Master Thesis

Crowdsourcing-Oriented Organization Framework For Public Institutions

An Assessment of Social Media Crowdsourcing For Policy Formulation In The Indonesia Ministry of Finance

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Abstract

The purpose of this study was to build the Crowdsourcing-Oriented Organization Framework to survey the Indonesian Ministry of Finance's capacity to crowdsource its policy formulation tasks and to revisit the framework to the survey results using Principal Component Analysis. It examines social media as policymaking instruments from a representative democracy or data-driven policy viewpoint. This study contributes to existing knowledge in the subject, considering that crowdsourcing in policy formulation is severely limited (Prpi et al., 2015, as cited in Taeihagh, 2017), and no Ministry of Finance has used it recently.

The framework discusses five principles based on the literature review: commitment to crowdsourcing, alignment of crowdsourcing to internal business processes, effective crowdsourcing plan design, mobilizing and incentivizing the crowds, and process continuity. In comparison to Principal Component Analysis (PCA), the analysis from PCA confirms these five fundamental principles, albeit with fewer subprinciples and questions.

The calculated result indicates that the MoF is proficient at crowdsourcing. Crowdsourcing can alleviate the current policy formulation challenges in the Indonesia Ministry of Finance regarding information management and public participation. However, crowdsourcing may face difficulties to implement in the ministry because of managers' readiness to accept failure, inadequate support for innovators, anxiety about involving non-professionals, worries about information security, and low digital literacy. Therefore, this study suggests MoF commence its crowdsourcing initiative by utilizing internal crowds to find potential commitment.

Keywords: Crowdsourcing, Crowd Wisdom, Collective Intelligence, Policy Formulation, Ministry of Finance.

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Chapter 1

Definition, Hypothesis, And Indonesia Current Situation

1.1 Definition of Crowdsourcing

Crowdsourcing is a deliberate blend of the bottom-up, open, creative process with top-down organizational goals (Brabham, 2013, p.15-16) or an online, distributed problem-solving and production model that leverages the collective intelligence of online communities to serve specific organizational goals (Brabham, 2013, p.19). One crucial primary criterion in these definitions that different crowdsourcing from other schemes is the authority locus, which ensures that the organizations that crowdsource (crowdsourcers) and the participants who engage in crowdsourcing (the crowd) do not overpower each other process. On the one hand, crowdsourcing requires that crowdsourcers determine the aim, define the tasks, and decide the desired outcomes (top-down management). On the other hand, crowds remain autonomous in their pursuit of a shared goal. Another distinction is the process of producing knowledge as groups of individuals by collaborating or become collectively intelligent. Crowdsourcing coordinates and mobilizes collective skills so the crowds will produce better results and generate more innovative ideas.

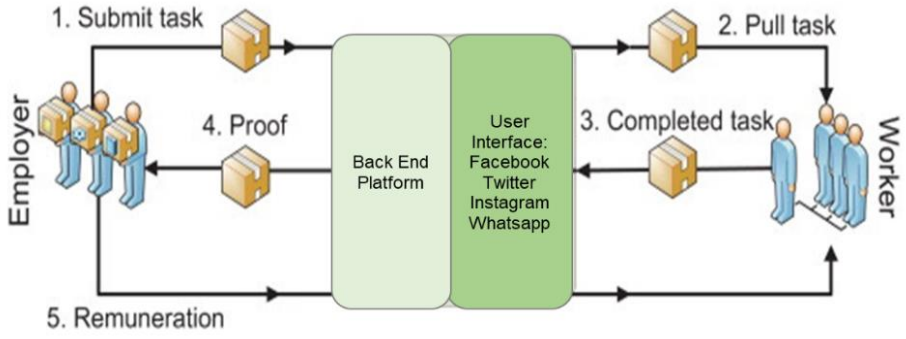
Accordingly, outsourcing, market survey, open-sourcing, simple voting, and crowdfunding do not fit crowdsourcing. For instance, outsourcing and market surveys put authority locus in the crowdsourcers by using more top-down control. Contradictorily, open-sourcing leaves too much freedom for the crowds. In the case of simple voting, crowdsourcers have narrowed down the possibilities in the beginning process, and when crowdfunding, they do not generate collective intelligence (Brabham, 2013).

In social media crowdsourcing, a crowdsourcer uses social media such as Facebook, Instagram, Twitter, Whatsapp, and Telegram as interfaces. Figure 1 illustrates the social media crowdsourcing process, a modified version of the crowdsourcing scheme from Hirth et al. (2013). In this version, employers or crowdsourcers initiate the process by distributing the task to the workers

or crowds through their back-end portal. This platform is a custom-built internal system that connects crowdsourcers' to social media sites. The crowds then receive information about the crowdsourced challenge and confirm their willingness to participate via social media. Whenever the crowds complete a mission, they submit it via the social media platform's menu and are redirected to the back-end platform to complete their inputs. In the end, the platform automatically verified crowds' contributions to crowdsourcers as a basis for compensating the crowds.

Figure 1

Social Media Crowdsourcing Scheme



Note: Adapted and Revised from Hirth, M., Hoßfeld, T., & Tran-Gia, P. (2013). Analyzing costs and accuracy of validation mechanisms for crowdsourcing platforms. Mathematical and Computer Modelling, 57(11-12), 2918–2932. doi:10.1016/j.mcm.2012.01.006

1.2 Recent Crowdsourcing Practice in Indonesia With Social Missions

Crowdsourcing has been employed by three billion organizations worldwide, with 90 percent of them claiming that it is effective for problem-solving[1]. Popular sites include Wikipedia, Google Maps, and Amazon Mechanical Turk. However, there are just three crowdsourcing platforms with a social aim in Indonesia. They are Peta Bencana.id for disaster mapping, Kawal Pemilu for general election counting, and Laporcovid19 for pandemic response mapping.

1.2.1. LaporCOVID-19.org

LaporCOVID-19.org is a crowdsourced database that visualizes the true extent of the virus spread that has eluded the government's control. LaporCOVID-19.org consists of volunteers who

[1] From https://digital.hbs.edu/platforms-crowds/biggest-challenge-future-crowdsourcing-business/

respond to the government's refusal to provide the most up-to-date and accurate information on the outbreak. As of February 17, 2021, it has 113 field reporters, volunteers, 14 Twitter opinion analysts, nine coordinating scientists, four programmers, and 13 co-leaders.

LaporCOVID-19.org allows people to share information regarding their health conditions by completing a digital questionnaire from an official Whatsapp and Telegram group, focusing on their experience with corona testing and whether they were hospitalized or self-confined at home. Simultaneously, a chatbot will automatically record personal details about users, such as their locations, email addresses, phone numbers, and social media accounts. Users also inform the bots who continue to work inside or outside their homes. In the end, LaporCOVID-19.org compiles the responses into a visual archive, depicts the extent of contagion in a region, and leverages the data to accelerate the government's policy responses.

1.2.2. PetaBencana.id

PetaBencana.id is an enhanced disaster mapping service initially developed by a dedicated community in Jakarta to track flooding and critical water supplies. It aims to deliver accurate and real-time disaster statistics to the residents and related emergency responder agencies. PetaBencana.id manages its information process using open-source CogniCity tools. It collects disaster information from social media users, verifies the location, collects photographs, and reports the analysis to relevant agencies. Individuals can easily communicate a disaster event via Twitter, Facebook, Telegram, Qlue, and its website. For example, when reporting about hurricanes, earthquakes, forest fires, smoke, windstorms, and mountain eruptions, social media users can tweet to @petabencana using a hashtag like #Banjir, #Gempa, #KebakaranHutan, #Kabutasap, #GunungApi, and #AnginKencang. Alternatively, they can send a message through Facebook messenger @petabencana; or texting through Telegram @Bencanabot. Following its success, PetaBencana.id expands its operation to Bandung and Surabaya cities.

1.2.3. KawalPemilu.org

KawalPemilu.org aims to protect the vote in general elections. This portal exists because the General Elections Commission's website lacked readily accessible information on the number of votes cast per candidate in each district. In the KawalPemilu.org social media account, people are encouraged to upload their vote form snapshot, referred to as C1. People also can post another person's vote form. When posting, people have two options. First, people can use the upload.kawalpemilu.org website as the medium. Second, people can send a direct message to Twitter @Kawalpemilu2019 with hashtag #PantauFotoUpload and Facebook fan page @kawalpemilu.org. A user submits the form once per IP address. During this process, he can notify if the document's tallies count is inaccurate and include additional details in the commentary box. Subsequently, KawalPemilu.org will manually enter data from the image by reading randomly one by one. If a document contains several data entries, the platform chooses the most commonly used.

Kawal Pemilu's organizers played a crucial role in organizing a team of over 700 volunteers to digitize the frequently handwritten forms and make the data more clear and accessible. The site was built in a short two days, with a total expenditure of only $54[2]. Following its success, now, KawalPemilu.org is recognized as a member of the Democracy and Electoral Integrity Network and has been granted official recognition by the Indonesian Election Supervisory Agency.

1.3 The Intersection of Crowdsourcing, Social Media, And Public Policy

Social media is a powerful medium for crowdsourcing. Social media connects people to create, exchange, and discuss knowledge and ideas through various online networks and forums. Its unique feature makes it more prominent for organizations to reach out to their users or customers. Therefore, governments can rely on social media to collect data or ideas from their citizens. These data and ideas gathered from residents are known as electronic participation modes (Boudjelida et al., 2016).

The use of social media can enhance citizen engagement via community under the leadership of a transformational leader (Purnomo et al., 2016). When people become active participants in decision-making rather than passive ones by simply judging, they contribute to a better policy (King

[2] From https://odimpact.org/case-indonesias-kawal-pemilu.html

et al., 1998). In this sense, crowdsourcing empowers people to become not only sources of ideas but also implementers of such solutions. As such, social media crowdsourcing is considered a subset of active e-participation in policymaking.

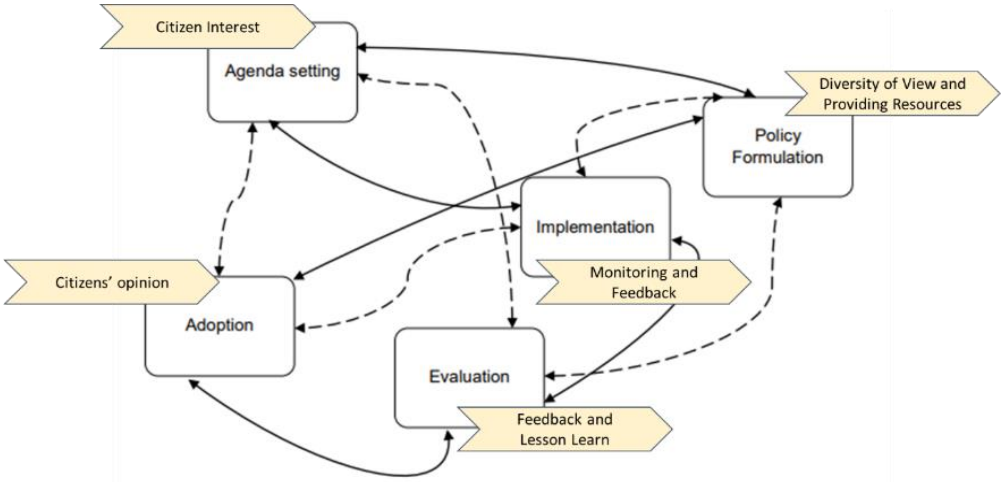
Social media crowdsourcing connects people to the policy process. According to Liu (2017), crowds are the addition to "citizens" and "customers." They are "partners" of government (Clark et al., 2013; Thomas, 2013, as cited in Liu, 2017). He used co-production theory to explain that people as the partner are the public involved in developing and executing public policy (Thomas, 2013, as cited in Liu, 2017). This co-production theory adds a different perspective in contrast to George H Frederickson (1991). He views the public into five critical divisions: the public as interest groups, the public as a consumer, the public as a representative, the public as a street-level bureaucrats client, and the public as informed citizens.

The citizen's role as a partner with the government in crowdsourcing is also distinct from the citizen's role in principle–agent theory. Citizens are independent workers in crowdsourcing, although their participation is voluntary, and anyone may enter and quit the contest at any time. On the other hand, the government is regarded as the agent; while, the citizens are regarded as the shareholder (principal). As the agent, the government typically has greater authority to define the process on behalf of the citizen, and citizens frequently are unaware of the process.

The intersection of crowdsourcing, social media, and public policy is shown in Figure 2. The research employs Howlett and Ramesh's 2003 model of the policy cycle. This model of the policy cycle demonstrates how each step is dynamically linked to the preceding phases. However, for the sake of clarity, the research associates social media crowdsourcing with each step, regardless of their connection. As shown in the figure, social media crowdsourcing occurs throughout the policy cycle. They are agenda setting, policy formulation, policy adoption, policy implementation, and policy evaluation in which social media bridges the communication and interaction during the process.

Figure 2

Putting Crowdsourcing in The Howlett and Ramesh's 2003 Policy Cycle Model



Note: Adapted and Revised from Benoit, F. (2013). Public Policy Models and Their Usefulness in Public Health: The Stages Model. Montréal, Québec: National Collaborating Centre for Healthy Public Policy.

Firstly, social media crowdsourcing broadens the ability for all people to contribute to agenda-setting. Government can use social media crowdsourcing to invite external contributors to discuss their interests as taxpayers and help determine policy priorities. Social media crowdsourcing makes public policy more inclusive by considering the interests of more stakeholders, regardless of their social status, and by including the unreachable crowds excluded by the conventional participation model. Secondly, social media crowdsourcing generates new insights by eliciting input from the crowds. Social media crowdsourcing utilizes representation from various educational backgrounds, case interactions, skill sets, and sectors, eliminating intellectual idols such as cave idols, marketplace idols, and theatre idols. Diversification of skills also aids the government in better understanding real-world issues, especially those with a complicated relationship that make them a wicked problem.

Further, social media crowdsourcing enables data collection at a reduced cost. The availability of a large online workforce would help the government that frequently struggles with staff shortage, insufficient funding, time constraint, and location distance. These limitations are even more apparent

during the COVID-19 pandemic after a lockdown and social distancing policies. Thirdly, social media crowdsourcing allows the government to experiment with various policy alternatives. Government can solicit more solutions because social media crowdsourcing provides convenient access to participation. Finally, social media crowdsourcing empowers the government to monitor its success during policy implementation. Crowds can report problems and propose solutions at this stage, allowing policymakers to formulate more effective future policies.

1.4 Social Media Trend in Indonesia

The popularity of social media is skyrocketing in Indonesia. Indonesia's active social media users have reached 59% of the country's 272.1 million population, rising at an annual rate of 8.1% in January 2020[3]. Indonesian spend an average of three hours and 18 minutes a day on social media, making the nation one of the most active users globally, out of 45 countries[4]. According to a 2017 survey conducted by the Ministry of Communications and Informatics, almost all groups dominate social media users, regardless of their spending, age, gender, or level of education. Facebook, Instagram, and Whatsapp are the most popular social media platforms[5].

Social media has become a preferable choice for Indonesian to receive news and information (Ritonga & Syahputra, 2019) because a sizable portion of traditional media channels is owned and controlled by powerful society actors with vested interests (Johansson, 2016). Regulators have been unable to enact an explicit restriction to address this issue due to a lack of cooperation and power struggles between their respective authorities (Nugroho et al., 2012, p.5-6).

People also turn to social media to express divergent viewpoints, encourage political advocacy, and link communities across a wide spectrum of topics that matter to them. For example, according to a study conducted by Sukmayadi and Effendi (2009), 89% of their 705 Facebook users agree that social media effectively brings new perspectives to political discussions during the 2017 Jakarta governor elections. Even more, youths can learn how to use social media responsibly (Harisa et al., 2018) and use social media to raise their political awareness (Saud et al., 2020).

[3] Hootsuite report (2020). From https://andi.link/hootsuite-we-are-social-indonesian-digital-report-2020/

[4] Q3 year 2020 social flagship report of globalwebindex.com. From: https://www.globalwebindex.com/reports/social

[5] Ministry of Communications and Informatics Survey (2017). From https://balitbangsdm.kominfo.go.id/publikasi_360_3_187

Social media has evolved into an essential part of critical communication in the modern era, which means that public sector organizations cannot afford to be oblivious (Kartikawangi, 2020). Social media spent 56.55 billion rupiahs on Indonesian government programs in 2018[6]. The government used the budget to share and disseminate information by social media marketing and recruiting influencers to garner public attention. Social media also plays as a low-cost tool for public consultation in Jakarta Province and the city of Bandung (Purnomo et al., 2016).

1.5 Research Gap

Several influential theories of public administration have examined the role of the media in public policy formulation. These are influence theory, agenda-setting theory, indexing theory, and detection theory (Jones & Wolfe, 2007). However, few are concerned with the impact of social media on policymaking. Tavasoli et al. (2019) discovered that between 2008 and the first month of 2019, public policy studies overwhelmingly ignored "social media in policymaking." Just a few nations, such as the United States, the United Kingdom, and Australia, have undertaken extensive research.

Examining social media for policymaking in the bureaucracy is critical from representative democracy or data-driven policy, and "crowdsourcing" is a possible solution. Unfortunately, crowdsourcing in policy formulation is extremely limited (Prpi et al., 2015, as cited in Taeihagh, 2017), which contrasts with the fact that academic study on crowdsourcing has increased significantly to 2,027 in 2016 (Taeihagh, 2017). Therefore, this study examines this under-researched intersection feature: "Social Media, Crowdsourcing, and Public Policy." Furthermore, as only a few studies refer to Indonesia's institutions, the research focuses on Indonesia's Ministry of Finance.

1.6 Thesis Objective And Outcome

Indonesia's Ministry of Finance serves as a role model for public institutions in Indonesia when it comes to innovation. However, under the co-production paradigm, the ministry still does not utilize a sizeable social media user base in Indonesia, the power of the internet, and available reliable platforms to involve social media users in problem-solving and increase inclusive participation. In contrast, the ministry maintains a traditional policy-making process. In its performance strategy

[6] From https://www.statista.com/statistics/1175592/indonesia-government-budget-for-social-media-and-influencers/#:~:text=In%202020%2C%20the%20Indonesian%20government,predominantly%20active%20social%20media%20users.

2020[7], MoF places the social media success metric under objective 2, "Optimal Governance and Resources," rather than under objective 8, "Optimal Decision Support System." It indicates that MoF continues to view social media as a mechanism for achieving an open government goal rather than a tool to assist decision-makers in developing public policy.

Therefore, it is worthwhile to collect Indonesia's MoF perception on its capacity to incorporate crowdsourcing best practices via social media automation. The evaluation implements a crowdsourcing-oriented organizational framework that includes critical success principles to identify areas for improvement. It addresses the following research questions: To what extent do the officials think that MoF currently adheres to five principles of a crowdsourcing-oriented organizational framework? Which areas of MoF are perceived good at, and which areas need improvement?.

1.7 Problem Statement

When introducing crowdsourcing to Indonesian MoF, at least five innovation-related issues could stymie its initial progress. These are bureaucracy's anti-innovation mindset, innovation failure, the complexity of policy formulation tasks, unattractive crowdsourcing projects, and low digital literacy.

Problem 1: The Bureaucracy's Anti-Innovation Mindset

Expansion of crowdsourcing practices in the public sector has been limited (Mergel, 2018). It is because behavioral scientists have long recognized that the bureaucratic organizational paradigm is characterized by a lack of innovative potential (Thompson, V., 1965). Even bureaucracy is considered a contradictory form of innovation. Its worldview is "controlism," where a few senior executives serve as gatekeepers, strategists, power delegators, and selectors of small leaders (Gary Hamel, 2014). On the other side, innovation is associated with the freedom to experiment and seek fresh experiences that are often not similar to previous ones. Consequently, current crowdsourcing intention primarily focuses on private companies that do extensive research and development (Murray et al., 2012; Villarroel 2013, as cited in Mergel 2018).

[7] From https://www.kemenkeu.go.id/profil/pengelolaan-kinerja-dan-risiko/peta-strategi/

The controversy about whether or not to involve social media users in public policymaking also centers on the bureaucratic mentality to deal with reckless use of free speech rights and media literacy skills. The spread of false information is one of the unintended consequences of social media (Ariestyani, 2019). Incorrect information via social media led to an inaccurate perception of an event, which resulted in negative social behavior. For instance, in May 2019, misinformation sparked deadly riots in Jakarta, prompting regulators to block access to Whatsapp, Facebook, and Instagram to combat misinformation and disinformation and avoid further casualties[8]. In response to this case, the government formed a task force and launched a Civil Service Complaints Portal in November 2019 to monitor extremists and hate speech on social media[9]. The government cites Article 27 of the 2008 Electronic Information and Transactions Law to justify the actions.

Problem 2: Failure to Transfer Innovation

Not every policy transfer is a success—at least three reasons influence policy failure. First, if the organization is unfamiliar with the policy and how it works. Second, if the organization mistakenly transmits essential policy or institutional structure components. Third, if an organization puts a little emphasis on the distinctions between its economic, social, political, and ideological circumstances with the context in the borrowed model (Dolowitz & Marsh, 2002).

Depending on the result of the implementation, when countries or organizations agree to adopt specific policies, they can face various obstacles that vary from the origin country/organization. For example, Aoki's study (2019) demonstrated that the application of HRM-based performance school systems differs across PISA countries. According to her research, the system has been used more widely in less transparent and less affluent nations.

Similarly, the adoption of crowdsourcing will challenge public sector organizations since crowdsourcing processes are design open and require minimal restrictions (Mergel, 2018). In contrast, bureaucracy innovation acquisition procedures are heavily controlled and adhere to rigorous rules and regulations. This challenge will be higher in light of the fact that there is no Ministry of Finance in the world that uses crowdsourcing, and only a few crowdsourcing projects are

[8] From https://kominfo.go.id/content/detail/18868/siaran-pers-no-106hmkominfo052019-tentang-pembatasan-sebagian-fitur-platform-media-sosial-dan-pesan - instan/0/siaran_pers

[9] From https://www.menpan.go.id/site/berita-terkini/tangani-radikalisme-asn-pemerintah-bentuk-taskforce-dan-portal-aduan-asn

functioning in Indonesia. It provides no adequate crowdsourcing role models for the Indonesia MoF to learn from.

Problem 3: Complexity of Policy Formulation Task

The bureaucracy frequently conducts public policy through the technical competence of officials whose training and professional experience uniquely qualify them to address a specific issue (Fung, 2006). Even with a competent solution in place, a study from OECD (2017) shows that several critical success indicators continue to trend in the wrong way. These flaws served as a reminder that existing policy approaches are still inadequate and frequently result in numerous crises (OECD, 2017).

Policy formulation is challenging because our systems are comprised of numerous discrete components that interact in complex ways, such as ecosystems, financial markets, energy networks, and societal events (OECD, 2017). Consequently, policy formation tasks often require professional competence to undertake. Meanwhile, not everyone who uses social media is an expert. Most of them can only handle an easy task.

Problem 4: Crowdsourcing Project is Unattractive

Participating in public discussion is often not a priority for individuals with limited time for involvement and a decreased interest in public concerns (Peng, 2020). It is because public policy is a much more serious subject in nature. Social media users, on the other hand, are more interested in entertainment and information gathering (Sokowati, 2019; the Digital Literacy Activists Network survey, 2019). And, they will be deterred from engaging in crowdsourcing projects simply because they do not have time and are not interested in policy formulation.

In addition, many companies often fail to draw a crowd and collect more than one suggestion each month since they do not employ proactive attention to achieve a critical number of participants (Dahlander, 2020). More individuals will dedicate their time and attention only if the organization continually engages in active interaction with the masses. On the other hand, the overwhelming majority of public entities in Indonesia continue to avoid two-way communication with their social

media users (Kartikawangi, 2020; Idris, 2018). Their social media platforms are primarily intended to provide information to the general public without further interaction.

Problem 5: Indonesia Has a Low Level of Education And Digital Literacy

In Indonesia, the main reasons for low public participation include marriage, children under two in the household, low educational attainment, and shifting economic patterns associated with rural-urban migration (AIPEG, 2017). Statistically, middle education continues to dominate the educational attainment of the populace. Only nine of 100 individuals aged 15 and older have finished college (Indonesians Statistic Agency Report, 2020).

Numerous Indonesians, particularly women, also have a lower percentage of digital literacy (Suwana & Lily, 2017), which indicates that information technologies skills are required for effective social and political engagement. This low digital literacy would result in a low range of mass involvement and social activities, such as social membership, civic engagement, political participation, and online participation (Riel, 2012).

1.8 Hypothesis

Based on the five problems above, MoF officials would still view that the ministry is capable of utilizing social media crowdsourcing for policy formulation based on the following premises:

Hypothesis 1: Indonesia MoF is Receptive to Innovation

Following the Asian financial crisis of 1997, MoF was tasked with improving its operations. MoF must strengthen its fiscal policies because they have become a critical component of Indonesia's economic recovery (Finance Minister Regulation Number 36/KMK.01/2014). And, in the current day, the recent pandemic problem would bolster this case for another reform. The ministry is under increased pressure to hold itself more accountable for adopting a sound fiscal policy that becomes the backbone of all economic activity.

To deliver change, MoF has a strategic blueprint as a mandate to accommodate new ideas for improved services and policymaking. In the blueprint, crowdsourcing is relevant in two initiatives: new thinking of working and office automation. New thinking of working effort intends to build an

adaptive, digital-based, and high-integrity work culture to boost MoF's productivity and performance. Additionally, office automation seeks to implement cost-effective and high-quality corporate processes and services[10].

The ministry's strong dedication to innovation is further demonstrated by its annual internal innovation contests as well. The successful proposals included coverage for various initiatives, which shows the ministry's openness to fresh ideas on multiple subjects. For example, the 2020 proposals include automating the public hearing process for the Ministry of Finance's internal policies, implementing the talent cloud model for talent optimization within the ministry, and optimizing the activity plan and fund withdrawal application[11].

Hypothesis 2: Indonesia MoF Has an Agile Business Process That Minimizes Adoption Failure

MoF has innovated on multiple occasions, transforming its organization, business processes, IT infrastructures, culture, and regulations. For example, when MoF implemented a new performance management system based on the Balanced Scorecard in 2011, it altered its bureaucracy in all relevant areas. First, MoF established a change management initiative that successfully gained widespread acceptance when the system sparked controversy over peer-to-peer evaluation and reduced supervisors' rating authority. Second, MoF successfully aligned the system with organizational objectives, risk management tools, internal control, and budget mechanisms, including establishing a new organizational structure to manage this alignment function and IT support. On top of that, the MoF also reached an agreement with higher regulatory authorities to implement the ministry system, which was distinct from the national system.

Historically, MoF also has a more extensive track record of reform implementation than other ministries. The ministry had restructured employee compensation, raised staff standards, improved operational processes, and implemented more effective performance evaluation systems since the mid-2000s. Even it dares to replace hundreds of dishonest tax officers and rigidly enhancing its personnel discipline nationally (LaForge, 2016, p.9). MoF was required to pass the Ministry of Administrative and Bureaucratic Reform (MenPAN), which was notorious for its hostility against new

[10] From https://www.kemenkeu.go.id/transformasi-kelembagaan/change-story-kemenkeu/transformasi-digital/sebelas-inisiatif-rbtk/

[11] From https://setjen.kemenkeu.go.id/in/post/setjen-telah-mendapatkan-juara-kompetisi-ide-inovasi-tahun-2020

ideas and rigid interpretation of national laws during its reform attempt. However, MoF dared to reinterpret the legislation and report it to MenPAN- an action that no other ministry would do (LaForge, 2016, p.11).

Hypothesis 3: Indonesia MoF Invests Progressively in Data Science

MoF has recently invested in data science development, including job creation in data scientists[12] and training provision[13]. In 2020, the ministry held an internal data analytics competition to pique staff interest in data analytics[14]. MoF increasingly promotes data science as a way to improve productivity and efficiency in the workplace.

In many ways, data science and crowdsourcing are inexorably connected. For example, data science teaches professionals how to think computationally and deconstruct complicated problems, which improves the professional's capacity to create simple assignments for the crowds[15]. Additionally, when a company lacks data science expertise, it is sometimes compelled to address problems creatively via crowdsourcing (Morgan, 2016), especially when evaluating vast quantities of data (Benedek et al., 2015). Finally, even if a company has a great data science team, crowdsourcing would still be beneficial since the organization can gather third-party ideas or solutions (Morgan, 2016) and fosters a conducive learning atmosphere among participants (Tauchert et al., 2020).

Hypothesis 4: Indonesia MoF Has The Ability To Attract Critical Mass

MoF has sponsored various popular public events, such as opinion writing competitions[16], high school quiz competitions on the state budget[17], themed calls for papers[18], and, most recently, a competition to assess local government budget realization data[19]. It shows that the ministry can draw public attention even for policy formulation purposes. The budget realization analysis competition, for example, was sought to improve the quality of local government spending (Rp800 trillion) by providing contestants with access to the Regional Financial Information System.

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[12] From https://www.cnnindonesia.com/ekonomi/20210608131604-532-651676/sri-mulyani-siapkan-jabatan-untuk-data-scientist-di-kemenkeu

[13] From https://klc.kemenkeu.go.id/tag/data-analytics/

[14] From http://www.itjen.kemenkeu.go.id/baca/742

[15] From https://towardsdatascience.com/five-types-of-thinking-for-a-high-performing-data-scientist-8ab70d70c23b

[16] From https://kemenkeu.go.id/media/15613/ketentuan-lomba-2.pdf

[17] From https://www.kemenkeu.go.id/publikasi/berita/peserta-olimpiade-apbn-2020-meningkat-signifikan/

[18] From https://karakter.ditmawa.ugm.ac.id/lomba-djpk-kemenkeu-call-for-paper/

[19] From https://www.kemenkeu.go.id/publikasi/berita/kemenkeu-selenggarakan-lomba-bedah-data-apbd/

The ability to attract public attention is also reflected in MoF platform performance at Kemenkeu.go.id. According to statshow.com, public interest in the ministry domain has increased by 31% over the last three months, up to August 2021. It reaches about 1,710,840 individuals per month and produces approximately 3,763,890 pageviews. Kemenkeu.go.id also has 1,990,000 pages indexed by Google, 203,000 pages indexed by Yahoo, and 203,000 pages indexed by Bing. Many indexed pages suggest that the domain is more likely to get a significant amount of visits which aligns with Statshow.com's good scoring for the ministry's platform for its trustworthiness, vendor reliability, privacy, and child safety.

Hypothesis 5: Indonesia MoF Focuses on Enhancing Its Public Communication

MoF aspires to optimize communication and interaction with people. MoF believes that effective communication is essential for national economic strength[20]. MoF uses Facebook, Twitter, and Instagram to communicate its policies and regulatory programs to the public. MoF believes that social media ensures that its policies are widely understood, adopted, and supported by society[21].

Public relations at the MoF also monitors and evaluates public opinion as it emerges in newspapers and social media. MoF incorporates public opinion into its performance metrics and categorizes them as supportive, neutral, or non-supportive. The fewer non-supportive voices in the mass media, the more effectively the MoF's communication programs rated in the evaluations. In 2020, MoF targeted minimizing non-supportive opinions in newspapers, blogs, and social media to 17.5 percent[22]. MoF closely tracks 43 print media outlets, 20 internet news portals, and 14 television stations[23] through the public opinion management dashboard system. In 2021, this public communication effectiveness indicator still becomes an essential element of the finance ministry's strategic framework. Effective public communication is equated with high-performing organizations and human resources goals, efficient state funds and assets administration, and reliable information systems[24].

[20] MoF's Annual Public Relations Report Year 2016, p.64. From https://www.kemenkeu.go.id/media/6480/lthumas-2016.pdf
[21] From https://www.kemenkeu.go.id/publikasi/berita/optimalkan-media-sosial-untuk-komunikasi-kepada-masyarakat/
[22] Secretariat General's Annual Performance Report Year 2019, pp.54-55. From https://setjen.kemenkeu.go.id/api/Medias/bc942a4a-3323-4aa6-a7cc-c36ac3b451b3
[23] MoF's Annual Public Relations Report Year 2016, p.64. From https://www.kemenkeu.go.id/media/6480/lthumas-2016.pdf
[24] From https://www.kemenkeu.go.id/media/17371/peta-strategi-dan-iku-2021-kemenkeu-wide.jpg

Chapter 2

Literature Review

2.1. Commitment to Crowdsource

It is worth noting for each organization that the effectiveness and advantages of crowdsourcing as a business model are no longer a debate due to the ever-increasing number of success stories of crowdsourcing (Vohn Ahn & Dabish, 2008, as cited in Iren et al., 2014). Crowdsourcing provides crowdsourcers with potential workers who have a wide range of talents and expertise and are willing and able to complete their assignments within a short timeframe at a considerably lower cost than in-house (Whitla, 2009). It also opens an alternative to full-time workers without paying fixed salaries, insurance, and overheads (Belsky, 2010).

However, crowdsourcing as open innovation is not always effective in attracting public institutions to embrace it (Mergel, 2018). Many public institutions do not use crowdsourcing because corporate management does not actively participate in innovation and encourages trial and error testing of new solutions (Arundel et al., 2015). It is because routines in bureaucracy make everything become taken for granted, automatic, and psychologically habitual as they used to say, “people always done it this way” (Langer 1989, Thomas 2017, as cited in Kelman, 2021). Thus, if a current idea has found to be satisfactory, no other proposal will be tried (Diamant, A, 1967).

Routines are resistant to change because organizations invest resources in designing procedures in the first place, making changes prohibitively expensive (Hannan and Freeman, 1977, as cited in Kelman, 2021). Furthermore, governments will be more hesitant to engage in crowdsourcing for additional transaction costs, namely, search and information costs (finding partners/collaborators/information), negotiation costs (negotiating the partnership), and policing and enforcement costs (Clark et al., 2019). In such a situation, without a desire to access external information from within the organization, there is no urgency to embrace crowdsourcing (Mergel, 2018). Solution by a non-professional is most likely to be adopted only when there is a shortage of

human or financial capital (Arundel et al., 2015), when the task exceeds the capabilities of the organization to complete it (Thuan et al., 2013), or when an internal issue becomes intractable and necessitates the assistance of a third party (Mergel, 2018).

Another factor that influences the acceptance of crowdsourcing is the cultural environment (Mergel, 2018). As a novel problem-solving method, crowdsourcing is frequently unpredictable in its outcome (Brabham, 2013). So, public institutions with risk-averse attitudes and aversion to innovation typically penalize any crowdsourcing failure (Arundel et al., 2015; Mergel, 2018). They will place little significance on crowdsourcing experience as a means of acquiring knowledge. In other cases, the organization also perceives a loss of control and ownership over the solutions it provides[25].

A risk-averse culture also makes the employee gloomy regarding crowdsourcing (Arundel et al., 2015; Mergel, 2018). Even some individuals view crowds as a threat to their job security (Dahlander, 2020). Consequently, without a proper incentive (Arundel et al., 2015), crowdsourcing just becomes a new burden on all executive levels to maintain a well-organized business as usual. Thus, Winsor et al. (2019) advise combining internal crowds, freelancers, and an external crowd to respond to this reluctance. In this way, existing full-time employees will feel less intimidated.

Crowds are not superior to experts in terms of work quality, accuracy, and precision, but they need a consistent commitment from the crowdsourcers to feel that their contribution will be taken seriously (Brabham, 2013). And, to retain the whole organization's commitment to crowdsourcing, public organizations should carefully consider securing a legal mandate from high-ranking authorities (Mergel, 2018). Unlike in commercial enterprises, a top leader in bureaucracy usually can mandate changes in their organizations (Power Brad, 2013).

The importance of senior executives in innovation has been broadly discussed in crowdsourcing, but there is no case in which middle management is portrayed as the driving force. On the other hand, looking at their position of most significant authority, middle managers are still important actors because they link senior management and the operational level. Middle managers viewed themselves as gatekeepers for high management and played essential roles in any change

[25] Deloitte. From https://www2.deloitte.com/content/dam/Deloitte/de/Documents/Innovation/us-cons-enterprise-crowdsourcing-and-growing-fragmentation-of-work%20(3).pdf

management effort (Delmestri & Walgenbach, 2005; Huy, 2022, as cited in Styhre, 2007). Middle managers' role is becoming more important because many organizations have become more bureaucratic in recent years (Hamel and Zanini, 2018). With the company's expansion, its working units have become more segmented, making collaboration more challenging to maintain speed and responsiveness. In such cases, the company must rely on middle managers because it is hard to run a large global organization with only two layers of management between frontline personnel and the CEO (Hammel and Zanini, 2018).

By contrast, other researchers say that middle managers play a minor role in bureaucracy, especially promoting innovation. They are usually subject to top-management decisions, a burden for adding a layer to a flexible organizational structure, having very little absolute authority, and only responsible for dealing with minor and routine jobs. Even their disadvantageous position frequently causes them to be singled out for their failure to handle tasks (Sims, 2003; Floyd and Woolridge, 1994, as cited in Styhre, 2007).

From a different perspective, research by Deichmann et al. (2021) explains how to grow organization commitment not from managers but “peers.” Their study found that creators who commit to other people's ideas on the crowdsourcing platform -rather than just liking it- evoke additional commitments from others for their ideas. This link is even increased for highly innovative and unfeasible concepts.

From this vantage point, it is evident that commitment to innovation has the most influence from top management, but it is still less potent for securing innovation if the organization lacks commitment from middle managers and peers. It is common to observe that top-level management positions are more likely to be filled by someone who does not share the same view as the predecessor, especially if the top leader is a political party member. Meanwhile, middle managers and peers will remain in the bureaucracy for a more extended period.

2.2. Align Crowdsourcing to Internal Business Process

Successful crowdsourcing needs continuous regulatory support. Having regulation in place aims to minimize information risks, as crowdsourcing is incompatible with tasks involving sensitive data, such as privacy, security, and intellectual property (Muntés -Mulero et al., 2013, as cited in Thuan et al., 2013). The regulation also ensures that the government actively seeks citizen input while protecting intellectual property rights, securing citizens' identifying information (Mergel, 2018), and managing the internal data sharing process (Rosen, 2011).

In terms of regulation, recently, the Indonesian government already has a Minister of State Apparatus Empowerment and Bureaucratic Reform Regulation No. 83 of 2012 on government departments' use of social media. The regulation is used as a reference for the public agencies to establish social media strategy, social media operations, social media campaign development, social media tracking, assessment, and how to measure government social media performance.

Having this regulation and social media's low cost and ease of use, social media crowdsourcing can now be considered an ideal medium for Indonesia to collect ideas from its citizens. Social media is design to be shared, making it simple to collaborate on content, update it, link to it, and even republish it (Srivastava, 2013). Social media roles in crowdsourcing align with scholars study that the public will participate in crowdsourcing when the platform allows minimal entrance thresholds (Organisciak, 2015), is easy to use (Brabham, 2013, Blohm et al., 2018), and providing the crowds with low-cost access (Mergel, 2018; Surowiecki, 2004, as cited in Brabham, 2008).

Nonetheless, social media users produce low-quality work compared to professionals (Roman, 2009; Whitla, 2009; Belsky, 2010, as cited in Rosen, 2011). They frequently redefine themselves as amateur-experts in fields they do not specialize in (Morgan, 2019). To address this problem, scholars propose to delegate quality monitoring to experts. They recommend specialists to assist crowds in completing the mission (Belsky, 2010; Dokoupil, 2008), verifying the output and ensure that the information is accurate (Dokoupil, 2008).

Another proposed strategy is to exclude inexperienced participants by administering qualification tests (Belsky, 2010; Alonso et al., 2008) and choosing participants based on a specific skill, demography, and prior performance (Blohm et al., 2018). Alternatively, crowdsourcers could assign a relatively small number of crowds if they perform high complexity tasks. Crowdsourcers may only delegate more crowds for a relatively easy task but divide them into distinct subgroups of varying participant counts (Jiang et al., 2018).

Other studies propose more varieties of crowdsourcing quality assurance. For instance, Iren et al. (2014) mention that Credibility And Selective Assignment could reduce the inherent risk of employees' diverse characteristics. On the other hand, Defensive Task Design and Statistical Filtering, Bias/Error Distinction And Recovery, and Granularity could mitigate the risk associated with crowdsourcing designs. Another option is to perform outgoing quality monitoring using Redundancy, a Control Group, Majority Decision Making, and Gold Standard processes.

In this matter, crowdsourcers should note that different instruments would have a different financial impact for them under different situations (Iren et al., 2014). For instance, the Control Group strategy is more cost-efficient for complex and expensive tasks. Meanwhile, Majority Decision-Making is more cost-effective for inexpensive and straightforward jobs (Hirth et al., 2013).

Managing to crowdsource will also become more difficult as the size and complexity of the crowdsourcing project increase, as measured by the number of tasks, stakeholders, and participants. Therefore, Mergel (2018) suggested establishing an open innovation office in government. The office helps manage policy implementation, the forum, initiate roadshows, phone calls, citizen training, and handle inter-organizational collaboration for open innovation, including preparing memorandums of understanding, coordinating joint promotions, and reporting results. Open innovation offices also ensure their initiatives have enough resources, remarkably sufficient social media staffing, budgets (Brabham, 2013), and a transparent funding scheme for inter-organizational collaboration/cross-agency activities (Mergel, 2018).

2.3. Design an Effective Crowdsourcing Plan

Crowdsourcers, especially the government, should bear in mind that the main impediment to crowdsourcing is designed (Noveck, 2009, p. 41, as cited in Clark, 2019). They are the fundamental difficulty of the problem that an organization must solve and the role assigned to the crowds (Vukovic, 2009; Rouse, 2010, as cited in Ghezzi et al., 2017). Crowdsourcing is effective when a problem is too ambiguous for a strictly mechanical approach or too large for a sizeable human expert[26], and when non-professionals could understand the task (Mergel, 2018), such as in a non-technical problem, and for a non-trial-and-error solution (Poetz & Schreier, 2012; Terwiesch & Xu, 2008, as cited in Ghezzi et al., 2017)

Effective crowdsourcers should have a firm grasp of their own needs and knowing how crowdsourcing platforms will assist them in meeting those needs (Mergel, 2018). This comprehension will enable crowdsourcers to begin writing a problem statement and solution parameter. The problem statement and solution parameter are registered as a part of the task definition document, and it includes a detailed task description (Rich, 2010), task scope and length, product ownership (Rosen, 2011), participation criteria (Blohm et al., 2018), and consequences if the result does not align with the organization's needs (Zuk, 2010, as cited in Rosen, 2011).

Task definition documents in crowdsourcing and a scope statement in project management share a similar idea (Wilson et al., 2018). When deemed necessary, crowdsourcers can always appeal to project management standards such as the Project Management Body of Knowledge (PMBOK) to identify the problem and write the parameters, as no clear guidelines in the literature. It includes a concise overview of the product scope description, deliverables, acceptance criteria, project exclusions, and constraints that guide the project team's work during project execution.

A task definition determines crowds profile and a suitable crowdsourcing assignment. In more detail, Blohm et al. (2018) distinguish them into four crowdsourcing archetypes: Micro-Tasking, Broadcast Search, Information Pooling, and Open Collaboration. In Micro-Tasking, crowdsourcers use homogenous crowds to expedite time-consuming research like categorizing data, translating

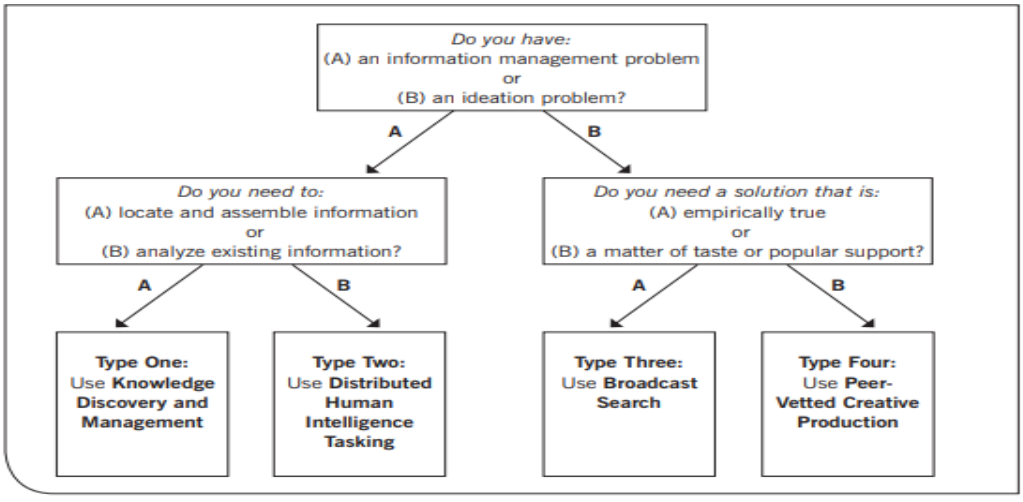
[26] Amazon Mechanical Turrk Webiste. From Mturk.com From Mtrurk.com

and correcting the text. Meanwhile, Information Pooling uses homogenous crowds to evaluate and select alternatives, demand forecasting, validate customer preferences, and collect location-based data. On the other hand, a Broadcast Search uses heterogeneous crowds to solve complex, analytical, scientific, and creative problems, such as software testing and patent analysis. Lastly, the crowdsourcers could create new knowledge in Open Collaboration by collectively generating ideas through more diverse crowds.

Similarly, the government can use a decision tree from Brabham (2013b) to determine a suitable crowdsourcing type, as shown in Figure 3. Brabham begins his questions by addressing whether a government entity views the challenge as one of information processing or ideation. In information processing, he claims that Knowledge Discovery Management is beneficial at locating and assembling information, while Distributed Human Intelligence Tasks are more effective at analyzing current data. Next, he recommends using a Broadcast Search if the crowdsourcers require an empirically true solution in the ideation problem. Or lastly, utilizing a Peer-Vetted Creative Production if the crowdsourcers need a solution that is a matter of taste or public support.

Figure 3

Decision Tree to Determine Suitable Crowdsourcing Type Based on The Problem



Note: Retrieved from Brabham, Daren.C. (2013): Using Crowdsourcing in Government. IBM Center for the Business of Government. Collaboration Across Boundaries Series.

In Brabham's explanations, Knowledge Discovery And Management are implemented by asking the crowds to gather certain information and submit it to the crowdsourcer to a central source. For example, this type of crowdsourcing is commonly used in reporting earth tremors or potholes. Meanwhile, a Distributed Human Intelligence Task asks the crowds to complete "micro-tasks" that require human intelligence, such as transcribing handwritten historical documents into electronic files. On the other hand, Broadcast Search disseminates a problem-solving challenge around the Internet and rewards its resolution. Then again, Peer-Vetted Creative Production generates ideas in which an online audience suggests and votes on proposed solutions collectively (Brabham, 2013b).

After selecting an appropriate crowdsourcing model, crowdsourcers should consider developing a low-barrier qualification task. A low barrier task is typically defined by the ability to decompose a complex problem into a simple individual assignment, a minimum skill sets, and low time commitment (Blohm et al., 2018; Dahlander & Piezunkab, 2014). Crowdsourcers must prioritize a low qualification because it denotes a simple mission and results in more productive contributions (Kraut & Resnick, 2011, as cited in Organisciak, 2015). As long as the task is easy to explain, interact with, and modulate, any task can be crowdsourced (Afuah & Tucci, 2012, as cited in Nicolas & Blohm, 2016).

Crowdsourcers also may wish to consider smoothing the procedure above by adding a set of instructions to assist crowds in comprehending the challenge at hand and documenting the outcomes of their efforts (Blohm et al., 2018). By having a guideline for the crowds, crowdsourcers can precisely identify and convey their crowdsourcing participation requirements to the crowds, including deliverables and performance metrics (Blohm et al., 2018). Clear guidance minimizes low-quality output, reduces the risk of information confidentiality breaches, reduces disputes over intellectual property rights, and assists in resolving issues between crowdsourcers and crowds regarding pay. It is critical to establish crowds' favorable experiences that will lead to their longer-term commitment. Regarding performance measures, crowdsourcers generally should focus on making them specific, measurable, attainable, and time-bound (SMART).

2.4. Mobilize And Manage The Crowds

The crowds can be from the internal and external organizations, although sometimes mixed crowds can also be found (Vukovic & Bartolini, 2010, as cited in Organisciak, 2015b). Internal crowds commonly aim to improve the organization's traditional process, such as evaluating management functions (Hill & Lineback, 2012). Meanwhile, external crowds are usually employed to improve the output/product or service. In terms of status, crowds are mostly paying out as independent employers or freelancers. Consequently, they are not offered insurance plans and face many privacy issues (Brabham, 2008; Berkus, 2009, as cited in Ikediego et al., 2018; Zuk, 2010, as cited in Rosen, 2011).

Understanding the "crowds" profile is essential for crowdsourcers and government in particular since "crowds" are the most discussed subject in the academic literature and are central to the concept of crowdsourcing. The words "crowds wisdom" or "collective intelligence" are rarely omitted from academics' justifications of crowdsourcing, as James Surowiecki explained that independent and diverse people would outperform the brightest individuals in the right conditions.

Crowdsourcers must ensure that they have a critical mass of users that can participate in their crowdsourcing program in the first place (Alonso et al., 2008, as cited in Sharma, 2010). Crowds are motivated to participate in crowdsourcing because they gain two benefits, intrinsic and extrinsic. And, for some researchers, intrinsic motivation is the most influential factor (Zeng et al., 2011) because it can reach a higher level of work and attracting more contributors (Kraut & Resnick, 2011). Crowds like if others admire their work (Huberman et al., 2008). Crowds also can learn new skills, become self-employed, gain attention from future employers, and publicly gain appreciation and fame from the crowdsourcing company and other users (Leimesiter et al., 2009, as cited in Rosen, 2011). Other crowds would instead participate in finding an artistic outlet, being involved in hobbies, and seeking excitement (Brabham, 2008; Winsor, 2009, as cited in Rosen, 2011). Therefore, from this explanation, crowdsourcing is consistent with the determination theory. It fosters an environment in which individuals can feel in control of their behaviors and goals (autonomy), master tasks and

acquire new skills (competence), and develop a sense of belonging and attachment to other people (relatedness). All of which contribute to crowds enhancing performance, persistence, and creativity[27].

Regarding this intrinsic motivation, Blohm et al. (2018) mention four types of rewards that crowdsourcers can implement. First, making a reputation system, such as ranking or degree of competence among contributors (Mallone et al., 2013). Second, framing the assignments in such a way so the activities become indispensable to contributors and addressing their inherent motivation (Rogstadius et al., 2011). Third, providing a socialization mechanism by enabling crowds to communicate and bond with friends (Zwass, 2010). Last, providing feedback through genuine expressions of gratitude to contributors (Blohm et al., 2018).

The key to crowdsourcing success is identifying the right people, making the work meaningful to them, and successfully designing incentives to keep them motivated (HBS Digital Initiative, 2020). In motivating and mobilizing the crowds, crowdsourcers must have a tenuous understanding of their social media users' motivations (Blohm et al., 2018) and pay attention to them when generating feedback (Dahlander & Piezunkab, 2014). Crowdsourcers should create internal routines for eliciting and processing crowds suggestions (Foss et al., 2011, as cited in Dahlander & Piezunkab, 2014), and most importantly, the system must advocate free expression, value a fair voice, and are receptive to external feedback (Brabham, 2013). Too many restrictions and censorship will curtail creativity and collective intelligence.

Similarly, homogenous crowds may not achieve collective intelligence as well. Therefore, the crowds in a crowdsourcing project must be diverse enough. Diversity is essential for gaining access to individuals' different types of knowledge and assigning the right task to the right individuals. In attracting more diverse crowds, crowdsourcers must possess a favorable profile and an appealing domain (Kraut & Resnick, 2011, as cited in Organisciak, 2015). Crowdsourcers also must have an adequate social media policy and the necessary expertise for handling online audiences (Brabham, 2013). This capacity is used to identify and manage the diversity of the crowds according to their

[27] From https://selfdeterminationtheory.org/theory/

linguistic skills, managerial abilities, national orientation, traditions, and level of education (Carmel, 2003, as cited in Sharma, 2010).

To maintain the crowds' interest, crowdsourcers should commit to ensuring participants regularly that their input will be treated seriously (Brabham, 2013). However, Dahlander (2020) mentioned that 88 percent of companies still do not give feedback to individual contributors, whether excellent or negative. Or, they do not tailor their answers to the crowd's characteristics. He suggested that if the contributor delivers input informally, the organization must also offer an informal response.

2.5. Continuity of Process

For the longer-term success of crowdsourcing, three points need to be considered: creating a positive crowdsourcing experience, crowds digital literacy, and continuous learning with other crowdsourcers. First, crowdsourcing is viable as long as the crowdsourcer interacts favorably with the crowds (Brabham, 2013; Mergel, 2018), and practicing effective strategic communication will provide this positive experience (Brabham, 2013). Good communication facilitates the ongoing conversation between the crowdsourcers and the participants. As crowds gain knowledge about the organization, their contributions improve (Winsor, 2009, as cited in Rosen, 2011).

Second, crowdsourcers must consider increasing their crowds' digital literacy (Mergel, 2018). Digital literacy refers to the capacity to safely and appropriately access, manage, comprehend, integrate, communicate, evaluate, and create information via digital technologies, such as ICT literacy, information literacy, and media literacy (Law et al., 2018, as cited in UNESCO UIS, 2019). Digital literacy is one of the prerequisites in using Web 2.0 responsibly and efficiently. Any effort to increase digital awareness would streamline the crowdsourcing process and alleviate users' frustrations with the site, allowing them to feel more comfortable with it for longer-term success.

Last, an organization's previous experience with a new instrument and available crowdsourcing best practices from other institutions will be advantageous (Mergel, 2018), especially for new organizations that begin crowdsourcing since it will accelerate the implementation. Some examples of crowdsourcing in government are Challenge.gov, Ushahidi, NASA, and Street Bump.

Chapter 3

Research Methodology

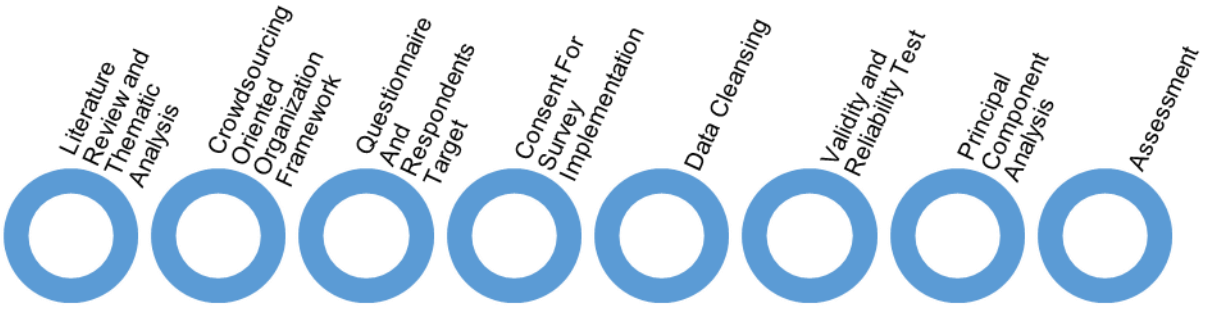
3.1. Research Procedure

The first step begins by conducting a literature review on practical perspectives and developing a framework for crowdsourcing. Practical perspectives are actions to overcome the inherent difficulties of government crowdsourcing. After identifying the factors facilitating and obstructing successful crowdsourcing, the study classifies them into five main principles and eighteen sub principles that guide the survey implementation (Appendix A).

The University of Tokyo's ethics committee and authorized units in MoF had first reviewed and approved the survey's plan before implementing the survey. Only after getting the approval, investigator collected responses from respondents. Further, the study eliminates outliers to normalize the data and conduct validity and reliability tests. Invalid or unreliable questions will not be accepted or scored. The study also looks at some normality indicators to know how well the data are distributed. After that, to evaluate the crowdsourcing-oriented organization framework, this study runs Principal Component Analysis to compare their result with original framework scores from Thematic Analysis (literature review). Figure 4 depicts these research procedures from start to finish.

Figure 4

Research Procedure



3.2. Crowdsourcing-Oriented Organization Framework

The crowdsourcing-oriented organization framework offers a holistic view but simplifies the "know-how" in existing literature into a more convenient format for practitioners. This structure provides a set of guiding principles for an effective crowdsourcing effort to help public organizations determine the areas they perform and need to enhance. It is beneficial for both beginners and organizations that have already implemented crowdsourcing.

The study started with an online search for material on crowdsourcing in public institutions and crowdsourcing in general. This phase involves gathering data about crowdsourcing efforts from websites, YouTube videos, case studies, and publications to understand crowdsourcing efforts' breadth better. The study used some guiding questions to identify helpful information, such as what situation usually requires crowdsourcing, what are organizations' motivations, ways crowdsourcing can solve the problem, who is the crowds and their qualifications, benefit for the crowds, what platforms are used in crowdsourcing, roles of social media, and what are the current challenges.

Three key characteristics of crowdsourcing were discovered in the preceding step. They are the individual motivations, the most common types of crowdsourcing efforts, and the crowdsourcing unique problem-solving technique. Crowdsourcing works best when people are engaged, the project is simple, and the crowds act independently with little direct supervision. However, no country's finance ministry has taken up this endeavor globally. Therefore, the researcher was interested in looking after a case study about innovation at a finance ministry. The study found a 2009 Princeton University study by Gordon et al. (2016) on Indonesia's MoF reform. As mentioned in the report, senior management commitment and organizational settings drove ministry transformation.

The next step included intellectually structuring the broad knowledge by reviewing pertinent academic papers on crowdsourcing. The research identifies several significant writers' works, such as Brabham and Blohm, among academics. Their efforts demonstrate a thorough understanding of crowdsourcing, which is relevant to the three prior results. The investigator adds more details regarding governance systems using their research, then looks for various crowdsourcing lessons

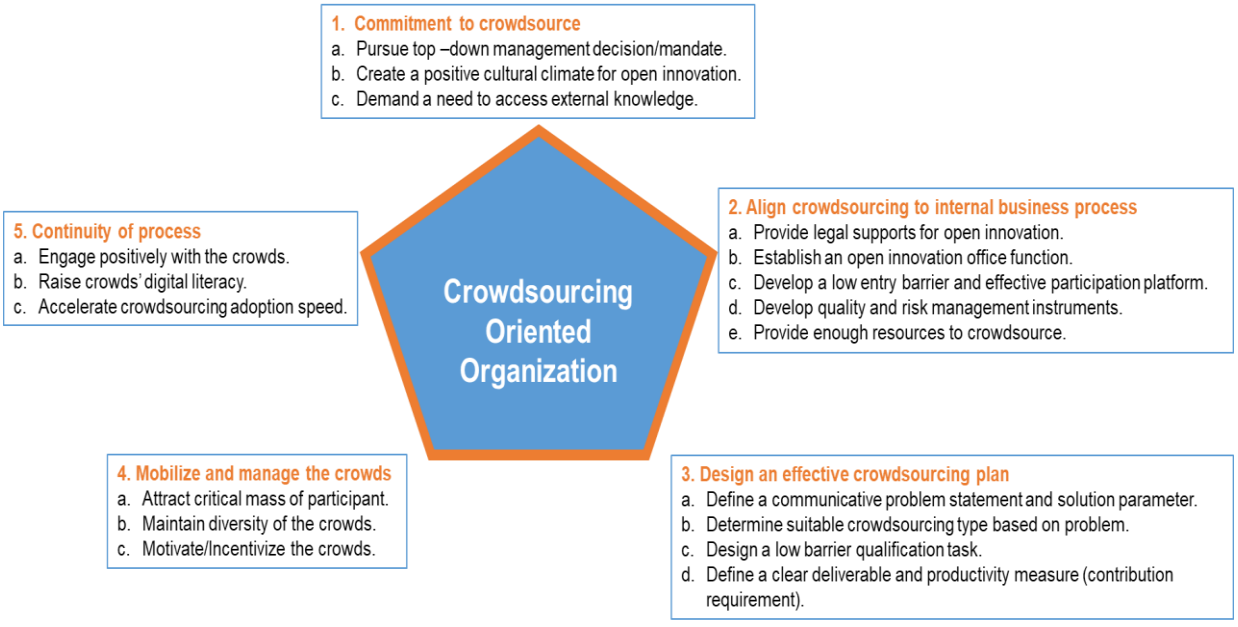
learned using keywords such as guidelines, best practices, obstacles, difficulties, and drivers of crowdsourcing. The investigator found that Dahlander (2020), Mergel (2018), and Arundel et al. (2015) as three key references that pertain to this study.

The investigator thoroughly examined the literature above to find common themes, patterns, and components and review other journals for confirmation. This process showed various crowdsourcing setups in public institutions, which were then categorized into a framework. However, since this theme analysis includes interpretation, it cannot be viewed objectively regardless of the method's thoroughness and objective.

The topics were condensed into five major principles and organized into a cycle inside the framework. They are committment to crowdsourcing, alignment to the internal business process, effective crowdsourcing design plan, crowd mobilization and incentives, and continuity. Figure 5 illustrates the sub principles that fall under these five primary principles.

Figure 5

A Crowdsourcing-Oriented Organization Framework for Public Institutions



3.3. Questionnaire

Respondents must respond to 53 Likert scale questions with a score from 5 to 1: (5) Strongly Agree, (4) Agree, (3) Neutral, (2) Disagree, and (1) and Strongly Disagree, except question 14 (most internal information by law is confidential for open innovation purposes) demonstrates the opposite scoring in the interpretation. Respondents also respond to Questions 54(a) and 55 (a), which aim to explore potential types of crowdsourcing in the ministry, as illustrated previously in Figure 3. They may experience two distinct types of problems concurrently: information management and ideation. Respondents could disagree if none of those issues exist in their offices. In this case, they might still voluntarily write an explanation via Question 56, to describe the problem and solution in their offices. Additionally, all questions will remain English and untranslated into Bahasa Indonesia, as shown in Appendix A.

3.4. Profiling The Respondents

Respondents must be Indonesia MoF headquarters employees because headquarter officers currently carry out policy formulation in the Indonesian MoF in Jakarta, and regional offices are typically involved in policy implementation rather than policy formulation. Respondents also must have at least six months of experience and be at least 18 years old.

3.5. Data Collection

The investigator contacts participants directly via Whatsapp, Facebook Messenger, and other instant messaging platforms, and the number of respondents depends on the number of people who agree to participate. The investigator does not compensate participants and receives no funds or facilities from the Indonesia Ministry of Finance. Some colleagues and acquaintances assist in disseminating the questionnaire's link during the invitation process without using any posters.

Respondents must complete a Google Form survey with a maximum of 56 questions in about 15 minutes, including reading the participant information form and granting their consent electronically (Appendix B). The following steps are involved in eliciting responses from respondents:

1) obtain an explanation and consent, 2) obtain a questionnaire, 3) respond to all questions, and 4) send all responses.

By configuring the Google form to receive an anonymous response, all information obtained in the survey is not personally identifiable from the start, so the investigator cannot determine their identity. Instead, the investigator will get only anonymized data, although respondents fill in some of their details in the questionnaire, such as gender, age, educational level, position, unit echelon I, length of employment in the MoF, length of service in their job, and participants' working role.

3.6. Ethics

This thesis was subjected to research ethics approval at The University of Tokyo. It mentions all acceptable associated risks and an overview of reducing them to obtain ethics approval. The inherent risks are minimal, as the subject of the online survey was anonymous. This procedure reduces confidential personal information collected during the study and the likelihood of stress or discomfort. It also did not require information with a high potential for damage.

3.7. Data Cleaning Process

The research excludes respondents who work in regional offices and outliers. The investigator conducts a statistical test using the absolute Z value to determine outlier responses. The common values of threshold (k) are 3. The threshold is associated with low probability in the standard normal distribution. It means that from an entirely random sample from a normal distribution, the expected percentage of identified outliers is 0.27% (Bakker, 2014). If respondents answer outlier responses in a question, then all of their responses will not be taken at all, although their responses are not classified as outliers in other questions.

3.8. Validity And Reliability Test

The validity test uses the Pearson correlation method with n =200 (212 respondents) and alpha 5%. It aims to eliminate questions that do not pass the criteria from scoring. In addition, the reliability test uses Alpha Cronbach with criteria > 0.7 as reliable. The reliability test only uses questions that pass the earlier validity test.

3.9. Normal Distribution Indicators

Normal distribution indicators use descriptive statistics such as Mean, Median, Modes, Standard Deviation (SD), Skewness, and Kurtosis. First, the study expects that the mean value with modes and median is close, so there is a slight variance of responses. In addition, the study also expects a value of 0-1 as the acceptable standard deviation score to measure the spread of responses from the mean in a question. For example, if the mean shows respondents “agree (4)” that managers take an active role in innovation, then the study expects at least the variance of other responses are also agree (4), or neutral (3), or strongly agree (5). It means that the tendency of all sample respondents also concurs with the mean value as their consensus. For the Skewness, the study uses a value range of -0.5 to 0 or 0 to 0.5 to nearly follow a normal distribution. Lastly, the study expects the Kurtosis value is not more than 2 or -2.

3.10. Principal Component Analysis (PCA)

The research used Principal Component Analysis to revisit the framework for Crowdsourcing-Oriented Organizations created previously via Thematic Analysis and a literature review. In this process, questions that pass the validity test are assessed using Principal Component Analysis to reduce the variables and determine the number of groups. It helps create categories from the selected items. In PCA analysis, the following assumptions in each step must be fulfilled:

- First, the Measure of Sampling Adequacy (MSA) test result must be above 0.5 to indicate a sufficient correlation between independent variables.
- Second, Kaiser-Meyer-Olkin (KMO) test values must range between 0.5 to 1 to indicate the Principal Component Analysis is feasible,
- Third, The Bartlett Test of Sphericity p-value must be less than 0.05 to indicate the variables are correlated.
- Fourth, the Eigen Value must be greater than 1 to retain the principal components of the selected variables (that passed The Bartlett Test of Sphericity) and determine the number of

components. Alternatively, the researcher might apply Parallel Analysis or decide on cumulative variance by looking at Scree Plot.

- Fifth, the Factor Loading must be more than 0.5 for each variable when performing Principal Component Analysis with oblimin rotation to establish the strength of a variable's contribution to a particular component.

After obtaining the new components and associated factors in the preceding procedures, the researcher labels them using their highest Factor Loading value or keywords. The researcher then matches each component under Crowdsourcing-Oriented Organization principles.

3.11. Assessment Scoring And Conclusion Method

The five-point Likert scale response is considered an interval scale. Therefore, the mean is very significant. A score from 1 to 1.8 is interpreted as strongly disagree. From 1.81 to 2.60, it means to disagree. From 2.61 to 3.40, it means neutral; from 3.41 to 4.20, it means agree; and from 4.21 to 5, it means strongly disagree.

"*Response Interpretation Interval*"

if the overall score is	$4.21 > x \leq 5.00$	– *Strongly Agree*
if the overall score is	$3.41 > x \leq 4.20$	– *Agree*
if the overall score is	$2.61 > x \leq 3.40$	– Neither agree or disagree
if the overall score is	$1.81 > x \leq 2.60$	– *Disagree*
if the overall score is	$1.00 > x \leq 1.80$	– *Strongly Disagree*

A composite score uses an averaging method from responses result and grades them according to the five categories of excellence with a range similar to the response scale above. Subprinciple scoring uses a similar way to find which ones are strong or require improvement.

"*Level of excellence to follow a succesful crowdsourcing*"

if the overall score is	$4.21 > x \leq 5.00$	– *We are "best practice" at this*
if the overall score is	$3.41 > x \leq 4.20$	– *We are good at this*
if the overall score is	$2.61 > x \leq 3.40$	– *We are okay at this*
if the overall score is	$1.81 > x \leq 2.60$	– *We are not good at this*
if the overall score is	$1.00 > x \leq 1.80$	– *We are awful at this*

Chapter IV

Results, Discussions, And Conclusion

4.1. Questionnaire Validity And Reliability

Two of the 53 questions do not pass the R-Pearson validity test: Question 9 and Question 10 (Appendix C). It is because respondents may perceive these questions to be ambiguous. For example, Question 9 (Ministry of Finance lacks human resources or financial resources in policy formulation) assesses two factors simultaneously: human constraints and financial constraints. Additionally, Question 10 (There is still an unsolvable internal problem in policy formulation that needs public participation) compares two terms with opposed definitions. The terms are "internal" and "public." Both questions are invalid because their values are less than 0.136 (alpha 5%, n=200). Table 1 presents the validity test results for Questions number 9 and 10.

Table 1

Validity Tests Result For Question Numbers 9 and 10

Question Number	Validity Test		
	R-Pearson	R-Table (Alpha=5%, n =200)	Results (Valid if R-Pearson Value > R Table)
9	-0.101	0.136	Invalid
10	-0.061	0.136	Invalid

After eliminating these two questions, the study examines the questionnaires using the Alpha Cronbach. The result in Table 2 shows that the survey value is 0.93 and is greater than 0.7. Therefore the questionnaires are reliable.

Table 2

Reliability Tests Result

Sum of Var	*28.89*
Var Total	*385.96*
Alpha Cronbach	*0.93*

4.2. Normal Distribution Indicators

The findings indicate that the mean, median, and mode values for each question are very close. It suggests that the data has a low level of significant variance. So the mean value does not far from almost the majority responses of respondents. However, when the means, medians, and modes are interpreted in response interval classification, we see that the medians and modes for Questions 6 and 18 are different from their means (Table 3).

Table 3

Mean, Median, and Modes Result For Question 6 and 18

	Question 6 *Staffs support open innovation and have a positive mindset to it.*	**Question 18** *MoF has a unit that manages organizational structure to follow strategies.*
Mean	4.23/ Strongly Agree	4.37/ Strongly Agree
Median	4.00/ Agree	4.00/ Agree
Mode	4.00/ Agree	4.00/ Agree

The standard deviation ranges from 0.53 to 0.96 for 51 questions. It is regarded to have an excellent value due to the low variation from the mean. Only questions 11, 14, and 17 are close to value 1. Similar to the previous mean-median-mode analysis, this result indicates that the mean value is not far from most respondents' responses. It is also supported by the Kurtosis values ranging from -1 to 1.6, or less than 2.

Table 4

Standard Deviation For Question 11, 14 And 17

	Question 11 *A solution from non-professional is accepted in formulating policy.*	**Question 14** *Most internal information by law is confidential for open innovation purposes.*	**Question 17** *Ministry of Finance has a dedicated unit that manages open innovation.*
Standard Deviation	0.96	0.93	0.95

Skewness values show more variations from -0.98 to 1.02 for 51 questions, and the data is deemed positively skewed because 44 of the questions have a negative value. Even specific question numbers are highly skewed in the positive direction due to their proximity to -1, such as

question numbers 3, 16, 19, 20, 23, 25, 26, and 49. On the other hand, six data points (question numbers 6, 11, 18, 22, 27, and 31) closely conform to a normal distribution (with a value less than or equal to ±0.1), and the remainder is regarded to be skewed moderately.

Table 5

Nearly Normal And Highly Skewed Questions

Nearly Normal		Highly Skewed	
Question 6 *Staffs support open innovation and have a positive mindset to it.*	-0.14	Question 3 *Ministry of Finance has been mandated to involve the public in policy formulation by President or higher authorities.*	-0.71
Question 11 *A solution from non-professional is accepted in formulating policy.*	0.01	Question 16 *Ministry of Finance has a clear legal basis as a guideline to protect citizen's identifiable information/privacy.*	-0.71
Question 18 *Ministry of Finance has a unit that manages organizational structure to follow strategies.*	0.06	Question 19 *Ministry of Finance has a unit that can provide the platform, initiate roadshows, phone conferences, and training to social media users.*	-0.77
Question 22 *Ministry of Finance has a moderation scheme for legal conflict in its online platform.*	0.04	Question 20 *Ministry of Finance has a unit that handles inter-organizational collaboration for open innovation, such as preparing a Memorandum of Understanding, managing shared promotion and outcomes.*	-0.79
Question 27 *Ministry of Finance uses random samples in manual quality control.*	-0.04	Question 23 *Ministry of Finance has flexible technology to accommodate new ideas during ongoing implementation.*	-0.78
Question 31 *There is a clear funding scheme for inter-organizational collaboration/cross-agency initiatives.*	-0.04	Question 25 *Ministry of Finance uses automated control, which comprises IT-facilitated to validate employees working contributions.*	-0.79
		Question 26 *Ministry of Finance uses peer assessment to approve working contributions among its employees.*	-0.98
		Question 49 *Ministry of Finance has a good strategic communication practice with online communities.*	-0.71

This highly positively skewed data with identical means with medians/modes and relatively small standard deviation values demonstrate that most respondents appreciate the Ministry of Finance's excellent performance across the board. Moreover, it relates to the study's premise that the Ministry of Finance can embrace crowdsourcing as a role model of innovative bureaucracy. Appendix D presents all details and results of the Descriptive Analysis.

4.3. Principal Component Analysis (PCA)

The data set from the validity test successfully fulfilled all the assumptions to run Principal Component Analysis. First, the Measure of Sampling Adequacy (MSA) test shows that all 51 questions (items that pass the validity test) have values above 0.5, indicating a sufficient correlation between independent variables. Second, Kaiser-Meyer-Olkin (KMO) values for 51 questions range between 0.5 to 1, indicating the PCA is feasible. Last, the Bartlett Test of Sphericity shows the p-value is 2.20E-16 or less than 0.05, indicating the variables are correlated.

The investigator then counts the components that have an Eigen Value greater than one. There are 12 components with a cumulative variance of 62.16%. This finding contrasts with Parallel Analysis that confirms the presence of three components with a cumulative variance of 37.9%. Therefore, based on the cumulative variance, the investigator prefers to have a maximum of twelve groups when performing PCA with oblimin rotation. From this rotation, the investigator automatically retrieves all Factor Loading values for each Factor (question), together with their connections to a component (groupings). The study then uses a minimum Factor Loading value of 0.5 to determine the factor's contribution to a component. There are only ten components and 26 factors (questions) based on this standard, accounting for 54.76% of the total variation. The investigator then labels the ten components based on their Factor Loading value and keyword content. The outcome indicates that these components are analogous to subprinciples in a Crowdsourcing-Oriented Organization. Therefore, the investigator decides to insert these components into the five principles in the initial framework (Appendix E shows all PCA statistics).

The PCA output reduces the number of subprinciples and questions in comparison to the original framework. For instance, Principle 1 initially contains three subprinciples and ten questions, whereas the PCA result contains only two subprinciples and four questions. The initial framework for principle 2 comprises five subprinciples and 19 questions, but the PCA output consists of four subprinciples and thirteen questions. In addition, it initially consists of four subprinciples and seven questions in Principle 3, but just one subprinciple and two questions in

the PCA output. It comprises three subprinciples and ten questions in the original Principle 4, but just one subprinciple and five questions in the PCA result. Finally, while the original Principle 5 contains three subprinciples and five questions, the PCA result contains just one subprinciple and two questions. The overall score for the MoF is 3.77, showing that the Indonesian MoF can use crowdsourcing (We are good at this category). Based on PCA results, alignment with business processes is the most significant supporting factor for the Indonesian Ministry of Finance to use crowdsourcing, while digital literacy is the lowest and needs to be improved for continuity. Table 6 illustrates the MoF score based on PCA Output.

Table 6

Indonesia MoF Score For Crowdsourcing Based on PCA Output

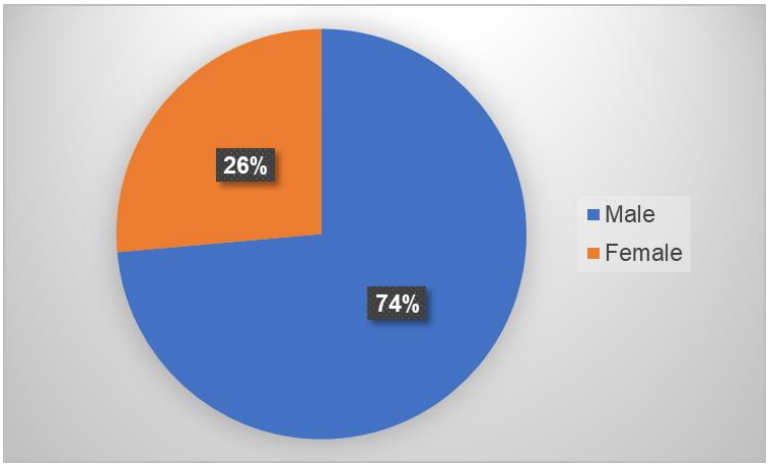
Principle Score	Principle	Subprinciple	Question Number	Question Score
3.72	**Principle 1** Commitment to Crowdsource	a. Pursue top-down management decision/ mandate	1	3.93
			2	4.33
		c. Demand a need to access external knowledge	11	3.18
			12	3.45
3.81	**Principle 2** Aligning crowdsourcing to internal business process	a. Regulating Information Confidentiality	14	2.46
		b. Establish an open innovation office function	17	3.67
			19	4.10
			20	4.02
		d. Develop quality and risk management instruments	24	4.06
			25	3.96
			26	4.19
			48	3.94
		e. Provide enough resources to crowdsource	29	3.89
			30	3.70
			31	3.59
			40	3.98
			41	3.94
3.69	**Principle 3** Design an effective crowdsourcing plan	c. Design a low barrier qualification task	35	3.75
			36	3.64
3.80	**Principle 4** Mobilize and manage the crowds	b-c. Motivate and Maintain the Crowds	43	3.69
			44	3.90
			45	3.86
			46	3.89
			47	3.66
3.66	**Principle 5** Continuity of process	b. Raise crowds' digital literacy	50	3.88
			51	3.44
Total	5 Principles	9 Subprinciples	26 Questions	3.77

4.4. Respondents Demography

The survey received responses from 241 employees. However, there are only 212 individuals who met the research criteria. The study eliminates 29 outliers respondents with at least one outlier response based on Z value with k=3. From 212 respondents, male respondents outnumbered female respondents by 73.58% to 26.42%. This number does not represent the gender distribution of the population because the percentage of the male population in the ministry is 55.54%, and female is 44.46%.

Figure 6

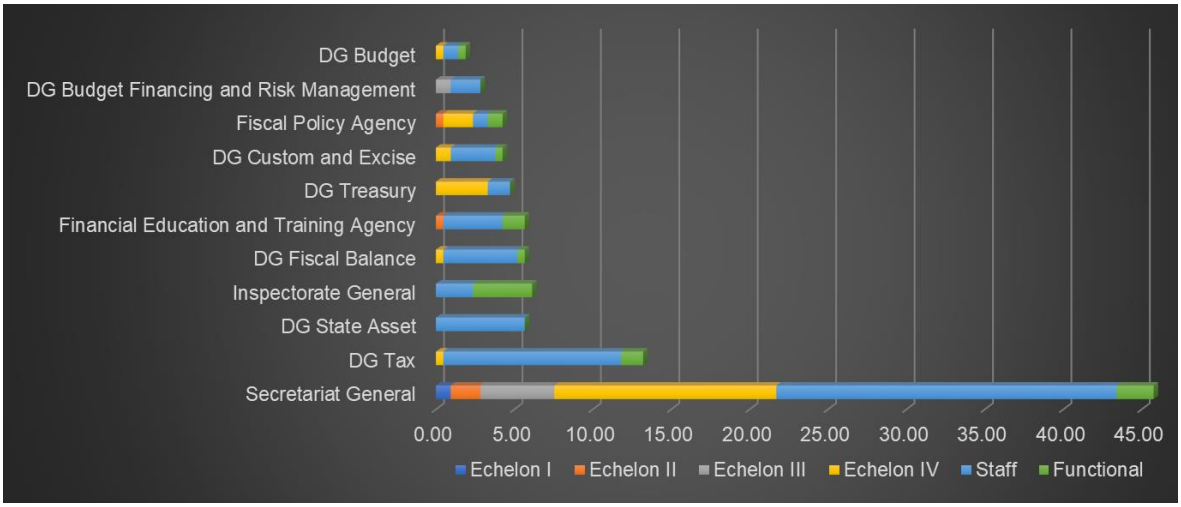
Distribution of Respondents Based on Gender (%)



Most participants worked for Secretariat General units (45.75%) and DG Tax (13.21%). This sample is very far from population distribution based on woking units. One of the reasons that Secretariat General and DG Tax employees more actively participated in the research is that they are interested in developing innovations within the MoF. Secretariat General is a catalyst and a driver of innovation, and DG Tax is one of the most innovative units. Further, in this study, two assistants ministers, the Secretariat of the Financial System Stability Committee staff and the Secretariat of the National Committee on Sharia Economics and Finance, are classified as Secretariat General Workers. Figure 7 depicts the following distribution of respondents based on Echelon I Units:

Figure 7

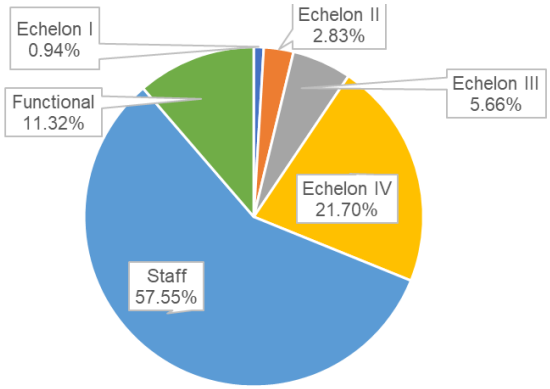
Distribution of Respondents Based on Echelon I Units (%)



Based on their positions, staffs account for the lion's share of respondents. They account for up to 57.55% of total respondents. The number is followed by 21.70% Echelon IV, 11.32% Functional, 5.66% Echelon III, 2.83% Echelon II, and 0.94% Echelon I. This sample does not represent the population distribution but still follows a similar pattern of hierarchy position like the population distribution. Compared to all MoF employees, Echelon I, II, III, IV, Functional, and Staff percentages are 0.10%, 1%, 5%, 19%, 5%, and 70%, respectively. Figure 8 below illustrates respondents' distribution based on their positions in the ministry.

Figure 8

Distribution of Respondents Based on Position (%)

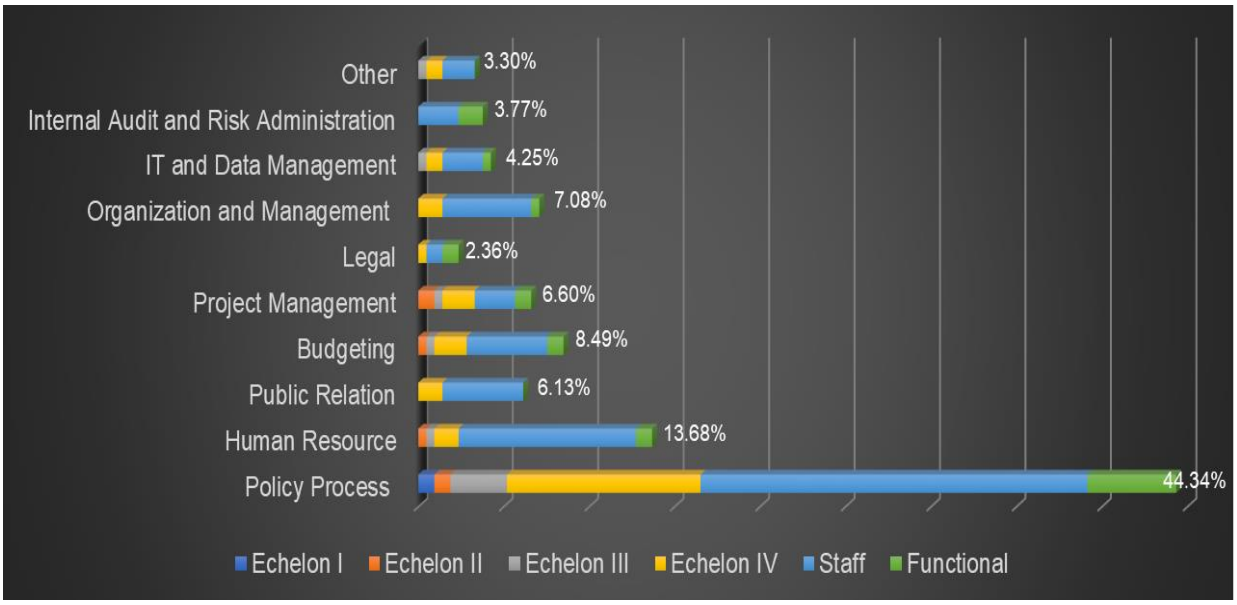


Moreover, 99 respondents (44.34%) indicated that their job involved the policy process, such as policy formulation and monitoring, where 45 (21.23%) were Secretariat General workers. Secretariat General officials play a critical role in the policy process by providing checks and balances on proposed policies. They provide advice and guidance to the Directorate Generals on strategic matters[28].

Additionally, other 29 respondents have capacities in human resource development (13.68%), 18 persons in budgeting (8.49%), 15 persons in organization and management (7.06%), 14 persons in project management (6.60%), and 13 persons in public relations (6.13%). The remainder of the respondents were involved in Information-Technology (IT) and data management (4.25%), internal audit and risk administration (3.77%), other work (3.30%), and legal (2.36%). Figure 9 illustrates the distribution of respondents based on their working roles.

Figure 9

Distribution of Respondents Based on Working Role (%)

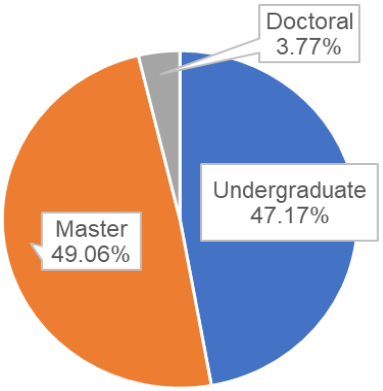


Based on their level of education, 49.06% of respondents indicate they have Master's degrees, 47.17% undergraduates, and 3.77% are doctoral degrees. Figure 10 illustrates these three categories.

[28] From: https://setjen.kemenkeu.go.id/api/Medias/228a56b1-44a4-4e57-83a9-87694dfb4d0d

Figure 10

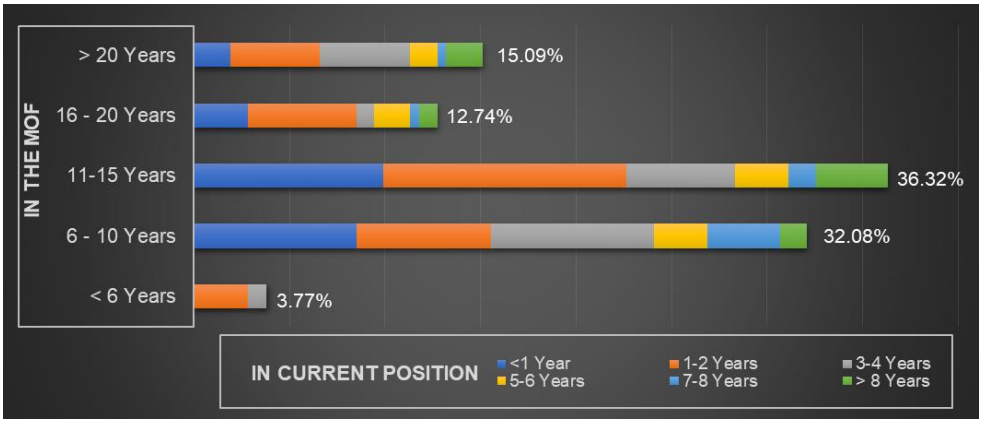
Distribution of Respondents Based on Educational Level (%)



Most respondents have worked in MoF for 11-15 years (36.32%). It is followed by a range of 6-10 years (32.68%), more than 20 years (15.09%), a range of 16-20 years (12.74%), and less than six years (3.77%). Additionally, 33.02% of respondents work in their current positions for 1-2 years. Others work in their current job for less than one year (23.11%), 3-4 years (20.75%), 5-6 years (8.96%), above eight years (8.02) and 7-8 years (6.13%), as shown below in Figure 11.

Figure 11

Distribution of Respondents Based on Length of Work (%)



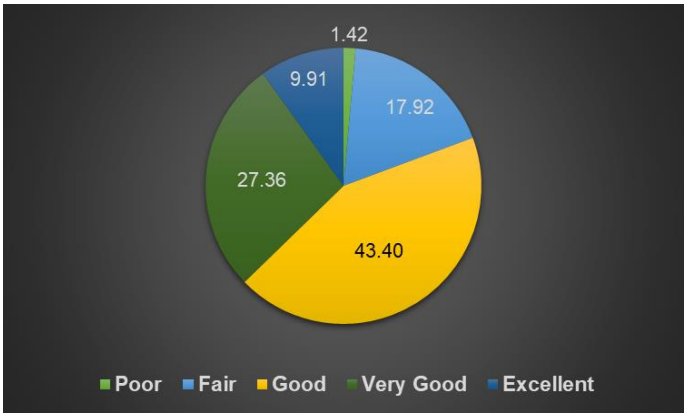
4.5. Respondent Understanding of Policy Formulation

The understanding of policy formulation assessment uses a Likert scale, with a score of 1 indicating that they understand the policy formulation process poorly and a score of 5 indicating

that they know the policy formulation process excellently. Almost all respondents already possess an adequate level of comprehension. 43.40% of workers claim to have a good understanding, 27.36% have a very good level, 17.92% have a fair understanding, and 9.91% have an excellent level. Only 1.42% have a poor level of understanding, and they are all male, undergraduate, and Staff/Functional (Figure 12).

Figure 12

Distribution of Respondents Based on Their Understanding of Policy Formulation (%)



Among the 80.66% of respondents who have at least a good understanding of policy formulation, 44.34% have a master's degree, 32.55% have an undergraduate degree, and 3.77% have a doctoral degree. Similarly, from 80.66% of these respondents, more than half (40.09%) have jobs related to the policymaking process. These numbers demonstrate that education and various working roles may not preclude them from comprehending the policymaking process within their units.

Table 7

Distribution of Respondents Who Have at Least a Good Understanding of Policy Formulation

Attributes	Managers		Staff And Functional		Total	% From Total Respondent
	Male	Female	Male	Female		
Doctoral Degree	6	2	0	0	8	3.77%
Master Degree	36	10	34	14	94	44.34%
Undergraduate	5	2	41	21	69	32.55%
Policy Process	27	8	35	15	85	40.09%

4.6. Results

The calculated score for a crowdsourcing-oriented organization in the MoF is 3.83, indicating that the MoF would be proficient at crowdsourcing (We are good at this). Similarly, all principles score also tell “We are good at this” category. The highest score is assigned to Principle 4-Mobilize and manages the crowds, which receives 3.89—following Principle 1 The commitment to crowdsourcing and Principle 3-Design an effective crowdsourcing plan, which gets a 3.83. Principle 2-Aligning crowdsourcing with internal business processes receives a score of 3.82, and the lowest one is Principle 5-Continuity of the process, with a score of 3.76.

Figure 13

Crowdsourcing-Oriented Principles Result in The Indonesia Ministry of Finance

In more detail, the highest score among all subprinciples is 1a-Pursue top-down management decision/mandate with a score of 4.15 or “We are best practice at this” category. Conversely, the lowest score among all subprinciples is 1c- Demand a need to access external knowledge with a score of 3.32 or “We are okay at this” category. And, the remaining subprinciples score are classified as the “We are good at this” category (see Appendix F).

4.7. Discussions

Although the result score indicates that the MoF is capable of crowdsourcing (We are good at this category), and the results for the five principles reveal the same category; however if we look more closely, crowdsourcing may be challenging to apply in MoF for several reasons, as discussed in each principle.

4.7.1. Indonesia Ministry of Finance Commitment to Crowdsource

MoF is open to change. The principle-1 score reflects this commitment to reform (Score: 3.83). This result strengthens the study hypothesis-1 that MoF would be highly likely receptive to crowdsourcing. In contrast with this finding that the ministry is open to change, another result reveals that executive managers (Echelon I) are less adaptive to innovation than Echelon II/III and staff. Their scores are 3.93, 4.33, and 4.23, respectively (Figure 14).

Figure 14

Perceptions on Echelon I, Echelon II/III, And Staff Acceptance of Innovation

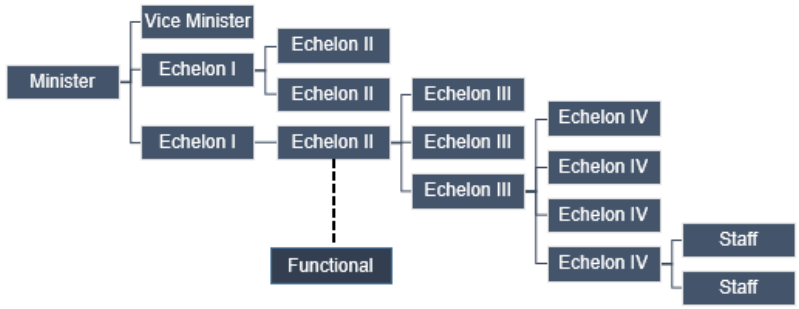
As the bureaucracy's highest policymaker, Echelon I stance in innovation is critical in the ministry since they are the gatekeepers of change. And, in large bureaucracies, they even can bring the changes themselves when there is no clear mandate to innovate from the law or higher authorities (Power Brad, 2013). Their roles are to motivate employees, create and explain a future vision, ensure support during the transition, insist on quality, place demands on managers, and persuade other top managements to change (Power Brad, 2013).

In MoF, after the minister, Echelon I retained their position as crucial decision-makers (Figure 15). Even the deputy minister has no authority over the directors-general unless the minister requests to lead on specific issues (Data et al., 2011). Echelon I is accountable for policy recommendations, implementation, and budget decisions. On the other hand, Echelons II and III are responsible for internal policy within their offices, while Echelon IVs supervise the staff. Apart from these structural

positions, Functional status is comparatively autonomous but overseen by Echelon II. Functional employees have no subordinates, so they must frequently coordinate with Echelon III and IV to work on specific tasks.

Figure 15

Hierarchy of Positions in The Indonesia Ministry of Finance



Echelons II is the best-qualified individuals to bring crowdsourcing and serve as change agents inside the ministry to address innovation commitment. Their score is the highest among all other positions in Figure 14 (score: 4.33). Echelon IIs have vital functions that allow them to exert influence on Echelon I and have the ability to interact with the minister and executive board. They also serve as an integrator of administrative superstructure inside leadership networks to generate political and administrative support (Haug, 2018). Echelon II perspectives are even more critical if executive managers often refuse to experiment and insist that related risks be kept to a minimum when innovating.

There are two Echelon II entities within the ministry that are capable of implementing change and have direct access to the minister. They are the Center for Policy Analysis and Harmonization, or called Pushaka and the Transformation Office (CTO). Pushaka was known as the "engine of transformation"; a delivery unit for the transformation in 2009 and the minister's private office. Pushaka supervised policy implementation and took on administrative responsibilities such as scheduling, internal communication, cross-directorate cooperation, and meeting notes (LaForge, 2016, p.5). In delivering reform, Pushaka implemented a biweekly meeting with the minister to

discuss its progress. If Pushaka expressed a complaint, the minister would personally talk with the relevant director-general, which makes Echelon I difficult to disregard the team's suggestions (LaForge, 2016, p.10).

In 2011, the Indonesia Ministry of Finance separated the Pushaka function as office reform with its private minister's office function. The ministry then built a Transformation Office to monitor and promote the strategic goals stated in the Ministry of Finance's organizational reform program. Unlike Pushaka, The Central Transformation Office (CTO) delivers innovation in cooperation with a Project Management Office (PMO) in each echelon I.

However, although there is a dedicated unit that ensures the change in the ministry, these change agents may still encounter obstacles in their efforts for crowdsourcing. 34.43% of respondents complained that openness to new ideas (question 5) in all levels of managers does not fully reflect their willingness to experiment and accept failures. Experimentation and accepting failure is one of the most common processes when implementing crowdsourcing. Although 90% of companies say that crowdsourcing effectively solves their problem (Harvard Business School Digital Initiative, 2020), the process of getting the right solutions may include several experiments and failures. It took time and continuous efforts. Therefore, support from higher managers is significant to keep the organization and personnel motivations.

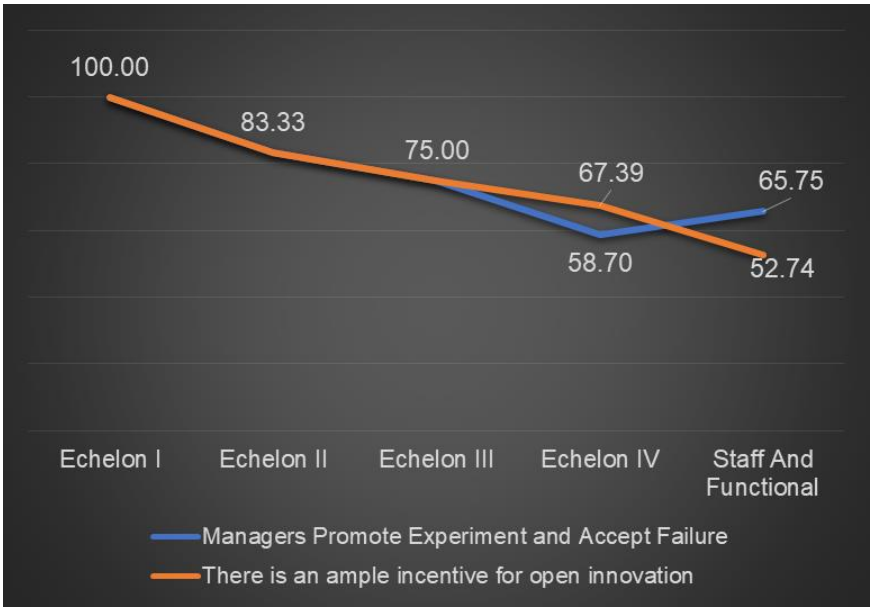
Among other roles, Echelon IV has the lowest sense of manager support (Figure 16), implying that Echelon I, II, and III provide them with less help in terms of innovation. Echelon IVs have identified a shortage of resources, notably staff, to carry out the work. On the other hand, they complain that the tasks are becoming more challenging due to increased demands and expectations from top-level decision-makers. Meeting a high standard is not easy, and it becomes even more complicated when responsibility for a task is dripped down, but the mandate to use resources is not. As the management's backbone, Echelon IVs supervise staff and lead implementation, yet they lack authority. Unfortunately, bureaucracy frequently imposes this constraint, failing Echelon IVs to achieve the desired goal. In the longer term, it will decrease

employees' commitment, reduce their desire for innovation and increase organizational inertia (Hitt et al., 1990; Thompson, 1965, as cited in Damanpor, 1996).

The further issue regarding managers' support is also with communication. Respondents feel that the office needs a different mode of communication to communicate their concerns to management and ensure that everything they said was heard. Effective communication is even more crucial when “Managers appear skeptical and risk-averse, and hence formulate policies from their perspective” (Echelon IV). According to Goins (1998), many executive leaders assume they are already effective communicators, yet they do not value internal communications. They do not have enough staff meetings and social functions owing to logistical challenges, they do not implement a dynamic formal process for attaining personal and agency goals, and even they do not have a standard mechanism for frequent communication between them and their team. Another common issue that impacts the internal communications process is the psychological aspect, such as a lack of trust, accountability, and office individualism (Goins, 1998).

Figure 16

Comparing Satisfied Respondents to Managers' Support And Incentives (%)



In comparison (as seen in Figure 16 above), the lowest-paid employees more openly voice their unhappiness with the rewards system. Employees urge the Ministry of Finance to balance effort and incentives, which may include a non-monetary acknowledgment. As the Directorate of Fiscal Balance staff said, “Problem in my office is about giving appreciation to employees with nonfinancial appreciation and giving more attention to the employee.” However, like common sense, most managers frequently argue that delivering appreciation is complicated, and they only practice it through a traditional developmental feedback form, making employees regard their acknowledgment as routine, impersonal, and meaningless (Gibson et al., 2020). It is even more common in large organizations due to its increased bureaucracy and tendency toward impersonal work settings (Whetten, 1987, as cited in Damanpor, 1996). In this condition, Staff/Functional may look that managers do not appreciate their work. Meanwhile, employees usually desire constructive feedback on their performance, both on what they are doing well and areas for improvement but, they appeared to have given up because they believed they could never do anything right after receiving negative feedback or critics (Gibson et al., 2020). As a result, this lack of perceived rewards and incentives can contribute to low morale and the impression that the agency does not care about its staff (Goins, 1998).

Furthermore, Staff/Functional responded that they are willing to share ideas with colleagues and management, but they rarely get the chance to promote innovation or policy. Therefore, they propose that the Ministry of Finance create a unit to collect inventions and recompense inventors based on their efforts. According to Deschamps (2013), low chances for innovation contributions can be attributed to three factors. First, this is based on the management philosophy that innovation is everyone's duty and that the organization can rely on each individual to do their normal functions throughout the process. Second, this is based on the absence of an innovation governance model due to temporary circumstances such as institutional reorganization. Lastly, this is based on management's belief that recent innovation is unimportant, making it unnecessary to assign responsibilities.

In the case of MoF, it is a mix of those three elements. Managers, for example, would favor regular work above innovation since they could delegate it to the project management office. On the other side, the project management office also keeps managers busy implementing new top-down innovation (including organizational restructuring) rather than asking for bottom-up solutions. Therefore, although this top-down innovation governance strategy was vital in the reform's success in 2009, with most employees now being Millenials and digital natives who value efficiency, this model still lacked experimentation, managerial support, and incentive. Selecting an appropriate organizational model is fundamental, but it is also crucial to acknowledge that conditions change (Deschamps, 2013).

Overall, the MoF condition above goes against the idea that the innovation commitment should extend beyond idea generation. It encompasses the freedom to experiment, the provision of resources, and the appropriate remuneration of innovators. In the future, high demand combined with insufficient support will stymie innovation progress. As a follow-up to these findings, the study suggests the Ministry of Finance improve reward for Staff/Functional and strengthen Echelon III's support for innovation in their capacity as Echelon IV's supervisors. For example, managers should provide greater flexibility and options, as employees quickly interpret work flexibility as a significant signal of trust and appreciation (Gibson et al., 2020).

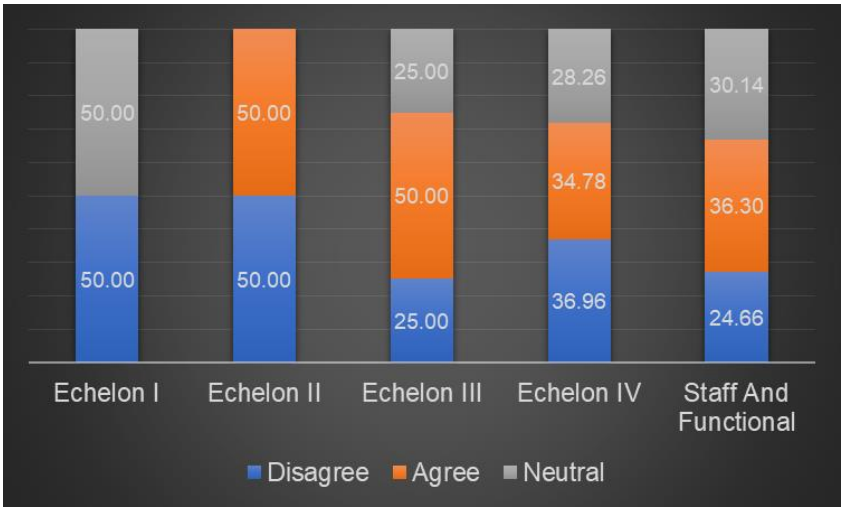
Next, concerning policy formulation, not all respondents are amenable to non-professional solutions (Score: 3.15), though respondents agree that MoF does not have a proclivity for risk avoidance (Score: 3.59). The term "non-professional" was purposefully and cautiously chosen in the questionnaire to avoid the respondent's perception of "incompetence" if using words like "amateur" or "unskilled." Instead, the expected interpretation of a "non-professional" term refers to an "inexperienced" individual capable of resolving a problem through a rapid learning program.

The survey indicates that non-professional solutions continue to be a source of contention in all levels of positions. Among the managers, none of Echelon I agreed with a non-professional solution, but it is still considered a moderately accepted idea, particularly among Echelon II and

Echelon III with 50% agreement (Figure 17). This finding is consistent with the preceding explanation that Echelon I is the least adaptable to innovation in the MoF and frequently believes in their own opinion. On the other hand, Echelon II/III is more susceptible to novel ideas and hence accepts advice from non-professionals. However, since the survey does not explicitly target Echelon I, a different result may be obtained if the study places a greater emphasis on their responses.

Figure 17

Perception For Non-Professional Solutions Based on Position (%)



MoF's reliance on professional expertise is a logical outcome of its role as a national strategic policymaker and the high risk associated with this position. MoF has essential functions in Indonesia. It develops and implements strategic policies in budgeting, non-tax state revenue, taxes, customs, excise, state treasury, state assets, financial balance, and state finance and risk management. MoF also establishes policies in the fiscal and financial sectors (Presidential Regulation Number 57 of 2020 concerning the Ministry of Finance).

MoF must exercise greater caution than other ministries when formulating policies, even though they are frequently unpopular. For example, MoF is currently debating whether to increase the value-added tax rate for basic needs, education, and health services, despite many believe that the current policy is ineffective as people continue to experience income decline during the

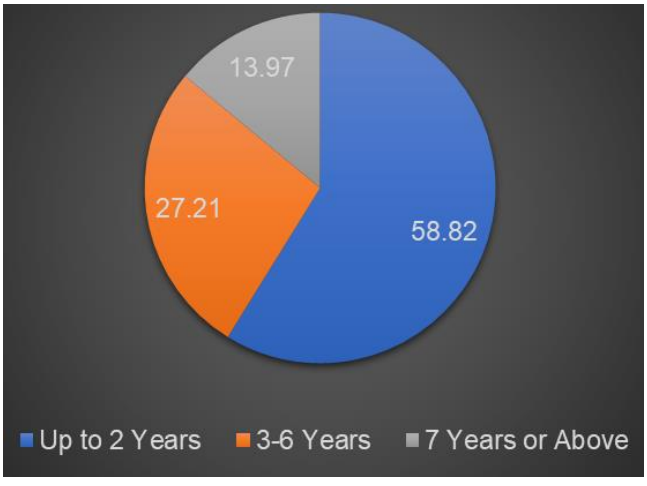
pandemic. To respond objectively to the opposition, MoF always relies on data and expert analysis for maintaining public trust.

One of the most prevalent outcomes of fostering professionals in an organization such as MoF is keeping the same people in the same position for a more extended period. The reason for this is that organizational expertise is lost when positions are changed. It also creates a convenient mechanism for personnel to conceal their knowledge and intentions to gain more significant influence within the bureaucracy (Max Weber, 1968)[29].

In contrast, Figure 18 indicates that rotation and transfer between roles occur more often in Indonesia MoF. Among respondents who have worked in the ministry for more than ten years, 58.82% have held their current position for less than two years, and 27.21% for between three and six years. This number demonstrates that the ministry has an adequate knowledge transfer system and effective training programs for its staff. It is relevant to crowdsourcing if MoF can expand the system for the crowds because the more crowds learn about MoF, the better work they produce.

Figure 18

Respondents Who Have Worked For MoF For More Than 10 Years Based on Their Current Position's Length of Service (%)



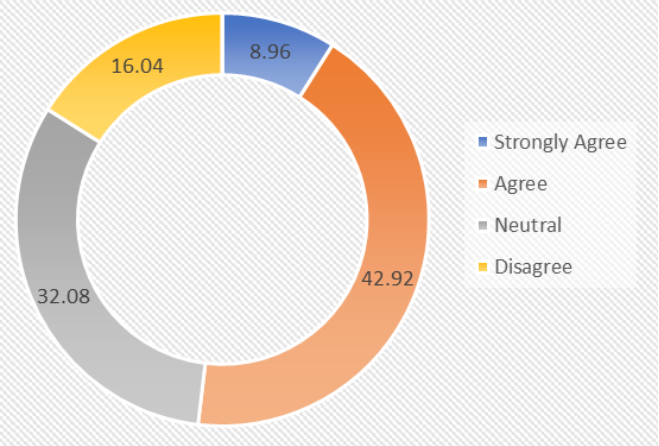
[29] Aoki, Naomi (2020). Policy, Process And Negotiation Course, Lecture 9 Material. The University of Tokyo

Furthermore, to address non-professional acceptance, the study proposes that MoF assign specialists to verify the output and ensure accurate information (Belsky, 2010; Dokoupil, 2008). MoF can also administer a qualification test (Belsky, 2010; Alonso et al., 2008) and choose participants based on a specific skill, demography, and prior performance (Blohm et al., 2018). All of those are for ensuring the internet users are qualified. In this way, crowds - who are generally seen as amateurs- can work together to resolve ministry-related problems since bureaucratization is inaccessible to ordinary people unless they possess the requisite skills and knowledge (Max Weber, 1968)[30].

In terms of cost, most respondents agree that hiring social media users is cheaper than internal sourcing (Score: 3.45). As seen in Figure 19 below, 42.92% of respondents agree, and 8.96% strongly agree with this notion. Others are neutral (32.08%), while only 16.04% of respondents disagree.

Figure 19

Response on Hiring Social Media Users is Cheaper Than Internal Sourcing (%)



If we compare compensation for the crowdsourcing workers with the median wage in the US, we can conclude that crowdsourcing is far cheaper than in-house. Crowds' compensation expenditure is only between $10,000 and $30,000 per week. Some earn as little as $300 to $1,000 per week if they work for small businesses (Prameswaran & Marcus, 2013, p.74). It is considered

[30] Aoki, Naomi (2020). Policy, Process And Negotiation Course, Lecture 9. The University of Tokyo

a substandard wage compared to the United States weekly median wage earned by a full-time worker, $989 in the first quarter of 2021 (The US Bureau of Labor Statistics).

In Indonesia, self-employed individuals earn an average net income of $33.39 per week, and casual workers earn $24.61 per week (Indonesia Labor Force Survey, February 2020[31]). On the other hand, a moderately low-wage employee in MoF makes approximately $137.62 per week[32]. This calculation suggests that when crowdsourcing, MoF should compensate the crowds in the range of $24.61 to $137.62 per week to minimize costs and maintain internal employees' motivation.

4.7.2. Aligning Crowdsourcing to Indonesia Ministry of Finance Internal Process

Organizations frequently fail at crowdsourcing because it requires a different management approach. For example, crowdsourcing management is distinct from typical outsourcing management (Afuah & Tucci, 2012; Felin et al., 2017; Ghezzi et al., 2018; Jeppesen & Lakhani, 2010; Puranam et al., 2014, as cited in Dahlander, 2020). One of which is because, in outsourcing, the employer retains a significant role compared to the party receiving the assignment. Crowdsourcing, on either way, is also inapplicable to a bureaucratic approach because in a hierarchical system, the majority of work is regulated and handled mechanically by several supervisors. By contrast, organizations that use crowdsourcing must democratize their alignment without sacrificing administrative authority. Therefore, when crowdsourcing, substantial changes in the management style of the organization should be considered.

One lesson learned to study managerial structure in crowdsourcing is from Chris Creel's presentation at the Business Agility Conference 2019[33]. His experiment involved developing a coaching bot that enables the entire organization to mentor one another. Through this collaborative coaching, he can enhance employees' performance, provide the organization with feedback topics, and visualize the employee's strategic alignment. In evaluating his experiment, he discovered that a strong alignment does not follow a hierarchy but rather a network. His crowdsourcing analysis also aids the managers in terminating ineffective teamwork alignment.

[31] From https://www.bps.go.id/publication/2020/06/19/0dce3c66158f35e8ab006612/statistik-pendapatan-februari-2020.html

[32] From https://money.kompas.com/read/2020/12/20/094321726/ini-rincian-gaji-pns-pajak-beserta-tunjangan-yang-diterimanya?page=all

[33] From: https://businessagility.institute/learn/adaptive-crowdsourcing-organizational-design/445

Based on the explanation above, it is reasonable to expect respondents to believe crowdsourcing will be challenging to implement at the Ministry of Finance, given the ministry's bureaucratic structure, and the fact that senior management cooperation appeared to be a serious issue, as each directorate-general governed its own kingdom (LaForge, 2016). However, the study discovers a contrasting finding. Concern about organizational and management change is unfounded. Instead, the result indicates that the ministry has a unit capable of managing organizational structure (Score: 4.37). Respondents further believe that MoF has dedicated teams that can provide the platform, and training to social media users (Score: 4.10), handles inter-organizational collaboration (Score: 4.02), and manages open innovation (Score: 3.67). These functions are conducted by Financial Education And Training Agency and Echelon II Units under Secretariat General, namely: Organization and Governance Bureau, Communication And Information Services Bureau, Chief Transformation Officer, Pushaka, and Center for Financial Information System and Technology.

Table 8

Open Innovation Office Function Score And Its Examples in Indonesia Ministry of Finance

Items	Score/ Category	Examples
Question 17 *MoF has a dedicated unit that manages open innovation.*	3.67/ Agree	Transformation Office
Question 18 *MoF has a unit that manages organizational structure to follow strategies.*	4.37/ Strongly Agree	Organization and Governance Bureau
Question 19 *MoF has a unit that can provide the platform, initiate roadshows, phone conferences, and training to social media users.*	4.10/ Agree	• Financial Education And Training Agency; • Communication And Information Services Bureau; • Center for Financial Information System and Technology.
Question 20 *MoF has a unit that handles inter-organizational collaboration for open innovation, such as preparing a Memorandum of Understanding, managing shared promotion and outcomes.*	4.02/ Agree	• Transformation Office; • Center for Policy Analysis and Harmonization.
Subprinciple 2b *Establish an open innovation office function.*	4.04/ We are good at this	

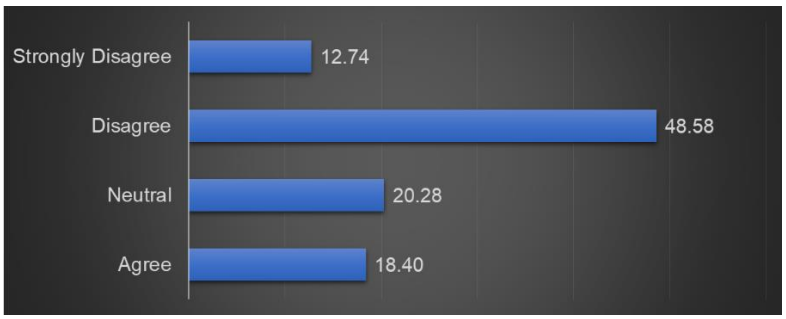
Another result also indicates that MoF possesses an adequate internal system for managing the risk of lousy work quality (Score: 4.06). Therefore, 79.25% of respondents are unconcern about receiving terrible advice from social media users. Even respondents think online communities can create quality work relative to experts (3.99).

Respondents are more worry about information confidentiality since the risk is more challenging to control internally. To manage risks, MoF first evaluates them in terms of their magnitude and likelihood following internal control or existing procedure (Minister of Finance regulation number 845 of 2016 on guidelines for risk management implementation). The combination of these two would vary on the characteristics of the risks. However, sharing internal data generally has a more significant risk impact than getting bad advice from the crowds since confidential information can fall outside the ministry's control. Due to this perceived risk, policy formulation in the MoF is exclusive to internal employees. Information confidentiality also maintains that the role of external experts as advisers in public policymaking remains controversial. It is the most effective defense against data leaking to limit the number of employees and personnel with access to sensitive information to a bare minimum.

Attentions regarding the confidentiality of information exchanged with external contributors are raised by 6 in 10 respondents. They argue that the regulation prohibits information sharing, making collaboration with external stakeholders more problematic. As a result, respondents gave this item the lowest score (2.46/ disagree) from 51 questions.

Figure 20

Response to The Statement That Regulation Prevents Information Sharing For Open Innovation



MoF data can be classified into three categories. The first type of information comes from other organizations' internal reports to the government, such as financial reports submitted by businesses to DG Tax. Second, personally identifiable information is provided by individuals or collected by the government, such as income tax reports, resident information, and employee profiles. And, the last is the information generated by the government as an entity, such as the country's debt profile, spending allocations, procurement, tax revenue, asset report, operational costs, and wages.

If the risk is assessed based on information ownership, the government's internal reports will be less confidential since the government can not disclose third-party data, and people want governments to treat their personal information with the utmost care when exchanging it (OECD Confidentiality and Information Security Management Toolkit, 2020, p.5). However, as a public entity, the government, on the other hand, has an obligation to make its internal data available to its citizens and taxpayers because they fund government operations, including producing and collecting information. As with other public goods such as schools or roads, citizens have the right to access government-owned statistics.

According to Minister of Finance Regulation No. 97 of 2017 on information and communication technology governance, the MoF classifies its data as very confidential, confidential, limited, and public. A disclose of very confidential information (i.e., the national budget allocation plan) could endanger the country's economic resilience. Additionally, opening confidential information (i.e., taxpayer data) can negatively impact the ministry's image and reputation. On the other hand, a leak of limited information (i.e., Standard operating procedures and performance reports) impairs the MoF's operations. Finally, public information (i.e., press releases) is made publicly available. Based on this category, the most likely type of information to be shared with crowds is public information, followed by limited information, confidential information, and very confidential information, in ascending order. Although MoF has this classification nonetheless, some information risks may remain incompletely understood or

subjective. For instance, information affecting the reputation of the MoF is deemed ambiguous. It is because a reputation risk is a highly subjective concept (Eccles et al., 2014), mainly when “the boundaries of information disclosure are unclear” (DG Tax-respondent).

According to Law No. 14 of 2008 on the disclosure of public information, all information held by public agencies is generally open and accessible; unless classified as confidential by law, propriety, and to protect the broader society's interests. But, interpretation of this regulation is highly situational. With the rate of innovation increasing to the point where it exceeds the scope of existing law and the inability of bureaucracy to grasp comprehension about the current change, the government will remain conservative implementing an open government. In Indonesia, bureaucracy is governed by law, which means that public information cannot be shared with other government entities. In addition, numerous laws in Indonesia are enacted based on a specific sector, topic, or even institution categorization, which frequently undermines the potential interaction between government agencies' missions and private institutions. With these restrictions, though some organizations agree to exchange information, they are prohibited from sharing the data they already acquire with other organizations, even within their ministries. But, under certain circumstances, it is common for regulations to permit the disclosure of certain citizen information to investigative and law enforcement agencies such as anti-corruption agencies, anti-money laundering (AML) authorities, or customs authorities, as well as to social security authorities to administer welfare benefits and to members of the public in appropriate cases (OECD Confidentiality and Information Security Management Toolkit, 2020, p.11).

In crowdsourcing, crowds are outsiders and have not been subjected to the same rigorous recruitment procedure as inside employees. As a result, safeguarding confidential information will become more challenging. This risk of data exploitation and leakage is becoming increasingly significant as the volume of data consumed, produced, and retained by crowds grows[34]. Additionally, given the global trend of massive cyberattacks, it is also possible to face an information security breach during the interaction between the crowdsourcer and the crowds. And,

[34] From https://www2.deloitte.com/content/dam/Deloitte/de/Documents/Innovation/us-cons-enterprise-crowdsourcing-and-growing-fragmentation-of-work%20(3).pdf

the ministry will become a prime target for attackers because of its high dollar value financial transactions. In 2019, there were 2,518,536 attacks on the ministry systems. Meanwhile, IT literacy and awareness of information security among MoF employees continue to be low. For instance, many employees continue to use non-official email addresses, do not change their passwords, and use applications that failed vulnerability tests[35]. If these risks remain unaddressed in crowdsourcing, it can result in a loss of public trust.

According to Saxena et al. (2018), three stages require additional risk mitigation attention in crowdsourcing: when the task is posted on a platform, handing over required resources, and during any correspondence between the crowdsourcer and the crowds in the process of getting the job done. In these stages, information leakage can occur when data contains traces of secrecy, crowdsourcers are unaware of the presence of sensitive data, or when the crowdsourcer or crowds purposefully give sensitive data away (Saxena et al., 2018, p.9-10). Examples of this sensitive information are National Unique Identification Numbers or SSNs, API keys, source code/blueprints for a project, database, details of pending patents/intellectual property, and customer information (Saxena et al., 2018). Therefore, crowdsourcers must screen this information using privacy-preserving practices, such as K-Anonymity, L-Diversity, and T-Closeness. They also only share sensitive information after proper Sanitization and Anonymization (Saxena et al., 2018, p.18).

On that grounds, it is especially effective if the MoF initiates the process with internal crowdsourcing to overcome earlier fears about sharing confidential information and the risk associated with information security. Around 81,000 internal crowds within the ministry have the potential to contribute to policy formulation solutions. It is supported by the fact that 7 in 10 respondents indicate that the ministry already has a platform for promoting challenges, aggregating diverse ideas, and validating employees' work contributions. And, through internal crowdsourcing, the ministry could further foster idea sharing, collaborative work, a learning environment, and reducing silo culture within the organization.

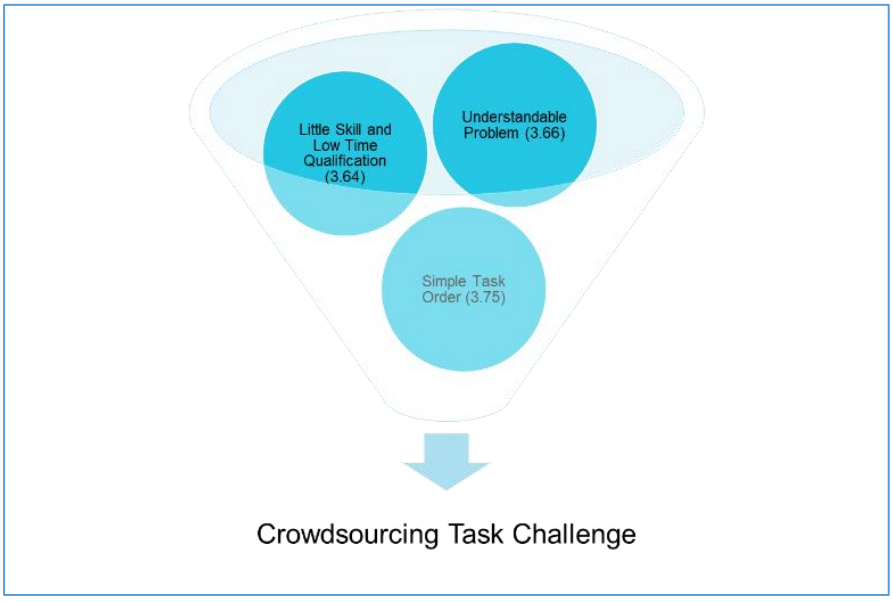
[35] From https://setjen.kemenkeu.go.id/api/Medias/304e43f9-495d-4bd1-bff4-72f9a44b1d35

4.7.3. Designing Indonesia Ministry of Finance Crowdsourcing Types

Policy formulation tasks are inherently complex, but this does not mean that social media users are unsuitable for this job. To effectively engage social media users in policy formulation, MoF must design a complex task very simple and clear. For this capacity, the poll results show that Echelon I, II, and III are confident that management and staff can distill a complex issue into a basic problem statement intelligible to non-professionals. (Score: 3.66). Only 17.31% Echelon IV, 12.75% of those whose work related to the policy process, and 12.66% Staff/Functional disagree with this assumption. Additionally, comparable figures apply to the capability of the Ministry of Finance to compartmentalize complex problems into easy individual jobs (Score: 3.75), which demand little skill and low time commitment (Score: 3.64).

Figure 21

Scores For MoF Capacity to Condense Complex Problem



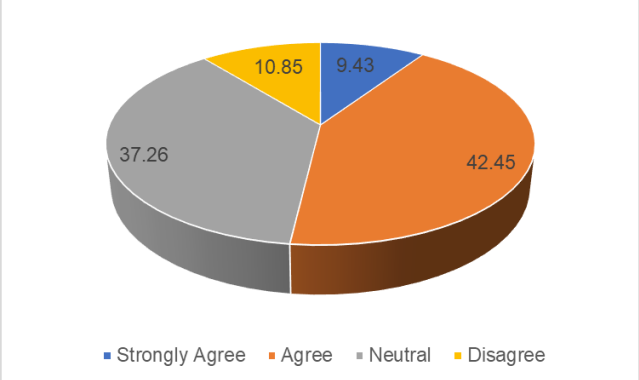
Respondents also agree that MoF can communicate its working target well and measure its productivity (Score: 4.14). It is because MoF is familiar with the quantitative approach based on the Balanced Scorecard to evaluate the organization's and employees' performances. The current system demands the ministry to quantify its objectives and disseminate them down to the

individual level. Individuals are also required to document their progress and report them to their supervisors as a basis of coaching sessions and their selves developments. With a highly dynamic human resource management system like the Balanced Scorecard and a bureaucratic structure, MoF can empower innovative climates through information sharing, employee suggestions, self-management teams, and job rotations (Zhou et al., 2021).

However, a possible challenge for MoF in adopting crowdsourcing is because the ministry is unfamiliar with the crowdsourcing process. Only 51.89% of respondents think that MoF understands crowdsourcing, 37.26% are neutral, and 10.85% say that MoF does not understand the crowdsourcing process. Figure 22 below illustrates the distribution of these responses.

Figure 22

Distribution of Responses For The Ministry's Understanding of Crowdsourcing (%)



The good news is that 48.7% of respondents are already aware that other governments have adopted crowdsourcing best practices (Score: 3.48). For this reason, although MoF does not yet use the term "crowdsourcing" officially, introducing crowdsourcing into the ministry may require less effort. To further identify the issue of policy formulation in MoF and to what extent crowdsourcing can address them, respondents respond to additional questions. First, they must locate their offices' problems in two categories: information management or ideation. In this stage, respondents may have both problems or may have no answer to either problem. In the latter case,

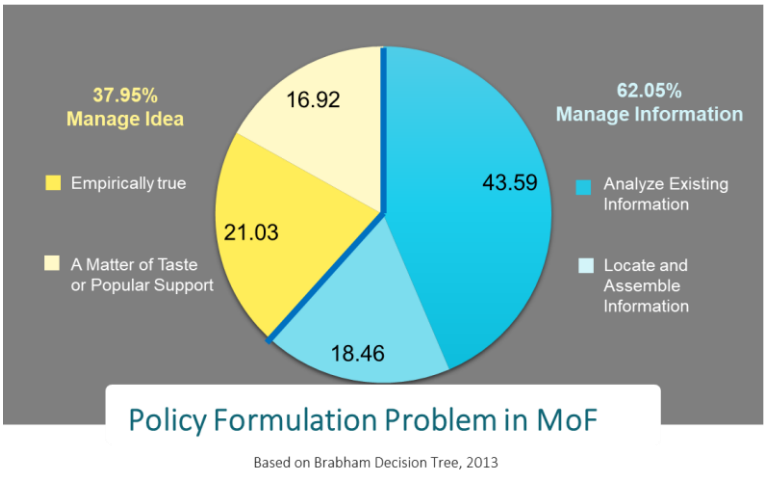
they can write their responses to allow the investigator to interpret, classify, and count their responses alongside other respondents.

The result shows that 47.45% of respondents still struggle to manage their information, especially when they need to structure many data (33.33% respondents). While remaining 14.12% of respondents report that they have difficulty in locating and assembling the information. In comparison, 29.02% of respondents have an ideation problem, in which 16.08% of respondents need an empirically true solution, and 12.94% of respondents need a matter of taste or popular support solutions. Others have a problem in human resources management (7.84%) and internal communication (5.88%), and some prefer not to state their concerns (9.80%).

Suppose we exclude those 25 neutral responses, human resources management problem (20 respondents), and internal communication problem (15 respondents) and follow the distribution of policy formulation problem in the Indonesia MoF based on Brabham's decision tree (2013); in that case, the resulting change shows that 62.05% of respondents have information management problems, and 37.95% have ideation problems (Figure 23).

Figure 23

Policy Formulation Problems in The Indonesia Ministry of Finance Based on Brabham Decision Tree (2013) Crowdsourcing Problem Categorization



Some examples of the information management problems in Indonesia MoF are data consolidation, objective and correct decisions, issue identification, analytical technique options, valid and reliable tools availability, knowledge management, external data collections, big data processing, integrated application, and data analytics. On the other hand, ideation problems are having a public hearing guideline, developing a forward-looking framework, collecting stakeholder inputs, managing public perceptions, governing stakeholder trust, enforcement approach, and policy options. Table 9 presents these policy formulation problems based on their working positions.

Table 9

Policy Formulation Problems in Indonesia Ministry of Finance

Respondent	Information Management		Ideation		Examples
	Analyze Existing Information	Locate & Assemble Information	Empirically True	A Matter of Taste or Popular Support	
Echelon I	1	-	-	2	Public hearing guideline (Ideation).
Echelon II	3	1	1	1	1. Data Consolidation (Managing Information). 2. Forward-Looking framework (Ideation). 3. Stakeholder inputs (Ideation). 4. Public Perception (Ideation).
Echelon III	8	-	3	-	1. Objective and correct decision (Managing Information). 2. Issue Identification (Managing Information). 3. Expertise or "know-how" in a particular field (Ideation). 4. Innovative Problem-solving (Ideation). 5. Stakeholder trust (Ideation).
Echelon IV	14	11	11	8	1. Analytical Techniques (Managing Information). 2. Valid and Reliable Tools (Managing Information). 3. Collective Archive (Managing Information). 4. Management of knowledge (Managing Information). 5. Negative Policy Consequence/Risk control (Ideation). 6. Public support (Ideation).
Staff/ Functional Related Policy Process	27	7	14	7	1. Analytical Techniques (Managing Information). 2. External data collection (Managing Information). 3. Big Data Processing (Managing Information). 4. Integrated Application (Managing Information). 5. Policy Impact Measurement (Managing Information). 6. Enforcement (Ideation). 7. Public Involvement (Ideation). 8. Compliance and Trust (Ideation).
Other Staff/Functional	32	17	12	15	1. Integrated Information System (Managing Information). 2. Confidential data collection (Managing Information). 3. Data Analytics (Managing Information). 4. External Data Monitoring (Managing Information). 5. Policy options (Ideation). 6. Knowledge about a particular issue (Ideation). 7. Public Communication (Ideation). 8. Community sharing (Ideation).
Total	**85**	**36**	**41**	**33**	*Note*: *one respondent can choose one information management problem and one ideation problem simultaneously.*
Percentage (n=195)	**43.59%**	**18.46%**	**21.03%**	**16.92%**	

The numbers in the information management problem underline that the major constraint to conducting analytical work is no more about data collection. Recently, many organizations have focused on managing, analyzing, summarizing, visualizing, and discovering knowledge from collected data in a timely and scalable manner[36]. However, around 80% of unstructured data worldwide comprises images, videos, and unstructured text (Marcus & Parameswaran, 2013, p.2). Therefore, to transform existing and unstructured information into more valuable outputs, respondents say they need to develop a reliable method for processing data into policy-based data analysis. This result corroborates the prior study's conclusion that public officials often fail to capitalize on existing information (World Bank 2012, 2016; Masaki et al. 2017, as cited in Brown et al., 2019).

The data analysis and collection problems are inextricably linked one to another. Suppose employees know that other institutions have collected the data and it is located in the repository. In that case, other institutions may partly resolve the problem of finding and assembling the data. Integrated data among government organizations also facilitates planning, implementation, evaluation, and control (Presidential Regulation Number 39 of 2019). For example, evaluation data from the Directorate General Assets regarding vacant buildings or lands can assist the Directorate-General Budget in planning the proper funding allocation for ministries that need to construct or acquire new land. Even the integration of public information is more powerful when linked to and compared to data held by various private and public sector organizations because relying solely on government data does not provide a complete picture of the real world. Today's organizations must make sense of seemingly unconnected data streams and identify meaning, correlation, and interdependence between one or more aspects to predict better and manage work[37].

In the data management cycle, crowdsourcing is prevalent in all stages: from extraction to integration, including cleaning, quality issues, and querying. Crowds can add missing values to datasets, label them, and verify/review work produced by other workers or an algorithm

[36] From https://datascience.foundation/sciencewhitepaper/crowdsourcing-big-data-analytics-impact

[37] From https://www.toolbox.com/hr/hr-analytics/articles/what-is-people-analytics/

(Crescenzi et al., 2017). According to Marcus and Prameswaran's survey (2013), crowdsourcers usually asked the crowds to help them manage their data for:

- Data cleansing, verification, and normalization. Namely, altering the capitalization or abbreviations, locating credible sources to verify facts extracted from unstructured data, ascertaining the accuracy of previously extracted facts, verifying the accuracy of existing information, and verifying the business's existence via phone calls or postcards.
- Extraction of data. For example, converting paper forms to digital format, extracting information about various entities from web pages, and extracting structured data from images, PDFs, Word documents, HTML documents, and Flash animations.
- Generation of text. For instance, researching a company, writing a blurb about it, creating new product descriptions, summarizing news articles, and rewriting content to improve search engine optimization.

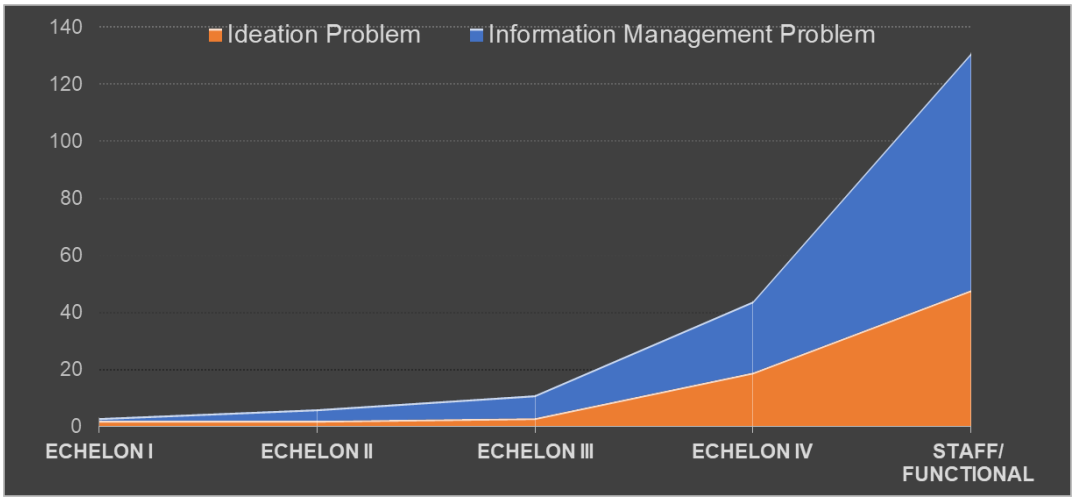
Additionally, crowdsourcing also has been utilized to make investment decisions[38] and predict earnings (Jame et al., 2016). In generating this forecast, big independent crowds turn the errors uncorrelated and eventually cancel out, leading to more reliable final responses (Surowiecki, 2005, as cited in Silverman, 2007). Therefore, crowdsourcing is not against MoF's data analytics program. Instead, it would complement the program for analytics activities that automated technologies cannot fully address and when humans are better than computers (Brabham, 2013).

Regarding the need to analyze the information, this study finds that data management issues affect lower management and staff at the ministry. Meanwhile, higher positions require more support for their policies and need an ideation solution. In other words, the higher the official's work, the more they need to solve ideation problems, and the lower officials' positions, the more they need accurate information. Lower-level staff usually handle the technical problem, complete tasks, structure information for analysis, and prepare briefing notes to present their research. Meanwhile, higher managers' role is to bring the concept, take a position, accomodating interests, resolve conflict, negotiate, and face public criticism.

[38] From https://centeronreputation.com/crowdsourced-opinions-vs-expert-knowledge/

Figure 24

Distribution of Indonesia Ministry of Finance Problems Based on Working Positions



In Figure 24 above, the orange represents an issue with ideation, while the blue represents an issue with information management. This figure illustrates a disconnect between senior managers' perceptions and their subordinates regarding their office problems. It also explains that managers have different focus priorities with their subordinates in policy formulation.

This study then explores the possible crowdsourcing for policy formulation to address those Indonesia MoF problems. The finding reveals that one of the most frequently used techniques for comprehending policy formulation is deconstructing it into constituent steps or tasks. They are problem characterization and evaluation, objective specification, options assessment, and policy design (Turnpenny et al., 2015).

The policy formulation process begins with interpreting and evaluating the issue through data collection, analyzing its causes and magnitude, and applying relevant theoretical concepts to define potential policy solutions. Following that, policymakers specify a policy objective and timeframe for implementation, enabling them to assess the option by weighing various policy alternatives' relative costs and benefits. Finally, policymakers concentrate on policy typologies, including regulations, instruments, governance, and fiscal tools (Turnpenny et al., 2015).

After that, the policymakers incorporate all relevant data and tasks to meet good policy criteria such as validity, importance, usefulness, originality, and feasibility (Juma and Onkware, 2015). Validity refers to the capacity of formulation to make rational and reliable judgments based on scientific reality. In comparison, importance refers to the ability to address the root cause of the problem. Similarly, the term "usefulness" refers to policymakers' attention, which accelerates decision-making, reinforces preconceived judgments, and converts decision-makers from pessimistic to receptive to a problem, or vice versa. Lastly, feasibility refers to policy adequacy to the timing, experience, commitment, funding, and other resources.

Crowdsourcing in policy formulation tasks should focus on the most critical criteria because policymakers do not evaluate policies against all standards for simplification (Lindblom, 1959). Firstly, when defining and assessing problems, policymakers should prioritize obtaining valid data as a baseline. In this case, crowdsourcing would empower data analytics activities through data management-micro tasking. MoF can enlist crowdsourcing to extract data from cross-ministry websites, publications, and research, verify asset ownership based on location for tax avoidance analysis, create a website for public hearings, and structure the data.

Secondly, when policymakers communicate values through participation, they emphasize the argument's usefulness. At this stage, MoF could gather public input on proposed choices and submit new programs through crowdsourcing. Crowdsourcing also serves as a component of the public participation solution when policymakers are frequently confronted with numerous disputes surrounding their decisions.

Thirdly, when setting an objective, policymakers prioritize addressing the root source of the problem. MoF can use crowdsourcing to solicit public suggestions and to detect potential problems. Finally, policymakers analyze an option's feasibility to understand its risk and utility when assessing options and designing policies. In this step, MoF can use crowdsourcing to solicit solutions from the crowd, discover potential risks and costs, improve an economic model, develop predictive modeling, conduct collective coaching, and assess an algorithm.

Furthermore, as all MoF employees still encounter public misperceptions regarding ministry policies (Table 9), this survey then asked respondents whether online platforms effectively reach out to communities excluded from the current public participation system. And, 70.43% of respondents said yes, 22.17% neutral, and 4.72% disagree.

Compared to traditional public participation methods such as workshops, town hall meetings, hearings, and design charrettes, crowdsourcing can reduce the influence of the facilitator and vocal powerful interest groups (Brabham, 2012[39]). However, crowdsourcing is not intended to replace the conventional way but to complement them. Crowdsourcing helps minority contributors find their motivation- earning more income in a more flexible time and place. In this regard, Ipeirotisthe (2010) study found that 70% of females, younger employees, lower salaries, and smaller families are driven to work on the Mechanical Turk platform to earn money in the United States and India. This fact reveals that the structural incentives bolster their appeal who are generally underrepresented in politics (Fung, 2006, p.67).

If not, MoF can at least reach the middle class by situating social media within the context of e-participation because neither can the growth of engaged social media users be isolated from Indonesia's increasing middle class. The middle class grew at a faster rate than the other classes. Middle-income households have been a significant engine of economic growth in Indonesia, with spending grows at a rate of 13% per year on average since 2002 and accounting for over half of total household consumption[40].

This study further proposes that the Ministry of Finance uses social media as a crowdsourcing interface. Social media can aid in transmitting and collecting data such as figures, photos, and videos during those processes. It also can attract the crowds to participate via a campaign and direct them to the crowdsourcing platform. MoF can disseminate crowdsourcing results through social media to demonstrate the MoF's commitment and attract more contributors. Utilizing social media as an interface would make crowdsourcing more interactive and attractive, as users are more familiar with social media than any platform.

[39] From https://firstmonday.org/article/view/4225/3377

[40] From https://www.worldbank.org/en/country/indonesia/publication/aspiring-indonesia-expanding-the-middle-class

In Table 10 below, the study illustrates some examples of crowdsourcing that are available to MoF. These examples try to address the existing MoF problem. MoF can utilize crowdsourcing from Micro-Tasking, Information Pooling, Broadcast Search to Open Collaboration.

Table 10

Crowdsourcing Examples Based on Policy Formulation Task

No	Policy Formulation Task	Information/ Tools needed	Focused Criteria	Crowdsourcing Types	Crowdsourcing Examples
	Turnpenny et al., 2015		**Juma & Onkware, 2015**	**Brabham, 2013; Blohm, 2018**	
1	**Problem Characterization and Evaluation**	**Baseline information**: A statistical report, survey data, Indicators on social, economic, and environment.	Validity	Locating and assembling information (Micro-tasking) e.g., problem in MoF: Knowledge management	Extracting structured data from images, PDFs, summarizing newspapers, extracting information across ministries websites/publications, extracting research, journal, identifying tax avoidance, creating a website for the public hearing, structuring data, adding missing values to datasets, and labeling data
		Problem Causation Evidence: Expert advice/evidence, information system.	Validity	Analyze existing information (Micro-tasking) e.g., problem in MoF: Objective and valid decision	Verifying the accuracy of existing information, cleansing and normalizing the data, and analyzing figures.
		Articulation of Values through Participation: Argumentation mapping, brainstorming.	Usefulness	A matter of taste or Popular Support (Information Pooling) e.g., problem in MoF: Public hearing guideline	Voting on proposed options proposed new program.
2	**Specification of Objective**	**Scenario Analysis**	Importance	Empirically true idea (Broadcast search, open collaboration) e.g., problem in MoF: Policy options	Suggesting solution, Identifying potential risks and costs
3	**Options Assessment and Policy Design**	**Comparison of Impacts between different options:** Cost and benefit analysis, risk assessment.	Feasibility	Empirically true idea (Broadcast search, open collaboration) e.g., problem in MoF: Measuring negative policy consequence/ risk control	Suggesting solution, Identifying potential risks and costs
		Past and Future Trend Time series, forecasting tools, statistical method.	Usefulness	Analyze existing information (Micro-tasking, broadcast search, information pooling, open collaboration) e.g., problem in MoF: Forward-looking framework	Improved modeling, predictive modeling, review an algorithm, collective coaching

Furthermore, as suggested in the previous section, the study emphasizes that the MoF begins with internal crowdsourcing and prioritize information management solutions before moving on to public crowdsourcing and ask for public support. Internal crowdsourcing can help mitigate information risk and senior managers' reluctance to involve non-professionals.

In the situation that MoF has been familiar with the crowdsourcing process, it can use both internal and external crowds concurrently. However, the ministry must first conduct an internal crowdsourcing experiment to evaluate whether any employees are willing to participate and capable of providing ideas. If there is a dearth of internal engagement, the ministry may invite the outside crowds. Thus, it enables the MoF to capitalize on the growth of activities that may be uninteresting to internal employees (Dahlander, 2020).

4.7.4. Indonesia Ministry of Finance Ability to Mobilize and Manage the Crowds

Having more potential workers is always beneficial, yet there is no minimum number of crowds required in crowdsourcing. As the number of workers increases, the MoF can mitigate the risk of acquiring a combination of poor workers (Carvalho et al., 2016, p.68). An optimal number occurs when adding a worker reduces the marginal expected error in aggregate output by less than 2% (Carvalho et al., 2016, p.48).

Regarding this issue, respondents think that MoF has a sizable network of potential online communities due to public interest in the ministry's domain (Score: 4.03). This result is supported by the perception that the MoF has the necessary skills and expertise to manage online communities (Score: 3.94) and has adequate social media policies (Score: 3.98). In 2016, MoF had at least 387 staff who work in public relations with a budget of approximately USD5,634,548.

Table 11

Staff And Budget in The Indonesian Ministry of Finance For The Fiscal Year 2016

Unit	The year 2016	
	Staff	Budget (USD)
Secretariat General	142	1,730,111
DG Custom and Excise	97	354,079
DG Tax	94	3,065,132
DG Treasury	12	52,034
DG State Asset	11	139,271
Inspectorate General	10	30,510
Financial Education And Training Agency	6	109,438
DG Budget	6	20,208
DG Fiscal Balance	5	73,710
Fical Policy Agency	4	60,055
Total	387	5,634,548

Note: Retrieved from https://www.kemenkeu.go.id/media/6480/lthumas-2016.pdf

Contrast with its fabulous resources, MoF has fewer social media followers than other ministries and the minister's account. MoF currently has 441,000 Instagram followers (only 2.75% Indonesian social media users) and 187,000 Facebook fans. As shown in Table 12 below, the Ministry of Health is still a prevalent domain since people required accurate health information during the pandemic and perceived the ministry's social media platforms as a reliable source.

Table 12

The Number of Social Media Followers on Selected Government Institutions

Ministry	Instagram	Facebook
Ministry of Health	2.1M	4,7M
Ministry of Communication and Information Technology	1.7M	317K
Ministry of State-Owned Enterprise	1.3M	65K
Ministry of Religion	717K	681K
Ministry of Transportation	480K	140K
Ministry of Social	444K	138K
Ministry of Finance	441K	187K
Sri Mulyani (Minister of Finance)	2M	515K
Ministry of Foreign Affair	273K	94K

Vast resources for social media do not contribute to media performance because Indonesia's number of government followers depends on information needs, perceived utility, and trust in government agencies (Suryadharma & Susanto, 2017). Social media platform naturally increase their attractiveness on those factors by inclusive design, considering their users are primarily ordinary people from various backgrounds, educational levels, and social classes. Meanwhile, the information provided via MoF platforms is more relevant for specific interest groups, such as investors, public finance practitioners, internal employees, and educated individuals. Few of the information related to users with rudimentary economy and finance knowledge. In addition, eight of the ten posts in MoF social media also contain complex language that the general public, particularly those with a low level of education, may find difficult to comprehend (Table 13). Therefore, though MoF employees believe that MoF supports free speech, values equal voice,

and is receptive to external criticism (Score: 3.94), these internal motivations do not affect the supply side. MoF should eliminate this jargon to increase its media attractiveness.

Table 13

Indonesia Ministry of Finance Facebook Posts That Contain Complex Wording

No	Post Date	Topics	Difficult Word		Examples
			Yes	No	
1	07/06/2021	Environment day	-	x	-
2	06/06/2021	Biography	x	-	Biography, the man with golden scissors (English)
3	06/06/2021	Scam	-	x	-
4	06/06/2021	High school tournament	x	-	APBN (abbreviation)
5	05/06/2021	Road construction	x	-	economic center
6	05/06/2021	Manufacture Industry	x	-	Purchasing manufacture index, new demand, export, production
7	05/06/2021	Sharia Financial Market	x	-	Stock, sharia financial market, Sukuk, corporation, instrument, investor, basis, investment, strategy, capital
8	04/06/2021	Stunting	x	-	Prevalence, stunting, index
9	04/06/2021	Budget for Covid Handling	x	-	Instrument, structural reform, inclusive, productive, competitive economy
10	04/06/2021	Tax exchange rate	x	-	exchange rate for tax

Besides removing jargon, this research also recommends that the ministry reallocate its budget for building crowdsourcing platforms. The platform can allow the MoF to counteract public misconceptions about ministry policy. Developing a crowdsourcing platform will also make MoF actively seek citizens' feedback to solve problems since respondents claim that MoF has not sufficiently created internal routines to elicit and process suggestions from an external contributor (3.66) compared with other efforts. Therefore, respondents assign the score for this question the lowest within this principle 4.

MoF has five times budget allocation for crowdsourcing compared with large crowdsourcing companies. MoF had around $5,6 million for Social Media in 2016 (Table 11) plus $45,9 million for system development under the Center for Financial Information System and Technology in 2020[41]. In total, MoF had a $51,5 million budget to be reallocated. In comparison, large companies

[41] From https://setjen.kemenkeu.go.id/api/Medias/2e325bd6-ed4d-4f37-bca3-96a5290445b9

budget (based on a market survey in The US) allocated around $1-$10 million per year for their crowdsourcing platform development and typically hired a median of four full-time employees to work on it, with two full-time employees (Marcus & Prameswaran, 2013, p.72).

The platform's development is becoming more effective because another result also finds that 60.38% of respondents agree that the MoF can identify and classify social media users based on their language abilities, managerial abilities, national orientation, traditions, and level of education. This capacity helps manage the diversity of crowds because diversification is a necessary condition to attain collective intelligence and reduce bias. For instance, if females are a minority, men's voices will suffocate women's voices under Majority Rule. In this condition, the power of numbers is paramount, and minorities are inevitably disadvantaged. On the other hand, more women's dominance in the group can result in risk-averse solutions since women naturally exercise more caution than men regarding policymaking, particularly financial decisions (Suzuki & Avellaneda, 2017).

If the Majority Rule condition is inevitable, MoF can use the Rule of Consensus Agreement to overcome the issue of representativeness. In this method, MoF allows women to participate equally in the male-dominant group, or MoF can increase the number of women to close the gender influence gap (Karpowitz et al., 2012). Another method of ensuring representativeness is selecting participants randomly from the general population or Deliberative Polling. Through Deliberative Polling, average citizens gain a better understanding and awareness of a particular program, become more engaged in the issue, and tend to be more public-spirited in pursuit of more substantial benefits for the entire community. Deliberative polling also creates an atmosphere in which differences are irrelevant, as the more affluent are unlikely to exert influence over minority views.

4.7.5. Indonesia Ministry of Finance Issue in Continuing Crowdsourcing Process

Respondents believe that MoF has an effective strategy to communicate with online communities (Score: 4.03) and has a program for digital literacy among its stakeholders (Score: 3.88). However, MoF can not ensure and monitor the success of those programs (Score: 3.44). Moreover, as stated in Table 9, respondents in all positions still face public misperceptions, complicating policy formulation. Therefore, respondents recommended that the ministry develop a comprehensive communication strategy with influential individuals and politicians to avoid policy misunderstandings (Secretariat General Respondent). For example, a respondent suggests MoF discuss debt financing since “debt has become a highly manipulable issue, and social media has played a significant role in shaping public opinion and influencing people's views (DG Budget Financing Respondent).”

According to Scheufele and Tewksbur (2007), the media have three essential roles: setting the agenda, framing, and priming. In agenda-setting, the media chooses and highlights the topics to the public. And, according to Feezell (2018), this agenda-setting in social media would significantly impact people with low levels of political engagement exposed to incidental political information, notably youngsters. It happens because social media enables the subversion of selective reporting and disseminating a tiny quantity of political knowledge to the uninformed. Even if individuals avoid engaging in political discourse, their networking, usage habits, and social media algorithms significantly impact their engagement (Feezell, 2018). This effect would be enhanced by the sensitivity of the words given via framing (Scheufele & Tewksbury, 2007). Media uses framing to create a focused understanding of their audiences. For instance, the term "global warming" limits participants' comprehension of the phenomenon in comparison to the word "climate change" (Schuldt et al., 2011). Last, media use priming to induce viewers to adjust their expectations in judging a leader's performance.

The debate about the role of social media in public policymaking in Indonesia is about the dissemination of misinformation and Indonesia's poor digital literacy levels. They contribute to the

misperceptions about policies because individuals' perceptions only change as they become more educated and acquire additional information (Fishkin et al., 2010). To combat misinformation, Pennycook and Rand (2018) proposed a solution by reducing the amount of content displayed from sites that users have deemed untrustworthy. They recommend using crowdsourcing by asking the crowds to judge news sources' dependability and rating. In their study, crowdsourcing is advantageous for rating low-quality content, mainly when participants are unfamiliar with a particular news source, as they are more objective.

On the other hand, Boichak et al. (2019) argue that encouraging crowds to analyze social media material critically falls short when the evaluation criteria are ambiguous and vary among social groups. Social influence easily manipulates the crowds and encouraging them to alter or reevaluate their positions, inadvertently bringing bias into statistical aggregates. They then propose to focus on increasing the ability of the crowds to evaluate the credibility and relevance of information content when using crowdsourcing. According to Boichak et al. (2019), determining a source's credibility means that the crowds can analyze the alignment of numerous pieces of information, verifying them and disconfirming them to the ground truth. For example, if three sources give verifiable facts and one contains information that contradicts the majority, the latter should be regarded as probably uncredible. Additionally, determining the relevance of a source indicates the ability of crowds to incorporate specific information that bolsters their arguments.

Based on the discussion above, the study suggests that MoF implement a digital literacy skill as a qualification test in crowdsourcing. Covello (2010) recommends several application tests. For example, iDCA for high school students aged 13-18 years old, project SAILS for higher education students, and ETS iCritical Thinking for grades 10 through college, teachers, employers, and adult employees. Alternatively, the Ministry of Finance can utilize basic questions to check whether the audience is familiar with the author, publisher, source name, and publication date. In this way, the MoF can raise awareness about misinformation and remove participants with poor literacy skills.

4.8. Conclusion

MoF potentials to adopt crowdsourcing -"We are good at this" category. The calculated score for a crowdsourcing-oriented organization in the MoF is 3.83, indicating that the MoF would be proficient at crowdsourcing. The highest score is assigned to Principle 4-Mobilize and manages the crowds, which receives 3.89—following Principle 1-The commitment to crowdsourcing and Principle 3-Design, an effective crowdsourcing plan, which gets a 3.83. Finally, principle 2-Aligning crowdsourcing with internal business processes receives a score of 3.82, and the lowest one is Principle 5-Continuity of the process, with a score of 3.76.

Similarly, the Principal Component Analysis (PCA) confirms the Crowdsourcing-Oriented Organization Framework results, although with fewer subprinciples and questions compared to the original concept. The MoF obtained an overall score of 3.77 from the PCA, proving its capacity to leverage crowdsourcing (We are good at this category). According to PCA, Indonesia's Ministry of Finance has the most potent ability to integrate crowdsourcing into its internal business processes (Score: 3.81). On the other hand, it is advised that the Ministry of Finance increase the digital literacy of its social media users (Score: 3.66).

Crowdsourcing can alleviate the current policy formulation challenges when most personnel struggle with information management, explicitly dealing with enormous data and integrating information from other institutions. MoF can utilize crowdsourcing for policy formulation to extract data from numerous websites and ministries, summarize research, request crowdsourced ideas, identify potential risks and costs, develop an economic/ predictive modeling, and perform collective coaching. At the same time, crowdsourcing also can be a part of public engagement, as management requires increased popular support and constantly meets opposition due to public misperceptions regarding its policies. The structural incentives improve interaction appeal to people who are less likely to participate in politics and typically become subjects to social media agenda setting and framing.

However, crowdsourcing may suffer implementation challenges in MoF due to managers' willingness to accept failure, insufficient support for innovators, fear about involving non-professionals, concerns about information security, and low digital literacy. As a result, this study recommends that the Ministry of Finance strengthen its support for innovation by assigning specialists to assist crowds in completing missions, administering qualification tests, and initiating its crowdsourcing initiative by prioritizing its 81,000 internal crowds to identify potential commitment and compensating crowds in the range of $24 per week. The Ministry of Finance can reallocate its social media budget to invest in crowdsourcing platforms and recompense crowds. Most significantly, the Ministry of Finance should minimize jargon when engaging with the populace to improve its social media attractiveness.

4.9. Limitation and Future Research

For a massive organization like the Indonesian Ministry of Finance, which employs over 81,000 people and is deemed to operate as a holding ministry, the sample size in this study (n=212) is insufficient. The respondent distribution also does not correspond to the population distribution in gender, work unit, and job position. Additionally, some participants recommended that the survey be customized in Bahasa Indonesia rather than English to facilitate comprehension of the questionnaire.

Finally, further research is required on the role of middle management in crowdsourcing implementation, as their existing functions in the bureaucracy are frequently attributed as project managers, innovation champions, and change agents. Academics alternatively can also discuss the role of the Center for Policy Analysis and Harmonization/Pushaka in connecting the vision of the Finance Minister with the numerous Director Generals. This dialogue is necessary because vision without commitment, and commitment without successful delivery, would fail the innovation. And, middle management, as well as Pushaka, serves as a link between leadership and operations.

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Appendix A Questionnaires And Its Literature Reference

No	Question	Reference
I. Commitment to Crowdsource		
a. Pursue top-down management decision/ mandate		Mergel (2018)
1.	Executive managers (Echelon I) support trial and error testing of new ideas, including from outsiders	Arundel et al. (2015)
2.	Top and middle managers (Echelon II and Echelon III) take an active role in innovation	Arundel et al. (2015)
3.	Ministry of Finance has been mandated to involve the public in policy formulation by President or higher authorities	Mergel (2018)
b. Create a positive cultural climate for open innovation		Mergel (2018)
4.	Ministry of Finance adopts a non-risk-averse culture in policy formulation	Arundel et al. (2015)
5	Managements (structural positions) support experimentation and accept failure	Mergel (2018)
6	Staffs support open innovation and have a positive mindset to it	Arundel et al. (2015); Mergel (2017)
7	There is an ample incentive to staff for open innovation	Arundel et al. (2015)
8	Ministry of Finance believes that online communities can create a quality of work, correctness, and precision relative to experts in the same field	Roman (2009); Whitla (2009); Belsky (2010)
c. Demand a need to access external knowledge		
9	Ministry of Finance lacks human resources or financial resources in policy formulation	Arundel et al. (2015)
10	There is still an unsolvable internal problem in policy formulation which needs public participation	Mergel (2018)
11	A solution from non-professional is accepted in formulating policy	Katz & Allen (1982), as cited in Mergel (2018)
12	Social media offer prospective employees a cheaper expense than "in-house" (internal resources).	Whitla (2009); Ye & Kankanhalli (2015); Paul (2009)
II. Aligning crowdsourcing to internal business process		
a. Provide legal support for open innovation		Mergel (2018)
13	The laws allow the Ministry of Finance to have direct interaction with citizens in social media	Mergel (2018)
14	Most internal information by law is confidential for open innovation purposes	Rosen (2011)
15	Ministry of Finance has a clear legal basis as a guideline to manage intellectual property rights	Mergel (2018)
16	Ministry of Finance has a clear legal basis as a guideline to protect citizen's identifiable information/privacy	Mergel (2018)

No	Question	Reference
b. Establish an open innovation office function		Mergel (2018)
17	Ministry of Finance has a dedicated unit that manages open innovation	Mergel (2018)
18	Ministry of Finance has a unit that manages organizational structure to follow strategies	Mergel (2018)
19	Ministry of Finance has a unit that can provide the platform, initiate roadshows, phone conferences, and training to social media users	Mergel (2018)
20	Ministry of Finance has a unit that handles inter-organizational collaboration for open innovation such as preparing Memorandum of Understanding, managing shared promotion and outcomes	Mergel (2018)
c. Develop a low entry barrier and effective participation platform		Brabham (2013); Blohm et al. (2018)
21	Ministry of Finance has a technological platform capable of promoting challenges, aggregating disparate, and collecting diverse ideas with a low barrier (low cost, easy access).	Mergel (2018); Surowiecki (2004), as cited in Brabham (2008)
22	Ministry of Finance has a moderation scheme for legal conflict in its online platform	Mergel (2018)
23	Ministry of Finance has a flexible technology to accommodate new ideas during ongoing implementation	Mergel (2018)
d. Develop quality and risk management instruments		
24	Ministry of Finance has an instrument for controlling and measure outcomes or evaluation tools for measuring working contribution quality	Blohm et al. (2018)
25	Ministry of Finance uses automated control, which comprises IT-facilitated to validate employees working contribution	Blohm et al. (2018)
26	Ministry of Finance uses peer assessment to approve working contribution among its employees	Blohm et al. (2018)
27	Ministry of Finance uses random samples in manual quality control	Blohm et al. (2018)
28	Ministry of Finance adopts a clear standard for implementing non-disclosure agreements, netiquettes, and authentication in social media	Blohm et al. (2018)
e. Provide enough resources to crowdsource		
29	Ministry of Finance has sufficient social media staffing	Brabham (2013)
30	Ministry of Finance has sufficient budgets for open innovation	Brabham (2013)
31	There is a clear funding scheme for inter-organizational collaboration/cross-agency initiatives	Mergel (2018)

No	Question	Reference
III. Design an effective crowdsourcing plan		
a. Define a communicative problem statement and solution parameter		
32	Management and staff can write a complex issue into an understandable problem statement even for non-professionals	Mergel (2018)
33	Ministry of Finance has a reliable project management tool to define problem and solution parameters	Wilson et al. (2018)
b. Determine suitable crowdsourcing type based on problem		Brabham (2013)
34	Ministry of Finance understands about crowdsourcing process	Mergel (2018)
35	My Office and I have an information management problem or an ideation problem	Brabham (2013)
36	If the answer in question number 35 is A: I need to (A) locate and assemble information or analyze existing information	Brabham (2013)
	If the answer in question number 35 is B: I need a solution that is: (A) empirically true (B) a matter of taste or popular support	Brabham (2013)
c. Design a low barrier qualification task		
37	Managers can modularize complex problem-solving processes into simple individual tasks requirement	Blohm et al. (2018)
38	Managers can modularize complex problem-solving processes into little skill and low time commitment tasks requirement	Dahlander & Piezunkab (2014)
d. Define a clear deliverable and productivity measure (contribution requirement)		
39	Ministry of Finance describes the desired outcomes clearly to the employees	Blohm et al. (2018)
40	Ministry of Finance uses a set of instructions to help the employees understand the task and to document the result of their work	Blohm et al. (2018)
IV. Mobilize and manage the crowds		
a. Attract critical mass of participant		
41	People are interested in the Ministry of Finance online public platform/domain	Kraut & Resnick (2011)
42	Ministry of Finance has sufficient social media policies	Brabham (2013)
43	Ministry of Finance has the necessary skills and expertise in handling online communities	Sharma (2010), as cited in Brabham (2013)
b. Maintain diversity of the crowds		

No	Question	Reference
44	Ministry of Finance has a large network of potential online communities to be employed	Howel (2006), as cited in Brabham (2008)
45	Ministry of Finance can identify and classify social media users based on their language skills, managerial skills, national orientation, traditions, and level of education	Carmel (2003), as cited in Sharma (2010)
46	Ministry of Finance can now invite unreachable communities through online platforms compared to conventional public participation channels	Brabham (2013); Mergel (2018)
c. Motivate/Incentivize the crowds		Brabham (2013); Blohm et al. (2018)
47	Ministry of Finance proactively motivates and pays attention to external contributors to develop a suggestion	Dahlander & Piezunkab (2014)
48	Ministry of Finance develops a deep understanding of its social media users' motive to participate in its platform	Blohm et al. (2018)
49	Ministry of Finance has established internal routines to elicit and process suggestions from an external contributor	Foss et al. (2011), as cited in Dahlander & Piezunkab (2014)
50	Ministry of Finance supports freedom of speech, respects equal voice, and accepts criticism from external	Brabham (2013)
V. Continuity of process		
a. Engage positively with the crowds		Brabham (2013); Mergel (2018)
51	Ministry of Finance has a good strategic communication practice with online communities	Brabham (2013)
b. Raise crowds' digital literacy		Mergel (2018)
52	Ministry of Finance has a specific digital literacy program for its stakeholders	Riel (2012)
53	Ministry of Finance has an instrument to monitor citizen digital literacy level	Riel (2012)
c. Accelerate crowdsourcing adoption speed		
54	Ministry of Finance has prior experience to understand the challenge of adopting a new instrument when innovating	Mergel (2018)
55	There is available crowdsourcing best practice example of other governments for the Ministry of Finance to adopt	Mergel (2018)

Appendix B Participant Information And Agreement Form

This information sheet provides you with information about the research you are invited to participate in. Please read the information below, and you can ask questions about anything you do not understand through the contact person provided below.

1. Research title

Crowdsourcing-Oriented Organization Framework for Public Institutions. An Assessment of Social Media Crowdsourcing for Policy Formulation in the Indonesian Ministry of Finance.

2. What is the purpose of this research?

This research is conducted by Eman Adhi Patra for a Master's Thesis in The Graduate School of Public Policy, The University of Tokyo, and supervised by Associate Professor Dr. Naomi Aoki. It provides a crowdsourcing-oriented organizational framework through which academics and experts can assess their level of expertise in crowdsourcing implementation. Furthermore, this study aims to determine the capacity of the Ministry of Finance to implement best practices in crowdsourcing, specifically through the use of social media for policy formulation purposes in the future.

3. Who can participate in the research? What is the expected duration of my participation? What is the duration of this research?

We want to distribute questionnaires to employees of the Indonesian Ministry of Finance's headquarters office. Respondents should know the Ministry of Finance business processes by been working for at least six months in the ministry and a minimum of 18 years old. Data will be collected through 53 Likert questions plus three additional questions that will take approximately 15 minutes to complete.

4. What will be done if I take part in this research?

You will be asked to complete an online questionnaire. The questions will be focused on your knowledge and opinion about the Ministry of Finance's business processes and the

crowdsourcing concept. It is written in the English language. Your anonymous response may be published in the future.

5. How will my privacy and the confidentiality of my research records be protected?

No identifying information and personal details are collected. Your anonymous response will be stored in a local database. All data collected will be used in the publication and kept for a minimum of 10 years before being discarded.

6. What are the possible discomforts and risks for participants?

There is no foreseeable risk or discomfort. However, of course, you are free not to answer any question if you wish.

7. Will there be reimbursement for participation?

There will not be any reimbursement for participating in this research.

8. What are the possible benefits to me and others?

Participating in this research provides no direct advantage to you. However, the acquired knowledge can support the Indonesian Ministry of Finance and academia.

9. Can I refuse to participate in this research?

Your decision to participate in this research study is voluntary, and there is no monetary or in-kind compensation for participants. Therefore, there is no foreseeable risk or discomfort.

10. Whom should I call if I have any questions or problems?

Should you have any questions about the research study, please contact me, Eman Adhi Patra- Master Student at Graduate School of Public Policy, The University of Tokyo- at the contact numbers listed: Email: emanadhipatra@g.ecc.u-tokyo.ac.jp. Phone: (+62) 85219441110.

I hereby acknowledge that I have agreed to take part in the above research.

□ Yes □ No

Appendix C Validity And Reliability Tests Results

Question Number	Validity Test			Reliability Test				
	R-Pearson	R-Table	Results	Variance	Sum of VAR	Var Total	Alpha Cronbach (k=213)	Result
1	0.381	0.136	Valid	0.591	-	-	-	-
2	0.420	0.136	Valid	0.332	-	-	-	-
3	0.339	0.136	Valid	0.399	-	-	-	-
4	0.414	0.136	Valid	0.745	-	-	-	-
5	0.421	0.136	Valid	0.709	-	-	-	-
6	0.471	0.136	Valid	0.356	-	-	-	-
7	0.525	0.136	Valid	0.816	-	-	-	-
8	0.588	0.136	Valid	0.474	-	-	-	-
9	-0.101	0.136	Invalid	-	-	-	-	-
10	-0.061	0.136	Invalid	-	-	-	-	-
11	0.241	0.136	Valid	0.915	-	-	-	-
12	0.259	0.136	Valid	0.749	-	-	-	-
13	0.327	0.136	Valid	0.403	-	-	-	-
14	0.194	0.136	Valid	0.864	-	-	-	-
15	0.566	0.136	Valid	0.668	-	-	-	-
16	0.607	0.136	Valid	0.539	-	-	-	-
17	0.550	0.136	Valid	0.893	-	-	-	-
18	0.573	0.136	Valid	0.279	-	-	-	-
19	0.575	0.136	Valid	0.573	-	-	-	-
20	0.597	0.136	Valid	0.521	-	-	-	-
21	0.587	0.136	Valid	0.620	-	-	-	-
22	0.677	0.136	Valid	0.613	-	-	-	-
23	0.622	0.136	Valid	0.650	-	-	-	-
24	0.573	0.136	Valid	0.471	-	-	-	-
25	0.557	0.136	Valid	0.543	-	-	-	-
26	0.438	0.136	Valid	0.520	-	-	-	-
27	0.554	0.136	Valid	0.591	-	-	-	-
28	0.614	0.136	Valid	0.553	-	-	-	-
29	0.485	0.136	Valid	0.622	-	-	-	-
30	0.523	0.136	Valid	0.617	-	-	-	-
31	0.553	0.136	Valid	0.631	-	-	-	-
32	0.551	0.136	Valid	0.616	-	-	-	-
33	0.627	0.136	Valid	0.487	-	-	-	-
34	0.619	0.136	Valid	0.658	-	-	-	-
35	0.567	0.136	Valid	0.494	-	-	-	-
36	0.532	0.136	Valid	0.470	-	-	-	-
37	0.538	0.136	Valid	0.390	-	-	-	-
38	0.564	0.136	Valid	0.280	-	-	-	-
39	0.420	0.136	Valid	0.459	-	-	-	-
40	0.581	0.136	Valid	0.535	-	-	-	-
41	0.646	0.136	Valid	0.678	-	-	-	-
42	0.494	0.136	Valid	0.573	-	-	-	-
43	0.543	0.136	Valid	0.651	-	-	-	-
44	0.490	0.136	Valid	0.615	-	-	-	-
45	0.657	0.136	Valid	0.542	-	-	-	-
46	0.676	0.136	Valid	0.414	-	-	-	-
47	0.597	0.136	Valid	0.541	-	-	-	-
48	0.552	0.136	Valid	0.503	-	-	-	-
49	0.647	0.136	Valid	0.445	-	-	-	-
50	0.577	0.136	Valid	0.567	-	-	-	-
51	0.561	0.136	Valid	0.682	-	-	-	-
52	0.562	0.136	Valid	0.392	-	-	-	-
53	0.466	0.136	Valid	0.638	-	-	-	-
						385.965	0.930	Reliable

Appendix D Descriptive Statistics

Question Number	Mean	Std Error	Median	Mode	Standard Deviation	Sample Variance	Kurtosis	Skewness	Range	Min	Max	Sum	Count
Question 1	3.93	0.05	4	4	0.77	0.60	0.52	-0.69	3	2	5	833	212
Question 2	4.33	0.04	4	4	0.58	0.33	-0.64	-0.18	2	3	5	917	212
Question 3	4.45	0.04	5	5	0.63	0.40	-0.48	-0.71	2	3	5	943	212
Question 4	3.58	0.06	4	4	0.86	0.75	-0.10	-0.38	4	1	5	760	212
Question 5	3.62	0.06	4	4	0.84	0.71	-0.30	-0.57	3	2	5	767	212
Question 6	4.23	0.04	4	4	0.60	0.36	-0.47	-0.14	2	3	5	897	212
Question 7	3.55	0.06	4	4	0.90	0.82	-0.33	-0.39	4	1	5	753	212
Question 8	3.99	0.05	4	4	0.69	0.48	0.10	-0.33	3	2	5	845	212
Question 9	2.25	0.07	2	2	0.95	0.91	0.91	1.02	4	1	5	478	212
Question 10	3.29	0.06	3	4	0.92	0.84	-0.38	-0.42	4	1	5	697	212
Question 11	3.18	0.07	3	4	0.96	0.92	-0.87	0.01	4	1	5	675	212
Question 12	3.45	0.06	4	4	0.87	0.75	-0.70	-0.17	3	2	5	731	212
Question 13	3.99	0.04	4	4	0.64	0.41	0.86	-0.43	3	2	5	846	212
Question 14	3.56	0.06	4	4	0.93	0.87	-0.78	-0.38	3	2	5	754	212
Question 15	3.87	0.06	4	4	0.82	0.67	-0.24	-0.42	3	2	5	820	212
Question 16	4.08	0.05	4	4	0.74	0.54	0.72	-0.71	3	2	5	866	212
Question 17	3.67	0.06	4	4	0.95	0.89	-0.54	-0.43	4	1	5	779	212
Question 18	4.37	0.04	4	4	0.53	0.28	-1.00	0.06	2	3	5	926	212
Question 19	4.10	0.05	4	4	0.76	0.58	0.67	-0.77	3	2	5	870	212
Question 20	4.02	0.05	4	4	0.72	0.53	1.13	-0.79	3	2	5	853	212
Question 21	3.90	0.05	4	4	0.79	0.62	0.22	-0.59	3	2	5	827	212
Question 22	3.58	0.05	4	4	0.78	0.61	-0.44	0.04	3	2	5	760	212
Question 23	3.84	0.06	4	4	0.81	0.66	0.43	-0.78	3	2	5	814	212
Question 24	4.06	0.05	4	4	0.69	0.47	0.58	-0.52	3	2	5	861	212
Question 25	3.96	0.05	4	4	0.74	0.55	0.99	-0.79	3	2	5	840	212
Question 26	4.19	0.05	4	4	0.72	0.52	1.60	-0.98	3	2	5	888	212
Question 27	3.47	0.05	3	4	0.78	0.60	-0.38	-0.04	3	2	5	735	212
Question 28	3.76	0.05	4	4	0.75	0.56	-0.32	-0.13	3	2	5	798	212
Question 29	3.89	0.05	4	4	0.79	0.63	0.13	-0.55	3	2	5	825	212
Question 30	3.70	0.05	4	4	0.79	0.62	-0.40	-0.13	3	2	5	785	212
Question 31	3.59	0.05	4	4	0.79	0.63	-0.44	-0.04	3	2	5	761	212
Question 32	3.66	0.05	4	4	0.79	0.62	-0.17	-0.41	3	2	5	775	212
Question 33	3.93	0.05	4	4	0.70	0.49	0.49	-0.48	3	2	5	833	212
Question 34	3.50	0.06	4	4	0.81	0.66	-0.48	-0.10	3	2	5	743	212
Question 35	3.75	0.05	4	4	0.71	0.50	0.57	-0.65	3	2	5	795	212
Question 36	3.64	0.05	4	4	0.69	0.48	0.16	-0.50	3	2	5	771	212
Question 37	4.14	0.04	4	4	0.63	0.39	1.42	-0.57	3	2	5	877	212
Question 38	4.20	0.04	4	4	0.53	0.28	-0.01	0.16	2	3	5	890	212
Question 39	4.03	0.05	4	4	0.68	0.46	0.39	-0.41	3	2	5	855	212
Question 40	3.98	0.05	4	4	0.73	0.54	0.41	-0.55	3	2	5	844	212
Question 41	3.94	0.06	4	4	0.83	0.68	-0.21	-0.49	3	2	5	835	212
Question 42	4.00	0.05	4	4	0.76	0.58	-0.04	-0.46	3	2	5	848	212
Question 43	3.69	0.06	4	4	0.81	0.66	-0.48	-0.13	3	2	5	783	212
Question 44	3.90	0.05	4	4	0.78	0.61	-0.12	-0.41	3	2	5	826	212
Question 45	3.86	0.05	4	4	0.74	0.55	0.25	-0.47	3	2	5	818	212
Question 46	3.89	0.04	4	4	0.65	0.42	0.16	-0.21	3	2	5	825	212
Question 47	3.66	0.05	4	4	0.74	0.55	-0.25	-0.13	3	2	5	775	212
Question 48	3.94	0.05	4	4	0.71	0.51	-0.02	-0.31	3	2	5	836	212
Question 49	4.03	0.05	4	4	0.67	0.45	1.41	-0.71	3	2	5	855	212
Question 50	3.88	0.05	4	4	0.76	0.57	0.53	-0.65	3	2	5	822	212
Question 51	3.44	0.06	3	3	0.83	0.68	-0.27	0.05	4	1	5	729	212
Question 52	3.96	0.04	4	4	0.63	0.40	0.92	-0.43	3	2	5	840	212
Question 53	3.48	0.05	4	4	0.80	0.64	0.37	-0.40	4	1	5	737	212

Appendix E Principal Component Analysis

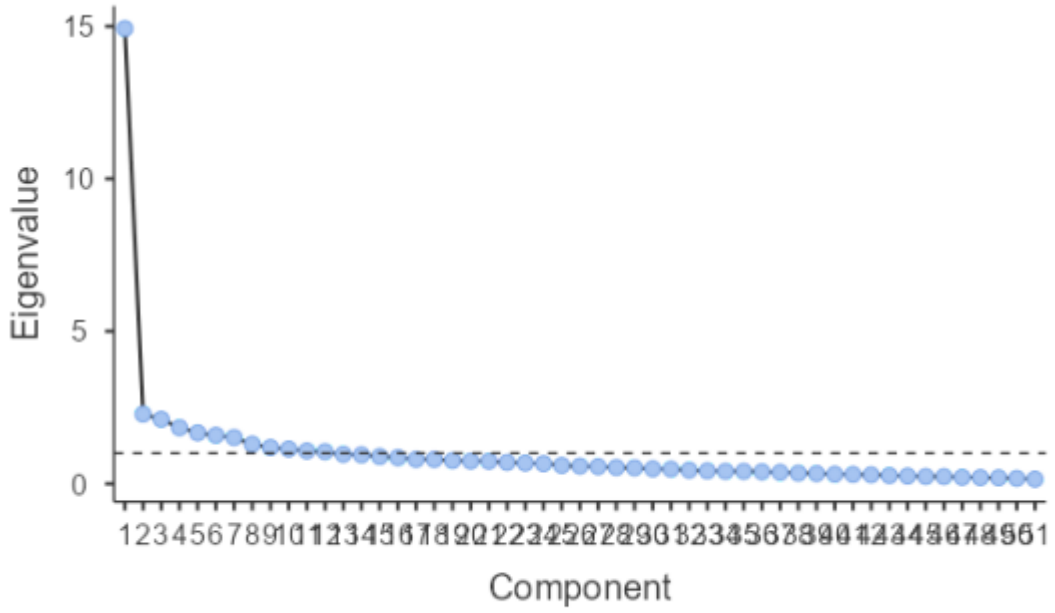
Measure of Sampling Adequacy (MSA) Result

Overall	0.908	*Variable13*	0.792	*Variable24*	0.922	*Variable35*	0.904	*Variable46*	0.937
Variable1	0.844	*Variable14*	0.642	*Variable25*	0.928	*Variable36*	0.896	*Variable47*	0.928
Variable2	0.882	*Variable15*	0.897	*Variable26*	0.866	*Variable37*	0.901	*Variable48*	0.894
Variable3	0.830	*Variable16*	0.915	*Variable27*	0.901	*Variable38*	0.936	*Variable49*	0.946
Variable4	0.871	*Variable17*	0.919	*Variable28*	0.924	*Variable39*	0.895	*Variable50*	0.909
Variable5	0.843	*Variable18*	0.943	*Variable29*	0.897	*Variable40*	0.911	*Variable51*	0.915
Variable6	0.924	*Variable19*	0.929	*Variable30*	0.85	*Variable41*	0.92	*Variable52*	0.915
Variable7	0.919	*Variable20*	0.932	*Variable31*	0.892	*Variable42*	0.909	*Variable53*	0.884
Variable8	0.919	*Variable21*	0.936	*Variable32*	0.927	*Variable43*	0.905		
Variable11	0.642	*Variable22*	0.932	*Variable33*	0.921	*Variable44*	0.893		
Variable12	0.765	*Variable23*	0.909	*Variable34*	0.935	*Variable45*	0.943		

Initial Eigen Value Result

Component	Eigenvalue	% of Variance	Cumulative %	Component	Eigenvalue	% of Variance	Cumulative %
Component 1	14.928	29.270	29.3	*Component 27*	0.562	1.102	84.3
Component 2	2.286	4.482	33.8	*Component 28*	0.533	1.046	85.3
Component 3	2.115	4.147	37.9	*Component 29*	0.523	1.025	86.4
Component 4	1.840	3.608	41.5	*Component 30*	0.490	0.961	87.3
Component 5	1.671	3.277	44.8	*Component 31*	0.479	0.939	88.3
Component 6	1.590	3.117	47.9	*Component 32*	0.445	0.873	89.1
Component 7	1.516	2.972	50.9	*Component 33*	0.423	0.829	90.0
Component 8	1.298	2.546	53.4	*Component 34*	0.409	0.801	90.8
Component 9	1.189	2.331	55.8	*Component 35*	0.407	0.798	91.6
Component 10	1.139	2.234	58.0	*Component 36*	0.393	0.770	92.3
Component 11	1.075	2.109	60.1	*Component 37*	0.373	0.731	93.1
Component 12	1.052	2.063	62.2	*Component 38*	0.349	0.685	93.7
Component 13	0.967	1.895	64.1	*Component 39*	0.336	0.658	94.4
Component 14	0.946	1.855	65.9	*Component 40*	0.313	0.613	95.0
Component 15	0.893	1.751	67.7	*Component 41*	0.306	0.600	95.6
Component 16	0.858	1.682	69.3	*Component 42*	0.294	0.576	96.2
Component 17	0.801	1.571	70.9	*Component 43*	0.271	0.531	96.7
Component 18	0.800	1.568	72.5	*Component 44*	0.254	0.499	97.2
Component 19	0.760	1.490	74.0	*Component 45*	0.238	0.467	97.7
Component 20	0.744	1.458	75.4	*Component 46*	0.235	0.462	98.2
Component 21	0.739	1.448	76.9	*Component 47*	0.212	0.416	98.6
Component 22	0.699	1.371	78.2	*Component 48*	0.203	0.399	99.0
Component 23	0.679	1.331	79.6	*Component 49*	0.199	0.389	99.4
Component 24	0.660	1.293	80.9	*Component 50*	0.177	0.348	99.7
Component 25	0.601	1.179	82.0	*Component 51*	0.152	0.297	100.0
Component 26	0.579	1.136	83.2				

Scree Plot



Bartlett's Test of Sphericity

χ^2	df	p
4878	1275	< .001

Component Statistic

Summary

Component	SS Loadings	% of Variance	Cumulative %
1	3.92	7.69	7.69
2	3.79	7.43	15.13
3	3.63	7.12	22.25
4	3.47	6.80	29.06
5	3.45	6.75	35.81
6	2.45	4.81	40.62
7	2.29	4.48	45.10
8	1.99	3.91	49.01
9	1.91	3.75	52.76
10	1.78	3.48	56.24
11	1.70	3.32	59.57
12	1.32	2.59	62.16

Intercomponent Correlation

	1	2	3	4	5	6	7	8	9	10	11	12
1	—	0.363	0.316	0.240	0.361	0.183	0.236	0.0845	0.1382	0.0906	0.1323	0.05805
2		—	0.290	0.265	0.268	0.169	0.207	0.0651	0.1610	0.1770	0.1095	0.05807
3			—	0.260	0.255	0.153	0.143	0.1975	0.1439	0.1248	0.0477	0.07795
4				—	0.267	0.238	0.178	0.1557	0.1319	0.1217	0.1719	0.05401
5					—	0.181	0.217	0.2027	0.1497	0.1326	0.1829	0.05922
6						—	0.140	0.0639	0.1025	0.1175	0.1146	-0.00795
7							—	0.1240	0.0736	0.1170	0.0921	0.05431
8								—	0.0424	0.0722	0.0428	0.06490
9									—	0.1308	0.0158	-0.03875
10										—	0.1216	-0.02930
11											—	0.00181
12												—

Component Loadings

Component 1			**Component 2**			**Component 3**		
Factor	Loading	Uniqueness	Factor	Loading	Uniqueness	Factor	Loading	Uniqueness
Variable30	0.833	0.275	*Variable47*	0.628	0.372	Variable36	0.812	0.271
Variable29	0.781	0.356	*Variable44*	0.621	0.400	Variable35	0.795	0.264
Variable31	0.639	0.384	*Variable46*	0.610	0.352			
Variable40	0.588	0.427	*Variable43*	0.593	0.336			
Variable41	0.542	0.315	*Variable45*	0.592	0.339			
Component 4			**Component 5**			**Component 6**		
Factor	Loading	Uniqueness	Factor	Loading	Uniqueness	Factor	Loading	Uniqueness
Variable24	0.693	0.327	*Variable17*	0.756	0.355			
Variable26	0.681	0.392	*Variable19*	0.54	0.354			
Variable25	0.568	0.447	*Variable20*	0.508	0.372			
Variable48	0.562	0.396						
Component 7			**Component 8**			**Component 9**		
Factor	Loading	Uniqueness	Factor	Loading	Uniqueness	Factor	Loading	Uniqueness
Variable1	0.824	0.305	*Variable14*	0.769	0.419	*Variable50*	0.58	0.36
Variable2	0.543	0.436				*Variable51*	0.526	0.414
Component 10			**Component 11**			**Component 12**		
Factor	Loading	Uniqueness	Factor	Loading	Uniqueness	Factor	Loading	Uniqueness
Variable11	0.792	0.296	*Variable13*	0.762	0.325			
Variable12	0.703	0.367						

Note. 'oblimin' rotation was used

Appendix F Crowdsourcing-Oriented Organization Score

Principle 1 Commitment to Crowdsource	**3.83**	**4.23**	a. Pursue top-down management decision/ mandate	Q1	3.93	agree
				Q2	4.33	strongly agree
				Q3	4.45	strongly agree
		3.79	b. Create a positive cultural climate for open innovation	Q4	3.58	agree
				Q5	3.62	agree
				Q6	4.23	strongly agree
				Q7	3.55	Agree
				Q8	3.99	Agree
		3.32	c. Demand a need to access external knowledge	Q11	3.18	Neutral
				Q12	3.45	Agree
Principle 2 Aligning crowdsourcing to internal business process	**3.82**	**3.60**	a. Provide legal support for open innovation	Q13	3.99	Agree
				Q14	2.46	Disagree
				Q15	3.87	Agree
				Q16	4.08	Agree
		4.04	b. Establish an open innovation office function	Q17	3.67	Agree
				Q18	4.37	Agree
				Q19	4.10	Agree
				Q20	4.02	strongly agree
		3.78	c. Develop a low entry barrier and effective participation platform	Q21	3.90	Agree
				Q22	3.58	Agree
				Q23	3.84	Agree
		3.89	d. Develop quality and risk management instruments	Q24	4.06	Agree
				Q25	3.96	Agree
				Q26	4.19	Agree
				Q27	3.47	Agree
				Q28	3.76	Agree
		3.73	e. Provide enough resources to crowdsource	Q29	3.89	Agree
				Q30	3.70	Agree
				Q31	3.59	Agree
Principle 3 Design an effective crowdsourcing plan	**3.83**	**3.79**	a. Define a communicative problem statement and solution parameter	Q32	3.66	agree
				Q33	3.93	agree
		3.50	b. Determine suitable crowdsourcing type based on problem	Q34	3.50	agree
		3.7	c. Design a low barrier qualification task	Q35	3.75	agree
				Q36	3.64	agree
		4.17	d. Define a clear deliverable and productivity measure (contribution requirement)	Q37	4.14	agree
				Q38	4.20	Agree
Principle 4 Mobilize and manage the crowds	**3.89**	**3.98**	a. Attract critical mass of participant	Q39	4.03	Agree
				Q40	3.98	Agree
				Q41	3.94	Agree
		3.86	b. Maintain diversity of the crowds	Q42	4.00	Agree
				Q43	3.69	Agree
				Q44	3.90	Agree
		3.84	c. Motivate/Incentivize the crowd	Q45	3.86	Agree
				Q46	3.89	Agree
				Q47	3.66	Agree
				Q48	3.94	Agree
Principle 5 Continuity of process	**3.76**	**4.03**	a. Engage positively with the crowds	Q49	4.03	Agree
		3.66	b. Raise crowds' digital literacy	Q50	3.88	Agree
				Q51	3.44	Agree
		3.72	c. Accelerate crowdsourcing adoption speed	Q52	3.96	Agree
				Q53	3.48	Agree

Appendix G Summary of Findings Related to Hypothesis

No	Hypothesis	Strenght	Weakness
1	MoF is receptive to innovation.	1. Echelons II potential to bring crowdsourcing and serve as change agents to address innovation commitment. 2. MoF does not have a proclivity for risk avoidance. 3. Non-professional solutions are still considered a moderately accepted idea, particularly among Echelon II and Echelon III. 4. Respondents agree that hiring social media users is cheaper than internal sourcing.	1. Executive managers (Echelon I) are less adaptive to innovation than Echelon II/III and staff. 2. Managers do not have the willingness to experiment and accept failures. 3. Non-professional solutions continue to be a source of contention in all levels of positions. None of Echelon I agree to involve them. 4. Echelon IV has the lowest sense of manager support, and Staff more openly voices their unhappiness with the rewards system.
2	MoF has an agile internal business process that minimizes adoption failure	1. Concern about organizational and management change is unfounded. MoF has some functional units to manage innovation. 2. MoF possesses an adequate internal system for managing the risk of lousy work quality. 3. Respondents are unconcern about receiving terrible advice from social media users. 4. Respondents think online communities can create quality work relative to experts.	1. Respondents are worried about information confidentiality. 2. Sharing internal data has a more significant risk than getting bad advice from the crowds since confidential information can fall outside the ministry's control. 3. Information confidentiality maintains that the role of external experts as advisers in public policymaking remains controversial. 4. MoF is a prime target for cyber attackers because of its high dollar value financial transactions. In 2019, there were 2,518,536 attacks on the ministry systems. Meanwhile, IT literacy and awareness of information security among MoF employees continue to be low.

No	Hypothesis	Strenght	Weakness
3	MoF invests progressively in data science	1. 48.7% of respondents are already aware that other governments have adopted crowdsourcing best practices. 2. MoF can distill a complex issue into a basic problem statement intelligible to non-professionals. 3. There are some examples of crowdsourcing that are available to MoF. These examples try to address the existing MoF problem. MoF can utilize crowdsourcing from Micro-Tasking, Information Pooling, Broadcast Search to Open Collaboration.	1. MoF officials are unfamiliar with the crowdsourcing process. 2. 62.05% of respondents have information management problems, and 37.95% have ideation problems. 3. Data management issues affect lower management and staff at the ministry. Meanwhile, higher positions require more support for their policies and need an ideation solution.
4	MoF has the experiences and resources to manage a successful public event	1. Respondents think that MoF has a sizable network of potential online communities due to public interest in the ministry's domain. 2. MoF has the necessary skills and expertise to manage online communities. 3. MoF has fabulous resources for managing social media.	1. MoF has fewer social media followers than other ministries and the minister's account. 2. Information provided via MoF platforms is more relevant for interest groups, such as investors, public finance practitioners, internal employees, and educated individuals. 3. MoF social media also contain complex language that the general public, particularly those with a low level of education, may find difficult to comprehend.
5	MoF focuses on educating people and enhancing communication with them	1. Respondents believe that MoF has an effective strategy to communicate with online communities. 2. MoF has a program for digital literacy among its stakeholders.	1. MoF can not ensure and monitor the success of digital literacy programs. 2. Respondents in all positions still face public misperceptions, complicating policy formulation.