for residents to report problems and contribute to city improvements. Additionally, the data collected aids city planners and officials in making informed decisions about infrastructure, public policies, and services. Overall, Traffy Fondue is an essential tool for involving Bangkok's residents in city management and enhancing the efficiency and effectiveness of municipal services.

This research focuses on Bangkok Smart City and public engagement through the Traffy Fondue platform managed by BMA. It aims to examine the implementation of public crowdsourcing in Bangkok, identify the main factors contributing to its success, and assess the outcomes on citizen participation, public policy, and services. The study also explores the challenges and lessons learned from Bangkok's crowdsourcing efforts and compares them with those of other local administrations in Thailand. Finally, the research proposes policy guidelines based on the case analysis of BMA for strengthening crowdsourcing in the public sector, especially in the local administration, and suggests future research directions for promoting digital democracy and public engagement in Thailand.

Focus and Scope of Case Study

The case analysis focuses on the Bangkok Metropolitan Administration (BMA), specifically examining the use of the Traffy Fondue platform for public crowdsourcing. It also includes analysis of the factors contributing to the successful implementation of crowdsourcing within the Bangkok Metropolitan area. In addition, the study compares the case analysis with other local administrations in Thailand that use the Traffy Fondue as the crowdsourcing tool. Based on these comparisons, the study proposes policy guidelines aimed at strengthening public crowdsourcing and enhancing digital democracy through increased citizen engagement in Thailand.

Literature Review

Crowdsourcing is a model in which organizations solicit external contributions to fulfill tasks that were traditionally handled internally. It capitalizes on the idea that valuable information and skills can come from a broad, distributed group. Essentially, crowdsourcing involves outsourcing tasks to a wide audience, typically through an open call on the internet, to harness collective intelligence and diverse skills for various objectives. Common mechanisms of crowdsourcing include competitions, idea generation, and microtasking, each utilizing the crowd's input differently but sharing a common goal of problem-solving or generating valuable outputs. Howe (2006) posits that this model can democratize innovation and reduce costs, potentially leading to more diverse and innovative solutions.

Crowdsourcing is also described as an IT-mediated problem-solving and idea-generation model that leverages dispersed knowledge to produce diverse resources for organizations (Prpić et al., 2015). Moreover, Liu (2017) notes that crowdsourcing serves as a distributed problem-solving production model for modern governments, with the potential to transform citizens into co-producers of public services. Properly designed crowdsourcing platforms can empower citizen participation, create

governmental legitimacy, and improve public service effectiveness. Effective crowdsourcing should align tasks with participants' knowledge and skills while incorporating rewards to boost participation rates. Additionally, creating opportunities for learning and skill-building is crucial for enhancing the quality of contributions, thereby promoting public policy, innovation, and digital democracy.

Crowdsourcing plays a significant role in smart cities. Kong et al. (2019) highlighted that mobile crowdsourcing (MCS) combines traditional ICT with modern mobile communications to deliver efficient, high-quality services. MCS is characterized by three main features:

i) **Mobility** - Smart devices reflect the mobility patterns of their users, which can enhance MCS performance.

ii) **Collaboration** - Tasks are distributed among crowd workers who collaborate to achieve a collective goal.

iii) **Human capacity** - Mobile users contribute their sensing, communication, and processing abilities to improve MCS systems.

MCS is essential for smart cities as it leverages dynamic crowds and mobile devices to provide decentralized services and applications. Residents act as active contributors by generating data that supports urban development and service improvements. Moreover, social media platforms also serves as an effective crowdsourcing platform for urban and policy planning. Wang et al. (2021) demonstrated that platforms like X (formerly Twitter) can collect and analyze public perceptions of the built environment at fine temporal and spatial scales, offering valuable insights into land use issues and environmental planning.

Crowdsourcing holds significant potential for developing sustainable cities. In the Global South (countries and regions primarily located in the Southern Hemisphere), where rapid population growth and urbanization pose significant challenges, Diop et al. (2022) provide an overview of crowdsourcing methods for promoting public participation in urban planning. They identify technological, administrative, academic, socioeconomic, and cultural challenges that affect the success of crowdsourcing initiatives. Collaborative mapping using web tools like OpenStreetMap (OSM) has been widely adopted for application, such as urban transportation, event detection, crisis management, urban tourism, health, environmental monitoring, and gender-related issues. The study suggests several solutions to overcome these challenges, including:

- Developing new collaboration frameworks with international experts to avoid digital colonialism
- Ensuring the inclusion of all population segments, particularly women
- Using more accessible platforms to enhance public participation in urban planning
- Creating methodologies that align with the specific needs and characteristics of the Global South

Although crowdsourcing is recognized as a cost-effective way for less developed countries to collect urban data and foster citizen empowerment, challenges remain. Addressing these challenges requires integrating complementary datasets, such as remote sensing data for informal settlements, disaster response, crime, and water issues as well as citizen-sensing data for mobility patterns and environmental monitoring.

As a result, crowdsourcing has evolved into a distributed problem-solving and production model, which has been increasingly integrated with IT to support the implementation of public services, policy development, and innovation. Modern governments can leverage crowdsourcing to transform citizens into co-producers of public services, thus fostering greater citizen engagement. Liu (2021) examines crowdsourcing in public services through the lenses of co-production theory, public sector volunteerism, and government-citizen relations. This framework categorizes crowdsourcing into four types based on two dimensions - policy stage and the functionality of citizens' efforts:

- Complementary crowdsourcing in service implementation
- Supplementary crowdsourcing in service implementation
- Complementary crowdsourcing in policy and service design
- Supplementary crowdsourcing in policy and service design

Liu's analysis includes four illustrative case studies. By designing crowdsourcing initiatives that align with citizen-government relationships, governments can better match goals and tasks with suitable contributors, thereby enhancing democratic engagement and systematically building expertise in the field.

Crowdsourcing also functions as an e-participation strategy of government. According to Flores et al. (2022), crowdsourcing strengthens open government by fostering citizen participation and collaboration. It serves as a digital tool that complements traditional public participation programs and engages citizens in local problem-solving. A key component of this strategy is the role of digital city projects in monitoring spontaneous crowdsourcing activities while actively planning and implementing government initiatives. Such frameworks can help local governments identify talents, influencers, and partners among various stakeholders. By understanding what motivates these individuals and the incentives they seek, governments can stimulate participation and innovation in projects, processes, products, and ideas.

Increasingly, government organizations are using crowdsourcing platforms to interact with citizens and incorporate their input into public service design and delivery (Shang, 2024). Hohensinn (2022) analyzed a seven-year dataset of online citizen requests and government responses. The study revealed that when requests are denied, citizens are less likely to continue engaging with the platform. This finding underscores the importance of transparency in government responses to maintain citizen participation.

Research on crowdsourcing in the public sector has demonstrated that well-designed platforms can empower citizen engagement, enhance government legitimacy, and improve public policy. Effective crowdsourcing can help resolve public issues and foster innovation. Several studies suggest that crowdsourcing initiatives should not only address the solutions needed for public problems but also ensure tasks are assigned to participants with relevant knowledgeable or skills. While rewards and incentives can boost participation rates, opportunities for learning and skill-building are crucial for improving the quality of contributions. Establishing an effective crowdsourcing system can, therefore, promote sound public policy, drive innovation, and advance digital democracy.

Crowdsourcing in Thailand: Challenges and Opportunities

There has been limited research on crowdsourcing in Thailand. Kankate (2019) examined crowdsourcing as a process for creating innovation in new public governance and designed an information technology (IT) platform for a proposed crowdsourcing model. The study identified a seven-stage model for crowdsourcing innovation in public governance: initiation, agreement, co-creation, project, funding, accomplishment, and accountability. Key considerations for platform design include authentication and authorization, participation, fundraising, service fees, and other essential structural elements.

Despite its benefits, crowdsourcing in Thailand faces several challenges, including issues related to data quality, participant motivation, and varying levels of digital literacy among users. The effectiveness of crowdsourcing initiatives can be hindered by these factors, particularly in rural areas where access to technology is limited. Khwanngern et al. (2020) found that crowdsourcing platforms usually rely heavily on user contributions. For instance, Thailand’s online healthcare information platforms, when accessed via mobile application, frequently face information gaps that prevent data from being effectively shared beyond their user bases.

Weeramongkonlert and Khamwon (2015) described crowdsourcing as a form of participatory online activity in which individuals, institutions, nonprofit organizations, or companies benefit from a diverse group of contributors with varying knowledge and expertise. Through an open voluntary call, participants contribute work, money, knowledge, or experience, leading to mutual benefits. The study highlighted that perceived benefits, such as access to specialized skills and solution diversity, directly influence individuals' willingness to participate in crowdsourcing initiatives.

On the other hand, Sayprom and Cheyjunya (2023) analyzed the crowdsourcing-based news reporting process of the Bureau of Networking and Public Participation, the Public Broadcasting Authority of Thailand (Thai PBS), and the Southern Cities Climate Change Resilience Networks Foundation (SCCCRN). Their findings show that these platforms are designed to enhance interaction between the hosting organizations and platform users, which is a mutually beneficial relationship. The process of news reporting on the C-Site and Hatyai City Climate platforms consists of three main processes:

i) **Input** is the import of data for disseminating problematic issues or news pieces, and for motivating users to participate in news reporting. This process operates across three public spheres: the virtual public sphere, the physical public sphere, and the public sphere in mass media.

ii) **Process** is the procedure of management of working agenda, mass participating, content, and technology.

iii) **Output** is completed work or news pieces, guidelines for problem-solving, and mutual benefits of both the organization and users.

Additionally, the study identified common trends among these platforms: (i) creating and maintaining relationships with both online and offline users; (ii) integrating crowdsourcing platforms with social media; and (iii) ensuring flexibility in content or news presentation.

Consequently, public crowdsourcing in Thailand has shown significant potential in various sectors, including governance, urban management, healthcare services, and disaster response. While there are challenges, particularly related to data quality and digital literacy, the growing use of crowdsourcing platforms like mobile application and Traffy Fondue demonstrates a trend toward more participatory and transparent governance in Thailand.

Leekrajan and Jensantikul (2024) explain the history of the Traffy Fondue platform and analyze its advantages and limitations in city management through the lens of public administration. The analysis found that the Traffy Fondue platform represents both product and process innovation, leveraging technology to enhance public service management while reducing costs. The platform is fast, be made accessible to everyone, and improves efficiency in urban services. The advantages of the Traffy Fondue platform are:

- Facilitating communications between citizens and responsible agencies regarding city problems
- Enabling responsible agencies to provide information and updates on the situation, resolve problems, and communicate with the people
- Offering a problem management and tracking system that utilizes statistical data service, which helps to increase efficiency in planning budgets and manpower

However, the constraint to the platform is the delay in resolving reported issues as notified by the Traffy Fondue platform.

In the case of Bangkok, Suphasuk (2022) described that the Traffy Fondue application can enhance the efficiency of public service provision in Bangkok by streamlining the complaint process. BMA became more effective after its implementation, optimizing complaint reception and hastening resolution process. The factors that contributed to its success in improving public service management in Bangkok include:

- A hierarchical agency structure that mirrors traditional government chains of command
- The role of leaders/policymakers were significant in shaping policies, guidelines, and vision for efficient agency action
- Consistent collaboration with diverse sectors
- Operational problem-solving technology in the bureaucratic chain of command structure

The research findings suggested that to make public administration more efficient, government agencies should adopt technology like Traffy Fondue to transform traditional governmental management system, improve public service workflows, have efficient response to complaint, and faster problem resolutions.

Similarly, Thongratthanadol et al. (2023) studied the factors affecting the acceptance and use of the Traffy Fondue platform in Eastern Bangkok. The research results found that there is a high level of official acceptance of the platform for city management and problem-solving. The factors of acceptance to use the Traffy Fondue Platform have a statistically significant influence at the level of .05 on officials behavior in managing and solving problems. The factors included intention to use, perceived usefulness, and perceived ease of use. However, the obstacles encountered in adopting the Traffy Fondue platform were:

- Unreliable internet networks, making it difficult to coordinate among responsible units in Bangkok
- Inaccurate information received from citizens
- The inability to search and retrieve as the application needed to be updated frequently
- The 24-hour complaint reception system, which increased workload and deprived government officers of rest
- Communication via chatbot is sometimes one-way from the complainants, and the officials are unable to request further information

This research, therefore, analyzes the city management of Bangkok Metropolitan through the application of the Traffy Fondue crowdsourcing platform, highlighting its role in improving urban services and efficiency in city management and public services, including creating open public policy and enhancing the citizen engagement.

Case Analysis through the Model

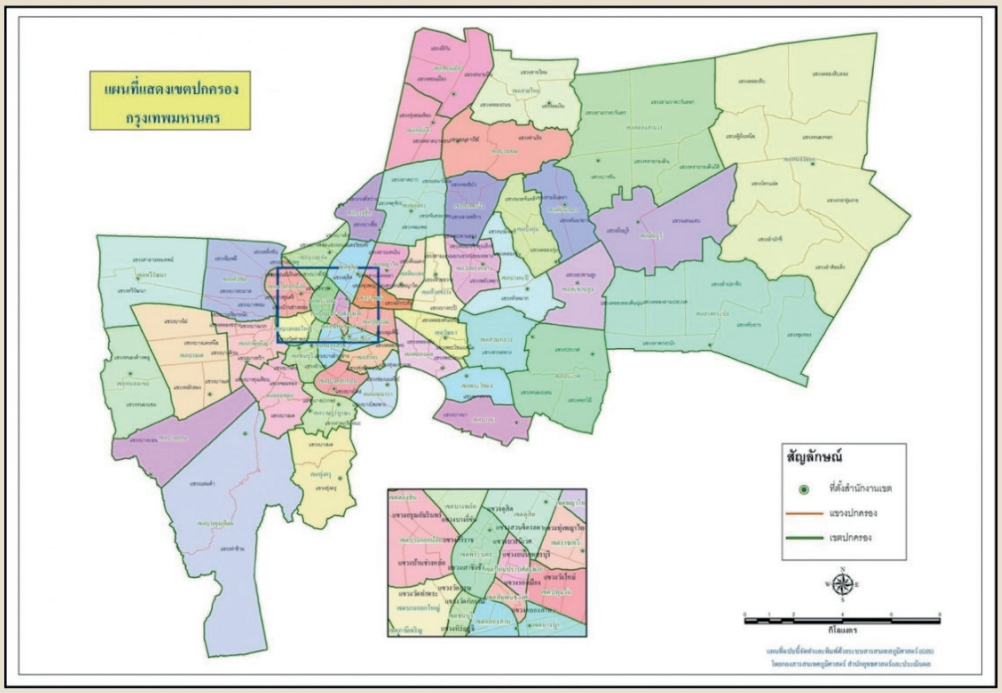
Situation

This research focuses on a case analysis of BMA in Thailand, specifically examining the use of crowdsourcing for public services implementation and citizen engagement. The BMA is responsible for the administration and development of Bangkok, the capital city of Thailand. Bangkok is divided into six zones and 50 districts, each managed by a district office that oversees local administration, services, and development projects. These districts are further subdivided into smaller administrative units known in Thai language as *"khwaeng"*.

The BMA is led by the Governor, who is elected by Bangkok residents. The current Governor is Chadchart Sittipunt. The Governor has executive powers while the Bangkok Metropolitan Council, which consists of elected members representing various constituencies within Bangkok, is responsible for legislative functions, planning, and policy-making.

FIGURE 6.4

BANGKOK METROPOLITAN MAP



Source: Geographic Information Division, Bangkok Metropolitan Administration (2024).

Bangkok's 2032 Vision

Bangkok aims to establish itself as the Capital of Asia by 2032. This vision is structured into four distinct five-year phases, each with its own set of priorities (Strategy and Evaluation Department, Bangkok Metropolitan Administration and Faculty of Political Sciences, Chulalongkorn University, 2013):

- **Phase 1 (2013–17):** Bangkok will focus on becoming a safe city
- **Phase 2 (2018–22):** The city will evolve into a city that is convenient, cost-effective, and environmentally friendly, ensuring to be inclusive, catering to all residents, visitors, and all socioeconomic groups, including the disadvantaged
- **Phase 3 (2023–27):** The physical structure of the city will undergo significant transformation, shifting from being a single central city to a metropolis with multiple dispersed city centers, including both the old town and suburban areas
- **Phase 4 (2028–32):** Bangkok will establish itself as an economic hub and a center for education, investment, transport, commerce, and culture within ASEAN and Asia.

The 20-year Development Plan for Bangkok Metropolis encompasses six key dimensions:

i) **Urban planning and infrastructure development** - Focuses on improving transportation systems, public utilities, and urban design to enhance the quality of life and support economic activities.

ii) **Environmental sustainability** - Aims to promote green spaces, reduce pollution, and manage waste effectively to create a healthier and more sustainable urban environment.

iii) **Economic development** - Seeks to bolster the local economy by supporting businesses, fostering innovation, and attracting investments to ensure long-term prosperity.

iv) **Social development and quality of life** - Emphasizes on improving healthcare, education, and social services to enhance the well-being of residents and reduce social inequalities.

v) **Cultural preservation and promotion** - Focuses on preserving Bangkok's rich cultural heritage while promoting cultural activities and tourism to maintain the city's unique identity.

vi) **Governance and public administration** - Aims to enhance the efficiency and transparency of public services, encourage citizen participation, and ensure effective governance to support the city's development goals.

Bangkok as a Sustainable, Inclusive, and Smart City

Bangkok is on an ambitious journey to become a model metropolis by 2032, guided by a clear and transformative vision:

- **Green and convenient city** - Promoting environmental sustainability and ease of living
- **City for all** - Creating an inclusive city that caters to all residents and visitors, regardless of socioeconomic status
- **Compact city** - Developing a city with multiple functional centers, reducing the need for long commutes, and promoting efficient land use
- **Democratic city** - Upholding principles of transparency, participation, and governance
- **Economic and learning centre** - Positioning Bangkok as a leading hub for economic activity and educational excellence

Additionally, the vision also includes a Management Strategy that focuses on:

- **Laws** - Ensuring effective legal frameworks to support the vision
- **Planning and assessment** - Implementing strategic planning and continuous assessment to guide development
- **Human resource management** - Building and maintaining a skilled workforce to drive progress
- **Finance and budget** - Securing and managing financial resources effectively
- **IT** - Leveraging technology to enhance city management and services

This comprehensive approach aims to transform Bangkok into a leading global city by 2032, enhancing its role as a key player in Asia's economic, educational, and cultural landscape.

Bangkok's Strategies for the 20-year Development Plan for Bangkok Metropolis (2015–2032)

Strategy 1: Bangkok as a Safe City

The goal is to ensure Bangkok is free from pollution, crime, drugs, disasters, and urban illnesses by 2032. Key targets include:

- Treating wastewater from all households before discharge into public water sources
- Proper waste management
- Ensuring at least 80% of residents in inner-city areas experience fresh air equivalent to at least 200 days per year
- Positioning Bangkok among the top five safest capitals in Asia concerning crime

- Draining rainwater within 30 minutes for 90% of the city area
- Eliminating flooding across the city
- Ensuring food safety and eliminating urban illnesses, including obesity, diabetes, hypertension, heart disease, stroke, brain diseases, mental illnesses, communicable diseases (dengue, tuberculosis, AIDS, rabies), respiratory diseases (flu), cancer, and elderly diseases (osteoporosis, cataracts, hearing loss)
- Enforcing all public buildings meet safety standards by 2032, exemplified by developing a Smart Public Database and Risk Monitoring System for buildings and infrastructure

Strategy 2: Bangkok as a Green and Convenient City

By 2032, Bangkok aims to improve its streetscape and quality of life with the following goals:

- Relocating overhead electricity and telephone cables underground
- Providing at least 9 sq m of green space per person and ensuring that green areas account for 40% of the city's total area
- Expanding affordable mass transit systems with efficient traffic flow and diverse commuting options

Strategy 3: Bangkok as a City for All

The goal is to create an inclusive city that offers:

- Expanding facilities and social welfare for the elderly, disabled, and disadvantaged
- Ensuring minimum wage guarantees and low-interest loans for economically disadvantaged and informal workers
- Providing complete basic education in all BMA schools with curricula tailored to Bangkok's context
- Encouraging an environment where families appreciate and pass on their unique cultural heritage, respecting cultural diversity

Strategy 4: Bangkok as a Compact City

Bangkok will focus on:

- Implementing systematic city growth with efficient land and resource use
- Developing and prioritizing subcenters based on their significance and potential, ensuring they are well-integrated and interconnected

Strategy 5: Bangkok as a Democratic City

By 2032, Bangkok aims to enhance governance by:

- Establishing a special administrative unit for utility management (functional decentralization)
- Restructuring BMA to include a council of Bangkok residents and district councils, facilitating policy initiation, public hearings, and performance assessments
- Promoting resident participation in budgeting and decision-making
- Building trust in BMA officers and political figures, fostering a network for monitoring progress and participation

Strategy 6: Bangkok as an Economic and Learning Centre

Bangkok aims to become a top-five city in Asia in:

- Commerce, economics, investment, culture, and conventions
- Transitioning from an industrial city reliant on low-wage labor to a service-oriented economy
- Attracting global tourists and serving as a cultural and innovative hub, particularly in performing arts, innovation, and design
- Hosting major exhibitions and conferences in the region

Strategy 7: Management Strategy

To support these objectives, the management strategy includes:

- Amending laws to facilitate a two-layer administrative structure
- Adjusting BMA roles and authorities to align with its growing independence and public service responsibilities
- Implementing standard strategic planning and performance reporting, using assessment data for continuous improvement
- Developing a skilled, professional workforce and efficient financial and budgeting systems
- Employing modern IT for accurate, convenient, and streamlined services

These strategies collectively aim to transform Bangkok into a leading global city by 2032, enhancing its role in Asia and beyond.

Bangkok Metropolitan Administration (BMA)

BMA is responsible for local governance in Bangkok. It operates under the Bangkok Metropolitan Administration Act BE.1985, which outlines its authority and responsibilities. The responsibilities and functions of the BMA include:

- **Urban planning and development** - Tasked with city planning, zoning regulations, infrastructure development, and the maintenance of public spaces
- **Public services** - Managing public transportation systems (such as the BTS Skytrain and MRT subway), sanitation services, public health, and education
- **Economic development** - Promoting economic growth, supports local businesses, and attracts investment to the city
- **Cultural and social services** - Organizing cultural events, maintains public parks and recreational facilities, and provides social welfare programs
- **Environmental management** - Addressing environmental issues, such as waste management, pollution control, and green space conservation
- **Public participation** - Encouraging public engagement through community meetings and consultations to incorporate resident needs and opinions into policy-making

Issues and Challenges

BMA has a long-term development plan. It plays a crucial role in shaping the quality of life in Bangkok and managing its growth and development. However, managing such a large and diverse city presents significant challenges, particularly in addressing the varied contexts and issues across its many

districts and serving a population of over 5.49 million people, which constitutes approximately 8.35% of Thailand's total population (Bangkok Metropolitan Administration, 2023).

The key issues and challenges of Bangkok Metropolitan include:

- **Traffic congestion and public transportation** - As the capital city, Bangkok is notorious for its severe traffic congestion, which impacts daily commutes, economic productivity, and air quality. While the city has expanded its public transportation network, including the BTS Skytrain and MRT subway, managing and funding further expansion remains a challenge
- **Air and water pollution** - Air pollution from vehicles, industrial activities, and construction is a major concern as it impacts public health and quality of life. In addition, the city also struggles with water pollution and the management of wastewater, exacerbated by urban runoff and inadequate drainage systems
- **Urban planning and land use** - Rapid urbanization has led to overdevelopment in certain areas, resulting in inadequate infrastructure and loss of green spaces. Maintaining a balance between residential and commercial areas development is challenging. Moreover, Bangkok must adapt to the effects of climate change by implementing and promoting sustainability practices in urban planning, including improved transportation and efficient land and energy uses are necessary for long-term resilience
- **Flooding and drainage** - Bangkok is highly susceptible to flooding, particularly during the rainy season. Ineffective drainage systems and rising sea levels contribute to this problem. Maintaining and upgrading drainage infrastructure to manage and mitigate flood risks is an ongoing issue
- **Waste management** - The increasing urban population and consumption levels have led to a rise in waste production, putting pressure on the city's waste management systems. Therefore, efficient recycling and disposal of waste is required, particularly essential are electronic and hazardous waste
- **Affordable housing** - There is a growing demand for affordable housing due to urban migration and population growth. Ensuring the quality of housing and managing slum areas or informal settlements is a significant concern
- **Public health** - Ensuring public health services are accessible for all is crucial, especially in densely populated areas and the low-income groups, continues to be an ongoing challenge
- **Economic inequality** - Economic inequality in Bangkok is evident, with disparities in income and living conditions between different areas. Addressing the needs of marginalized communities and ensuring equitable access to social services is critical
- **Transparency and administrative efficiency** - Improving the efficiency and transparency of local administrative is vital for improving the effectiveness of BMA and strengthening public trust
- **Smart city initiatives** - Bangkok aims to position itself as a leading capital city of Asia, and began initiatives for the Smart City project. One of the major works to be carried out is to improve city management and public services, such as smart infrastructure and data analytics, presenting both opportunities and challenges in terms of implementation and cost

Addressing these challenges requires a comprehensive and integrated approach, involving collaboration between government agencies, private sector stakeholders, and the community. Effective planning, infrastructure investment, and innovative solutions will be essential for the BMA to manage these issues and ensure sustainable urban development in Bangkok. To address these challenges, the BMA is leveraging technology to tackle public issues and advance development projects and urban management across the city through initiatives like the Traffy Fondue Platform.

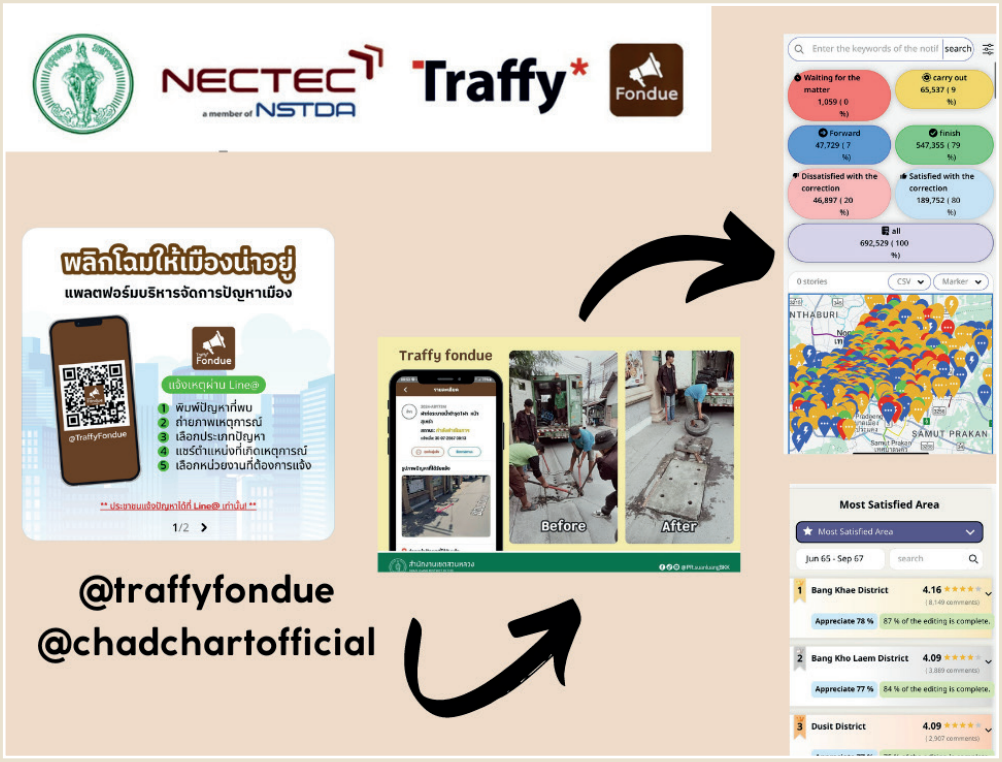
Solution

BMA's Complementary Crowdsourcing in Urban Management, Public Services Improvement, and Citizen Engagement

BMA has utilized the Traffy Fondue platform as a crowdsourcing tool to enhance urban management and policy implementation, including promoting citizens' engagement and city democracy. The platform facilitates the submission of complaints by Bangkok citizens and promotes public participation aimed at improving public services, creating open policies, and fostering policy and innovation. Traffy Fondue assists the BMA by recording and analyzing data, tracking problem areas through an online map (Google Maps), and managing the issue-resolution process through https://bangkok.traffy.in.th/. Citizens can monitor the status of their complaints online, provide relevant feedback on their satisfaction, and potentially earn rewards from the BMA. The case analysis model is illustrated in Figure 6.5.

FIGURE 6.5

CROWDSOURCING MODEL OF BMA VIA TRAFFY FONDUE PLATFORM



Source: Bangkok Metropolitan Administration (2024).

The Traffy Fondue platform, developed by the National Electronics and Computer Technology Center (NECTEC) and initiated by Dr. Wasan Pattara-atikom, was implemented by BMA in 2022 under the leadership of Governor Chadchart Sittipunt. This platform was designed to facilitate public engagement in addressing city problems. Traffy Fondue allows citizens to anonymously submit complaints both in text and image format about urban issues without revealing personal information. Complaints can be filed via Line (free app and service for instant messaging) (@traffyfondue or @chadchartofficial, known as *Puean Chadchart* in Thai) by selecting the "Report Capillary Issues" (*Sen-Liad-Foi* in Thai) menu.

The platform notifies complainants when their issues are resolved, and all complaints, along with their statuses are publicly accessible on the website https://bangkok.traffy.in.th/. Traffy Fondue is free to use by individuals and organizations to report and address public issues. It covers 14 categories of complaints, including: (i) cleaning and waste management; (ii) electrical services; (iii) water services; (iv) broken streetlights; (v) street and pavement conditions; (vi) damaged buildings and equipment; (vii) safety concerns; (viii) disaster-related issues (e.g., floods, fires); (ix) environmental concerns (e.g., trees, odors, noise, animals); (x) communication and public relations; (xi) health issues; (xii) animal-related concerns, (xiii) issues related to homeless persons and street vendors, and (xiv) traffic congestion and vehicle-related issues.

Results

Between 2022 and 2024, the Bangkok Traffy Fondue platform received a total of 722,535 reports, with 570,899 (79%) successfully resolved. Additionally, 80% of Bangkok residents expressed satisfaction with the improvements in addressing public issues (Bangkok Metropolitan Administration, 2024). This data aids the BMA in implementing policies and strategies aligned with the Bangkok Development Plan.

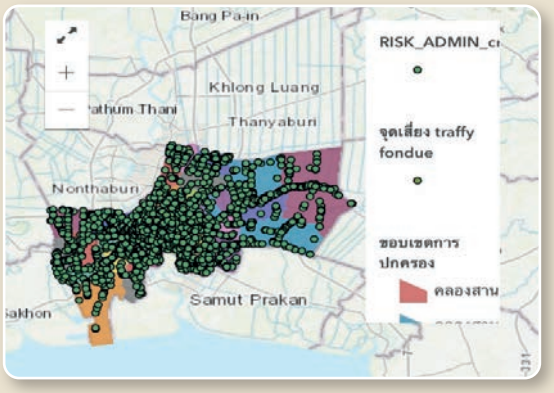
The Traffy Fondue platform showcases the efficiency of city management and problem-solving in public services and infrastructure through its crowdsourcing capabilities. By utilizing this tool, BMA has effectively addressed public concerns and fostered open policymaking.

From 1 June 2022 to 19 March 2024, the platform has supported a total of 3,794 open data and policy projects, with 630 successfully completed. Notable projects include street and pavement management, street lighting installation, and improvements at high-risk accident points throughout Bangkok. These initiatives cover various sectors, including transportation, infrastructure, safety, health, education, environment, social services, and economic development, and are implemented under 216 policies set by the BMA Governor.

The allocated budget for these projects is THB43.13 billion (approximately USD1.27 billion), with THB4.51 billion (approximately USD134 million) (10.49%) already spent in 2024. These efforts align with the Bangkok Development Plan, which is structured around nine key strategies, known as the *"9 Dee 9 Dan"* strategies (where "Dee" means "good" and "Dan" means "sides" in Thai), aimed at making Bangkok a more livable city. Traffy Fondue primarily supports the Transparency policy, which was launched on 1 October 2022, and will conclude in 2024 (Bangkok Metropolitan Administration, 2024).

FIGURE 6.6

RISK POINTS IN BANGKOK REPORTED BY TRAFFY FONDUE

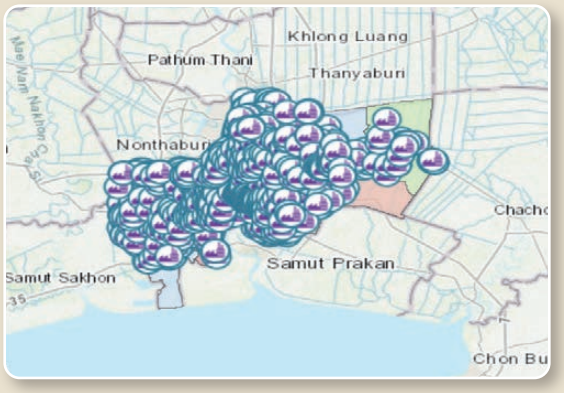


Source: BMA GIS Portal, Bangkok Metropolitan Administration (2024).

The Traffy Fondue platform enhances accountability and transparency of the BMA by facilitating public reporting and issue resolution without incurring additional operating costs. BMA staff can use the platform to proactively monitor urban utilities and analyze data, which is then integrated into the Bangkok Livable City Index. This index includes metrics, such as risk points and wastewater data, providing a comprehensive overview of the city's management and development efforts.

FIGURE 6.7

WASTEWATER DATA FROM ESTABLISHMENTS IN BANGKOK



Source: BMA GIS Portal, Bangkok Metropolitan Administration (2024).

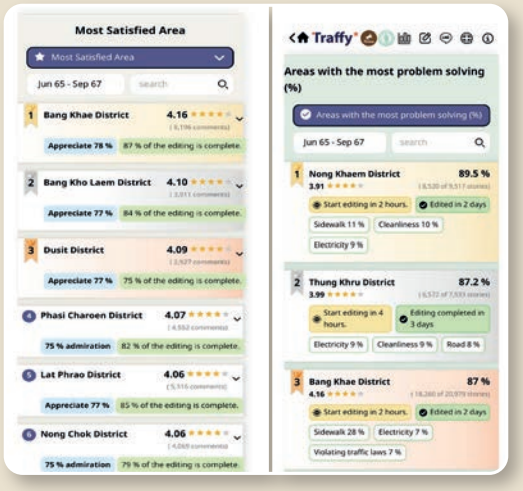
Data on policy projects is openly accessible on the Bangkok Open Policy website (https://openpolicy.bangkok.go.th/index.html), where Traffy Fondue plays a crucial role in building trust between BMA and citizens. BMA employs Traffy Fondue in four key ways:

- **Simplifying the reporting process** - AI is utilized to identify complaint types, reducing the number of questions citizens must answer from five to three
- **Enhancing citizen satisfaction** - BMA increases monitoring of complaints in nearby areas and allows citizens to review issues and rate service quality. This feedback enables the administration to address areas needing improvement
- **Encouraging participation** - A points leaderboard rewards citizens for their involvement, making the experience more engaging and enjoyable
- **Ensuring privacy** - The platform does not collect personal data, such as photos or names, ensuring that complainants can trust their information will remain confidential

By implementing these strategies, Traffy Fondue fosters a more responsive and accountable governance model. Through the platform, citizens can provide feedback on BMA operations and projects by voting on their satisfaction levels. The data generates statistics, such as the "Most Satisfied Area" and "Most Resolved Issues," illustrated in Figures 6.8. These metrics help the BMA understand public perceptions and assess the effectiveness of their initiatives across different districts. Additionally, this process enhances public communication and public participation between the BMA and citizens.

FIGURE 6.8

STATISTICAL DATA OF MOST SATISFIED AREAS AND AREAS WITH THE MOST PROBLEM-SOLVING IN BANGKOK DISTRICTS

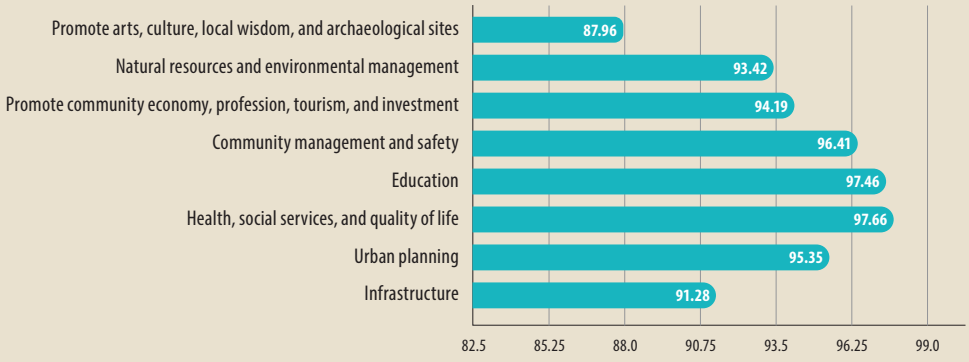


Source: Bangkok Metropolitan Administration (2024).

Overall feedback on city management and problem-solving in the BMA areas has generally been positive, with satisfaction ratings averaging between 3.42 and 4.16 out of 5. According to the 2022 public satisfaction survey, public services provided by the BMA received high ratings, ranging from 87.96% to 97.66%. The top three areas of satisfaction were: (i) public services: health, social services, and quality of life (97.66%); (ii) education: (97.46%); and (iii) community management and safety: (96.41%). This data highlights strong public approval in these key service areas.

FIGURE 6.9

RESULT OF PUBLIC SATISFACTION SURVEY ON BMA PUBLIC SERVICES IN 2022



Source: Bangkok Metropolitan Administration (2024).

Key Success Factors

The key factors contributing to the success of the Traffy Fondue platform for BMA are:

i) Leadership and strategic vision

The leadership of the Bangkok Governor plays a crucial role in the successful implementation of the Traffy Fondue platform. As part of the Bangkok Development Plan, the Governor's commitment to integrate Fondue aligns with principles of "democracy," "breaking down silos," and "cutting the chain of command." This approach ensures that all concerns are addressed democratically, and interagency coordination within Bangkok happens seamlessly to resolve citizens' issues. Furthermore, the Governor actively monitors the platform and tracks the statistics on problem resolution by organizing regular evaluation meetings. These include both formal and informal meetings with the Heads of Local Administrative Offices each week. The Governor's leadership emphasizes a collaborative and motivational approach to work, rather than relying on punitive measures (Danuda Jiwjinda, Assistant Secretary to the Bangkok Governor, personal communication, 2024).

ii) Technology and network integration

The effective use of technology and a well-established network for operational problem-solving are critical. The Traffy Fondue platform benefits from collaboration between district offices, various government agencies, and organizations, such as the Metropolitan Electricity Authority and local police stations. This cooperation enhances the BMA's ability to improve public services, manage urban development projects efficiently, and respond rapidly to public issues. Key partner agencies include the Metropolitan Electricity Authority, the Metropolitan Waterworks Authority, and the Royal Thai Police (Figure 6.10).

FIGURE 6.10

FLOWCHART OF PROBLEM FORWARDING IN BMA'S HIERARCHICAL STRUCTURE

Source: Bangkok Metropolitan Administration and National Science and Technology Development Agency (2022).

iii) Promotion of digital civic engagement

The BMA actively promotes digital civic engagement through the Traffy Fondue platform and uses AI to simplify the complaint process, making it easier for citizens to submit complaints and track complaints. As a result, more citizens participate in BMA's policy implementation and city management. Meanwhile, the quick response to the complaints enhance citizen trust and satisfaction, reinforcing transparency, accountability, and the effectiveness of BMA operations and policy implementations.

iv) Bangkok public relationship (Bangkok PR)

BMA actively promotes the Traffy Fondue application as an accessible channel for citizens to voice their concerns and report public issues. Citizens can submit complaints freely and anonymously through Line (free app and service for instant messaging), encouraging more Bangkok residents to use Traffy Fondue on their mobile devices.

v) Creating citizen engagement, satisfaction, and benefits of involving in policy implementation

Every citizen has the right to voice their concerns. It is a form of direct democracy, free from patronage relationships. All citizens can equally access the open data provided through the Traffy Fondue platform. BMA ensures quick responsiveness to citizens' complaints, with two-way communication facilitated through the platform's app chatbot and the Bangkok Traffy Fondue website's data dashboard. This enhances citizen satisfaction and encourages active participation in problem-solving. This approach fosters a sense of involvement by addressing responsive needs and facilitating active participation.

vi) Financial autonomy and resources

BMA's unique status as a special local administrative body provides it with significant financial resources. It generates income through property taxes, fees for public services (e.g., water, sanitation, permits), and transport fees (e.g., BTS Skytrain, MRT subway). This diverse revenue stream, combined with budget allocations and subsidies from the central government, supports the BMA's capacity for policy implementation, staffing, and project management.

vii) Advanced digital infrastructure

Bangkok's advanced digital infrastructure contributes to the platform's success. High-speed internet, widespread smartphone usage, and high digital literacy facilitate the use of Traffy Fondue. Residents' familiarity with digital tools, enhanced by public awareness campaigns, further supports the platform's effective use.

Challenges in Smaller Municipalities and Rural Areas

In contrast to Bangkok, where the Traffy Fondue platform is used extensively, smaller municipalities and rural provinces face some challenges in its application.

i) Scope of use

In rural areas, Traffy Fondue is often utilized primarily for basic issue reporting and tracking, rather than for comprehensive urban management. Local governments in these regions typically focus on specific tasks, such as road maintenance, community services, or basic infrastructure issues. Consequently, their use of Traffy Fondue tends to be less complex, reflecting their localized needs and smaller scale of operations.

ii) Leadership and strategic vision

The leadership and vision of the administrative teams in local government offices are crucial for fostering civic engagement, effective policy implementation, and organizational efficiency. However, changes in organizational leadership due to local elections can impact the sustainability and maintenance of the Traffy Fondue system within local organizations.

iii) Capacity building for human resources

There is a need to enhance the capacity of local staff, administrative teams, and village headmen in local areas. This development is essential for effective human resource management and local development as well as for utilizing Traffy Fondue as a supportive tool for policy implementation.

iv) Resource constraints

Limited resources, smaller budgets, and reduced staff sizes in some small local governments can restrict their ability to fully leverage Traffy Fondue. They may struggle with utilizing the platform's full range of features or integrating it into broader administrative processes due to these constraints. Additionally, there are also many local tasks and projects, some are mandated from the central and provincial governments. The lack of integration Traffy Fondue with the central policy implementation and resources might limit the affect of local government in applying the Traffy Fondue for their development.

v) Active public relations and responsiveness

Promoting the use of Traffy Fondue for citizen engagement, including the ability to freely submit complaints and problems anonymously, is crucial for helping citizens understand how to use the Traffy Fondue application effectively, as the BMA does. Ensuring quick responses to citizens' complaints and issues is also significant for building trust in local government management and encouraging active use of the Traffy Fondue application.

vi) Traditional communication preferences

In many rural areas, traditional communication methods remain prevalent. This is closely tied to the promotion of the Traffy Fondue application of local government, as mentioned earlier. Ineffective or slow responses on Traffy Fondue may fail to persuade local residents to shift away from traditional communication styles. They may prefer direct interactions with local leaders or phone calls to administrative offices, as these methods are perceived as faster and more responsive to their needs. These traditional preferences make it challenging to boost digital engagement in these communities.

Overall, Traffy Fondue's effectiveness as a public crowdsourcing tool is significantly higher in Bangkok compared to other local administrations. This is attributed to Bangkok's advanced digital infrastructure, strong leadership, active promotion of citizen engagement, and high levels of technology adoption. The city's proactive government support and public relations efforts further enhance the platform's impact. In contrast, smaller municipalities and rural areas encounter challenges, such as limited resources, weak leadership, and reliance on traditional communication methods. These factors can hinder their ability to fully utilize the platform and engage effectively with citizens.

Discussion and Policy Recommendation

The implementation of public crowdsourcing through the Traffy Fondue platform by BMA has proven to be an innovative and effective approach to urban management. The platform facilitates real-time data exchange and communication between citizens and government agencies, enabling rapid reporting and resolution of issues. Key factors contributing to the platform's success include strong leadership, particularly under Governor Chadchart Sittipunt, the effective integration of technology with policy implementation, and a strong emphasis on promoting citizen engagement.

Traffy Fondue platform's success can be attributed to several critical components. Firstly, the leadership within the BMA, especially the strategic vision of the Governor, has been pivotal. The Governor's initiative to incorporate public issue reporting into the Bangkok Development Plan has transformed how public services are managed. This leadership has empowered local government agencies to adopt digital tools and engage citizens directly, ensuring that public concerns are promptly addressed. Leadership plays a pivotal role in the success of crowdsourcing initiatives.

As noted in the literature by Liu (2021), effective crowdsourcing in public services requires strong leadership to align goals with citizen participation. In Bangkok, Governor Chadchart Sittipunt's leadership has been instrumental in integrating crowdsourcing into the BMA's strategic urban

management framework and policy. This aligns with the findings from studies of Suphasuk (2022) and Thongratthanadol et al. (2023), which emphasize the importance of leadership in encouraging the adoption of digital tools like Traffy Fondue and shaping policies. Without such leadership, the adoption of these platforms in other municipalities remains limited, again indicating the crucial role leadership plays in ensuring successful implementation.

The technological infrastructure and active promotion of Traffy Fondue in Bangkok are also the key drivers of its success. The city's advanced digital ecosystem, featuring free access to the platform, helps reduce siloed work and operational costs. It also allows anonymous complaints via the Line app, ensuring that citizens can easily and safely use the Traffy Fondue platform. This is crucial in enhancing the efficiency and responsiveness of government services. Additionally, the open data system integrates with Google Maps and a real-time dashboard, enabling quick responses and up-to-date reporting.

As a result, citizens can report issues, track their progress, and receive resolution updates, fostering greater trust and transparency in government operations. This has significantly strengthened public engagement, with Traffy Fondue's mobile application. This level of civic engagement contributes to the platform's widespread use and effectiveness in addressing urban management challenges. Kong et al. (2019) noted that mobile crowdsourcing (MCS) relies heavily on a robust technological ecosystem. The case of Bangkok supports this, as the city's advanced digital infrastructure and promotion of technology-driven civic engagement have facilitated the effective use of Traffy Fondue.

This contrasts sharply with smaller municipalities and rural areas in Thailand, where the absence of robust infrastructure and weak integration of technological crowdsourcing with local development and provincial government policies create barriers to effective crowdsourcing.

In Bangkok, the implementation of Traffy Fondue has enabled citizens to actively report and track urban issues, exemplifying successful public participation that enhances city management and policy implementation. However, engagement in rural areas remains limited due to a lack of awareness about the benefits of crowdsourcing. This mirrors the challenges outlined by Khwanngern et al. (2021), which highlight barriers to user contribution in crowdsourcing platforms.

Meanwhile, the traditional communication methods preferred by local residents pose significant challenges for effective public crowdsourcing in Thailand. These challenges can be addressed through active promotion of crowdsourcing trends that make public services more accessible, along with improvements in technological infrastructure and resources in local areas. Increasing public awareness and digital literacy, alongside ensuring transparency in complaint resolution and prompt responses from local government organizations, are essential steps.

These challenges are reflected in recent 2024 statistical data on digital and social media usage in Thailand. Data shows that 88% of Thais (approximately 63.21 million out of 71.85 million) use the internet, with 68.3% (around 49.1 million) engaging with social media. Furthermore, 98.5% of Thais have access to smartphones while only 5.4% use basic mobile phones. Desktop and laptop usage stands at 36% while tablet usage is at 29.4%. Most internet access occurs via mobile phones (over 98.6%), with 88.9% of users engaging with social media. The average time spent online is 7 hours and 58 minutes (Nukulsomprattana, 2024).

This suggests that Thailand has the potential to expand public crowdsourcing on a nationwide scale, encouraging citizens to leverage the internet and mobile phones to participate actively in government policy and project implementation. Such engagement fosters greater involvement in policy planning, decision-making, and monitoring. Ultimately, this will enhance citizen engagement, improve government transparency, and strengthen digital democracy.

The success of public crowdsourcing through Traffy Fondue in Bangkok has led to higher citizen satisfaction and increased public participation, and strengthened trust in the policy implementations of BMA and the Governor. As Hohensinn (2022) notes, government responsiveness and transparency on crowdsourcing platforms can build trust and sustain citizen engagement.

Moreover, crowdsourcing fosters greater civic engagement, enhancing policy openness and efficiency in urban management and public services. This aligns with findings by Liu (2021) and Flores et al. (2022), which emphasizes that the success of public crowdsourcing in improving public services depends on the strength of government-citizen relationships. Such relationships enhance democratic engagement, transparency, and open governance based on e-participation in crowdsourcing efforts.

Bangkok's use of Traffy Fondue exemplifies how the platform enables citizens to track the resolution of their reported issues, thereby enhancing accountability. This transparency fosters public trust and strengthens governance. However, in rural areas, where the ecosystem for promoting the benefits of public crowdsourcing is limited, achieving similar transparency is more challenging. This results in slower adoption of digital governance tools, consistent with the findings of Sayprom and Cheyjunya (2023), that identifies barriers to engagement in less developed regions.

According to Dr. Wasan Pattara-atikom, the developer of Traffy Fondue, promoting public crowdsourcing within local organizations could transform perceptions of organizational performance. An increase in complaints or reported issues can indicate that citizens trust the organization's ability to address their concerns. Conversely, a lack of reported problems may stem from a belief in the unresponsiveness and inactivity of local organizations. For instance, while BMA has received over 724,098 complaints, citizens express high satisfaction with BMA's performance, largely due to its quick responses to needs and reported issues. It is suggested that enhancing public relations and building trust between local governments and their constituents through the use of Traffy Fondue could better address citizens' basic needs and issues (Wasan Pattara-atikom, personal communication, 2024).

Moreover, BMA's capacity is a crucial factor that affects the management of complaints and grievances in Bangkok. It directly influences the ability to respond to citizens' issues, manage large-scale data, and coordinate between agencies. When agencies have high capacity, they can resolve problems quickly and efficiently, leading to greater citizen satisfaction and building trust in the management system of Bangkok in a sustainable manner.

Policy Recommendations

While the BMA's use of the Traffy Fondue platform demonstrates the potential of crowdsourcing in urban management, it also underscores the disparities between urban and rural regions in Thailand. These disparities, such as differences in leadership, infrastructure, digital democracy, and civic-engagement, must be addressed to extend the benefits of crowdsourcing nationwide. To further enhance the effectiveness of public crowdsourcing platforms in Thailand, especially in the public and government sectors, the following policy recommendations are proposed:

i) Promote the Traffy Fondue platform as a nationwide system

The Thai government should enhance digital infrastructure and create an ecosystem of digital governance and democracy by implementing the Traffy Fondue system across all government channels. This approach benefits the government by reducing public costs associated with technology as the Traffy Fondue system is already developed and available at no additional cost. Further, it enables government organizations to collect data, enhance transparency, and improve public service efficiency.

Traffy Fondue can support public crowdsourcing platforms and other technological tools while being user-friendly and secure for all citizens. The integration of the Traffy Fondue platform across all government organizations will promote public engagement in crowdsourcing, complemented by an open data system that provides real-time dashboards reflecting government projects and their progress.

Utilizing open data to inform policy decisions and enhance public services will improve overall government effectiveness. Furthermore, the Thai government should prioritize investments in digital infrastructure, especially in rural areas, to enhance internet connectivity and foster a

public crowdsourcing ecosystem that encourages greater use of the Traffy Fondue application on mobile devices.

ii) Increase the capacity of local government organizations

The Thai government should promote decentralization policies to enhance the capacity of local governments in self-management and local infrastructure investment. This includes improving efficiency and responsiveness to public issues and needs, such as flood management and risk mitigation. Strengthening these capacities will support the effective use of the Traffy Fondue system for receiving and addressing complaints from citizens.

The platform can be tailored to meet the specific needs of smaller municipalities and rural areas. Initially, these regions can focus on implementing basic features of the platform, gradually expanding capabilities as technological infrastructure and local capacity improve. In areas where traditional communication methods are preferred, Traffy Fondue should be integrated with existing communication channels, supported by proactive public relations and timely responses.

This approach will ensure broader acceptance, build public trust, and facilitate usage, allowing citizens to report issues through a combination of digital and traditional means until they can efficiently integrate the Traffy Fondue system into their daily lives, similar to other social media platforms.

iii) Promote digital democracy

The Thai government should promote public communication and civic engagement through Traffy Fondue platform. Ensuring that citizens can safety and openly use the Traffy Fondue to express opinions and complaints on public issues without restrictions will encourage Thai citizens to use public crowdsourcing platforms and other digital tools. This openness is essential for broad-based participation and engagement, and create the digital democracy of Thailand.

iv) Strengthen interagency collaboration

The government should foster collaboration among various agencies to ensure a cohesive approach to problem-solving and public service delivery through crowdsourcing. Additionally, forming partnerships with organizations, academia, and other government bodies will help drive innovation and address complex societal issues through collaborative crowdsourcing efforts.

v) Invest in R&D

The government should support the development of public crowdsourcing platforms and technologies to address challenges in both the public and private sectors. Investment in R&D will drive innovation and improve the effectiveness of these tools. In addition, the research can contribute to sustainable integration of crowdsourcing within government organizations.

vi) Align with the 20-year National Development Plan

Public crowdsourcing efforts should be aligned with Thailand's 20-year National Development Plan to ensure efficient and sustainable implementation of public policies and services across all government sectors. Therefore, the National Strategic Plan might be revised according to the alignment of public crowdsourcing and promotion of civic engagement and digital democracy. This will also support innovation in addressing societal and political challenges, such as changing of political leaders and military coups.

vii) Enhance public engagement and transparency

To foster greater trust and participation, government should provide regular feedback on reported issues and the outcomes of government actions by using public crowdsourcing. Ensuring that

digital platforms are responsive, user-friendly, and accessible will enhance civic engagement and strengthen the relationship between citizens and government agencies.

Conclusion

Public crowdsourcing has been strategically planned and implemented in city development and management by BMA under the 20-year Development Plan for Bangkok Metropolis. BMA has successfully used the Traffy Fondue platform for city management and civic engagement to improve public services and infrastructure as well as support open policies and innovations. The key factors contributing to the successful implementation of crowdsourcing include:

i) Leadership and strategic initiatives

The leadership of Bangkok Governor Chadchart Sittipunt has been instrumental in initiating and enforcing the Traffy Fondue platform as part of the Bangkok Development Plan. Executive leadership plays a crucial role in enhancing operational efficiency by formulating effective policies and ensuring their successful implementation. Under Governor Sittipunt's "Nine Good Policies," one initiative focuses on citizen issue reporting and resolution through Traffy Fondue. This policy aims to improve service management and address minor issues by providing a direct communication channel, such as the Line app, for citizens to report problems to government agencies. This approach has significantly contributed to the successful enforcement and implementation of public policies.

ii) Effective technology, active public relations, and networking

The effective use of technology, active promotion of Traffy Fondue in public communication, and a coordinated network for problem-solving and public service development among BMA district offices are essential. Heads of government departments in Bangkok have underscored the importance of BMA policies and encouraged agencies to engage with the Traffy Fondue platform. This participation ensures that agencies promptly receive and address public complaints, coordinate actions, and resolve issues efficiently.

Additionally, Bangkok's proactive public relations efforts and widespread awareness campaigns promote the use of Traffy Fondue, leading to increased public engagement. Effective communication strategies encourage residents to report issues and provide feedback through the platform in an accessible manner, particularly via the Line app. Moreover, executives can monitor the implementation process and identify obstacles faced by agencies, and enhance organizational management and system efficiency through Traffy Fondue. Data from the platform also supports the BMA's open data initiatives and transparency strategies.

iii) Public engagement and trust

Promoting the use of Traffy Fondue among executives and BMA districts, and crucially, quick responses to complaints and issues, have fostered public trust in government agencies. The platform also facilitates free complaint submission and public engagement, allowing citizens to track government projects and budgets. This transparency enhances accountability and effectiveness in city management by making the BMA's work more accessible and responsive to public needs and benefits.

iv) Organizational capacity

The BMA's structure and authority enable self-governance, including staff recruitment and the generation of income and fees to fund operations and development projects. This capacity supports the successful execution of crowdsourcing initiatives.

v) Digital infrastructure and ecosystem

Advanced digital infrastructure and a robust ecosystem for digital democracy are critical to the success of public crowdsourcing through Traffy Fondue. These factors ensure the effective use and integration of the platform in Bangkok's city management efforts while fostering civic engagement.

In summary, Bangkok's advanced digital environment, active public relations, and supportive leadership enhance the effectiveness of the Traffy Fondue platform for public crowdsourcing. In contrast, smaller municipalities and provinces face challenges related to infrastructure, public communication, government support, and traditional attitudes, which can hinder their engagement and negate the effectiveness of the platform. Addressing these challenges through targeted strategies and investments can improve the platform's performance across various regions.

Recommendations for Further Research

To deepen the understanding of the Traffy Fondue platform and its broader implications, further research is essential. Such research should focus on its long-term impacts, scalability, technological advancements, and organizational integration to maximize its potential for public service efficiency and civic engagement.

i) Assessing the long-term impact of Traffy Fondue

Further research could explore the long-term impacts of the Traffy Fondue platform on public service efficiency and civic engagement. This includes evaluating how effectively the platform addresses recurring issues, fosters public engagement, and contributes to digital democracy as well as its role in shaping public policies over time.

ii) Evaluating the scalability of crowdsourcing models

Research could focus on the scalability of the Traffy Fondue model to other cities or regions. This includes evaluating the adaptability of the platform’s technology and processes to different administrative and cultural contexts.

iii) Exploring the integration of AI

Investigating the potential integration of AI into crowdsourcing platforms could reveal opportunities for more advanced data analysis, predictive problem-solving, and personalized citizen engagement.

iv) Studying the impact on organizational efficiency

Further analysis could examine how the implementation of crowdsourcing platforms like Traffy Fondue affects the efficiency and effectiveness of organizational processes within the BMA. This includes understanding how well the platform integrates with existing systems and workflows.

v) Enhancing public feedback mechanisms

Research into the effectiveness of feedback mechanisms within crowdsourcing platforms can provide insights into how public input is utilized and how feedback loops can be improved to ensure continuous improvement and civic engagement.

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CHAPTER 7: TURKIYE

CROWDSOURCING INNOVATION: TEKNOFEST'S IMPACT ON TURKIYE'S NATIONAL TECHNOLOGY ECOSYSTEM

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Abstract

This study investigates how Teknofest, an innovation competition, crowdsources solutions to public-sector challenges experienced in Turkiye. Launched in 2018, Teknofest is organized annually on a grand scale by the Turkish Technology Team Foundation (T3 Foundation) in collaboration with the Ministry of Industry and Technology. The study highlights how Teknofest has successfully fostered a passion for technology, science, and entrepreneurship among young people while also bridging the gap between different sectors through public-private collaboration. Much of this success is largely attributed to the festival's broad participation base, thematic alignment with national development goals, and the role of public-private sector collaboration.

However, certain challenges remain, including the sustainability of financial resources, the need for ongoing adaptation to technological developments, and the risk of brain drain.

The study further suggests the institutionalization of Teknofest through legal and administrative regulations, along with increased participation from public institutions. Additionally, expanding project commercialization support would be useful as well as the development of low-technology funds and improving international cooperation. To maintain its position as a leading innovation competition, Teknofest should also introduce new categories and improve competition formats for future edition.

Introduction

In today's public administration, innovation and citizen participation have become essential strategies for improving the quality of public services while ensuring a more efficient use of limited resources. Crowdsourcing has emerged as a transformative model for public sector service delivery, enabling citizens to contribute their knowledge, skills, and resources. This model has proven particularly effective in research, design, software development, and product innovation, offering a number of advantages to both the public and private sectors.

By aligning these dynamics, Turkiye launched the National Technology Initiative in 2017, spearheaded by the Ministry of Industry and Technology. This initiative sees Turkiye adopting a strategy that prioritizes technological independence and innovation, which is structured around a comprehensive process consisting of five main components: (i) high technology and innovation; (ii) digital transformation and industry move; (iii) entrepreneurship, (iv) human capital; and finally (v) infrastructure. To ensure the

success of this initiative, it is crucial to raise awareness of education, research and development (R&D), and production processes in all segments of society, especially among young people. Broad public participation serves as an important element that forms the basis of the National Technology Initiative.

In this context, Teknofest is an event organized in Turkiye as a platform where all of these principles converge with the National Technology Initiative. It was launched in 2018 by the Ministry of Industry and Technology in collaboration with Turkish Technology Team Foundation (T3 Foundation). Through Teknofest, innovative projects contribute to national and domestic advancements by combining the knowledge, skills, and resources of a wide range of participants. Its aim is to increase young people's interest in technology and foster technological awareness as to strengthen Turkiye's global competitiveness.

This research analyzes crowdsourcing in Teknofest and explores its role in social participation, technology production, and the National Technology Initiative. The central research question is: How effective is this crowdsourcing model, and in what ways does it contribute to the technology ecosystem of Turkiye? This case study seeks to reveal how different participants, projects, and stakeholders have participated and contributed to these processes at Teknofest from the perspective of crowdsourcing in the public sector.

Focus and Scope of the Case Study

This research explores the integration of crowdsourcing with Teknofest, a public-sector initiative in Turkiye under the National Technology Initiative. It examines how this integration enhances social involvement, creativity, and public offerings. Teknofest aspires to be Turkiye's premier technology event and one of the leading technology festivals in the world. As a major technology ecosystem development platform, Teknofest has pioneered initiatives with its projects toward technological independence, social awareness, innovation by engaging youth in cutting-edge projects.

The case study will include a historical development of Teknofest, recognized as the world's largest aerospace and technology festival, accompanied by real-world examples of its impact. It examines the types of projects presented, its ripple effect on Turkiye's technology ecosystem, and international comparable cases. Additionally, it evaluates the future potential of Teknofest and identifies areas for further enhancement.

Historical Development of Teknofest

In this case study, the historical evolution of Teknofest is traced. The festival has expanded rapidly, both in the number of participants and the diversity of projects. The study also analyzes the changing nature of Teknofest and its growing integration into Turkiye's technology policies and the National Technology Initiative.

Impacts of Teknofest on the Ecosystem

Teknofest is a big hackathon event wherein Turkiye's technology sector is advanced, eliminating dilettantism against technology, and strengthening the domestic innovation system. This research focuses the festival's impact on the domestic technology industry, entrepreneurship ecosystem, and collaborations between public and private sectors. In addition, it will explore Teknofest's long-term effects and its contributions to national technology strategies. Evaluating these aspects will provide a comprehensive perspective of the way Teknofest aims to change the course of technology in Turkiye.

Suggestions for the Future

Finally, this study offers recommendation for Teknofest's future development. It suggests possible improvements to its crowdsourcing strategy to maximize effectiveness, increase national and international participants, and enhance its role in technological innovation processes. Additionally, this paper presents strategies to ensure Teknofest's sustainability, particularly in the areas of education,

R&D, and technology production. These recommendations are designed as steps to enhance the role of Teknofest in further developing Turkiye's technology ecosystem and promoting long-term sector growth.

Scope and Limitations

This case study analyses the development of Teknofest from 2018 to 2023 and its collaborations with the public sector. However, while the role of the public sector is the main focus, the private sector's involvement will be analyzed in a more limited way.

Literature Review

Digitalization in Turkiye

E-Government Gateway

The E-Government Gateway, launched in 2008, is one of Turkiye's most significant steps toward digitalizing public services. Managed by the Presidency of the Republic of Turkiye Digital Transformation Office, it enables citizens to access various public services online and provide feedback on them.

CIMER Application (Survey and Complaint Mechanisms)

CIMER, which stands for the "Presidential Communication Centre," is the world's largest public communication platform created to uphold citizens' rights to petition and access information, as guaranteed by the Constitution of the Republic of Turkiye. The primary aim of CIMER is to gather citizens' opinions, suggestions, and complaints regarding government activities and the actions of public administration, thereby providing valuable insights for policy formulation. In alignment with the principle of participatory governance, CIMER's main objectives are to enhance the quality of public services delivered by the administration and to maintain open communication channels between citizens and the state at all times (Durmusoglu & Genel, 2022).

Municipalities and Local Governments

Smart City Projects - Istanbul

Today, there is a growing recognition on the importance of smart citizens and public participation as essential components of smart city development. While a robust technological infrastructure is often viewed as a critical factor for the success of a smart city, it is equally important to acknowledge that the learning capacity and active involvement of citizens play a crucial role in enhancing a city's overall intelligence. Engaging citizens in the smart city initiative not only empowers individuals but also contributes to the city's evolution into a more innovative and responsive environment (Bingol, 2021).

Ankara Metropolitan Municipality

Platforms, such as "Baskent Mobil" and ALO 153 Blue Desk, are among the crowdsourcing applications that enable citizens to quickly communicate their problems to the authorities and facilitate solutions (Saylam & Elitok, 2023).

TUBITAK and Research Projects

In projects supported by the Scientific and Technological Research Council of Turkiye (TUBITAK), data collection and solution proposals are developed by using crowdsourcing methods.

TUBITAK 1001 Projects

The aim of the Scientific and Technological Research Projects Funding Program is to support research projects that complies with scientific principles, generates new information, and makes scientific comments, or solves technological problems (1001 - The Scientific and Technological Research Projects Funding Program, n.d.).

TUBITAK 4004 Programs

The Education in Nature and Science Camps/Schools Support Program promotes training programs that enhance the target audience's understanding of scientific concepts, fields, and processes through observation and hands-on scientific applications in natural sciences. The program supports activities that include one or more of the following: experimental observations, workshops, field visits, the use of games or arts for training, drama, measurement and evaluation, focus groups, sports, and interactive training. Universities, schools, and public institutions may apply with their training projects targeting preschool children, primary and secondary school students, graduate and postgraduate students, teachers, and governmental personnel (4004 - Education in Nature and Science Camps/Schools Support Program, n.d.).

TUBITAK 4005 Programs

Launched in 2013, the Innovative Educational Applications Support Program is designed for graduate students, university academic, permanent teachers actively working in institutions, and employees of science centers operated by public and municipal affiliates. The program includes interactive learning activities that equip participants with the necessary knowledge and skills through innovative approaches, aiming to spark interest and curiosity in their fields, develop positive attitudes, boost their motivation, and facilitate effective learning. Since 2018, project coordinators have been required to hold a PhD degree (4005 - Innovative Educational Applications Support Program, n.d.).

Academic Research on Crowdsourcing in Turkiye

Citizen Participation and Public Administration

Democratic participation and crowdsourcing are increasingly recognized as vital components of public governance. Research examining the relationship between digitalization, democracy, and governance highlights how crowdsourcing can make public policies more transparent and participatory (Saylam, 2021; Orselli et al., 2018). In Turkiye, these methods have been included into different public administration plans, showing a move toward more inclusive decision-making.

Open Data Development

Open data portals established by both central and local governments in Turkiye provide citizens with access to public data, enabling them to develop informed policy recommendations. The Istanbul Metropolitan Municipality's (IMM) Open Data Portal serves as a platform for citizens to access and analyze publicly available data, fostering transparency and community engagement (IMM Open Data Portal, n.d.). Similarly, Aperta Turkiye Open Archive allows researchers to upload and store research data in a standardized format, facilitating organized access and sharing of findings (Turkiye Open Archive - Aperta, n.d.). These initiatives recognize the importance of open data in supporting participatory governance.

Crisis Management and Crowdsourcing in Disasters

In crisis management and disaster response, data collected from citizens plays a crucial role in enhancing public service delivery. During natural disasters, such as earthquakes and floods, crowdsourced information from affected individuals enables faster and more efficient organization of aid efforts. For example, the Disaster and Emergency Management Authority (AFAD) allows citizens to report their location and urgent needs through mobile applications, streamlining response operations. These practices demonstrate how crowdsourcing can significantly improve disaster management and resilience in Turkiye (AFAD, n.d.).

Teknofest and Crowdsourcing

A prominent example of crowdsourcing in Turkiye is its major technology and innovation festival, Teknofest. Organized annually since 2018 with the support of the Republic of Turkiye Ministry of Industry and Technology, Teknofest is a technology festival showcasing advancements in aviation, space, and other industries. The festival is managed by T3 Foundation with the aims to increase public

interest in technology, especially among young people, and to support their ideas and projects through crowdsourcing methods.

Teknofest Competitions

As an example of crowdsourcing, the festival is a platform that enables the evaluation of ideas from participants of different age groups. In the competitions, young people develop various projects, which are supported by public-private sector collaboration. During this process, social feedback is gathered, and projects are refined.

Crowdsourcing Innovation

Teknofest not only supports youth projects but also encourages ideas generated with the participation of large segments of society. This approach spurs innovation and strengthens public engagement with the technology sector.

Case Analysis through the Model

Situation

Teknofest is an annual festival that began in 2018 as part of Turkiye's national technology and innovation initiative. As a world-class event, it attracts international universities and institutions. Led by the Ministry of Industry and Technology, the festival is organized in collaboration with the T3 Foundation to generate technology- and innovation-confident individuals as well as shaping projects for future generations. Teknofest serves as a significant platform for crowdsourcing large-scale technological efforts and joining hands with top players from different competitive fields around the world.

According to this situation analysis, by and large, Teknofest primarily aims to benefit society, aligning with Turkiye's development objectives to increase participation in the technology development process. The event is a multi-stakeholder gathering that engages all sectors, from universities, the private sector, public institutions, and young people. Carried out with the vision of the National Technology Initiative, this festival is strategically designed to expand the innovation ecosystem and accelerate domestic and national technology development processes.

The strengths of Teknofest include the fact that it has a wide range of participants, alignment with national development goals, and generates a large amount of resources through public-private sector cooperation. However, weaknesses include sustainable financing and limitations in incorporating mass participation into in-depth innovation processes.

Competition Categories in Teknofest

Teknofest features numerous competitions aimed at fostering technological advancements across various domains. A summary of the key competitions are listed in Table 7.1.

TABLE 7.1

TEKNOFEST COMPETITION CATEGORIES SUMMARY

Smart Wi-Fi Coverage Competition	• Enhances Wi-Fi technology performance in homes by using LIDAR sensors for indoor mapping and optimal CPE positioning • Open to university students in Turkiye, teams of 2 –5 participants
Blockchain Competition	• Focuses on advancing blockchain technology and solving real-world problems in identity, finance, and supply chain using decentralized ledger technology (DLT) • Open to undergraduate, graduate, and postgraduate students, teams of 2–5 members

Financial Technologies Competition	• Promotes innovative ideas in fintech, including digital assets, payment technologies, robo-advisor, and banking solutions • Open to university students and graduates, with teams of 2–5 participants
Air Defense Systems Competition	• Aims to develop air defense technologies for national security • Open to higher education students from Turkiye and abroad
Unmanned Surface Vehicle Competition	• Focuses on developing autonomous or remotely controlled maritime vehicles • University students can participate in teams of 3–15 people, working on obstacle avoidance and port berthing missions
Quantum Hackathon Competition	• Encourages innovation in quantum computing, specifically for lung donor matching solutions • Open to university students and graduates from Turkiye and abroad
Nuclear Energy Technologies Design Competition	• Aims to advance nuclear energy technology by designing modular reactors and related systems • Open to higher education students and professionals, evaluated across several subcategories
TEKNOFEST Roboleague Competition	• A robotics competition that fosters development in electronics, coding, and robotic design, targeting tasks with the locally developed Deneyap Kart • Open to secondary school to university-level students
T3 AI Hackathon	Focused on developing applications using the T3AI Large Language Model, this hackathon is open to students and professionals in the public and private sectors
E-Commerce Hackathon	• A competition promoting digital solutions for rural development and gender-sensitive digitization through e-commerce platforms • Open to students, graduates, and professionals in Turkiye and abroad
Smart Transportation Competition	• Encourages smart transportation solutions for safer, faster, and more efficient mobility • Open to participants from primary school to professional levels • Aims to develop renewable energy solutions and environmental awareness • Open to students and professionals, with an emphasis on innovative environmental ideas
Educational Technologies Competition	• Encourages projects that integrate technology into education for enhanced learning • Open to all students and graduates, this competition consists of a Project Preliminary Evaluation and a Semifinal Presentation
Barrier-free Living Technologies Competition	• Aims to improve life for individuals with special needs through technology • The competition involves a Project Preliminary Evaluation and a Semifinal Presentation
Technology for Humanity Competition	• Encourages projects with societal impact, solving problems in health, disaster management, and social innovation • Categories are divided into Health and First Aid, Disaster Management, and Social Innovation
Pardus Debugging and Suggestion Competition	• Focuses on improving free software usage in IT • Participants can contribute in two categories: Suggestion/Error Catching and Development
TEKNOFEST Drone Championship	• A high-level drone racing competition using FPV cameras and UAVs (unmanned aerial vehicles), where individual participants compete through qualifying rounds
Turkish Natural Language Processing Competition	• Participants develop projects in Turkish NLP • There are two categories: Free Category and Turkish NLP Scenario • The output of a successful study conducted with Topic Modeling Using LDA and BERT Techniques in this category was published in IEEE (ATAGUN, Hartoka, & Albayrak, 2021)
World Drone Cup	• A competition featuring top drone pilots from around the world • Open to amateur and professional pilots
Unmanned Underwater Systems Competition	Focuses on creating autonomous or remote-controlled underwater vehicles to perform missions like torpedo launch, cable tracking, and anomaly detection

Robotics Competitions	Offers various categories like Autonomous Vehicles, Mini Sumo, Underwater robots, and more, encouraging scientific and technological skills
Biotechnology Innovation Competition	• A category in Rare Diseases-Genetic Therapy (RaDiChal), participants are invited to develop biological products or methods • Categories include high school, university students, and other levels
HACKMASTERS	An international cybersecurity competition, where teams tackle real-life cyber incident scenarios
High School Students Climate Change Research Projects	Encourages high school students to research solutions to climate change in areas, such as biodiversity, water management, and air quality
High School Students Polar Research Projects	Focuses on polar science research, covering themes like Life Sciences and Earth Sciences
High School Efficiency Challenge Electric Vehicle Competition	Promotes clean energy by having students develop electric vehicles
High School Students Unmanned Aerial Vehicles Competition	A competition, where high school students build and operate UAVs, promoting innovation in flight technologies
Robotaxi Full-Scale Autonomous Vehicle Competition	Encourages teams to develop autonomous vehicle technologies, including both vehicle production and software design
Rocket Competition	• Aims to increase interest in space technologies through rocket design • Participation is open to various categories, such as high school, associate, undergraduate, graduate students, and graduates in categories, including Medium Altitude, and High Altitude
Artificial Intelligence in Health	• Focuses on AI solutions in healthcare • Open to high school and university students and graduates, participants submit a Project Presentation Report (PPR) and a Project Detail Report (PDR) • The output of a successful study conducted with the Stroke Dataset in this category was published in Eurasia Medicine Journal. (KOC, et al., 2022)
Digital Technologies in Industry	• Encourages designing autonomous robots for industrial use • Open to high school and university students worldwide, with Basic and Advanced categories • Evaluated through forms, videos, and project reports
Fighter UAV (unmanned aerial vehicle)	• Aims to improve UAV dogfighting capabilities • Participants, including high school students and graduates, are judged on design reports and flight-proof videos
Agricultural Technologies	• Promotes the use of technology in solving agricultural problems • Open to high school and university students, projects are judged via reports and presentations
TravelX Ideathon	• Competitors develop innovative ideas related to aviation, using technologies like AI, blockchain, and VR • Open to teams of 2-4 people across all educational levels
Tourism Technologies	• Focuses on enhancing cultural heritage and tourism using IT • Open to high school and university students, judged through project design and presentations
Flying Car Simulation	• Encourages autonomous flight simulation for flying cars • Participants submit design reports and videos • There are categories for high school and university students
Artificial Intelligence in Transportation	• AI-based solutions for transportation problems • Participants submit design reports and simulations
Chip Design	• Participants work on analogue, digital, and microcontroller design projects • Judged through detailed reports and presentations
Vertical Landing Rocket	• Focuses on the controlled landing of rockets • Open to university students and graduates, evaluated through design reports
Helicopter Design	• Participants design rotorcraft for future transport needs • Open to university students and graduates, participants are judged through design and business plan reports

Hyperloop Development	• Focuses on developing friction-reducing transport vehicles, like the hyperloop • Open to undergraduate and graduate students
Jet Engine Design	• Design a low-bypass fan for a turbofan engine • Open to university students and judged on conceptual and detailed design reports
Model Satellite	• Participants design and build a satellite, where evaluated across multiple stages from design to postflight review • Successful studies in this category have contributed academically (Ozgultekin, Turanli, & Sadik, 2024)
Technological Applications in Psychology	• Projects aimed at improving mental health through technology • Open to undergraduate students and graduates
Swarm UAV	• Focuses on developing algorithms for UAVs to work in swarms, participation is judged through software and real-world missions
Agricultural Unmanned Land Vehicle	Projects focused on using unmanned land vehicles to solve agricultural problems, where projects are judged through design reports and videos
International Efficiency Challenge Electric Vehicle Races	Teams design vehicles powered by electric or hydrogen energy, judged through design reports and dynamic tests
University Students Research Projects Competitions	A research-based competition encouraging contributions to science across various categories, like smart cities, defense, and health
International UAV Competition	• UAV technologies competition aimed at promoting innovation in aerial vehicle tasks • Teams submit reports and task videos for evaluation

Each competition is aimed at fostering innovation in its respective field, offering participants opportunities to develop real-world applications and technologies (Teknofest Competitions, 2024).

Application Processes for Competitions and Corporate Management System

Candidates who want to participate in the competitions make their applications through Teknofest's official website. In this process, an online platform called Corporate Management System (CMS) is used. The CMS is a transparent and effective system that regulates application and evaluation procedures. Candidates register through this system, select the competition category according to their interests, and upload project details and necessary documents. In addition, CMS allows competitors the opportunity to track their application status (T3 Foundation Corporate Management System, n.d.).

The CMS also works in line with Teknofest's crowdsourcing principles by organizing and evaluating ideas, projects, and solution proposals from a wide range of participants. This system brings together more sources of ideas and innovation by expanding Teknofest's competitor portfolio. Competitors can participate individually or as a team, and all application stages are completely free. This approach ensures equal opportunities to all technology enthusiasts across Turkiye, and innovative projects of young people are evaluated and supported by collecting them into a large pool through crowdsourcing.

Teknofest Startup Program

The Startup Program aims to raise awareness about transforming business ideas and products developed by teams during Teknofest competitions into viable entrepreneurial ventures. It encourages entrepreneurship among Teknofest teams or team members by supporting them in establishing their initiatives. The program focuses on transforming the Teknofest project or other innovative ideas into internationally competitive, high-tech products or services that are innovation-driven and verified for commercial value.

Between 2018 and 2023, the Teknofest Venture Competition was organized at the Preincubation and Acceleration levels for high school, university, and graduate-level teams as well as team members who applied to the competitions organized within Teknofest. Moving forward, competitions will be held in 10 themes, covering Teknofest competitions areas. Teknofest Startup Competitions will be organized in two categories, which are:

- **Preincubation** - These teams have a start-up idea and/or are developing a prototype product that will be evaluated in this category. At this competition level, the start-up doesn't need to be established and/or incorporated
- **Acceleration** - This category evaluates teams that have transformed their project into testable prototypes or products and have established companies related to these initiatives. The competition is open to high school and university students (including undergraduate, associate degree, graduate, and doctorate students) as well as graduates studying in Turkiye or abroad, who can participate in the competition as part of a team (T3 Venture Center, n.d.)

Historical Development

Teknofest was first held in Istanbul in 2018 through a partnership between the Ministry of Industry and Technology and T3 Foundation. The event, which was organized with wide participation in its first year, continued to grow steadily each year.

TABLE 7.2

TEKNOFEST COMPETITIONS FROM 2018 TO 2023

		2018	2019	2020	2021	2022	2023
Number of competitions		15	20	21	35	40	44
Total applications		4,333	17,373	20,197	44,912	154,034	337,744
Total team members		20,547	51,044	101,841	151,347	598,687	1,020,730
Gender	Male	16,893	38,678	71,764	91,757	333,404	613,728
	Female	3,654	12,366	30,077	59,590	265,283	407,002
Advisory board members		280+	350+	440+	1,000+	1,250+	2,250+
Countries that applied		57	122	84	111	107	100
Total finalist teams		754	2.053	1,260	2,296	5,961	3,000+
Total finalist members		2,000+	10,000+	1,260+	13,000+	27,109	12,000+
Total number of degrees		50	155	149	328	392	260
Teams receiving financial support		344	658	829	979	1,063	1,264
Number of visitors		550,000	1,720.000	Pandemic: No visitor access	760,000	1,250,000	2,500,000

Source: Reproduced with permission from Technology Team Foundation of Turkey Corporate Communication Department (2024).

Increase in Participation over the Years

Teknofest initially organized competitions in 15 categories in 2018. This number has increased each year, reaching 44 in 2023, reflecting the event's expanding vision and diversity in technology and innovation. While the total number of applications in 2018 was 4,333, in just five years, this number had increased significantly 337,744 in 2023. This is an indication of the growing interest in technology not only in Turkiye but also globally as well an acknowledgement of Teknofest's increasing international recognition.

Similarly, the total number of team members increased from 20,547 in 2018 to 1,020,730 in 2023. These figures show that the organization has a wide resonance going beyond the borders of Turkiye. The increase in the number of visitors not only reflects the interest of Turkish citizens in Teknofest but also shows that this event has been embraced by large segments of society.

Increase in the Number of Categories

The number of competition categories increased from 14 in the first year (2018) to 35 in 2021, 40 in 2022, and 41 in 2023. In 2024, the number of categories was expected to reach 50, demonstrating Teknofest's aim to increase diversity and interest in the field of technology.

Gender Distribution and Inclusion

When the gender distribution is analyzed, the number of male Teknofest participants increased from 16,893 in 2018 to 613,728 in 2023. The increase in the number of female participants is particularly noteworthy, from 3,654 participants to 407,002 in 2023, reflecting greater inclusion of women in the field of technology and science.

International Participation

The rapid rise in Teknofest applications and the number of team members also reveal its growing status as an international brand. In recent years, there has been a significant increase in the number of applications and participants from abroad, reinforcing that Teknofest has become a global platform for technology and innovation enthusiasts.

Contributions of Teknofest to the Entrepreneurship Ecosystem: From Idea to Product

Teknofest's encouragement of innovation through public-private sector cooperation and its role in fostering the development of new technological products serve as a significant example of crowdsourcing. The event not only showcases individual- and team-based projects but also facilitates their transformation into tangible products and initiatives. Through competitions and mentoring programs, Teknofest provides participants financing, business development, and commercialization opportunities, bridging the gap between innovative ideas and capital.

The processes of Teknofest and its contributions to Turkiye's entrepreneurship ecosystem will be analyzed through two key initiatives. Specifically, the growth and development of successful products and initiatives that emerged as a result of Teknofest will be highlighted. In this context, detailed insights will be provided on AIHEAR Technology Inc., a manufacturer of autonomous audiometer, and Degz Robotics, which specializes in unmanned or semiautonomous marine robots and parts. These companies have enriched the entrepreneurship ecosystem by commercializing their innovative ideas, leveraging the opportunities provided by Teknofest.

Success Story 1 - AIHEAR- Sebahattin Unlu

Sebahattin Unlu is a graduate of Istanbul University's Department of Audiology. In 2018, he participated in the Teknofest Travel Hackathon Competition as part of the SoulFly Team, gaining valuable entrepreneurship experience by participating in various hackathons in 2018 and 2019. In February 2020, Unlu was accepted into the T3 Foundation's Entrepreneur Candidates Scholarship Program, where he received training and mentorship.

Building on the knowledge and mentoring acquired, Unlu commenced working on an AI-powered Autonomous Audiometer project within his area of expertise, audiology. In September 2020, his team participated in the TUBITAK 1512 Entrepreneurship Support Program, where they outperformed thousands of projects to secure a grant of TRY200,000 (approximately USD5,550). They subsequently established their company at Istanbul Tecnokent Entertech. By September 2021, the AIHEAR team became finalists at the Take Off International Entrepreneurship Summit at Teknofest, which provided them with opportunities to engage with numerous investors and corporate firms.

Following this, they launched an investment round on the equity-based crowdfunding platform Fonbulucu, successfully raising a total of TRY828,000 (approximately USD23,000) from 591 investors by October 2021. They completed the R&D of their AI-supported medical device and constructed a prototype. In November 2021, they also received the Small and Medium Enterprises Development Organization's (KOSGEB) Business Development Support, allowing them to initiate the necessary certification processes to commence sales and mass production.

The venture aims to revolutionize the field of hearing health and is actively promoting its products in the global market. AIHEAR's products offer innovative solutions, particularly for individuals with hearing disabilities and audiologists, with the goal of making a significant impact in the healthcare sector. The company's audiometer devices use AI technology to conduct hearing tests swiftly and accurately, thereby facilitating more effective treatment processes. AIHEAR continues its

entrepreneurial journey with innovative technologies and strong support (AIHEAR Technology Inc, 2024; Soykan, 2024).

Success Story 2 - Degz Robotics

In 2018, a team of five young engineers, consisting of Kaan Ozturk, Kadir Yazici, Ahmet Sevim, Sena Dilber, and Fatih Akbulut, won first place at Teknofest with their team named Creatiny, established at Karadeniz Technical University. In 2020, they expanded their endeavors by founding a company named Degz Robotics. The team developed an unmanned underwater vehicle called "Deringezen" and markets over 50 mechanical and electronic components used in the development of this vehicle worldwide. Reflecting on their journey from scientific competitions to commercialization, the young engineers shared their insights in an interview:

"In 2018, we participated in scientific competitions for the first time at Teknofest with our team Creatiny formed at Karadeniz Technical University. Our unmanned underwater vehicle secured first place. We achieved first place again in 2019 and third place in 2020. Sourcing parts, particularly from abroad, posed significant challenges. Faced with difficulties, we started producing and developing every component ourselves. There was a high demand for these components from a multitude of individuals and international companies. Recognizing our capabilities, we decided to commercialize our efforts by establishing Degz Robotics in 2020" (Degz Robotics, 2024).

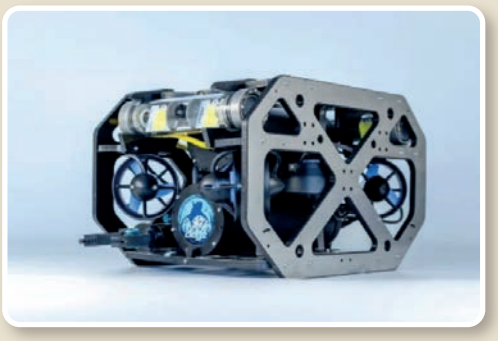
"Through our unmanned underwater robot, the Deringezen, and the electronic and mechanical components we developed in conjunction with it, we entered the global market. We do not merely sell our underwater vehicle; we also market technology. Our current achievements are a source of great pride for us.

"What is commonly observed worldwide is the procurement of ready-made subcomponents to replicate existing designs. However, we have developed our unmanned underwater vehicle, including its subcomponents, entirely on our own. The Deringezen, a new technology product consisting of completely original design, software, and components, boasts superior features compared to similar examples globally following its latest developments. We have obtained a patent for the critical waterproof chamber used in underwater vehicles, and we currently have four additional electronic components in the patent application process. For instance, our camera features a 360-degree field of view, making it more advanced than all similar models available worldwide. Furthermore, an unlimited number of arms and devices can be attached, and the system is equipped with advanced power safety features that mitigate user errors." (Teknofest'ten dogan girisimler: Sualtindan dunyaya acildilar, 2022).

Three of the products produced by Derz Robotic are shown in Figures 1–3.

FIGURE 7.1

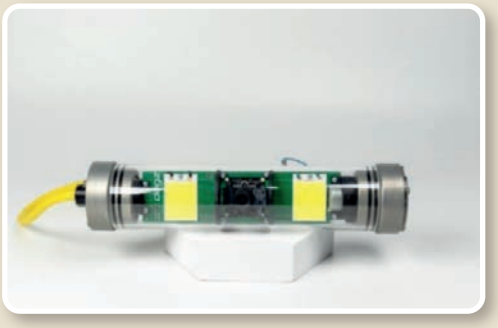
UNDERWATER ROBOT (ROV) - DERINGEZEN X



Source: Degz Robotics (2024).

FIGURE 7.2

ROLICA UNDERWATER CAMERA GIMBAL - SINGLE AXIS



Source: Degz Robotics (2024).

FIGURE 7.3

UNMANNED SEMIAUTONOMOUS VESSEL - KEMI

Source: Degz Robotics (2024).

These success stories demonstrate how Teknofest empowers young entrepreneurs with opportunities to succeed in both local and international arena through technological innovations.

Issues/Problems

Main Objectives of Organizing the Festival

- **Increasing interest in technology** - To spark interest in technology, especially among younger generations, and to encourage them to become technology developers. Additionally, to enhance Turkiye's domestic and national technology production capacity, support technology-based development, and reduce foreign dependency
- **Supporting entrepreneurship and innovation** - To foster entrepreneurship by encouraging and supporting individuals who develop new technologies and focus on innovation

- **Developing a skilled workforce** - To strengthen Turkiye's talent pool in science and technology by nurturing individuals in technology and engineering
- **Encouraging national and international collaborations** - To develop cooperation with various technology and defense industry organizations at both national level and international arena
- **Raising awareness** - To increase awareness in areas, such as aviation, space, AI, and defense industry while inspiring young people to pursue careers in these fields

Problems and Challenges

The Ministry of Industry and Technology, in collaboration with the Technology Team Foundation of Turkey (T3 Foundation), primarily oversees these objectives. In addition, the government of the Republic of Turkiye plays a crucial role as the key budget allocator and policymaker. However, various challenges arise in this process:

- **Sustainability** - Ensuring the large-scale festival such as Teknofest maintains its impact over time poses a challenge as public and participant interest may decline over time
- **Inadequate resources** - The sustainability of financial resources, such as sponsorship and state support is critical to the long-term success of the festival. If resources declines or diminishes, the scale and quality of the festival may be negatively affected
- **Keeping up with technological advances** - The rapid evolution of technology may make it difficult for the festival to stay aligned with technological trends. Failure to adapt to new and developing technologies swiftly may prevent Teknofest from achieving its innovation-oriented goals
- **Competition design** - Competitions must remain innovative and unique each year. Otherwise, repetitive formats may lose their appeal to participants and viewers
- **Risk of brain drain** - The tendency of qualified young people and engineers trained through events, such as Teknofest, may seek opportunities abroad and negatively impact Turkiye's technological development targets
- **Competing with international events** - To compete with global technology and aviation events may require continuously developing new strategies to maintain and increase the quality of Teknofest in line with its vision

The crowdsourcing model is vital in addressing these problems as well as ensuring a wide range of participation and maximizing innovation.

Solution

- **Open innovation and virtual platforms** - A segment of the festival can be expanded in a virtual environment, which can eliminate geographical limitations and reach a wider audience. The digital dimension of the festival can be expanded with online workshops, competitions, and technology experiences
- **Increasing international participation** - Establishing strategic partnerships to attract participants and projects not only in Turkiye but also internationally to position Teknofest as a global brand
- **Introducing new categories and trends** - Every year, new trends in technology and science, such as AI, green energy, and biotechnology, should be incorporated into the competition categories. This ensures the festival stays up-to-date and remains appealing to participants
- **Crowdfunding and sponsorship diversification** - Launching crowdfunding campaigns and expanding sponsorship opportunities can secure long-term financial sustainability. Greater corporate involvement and support can provide additional resources

- **Building a network of former competitors** - A network of Teknofest past participants can be established as part of continuous renewal of the festival. Past participants can be involved to help sustain innovation through mechanisms, such as mentor-mentee programs and innovative project support. Former participants' experiences can contribute to the future and long-term success of the festival

Results

Teknofest's crowdsourcing model has made significant contributions to Turkiye's technology ecosystem. One of the most notable impacts is evident in the young engineers working at companies within Turkiye's defense industry. The following is an insight of the average age of the employees of companies operating in the Turkish defense industry, especially in the field of aviation and aerospace.

TAI (Turkish Aerospace Industries, Inc), in its 2022 Sustainability Report, published data on the age distribution of its employees. According to the report, 5,388 employees, or almost 40% of the 13,570 workforce in 2022, were under the age of 29 (Turkish Aerospace, 2022).

Another notable company is Baykar Technology. Haluk Bayraktar, the general manager of the company, said in a television interview that "3,500 people with an average age of 27 are working on the Red Kizilelma project."

For Roketsan, another major defense industry company, Chairman of the Board Faruk Yigit highlighted, in an interview, a striking difference in age demographics. During the Teknofest Rocket Competition, he noted that the average age of engineers in traditional rocket and missile production companies is between 45–50 while at Roketsan, the number ranged between 28–32.

Considering that the first Teknofest was held in 2018 and engineering students typically graduates at the age of 23, it is likely that many young engineer working in these companies have participated in Teknofest before completing their degrees. This claim is further reinforced by the words of Murat Ikinci, General Manager of Roketsan, who said at the 2022 Teknofest:

"We have been seeing a growing motivation and momentum here for five years. Being in this environment where everyone from university students to high school students channel their energies to the field also motivates us a lot. Here, Roketsan's engineer colleagues come together with young people and share their excitement. In fact, we are becoming teammates with them. We include these talented friends in the field to work on our projects."

As a result, it is clear that young individuals who gain hands-on experience in various sectors and projects through Teknofest competitions often go on to work directly for Turkiye's leading defense industry companies after graduation. Young people who have achieve degrees in competitions are invited to internship programs by companies, and in some cases, they even start working as engineers in projects.

Participation in the festival has increased interest in technology and scientific projects, especially among young people. Teknofest has attracted more than 7.2 million visitors since its establishment in 2018. In addition, the number of competitors has risen annually, surpassing 1,000,000 participants and more than 300,000 teams by 2023 (Table 7.2). This contributes positively to Turkiye's future innovation and technology development potential and demonstrates how crowdsourcing can create value in line with public policies.

Key Success Factors

The main factors that make Teknofest successful in terms of crowdsourcing management are as follows:

- **Strong public and private sector cooperation** - The collaboration between the public sector, universities, and private industry has been instrumental in Teknofest's success, allowing it to

leverage a wide range of resources. The public sector, led by the Ministry of Industry and Technology and supported by numerous government organizations, provides the basic platform for Teknofest. It ensures policy alignment, regulatory support, and funding opportunities while also facilitating logistics, securing venues and infrastructure, and promoting the festival at a national level.

Academic institutions contribute by offering expertise and fostering student engagement. They encourage student participation in competitions, support R&D, and offer mentoring through their faculty members. Further, they also collaborate on joint R&D projects and grant access to specialized facilities, such as prototyping centers.

Private-sector companies, especially those in the technology and defense, play a critical role by providing financial sponsorship, technical expertise, and market opportunities. They often serve as competition sponsors and offer awards and internship opportunities to promising participants.

There are also expert consultancy or mentoring partnerships in some categories at Teknofest. Examples are: (i) Roketsan sponsors the Rocket Competition category; (ii) Turkish Airlines Inc. sponsors the TravelX Ideathon Competition category; and (iii) Turksat Satellite Communication Cable TV and Business Inc. sponsors the Model Satellite Competition category. These private companies and others are involved in joint ventures with start-ups or projects emerging from Teknofest, helping to commercialize innovative solutions and integrate them into real-world applications.

- **Reward models that encourage participation** - Teknofest's prizes and competitions structure have accelerated the innovation process while ensuring widespread participation. The significant increase in the number of participants in the historical development of the festival is a strong indicator of its success

- **Training and support programs for sustainability** - Mentoring programs have increased the long-term success of participating projects. Training opportunities, such as those offered in Deneyap Workshops, provide participants with essential preliminary preparation knowledge. Furthermore, initiatives like the Teknofest Initiative support the commercialization of successful projects by guiding teams through incubation processes, facilitating the development of real-world solutions

- **International competition and cooperation** - Strategic international partnerships and collaborations have enabled Teknofest projects to make a global impact. In 2022, Teknofest, as an international organization, was held in Azerbaijan for the first time, with the event co-organized by the T3 Foundation, Azerbaijan's Ministry of Digital Development and Transport, and Turkiye's Ministry of Industry and Technology. Within the scope of Teknofest Azerbaijan, the event featured 10 technology competitions, including Smart Karabakh Hackathon (Smart City, IoT) and Rocket League Esports EuroCup competitions

- **Continuous innovation and diversified competition categories** - As seen from the evolution of Teknofest, the increasing diversity of its competition categories has contributed to its ongoing success. Year to year, the number of participants has risen, reflecting the festival's dynamic and adaptive nature

  Moreover, Teknofest has expanded beyond competitions by integrating incubation center initiatives, which help advanced participants transition into the entrepreneurial ecosystem. This continuous development approach ensures the festival remains relevant and influential in fostering innovation.

Discussion and Policy Recommendation

Discussion

This research focuses on the impact of Teknofest on Turkiye's crowdsourcing strategies and innovation processes in the public sector. The festival-based crowdsourcing model has great potential in terms of

providing a platform that encourages innovation. In particular, it has increased the interest of young people in technology and science projects, resulting in widespread participation. This, in turn, has facilitated the involvement of diverse segments of society in technology-driven initiatives that made a significant contribution to Turkiye's technology ecosystem.

When the effects of crowdsourcing on the public sector are analyzed in the literature, it is observed that it accelerates both effective participation and innovation processes. Teknofest has a serious impact on innovation processes by reaching large masses. However, there are debates in the existing literature regarding the sustainability and long-term effects of crowdsourcing. While Teknofest's current achievements have yielded positive results in the short term, additional solutions are needed to ensure the sustainability of long-term innovation processes. Moreover, the fact that only a small percentage of the projects submitted to the festival reach commercialization indicates a need for deeper analysis of crowdsourcing management, particularly in terms of economic returns.

In this context, although Teknofest has positively influenced Turkiye's technology ecosystem, its impact needs to be aligned with sustainable development goals from a broader perspective. Crowdsourcing is an important tool for developing countries like Turkiye to accelerate domestic and national technology production. However, some structural improvements are necessary to enhance the efficiency and effectiveness of this process.

Policy Recommendations

- **Institutionalization of crowdsourcing**

  To further strengthen crowdsourcing strategies in large-scale organizations, such as Teknofest, a more systematic institutionalization of public-private sector collaboration is essential. This requires clear legal and administrative frameworks to establish a structured approach for public-private partnerships. For example, dedicated offices could be set up to facilitate interaction between innovators and government agencies. Public institutions should take a more active role in supporting R&D, helping to bridge the gap between idea generation and implementation by providing not only financial resources but also administrative guidance and logistical support. Additionally, national innovation funds should allocate dedicated budgets, and incentive programs should be introduced to encourage wider participation in this crowdsourcing ecosystem from both the public and private sectors

- **Enhancing project commercialization and support mechanisms**

  Stronger financing and mentoring mechanisms are needed to commercialize the projects developed under Teknofest into commercially viable technology products. In particular, establishing technology accelerators and incubators directly linked to Teknofest could help start-ups scale up by providing structured mentoring, technical support, and seed funding. In Turkiye, the Ministry of Industry and Technology oversees most R&D support through organizations, such as KOSGEB, TUBITAK, technoparks, R&D centers, and organized industrial zones. The support mechanism in these institutions can be modernized and made suitable for today's needs. It can create innovation grants, tax incentives, and additional seed funding programs to encourage both technological advancement and commercialization. Furthermore, public-private technology investment funds could be established to support start-ups, with the government acting as a catalytic investor to attract private sector funding

- **Expanding international cooperation**

  To enhance its global influence, Teknofest should pursue international partnerships with technology centers, research centers, and universities worldwide. Such partnerships would provide Turkish entrepreneurs with access to global knowledge networks, international markets, and foreign investment opportunities. Cross-border innovation collaborations could be encouraged by organizing international competitions and challenges. Public-private international cooperation

agreements should also focus on R&D joint ventures and innovation financing, enabling participants to benefit from both local and international expertise. Additionally, international exchange programs and cross-border mentoring initiatives could be established to connect Turkish start-ups with international markets and accelerate the commercialization of their innovations

- **Ensuring continuity participation and training programs**

  The long-term success of Teknofest's crowdsourcing initiatives will require a strong emphasis on the sustainability of youth engagement and skill development. One potential strategy is to establish year-round incubation programs that provide ongoing training and mentoring for innovators. For example, STEM-focused academies under the Teknofest brand could help maintain momentum by equipping young people with technical skills and guiding them through the innovation process. The Deneyap Workshops, which are carried out in partnership with the Ministry of Industry and Technology and the T3 Foundation, within the scope of Teknofest, could be expanded and transformed into a national education program and fully integrated into the existing formal education system. Another option is to offer online certification programs in innovation, entrepreneurship, and technology development, enabling participants to build expertise throughout the year. To further sustain engagement, the government could provide a pipeline of talented innovators scholarships and grants for participants who successfully develop technology-based solutions

- **Developing digital platforms for crowdsourcing**

  Teknofest could greatly benefit by developing digital innovation platforms where participants can showcase their ideas and receive ongoing feedback and support. These platforms should include virtual accelerators, mentoring portals, and crowdfunding mechanisms, allowing innovators to access funding, technical resources, and international markets throughout the year. Public institutions can facilitate these platforms by establishing an open innovation hub where innovators and industry experts can collaborate digitally. Additionally, a dedicated project management portal tracking the progress of post-Teknofest projects would ensure continuous engagement and allow for better monitoring of project growth. Implementing data-driven tools could assess project viability and market readiness would further enhance support mechanisms, helping participants scale their innovations successfully

Conclusion

This research analyzes the effects of Teknofest on the public sector and innovation processes in the context of crowdsourcing in Turkiye. The main research question explores how Teknofest plays a role in promoting innovation using the crowdsourcing model and encouraging active citizen participation in technology projects. In the research process, the historical development of Teknofest and its influence on the technology ecosystem is discussed in detail. In addition, policy recommendations for the future are presented.

The findings show that large-scale events like Teknofest serve as a powerful platform for accelerating innovation and increase social participation within the scope of crowdsourcing. Participants' direct contributions to the technology ecosystem align with Turkiye's science and technology-oriented development goals. However, more effort is needed to ensure the long-term sustainability of crowdsourcing, facilitate the commercialization of projects, and increase opportunities for international cooperation.

This research has revealed the importance of structuring public-private sector collaboration in a more institutionalized framework. It also emphasizes the need to develop new strategies on how crowdsourcing projects can yield more effective results in the long term.

The findings of this study provide important insights into integrating crowdsourcing into public administration and innovation processes. However, further research is necessary to deepen understanding in this field. In particular, analyzing the long-term effects of events such as Teknofest and conducting comparative analyses in an international context would address existing knowledge gaps in this field. In addition, more in-depth research on how crowdsourcing can be applied in different sectors will contribute to future academic and policy discussions.

In conclusion, Teknofest plays a crucial role in fostering innovation and encouraging citizen participation in alignment with Turkiye's national technology initiative. Making these processes more effective will be possible with the proposed policy changes and further research.

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CHAPTER 8: CONCLUSION

LESSONS, CHALLENGES, AND FUTURE DIRECTIONS FOR CROWDSOURCING

Crowdsourcing has emerged as a transformative tool in the public sector, offering innovative solutions to complex policy challenges while fostering greater public engagement and participation. Across the six APO member economies studied, this report has explored diverse contexts, methodologies, and lessons learned, highlighting how crowdsourcing can be effectively designed and implemented to address local and national priorities. From aligning policy problems with crowdsourcing solutions to designing tasks that match participants' capacities, and from incentivizing participation with rewards to building skills through feedback, the case studies reveal both the potential and the challenges of leveraging crowdsourcing for public sector innovation.

This conclusion extracts the key insights from these experiences, enabling policymakers and practitioners a roadmap for adapting crowdsourcing practices to different political, social, and technological contexts. The aim is, by examining the successes and lessons learned, to provide actionable recommendations to harness the power of crowdsourcing to enhance service quality, drive innovation, and achieve policy goals.

Lessons Learned

Lesson 1: Aligning Policy Problems with Crowdsourcing Solutions

Crowdsourcing enables organizations to discover more efficient solutions or proposals for addressing people's needs, as supported by the distant search theory. This theory puts forward that crowdsourcing reduces the costs of distant searches by engaging participants outside the organizations for a local search (Afuah & Tucci, 2012). Crowdsourcing performs more efficiently than in-house production or outsourcing to a single contractor when the administrators can break down problems into smaller tasks, leverage knowledge that exists outside the organization, and rely on knowledge and experience-based expertise (Afuah & Tucci, 2012).

The Taipei City Dashboard Open-Source Hackathon, adopted by the Department of Information Technology at the Taipei City Government, exemplifies the application of distant search theory in crowdsourcing. The Hackathon empowers residents to design services for their needs by using the data released by the city government, enabling them to share local information about the needed public services. Similarly, Turkiye Teknofest taps into the private sector's technological savvy to drive new innovations for public services.

Another example of crowdsourcing user-experience-based information is the Traffy Fondue by the Thailand Bangkok Metropolitan Administration. Managing a large and diverse city like Bangkok presents significant challenges, but the Traffy Fondue platform allows residents to report traffic conditions and other issues to local agencies. This reduces time and resources needed to identify problems and enable agencies to focus on solving them effectively. Similarly, Pakistan's Citizen Portal and India's MyGov.in leverage on residents' experience-based knowledge to improve public services.

Lesson 2: Designing Crowdsourcing Tasks to Match Participants' Capacities

Our case studies indicate that effective crowdsourcing requires well-designed process that align tasks with the capacity of the participants, as shown in previous literature (Boudreau, 2012; Kozinets et al.,

2008; Surowiecki 2005; Liu, 2017). In general, the literature highlights two types of crowdsourcing outcomes, as shown in the studied cases: task-based outcomes and innovation-based outcomes (Liu, 2017).

Task-based Outcomes

Literature suggests that lay participants can perform equal to or better than experts when assigned technical tasks with specific instructions and job classifications (See et al., 2013). For instance, Bangkok residents can report traffic congestion, road damage, and other traffic-related issues by posting photos or texts through the Traffy Fondue platform or app. Similarly, Pakistan's Citizen Portal allows citizens to file complaints and suggestions related to public services without the red tapes or bureaucratic hurdles. Users can upload attachments and track the progress of their submissions through one portal, ensuring that relevant agencies address the reported issues efficiently.

Innovation-based Outcomes

Research highlights that increasing the size of the crowd can increase the likelihood of generating innovative ideas (Prpić et al., 2015). However, improving the quality of these ideas requires education (Mergel et al., 2014) and well-structured task designs (Majchrzak & Malhotra, 2013). For instance, Turkiye's Teknofest engages the private sector experts and the public with innovation ideas as well as provides workshops on financing, business development, and commercialization opportunities. Similarly, for Taipei's Hackathon, the agency organizes a full-day workshop to prepare participants and ensure their technical proficiency and understanding of policy. The agency also provides Taipei City Dashboard documents, GitHub resources, and demos for the participants to review, help them understand the context of the competitions, and generate innovative ideas aligned with it. By offering training and information to equip the participants, the workshop design ensures the participants spend sufficient time and attention to relevant information, encouraging them to innovate (Majchrzak & Malhotra 2013).

Lesson 3: Improving Participation with Prizes and Rewards

The highlighted cases show that prizes and rewards are effective in attracting participants to contribute to crowdsourcing projects. Empirical studies indicate that monetary rewards increase participation because participants view crowdsourcing projects as work and expect reward (Kaufmann et al., 2011) while significant awards attract attention from the public (Tokarchuk et al., 2012).

For example, in Taipei's Hackathon, the government offers multiple prizes to establish a reputation among the tech-savvy community about the competitions. The city government offers TWD300,000 (approximately USD9,300) to the champion, TWD150,000 (approximately USD4,550) to the runner-up, TWD100,000 (approximately USD3,040) to the third place, and TWD50,000 (approximately USD1,500) to all merit award recipients. In addition to monetary rewards, the city government also offers partnerships with the winning team as implicit awards, such as recognition and reputation-building.

Prize awards are similarly effective in other competitions, as shown in Turkiye's case. For instance, Teknofest offers substantial grants to get the attention of the public and international community, as shown in Unlu's case in the TUBITAK 1512 Entrepreneurship Support Program. Unlu's team successfully secured a grant of TRY200,000 (approximately USD5,550) through the competition and later established a company at Istanbul Tecnokent Entertech. The government builds an attractive model that offers grants and investments to encourage participants to offer quality innovation for potential start-ups.

Lesson 4: Providing Skill-building Opportunities and Feedback

The case studies in this publication demonstrated that building participants' skills and knowledge improves the quality of their contribution as they perceive their work as meaningful (Chandler & Kapelner, 2013). Studies found that participants are more likely to contribute when they can improve their knowledge as they revisit their contributions or view others (Tokarchuk et al., 2012). For instance, the Bangkok Traffy Fondue platform notifies participants when their submitted issues are resolved. The platform enhances accountability and transparency by providing timely feedback regarding the

status of the reported issues. It reduces the repeated submission of the same issues while the participants can learn from the governments' timely responses.

Furthermore, crowdsourcing often occurs in an open environment where participants' work and performances are visible to the public, including potential employers. Events like Taipei's Hackathon and Turkiye's Teknofest provide participants with exposure to public policy-related skills and professional networking opportunities. As discussed previously, many top teams in Teknofest, even those who did not reach the finals, successfully attracted investors.

These crowdsourcing projects also allow for choices of tasks in which the participants can adopt and develop different skills through participation (Kaufmann et al., 2011). For example, Taipei's Hackathon includes workshops and instructive sessions for the participants to exchange knowledge. At the workshops, government officials would invite speakers to explain policy backgrounds and share data to improve participants' content knowledge. Given the available datasets, these workshops serve as an essential feedback mechanism for participants to exchange ideas and discuss feasibility with the organizers.

Similarly, Turkiye's Teknofest provides Deneyap Workshops and training for participants. These workshops and training sessions facilitate the development of ideas provided by participants through an incubation process. During this process, participants would learn about finance, marketing, branding, and networking with potential investors. As a result, regardless of the competition outcomes, participants benefit significantly from these learning opportunities.

Summary and Recommendations for Future Research

The case studies of crowdsourcing implementation in selected APO member economies highlight the importance of adapting to change, utilizing digital technology, and engaging the public to enhance productivity. These transformations are driven by leadership and technological advancement aimed at fostering engagement and innovation. The cases also demonstrate how they overcome challenges in regulatory and technology infrastructure. The contributions of this report lie in the unique approaches to designing crowdsourcing practices that work for each APO member economy's political and social context. By learning from these diverse practices, other countries can consider implementing crowdsourcing to meet their policy goals and enhance service quality.

The research on crowdsourcing implementations in the ROC, India, Malaysia, Pakistan, Thailand, and Turkiye reveals innovative approaches through platforms and advanced technologies, such as open source tools and automation. These cases reflect the broader national strategies for crowdsourcing implementation, where leadership and political support play a significant role in their success. However, this study has limitations, as it does not provide analysis results from a more general perspective as it focuses on specific organizations within each APO member. Challenges, such as technological disparities, differing policy environments, and the need for standardized metrics to evaluate the effectiveness of crowdsourcing implementation across different cases further complicate the analysis.

Future research could delve into comparative studies across different sectors and countries, given that crowdsourcing is a common practice in both private and public sectors. Also, it would be interesting to include longitudinal studies to understand the sustainability of crowdsourcing practices and discover strategies for adopting crowdsourcing and existing strategies. More importantly, it would be beneficial to investigate the institutionalization of crowdsourcing in the public sector across different political contexts to ensure the sustainability of crowdsourcing initiatives.

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ABBREVIATIONS AND ACRONYMS

1MDB	1Malaysia Development Board
AFAD	Disaster and Emergency Management Authority
AI	Artificial intelligence
APIs	Application programming interfaces
APO	Asian Productivity Organization
BMA	Bangkok Metropolitan Administration
BN	Barisan Nasional *(The National Front - a political coalition of Malaysia)*
CIMER	Presidential Communication Centre
CMS	Corporate Management System
DFTZ	Digital Free Trade Zone
FPV	First-person view
GDP	Gross Domestic Product
GST	Goods and services tax
ICT	Internet communication technologies
IMM	Istanbul Metropolitan Municipality
IT	Information technology
KOSGEB	Small and Medium Enterprises Development Organization
MaGIC	Malaysian Global innovation and Creativity Centre
MCS	Mobile crowdsourcing
MeitY	Ministry of Electronics and Information Technology
MOEA	Ministry of Economic Affairs
NADRA	National Database & Registration Authority
NECTEC	National Electronics and Computer Technology Center
NGOs	Nongovernmental organizations
NLP	Natural Language Processing
OCF	Open Culture Foundation
OGD	Open Government Data
PCP	Pakistan Citizen Portal
PIA	Pakistan International Airlines
PMDU	Prime Minister's Performance Delivery Unit
PMGDISHA	Pradhan Mantri Gramin Digital Saksharta Abhiyan *(Prime Minister's Rural Digital Literacy Campaign)*
R&D	Research and development
ROC	Republic of China
SEDA	Sustainable Energy Development Authority

T3 Foundation	Turkish Technology Team Foundation
TAI	Turkish Aerospace Industries, Inc
TN50	Transformasi Nasional 2050 *(National Transformation 2050)*
TRAI	Telecom Regulatory Authority of India
TUBITAK	Scientific and Technological Research Council of Turkiye
UAVs	Unmanned aerial vehicles
UMNO	United Malays National Organisation
VR	Virtual reality
WAPDA	Water and Power Development Authority
WASA	Water and Sanitation Agency

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