

MASTER THESIS

AN EXPLORATION ON THE ROLE OF RESPONSIBLE RESEARCH AND INNOVATION (RRI) FRAMEWORK IN INDONESIAN DIGITAL ENTREPRENEURSHIP

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ABSTRACT

This study explores the relevance and applicability of the Responsible Research and Innovation (RRI) framework in Indonesian digital entrepreneurship. This study aims to acknowledge how digital entrepreneurs act according to the relevance of the RRI framework and incorporate its dimensions, such as anticipation, reflexivity, deliberation, participation, responsiveness, and inclusivity, into their innovation process as well as identify the challenges they encounter. The objective of this study is to guide the suggestions for adjustments or adaptations in the implementation process of RRI dimensions to better fit specific local circumstances, particularly in Indonesia as one of the Global South countries.

A qualitative study using semi-structured interviews was conducted to examine the relevance of RRI framework. The participants were 9 digital startup companies based in Indonesia. For data analysis, interview transcripts were inductively coded using thematic analysis with Atlas.ti. The results indicate that Indonesian digital entrepreneurs act according to the RRI framework even though they do unintentionally. However, they encounter significant challenge such as disparities in education, social, and technological infrastructure, particularly between rural and urban areas, as well as regulatory gaps and cultural resistance to change.

This study highlights the need for contextual adaptation of the RRI framework to align with local conditions. It underscores the importance of stakeholder engagement, identification of societal challenges, and contributions to social impacts by digital entrepreneurs. Through an interdisciplinary lens that combines the philosophy of science, technology, and society and business administration, this study enhances the broader discourse on RRI by offering practical insights for digital entrepreneurs, scholars, and policymakers. It emphasizes the importance of ethical, sustainable, and inclusive innovation processes in the Global South. It provides beneficial insights from Indonesia as a blueprint for other regions in the context of digital entrepreneurship. Ultimately, this study promotes the idea of ongoing collaboration among digital entrepreneurs, governments, scholars, and society to foster responsible innovation and collectively tackle the challenges that have been identified.

Keywords : Responsible Research and Innovation (RRI), Digital Entrepreneurship, Indonesia, Global South, Qualitative Analysis, Societal Impacts, Stakeholder Engagement, Inclusive Innovation

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1. INTRODUCTION

'Responsible Research and Innovation (RRI)' is a framework that aims to ensure that research and innovation activities are transparent, interactive, and responsive to societal needs and values (Stahl & Brem, 2013). This framework encourages a diverse range of societal actors, including researchers, policymakers, and business organisations, to collaborate and enhance the alignment of their operations, procedures, and outcomes with society's values, needs, and anticipations (Fitjar et al., 2019). Organizations may have priorities in financial stability and gains. This profit-driven approach can lead to behaviours that disregard essential ethical and societal considerations¹. In addition, organizations involved in innovation developments frequently face substantial levels of uncertainty, which poses a challenge in accurately forecasting the possible impacts of their technological progress (Kafka & Kostis, 2024). Regulatory frameworks frequently lag behind technological development, potentially allowing hazardous technologies and innovation to spread². The RRI framework can be considered to assist solve numerous significant issues in organizations. RRI focuses on ethical principles to ensure that research and innovation activities are carried out responsibly and ethically, addressing ethical concerns in practices (Schmidt, 2023). RRI emphasizes ensuring that research and innovations are socially acceptable and useful by considering the needs and values of society (Jakobsen et al., 2019). Implementing a long-term monitoring and evaluation plan to evaluate the sustained impact of RRI practices on research and innovation outputs can aid in identifying trends, difficulties, and opportunities for improvement (Fraaije & Flipse, 2019).

The notion of the RRI framework mainly originated from the European Commission (Shanley et al., 2022). However, it is not limited to the European Union (EU) countries; it also includes perspectives from several non-EU countries, such as the United States and China (Wang & Long, 2023). Hence, RRI can be utilized outside the EU, and there is a continuous endeavor to develop its application universally. Nevertheless, the implementation of the RRI framework acquires different terms when we emphasize it in the context of the Global South countries. Indonesia, as a typical example of the dynamic and diverse group of nations in the Global South, deserves thoughtful consideration when it comes to applying RRI. The innovation landscape in Indonesia is underpinned by a legal framework established by the implementation of Law Number 18 of 2002, which focuses on the National System of Research, Development, and Application of Science and Technology. According to Article 22 of this law, the government is legally bound to the interest of society and to ensure the sustainability of the environment while utilizing science and

¹ <https://www.strategicadvisorboard.com/blog-posts/the-balancing-act-profit-ethics-and-social-responsibility-in-business>

² www2.deloitte.com/us/en/insights/industry/public-sector/future-of-regulation/regulating-emerging-technology.html

technology (Indonesia, 2002). While Indonesia's legal framework emphasizes the principle of responsible innovation, it is worth noting that the RRI's framework developed by the EU is not explicitly mentioned in the Indonesian legal context. Thus, the core principles of RRI may require further alignment with the nuanced circumstances developed specifically in Indonesia.

Furthermore, responsible innovation is inextricably linked with entrepreneurship, since it incorporates the principles and values that entrepreneurs embrace to build and grow businesses that generate economic success and commit positively to the environment and society. Indonesia's diversified environment presents unique challenges and entrepreneurial opportunities. In terms of challenge, entrepreneurs in Indonesia encounter difficulties pinpointing the exact needs of different communities and market segments as there is a wide diversity of ethnicities, languages, and social backgrounds in the population (Hermanto & Suryanto, 2017). Moreover, the rapid digitization and advancements of emerging technologies such as artificial intelligence, also pose various challenges which are multifaceted and complex. For instance, the challenges are data security, ethical considerations, job displacement, regulatory issues, and social inequalities (Kraus et al., 2021)

Amidst those challenges, Indonesian entrepreneurs have a plethora of opportunities. A growing number of people are using the internet, driving the growth of the digital economy and creating opportunities for technology-based entrepreneurship (Timotius, 2022). As of January 2023, Indonesia ranked fourth behind China, India, and the United States with the most internet users worldwide for 212,9 million users³. Indonesia has been ranked sixth globally behind the United States, India, United Kingdom, Canada, and Australia, with a total of 2,502 identified startup companies as of March 2023⁴. Opportunities are available in e-commerce, finance technology, education technology, and other digital industries, encouraging innovation and digital entrepreneurship in creating an atmosphere conducive to economic success.

Regarding the responsibility concepts which Indonesian entrepreneurs would naturally refer to before introducing RRI, the notion reflects the responsibility and commitment toward society. Indonesian entrepreneurs often participate in endeavors that contribute positively to both local communities and society (Gunawan, 2014). These ideas encompass initiatives to promote economic growth, mitigate social disparities, and assist in the field of education which aligns with the societal engagement of RRI. Another notion is innovation to local needs is compulsory. Indonesian entrepreneurs concentrate and commit to addressing the needs of the Indonesian market (Sarma et al., 2022). This anticipatory approach aligns with RRI's framework of proactively tackling societal issues.

³ <https://www.statista.com/statistics/262966/number-of-internet-users-in-selected-countries/>

⁴ <https://www.startupranking.com/countries>

Thus, even though not explicitly employing the term RRI, existing responsibility concepts demonstrate that Indonesian entrepreneurs are already committed to responsible business practices. However, there may differ, depending on the cases and circumstances. The implementation of RRI has the potential to enhance and formalize these practices, establishing a systematic framework for responsible innovation in the context of entrepreneurship in Indonesia. Entrepreneurs in Indonesia need a sophisticated understanding and strategic approach to develop responsible and innovative business practices. RRI may assist entrepreneurs to respond and align their ideas about developing the technology with changing societal dynamics. With support from this approach, entrepreneurs can create cutting-edge technologies and ensure that their innovations positively impact society and align with shared values.

Furthermore, it is crucial to recognize that RRI implementation is mostly focused on Western contexts, creating a knowledge gap regarding its applicability in Global South contexts, particularly in Indonesia. The gap can be characterized by several key aspects such as the degree of awareness and understanding among stakeholders (e.g.: researchers, policymakers, and communities) may be limited, making it challenging to integrate them into research and innovation procedures. Besides, cultural values, societal norms, and economic circumstances can affect the acceptability and execution of the RRI framework. Discrepancies in cultural values and priorities may influence the relevance and applicability of the RRI framework in the regions. More research is required to investigate RRI techniques in Global South countries and ensure that the principles and strategies are culturally and economically appropriate (Wakunuma et al., 2021).

1.1 Research Questions

Therefore, those topic considerations lead to the following main research question in this study :

To what extent do digital entrepreneurs in Indonesia act in accordance with the RRI framework and which challenges do they encounter ?

1.2 Relevance and Contribution of the Thesis

This research is a joint master thesis between two studies: Philosophy of Science, Technology, and Society (PSTS) and Business Administration (BA). PSTS studies the interplay between science, technology, and society from philosophical and STS (science and technology studies) perspectives and BA studies entrepreneurship, innovation, and strategy in a high-tech business context. Through an examination of the RRI framework and its relevance to entrepreneurship in Indonesia, this research aims to produce results that transcend the scope of each study program. This research is pertinent to both study programs as it enhances both fields by providing valuable insights into responsible innovation,

ethics, and societal implications in the context of business and technology, which are becoming more interconnected in contemporary society.

Moreover, this research aims to provide significant contributions on both conceptual and empirical levels, shedding light on the complex interplay between RRI, entrepreneurship, and the unique context of the Global South, with a particular emphasis on Indonesia. Conceptually, this research aims to establish novel linkages between existing knowledge concerning RRI and digital entrepreneurship and RRI within the Global South. By scrutinizing literature at these crossroads, the research aims to develop a comprehensive conceptual framework that integrates RRI principles, entrepreneurial practices, and the specific challenges and opportunities in the Indonesian context. This synthesis of theoretical constructs will not only fill existing gaps but also establish the foundation for a more nuanced understanding of the theoretical landscape.

Empirically, the research investigates the practical implementation of RRI principles through semi-structured interviews of digital startup companies in Indonesia. By employing such interviews with entrepreneurs, the research endeavors to collect a wide range of viewpoints regarding the relevance of RRI frameworks within the digital entrepreneurship environment of Indonesia. The empirical findings will guide the suggestions for adjustments or adaptations in the implementation process of RRI dimensions to better fit specific local circumstances, which maintain the RRI dimensions in their intended state.

1.3 Thesis Structure

After this Chapter 1 Introduction, the next Chapter 2 Theoretical Background summarizes existing literature relevant to the research topic, introduces the theoretical perspectives guiding the study, and identifies existing knowledge gaps. The concepts used in this research are specifically on RRI and its key dimensions, digital entrepreneurship, innovation, and entrepreneurial practice, RRI in entrepreneurship and RRI in the Global South countries, particularly in Indonesia. Chapter 3 Methodology describes the research design for the study. This research will use a qualitative method based on semi-structured interviews as the primary data collection and thematic analysis. The participants are selected employees mainly involved in developing technology and innovation from digital startup companies based in Indonesia. Next, Chapter 4 Results presents the research findings in a clear and organized manner. The chapter is organized to initially offer a comprehensive summary of the key themes that were identified through thematic analysis. A thorough analysis of every theme follows this, supported by relevant quotations from the data to demonstrate the findings. The results are divided into sub-sections corresponding to the research questions. Tables and figures are also included as visual aids to strengthen the clarity and comprehensibility of the results. Finally, Chapter 5 Discussions interprets and relates the

results to the research questions and objectives. It also discusses the conclusion, theoretical and practical implications, limitations, and potential areas for future research.

2. THEORETICAL BACKGROUND

This chapter discusses the analytical and theoretical perspectives on which the thesis is based. The first section investigates the RRI framework and its key dimensions. The second section discusses digital entrepreneurship, innovation, and entrepreneurial practices. The third section explores RRI in entrepreneurship, and then the fourth section examines the RRI application in the Global South countries, particularly in Indonesia.

2.1 RRI and the Key Dimensions

RRI is an approach to research and innovation that aims to match scientific and technological advancements with societal values, needs, and expectations. It entails anticipating and evaluating the potential effects of research and innovation, collaborating with stakeholders and citizens, and encouraging ethical and sustainable outcomes (Stahl et al., 2021). Initially, the European Commission has incorporated RRI ideas into its Horizon 2020 initiative, as a framework for ensuring that research and innovation activities are ethically acceptable, sustainable, and socially desired (Baumann et al., 2019). Prominent academics have put forth a wide range of RRI ideas and methods. Some of them specify the RRI approach into a set of dimensions, which are the essential components or significant parts of the RRI process. This thesis draws in particular on the five dimensions suggested by Setiawan et al. (2019): anticipation, reflexivity, deliberation, responsiveness, and participation. These dimensions are selected since they offer a comprehensive framework for comprehending and assessing the ethical and societal aspects of innovation processes. By prioritizing these dimensions, this research may provide detailed insights into the extent to which digital entrepreneurs in Indonesia act following RRI frameworks and pinpoint the challenges that may they encounter.

Anticipation refers to innovation actors or stakeholders attempt to anticipate and plan for the potential inappropriate consequences and implications of an innovation (Setiawan et al., 2019). Anticipation creates questions like "what if" and "what else could it do?" and entails the thoughtful evaluation of the possible ramifications, outcomes, and ethical complexities associated with novel technologies or advancements before their complete integration (Chen et al., 2022). The comprehension of foresight and its methodologies can facilitate the identification of potential applications and consequences of innovation.

Moreover, such comprehension can promote decision-making and the formulation of an innovation policy and strategy. (Owen et al., 2013)

Reflexivity refers to a circular or iterative process in which stakeholders create and shape innovation. This dimension focuses on learning from experience to understand feedback mechanisms and cause-effect correlations in innovation processes (Setiawan et al., 2019). It entails being aware of the potential effects of research on society, the environment, and other factors, and actively evaluating these consequences (Schuijff & Dijkstra, 2019). Reflexivity is essential for increasing self-critical analysis, recognizing pertinent concerns, and developing a better grasp of the relationships between science, technology, and society (Stahl et al., 2021)

Deliberation refers to an extensive exploration process by innovation actors or stakeholders, conveying a careful assessment of numerous elements which demonstrates in-depth talks to achieve agreement regarding the way forward (Setiawan et al., 2019). This dimension seeks to facilitate collective reflection and decision-making regarding the objectives, dilemmas, questions, and visions of innovation actors (Owen et al., 2013). Deliberation frequently seeks to achieve a consensus or well-informed choice through a comprehensive analysis of pertinent information, values, and views (Arnaldi & Gorgoni, 2016).

Responsiveness refers to the ability of innovation actors or stakeholders to respond to specific circumstances promptly and effectively, considering various requirements, needs, views, issues, and values (Baumann et al., 2019). This dimension highlights the importance of researchers and innovators being attentive to society's impact while considering ethical, social, and environmental factors in their work. This proactive strategy is meant to help create trust, facilitate collaboration, and improve the social effect of scientific and technological breakthroughs (Dijkstra & Yin, 2019). Being responsive involves utilizing the collective process of reflexivity and deliberation to adjust and influence the direction and speed of innovation adaptively (Setiawan et al., 2019).

Participation refers to a process that acknowledges the value of the stakeholder involvement, knowledge and opinions on issues (Setiawan et al., 2019) This dimension assures the opinions, values, and concerns of many societal actors are considered when making decisions about technical advancements (Koops et al., 2015). Participation attempts to democratize the innovation process by ensuring that diverse viewpoints, values, and concerns from stakeholders. It encourages inclusion, transparency, and accountability in research and innovation efforts. Involving stakeholders early and iteratively can assist uncover opportunities for innovation, solving societal demands, and promoting the legitimacy and social acceptance of technological breakthroughs (Owen, 2019).

Hence, RRI and its interrelated components exemplify a comprehensive and progressive methodology towards scientific and technological advancement. RRI aims to include the dimensions in the research and innovation process to promote a more accountable, enduring, and socially advantageous approach to scientific and technological progress, ultimately leading to the improvement of society (Von Schomberg, 2011).

2.2 Digital Entrepreneurship, Innovation, and Entrepreneurial Practices

Entrepreneurship can be defined as the act of originating and developing ideas, which are subsequently validated by starting a new business or transforming an existing one. This act of entrepreneurship, regardless of how it is carried out, requires involvement, and is not limited to certain results such as business development, uncertainty, innovation, opportunity, or the production of new value (Prince et al., 2021). While traditional entrepreneurship focuses on producing value via innovative business ventures, digital entrepreneurship uses digital technology and the internet to redefine how businesses operate and interact with the market (Bensaid & Azdimousa, 2021).

Moreover, digital entrepreneurship refers to the proactive exploration of entrepreneurial prospects that arise from the utilization of digital infrastructures, platforms, and technologies. This practice entails the application of information and communication technologies, digital media, and the Internet to establish and manage enterprises, provide products and services, and generate value in the digital economy (Paul et al., 2023). Digital entrepreneurship fosters innovation and agility, enabling entrepreneurs to respond quickly to market developments and consumer preferences. With the rising popularity of the internet and mobile technology, digital entrepreneurship is emerging as a critical driver of economic growth, job creation, and change in traditional industries (Nambisan, 2017).

The relationship between digital entrepreneurship and innovation is complex and interdependent. While both concepts are unique, they are inextricably linked and critical to the success and sustainability of enterprises, particularly in today's dynamic environment. Digital entrepreneurs drive innovation by discovering new possibilities and taking risks to bring novel ideas to market with technological advancements, whereas innovation gives digital entrepreneurs a competitive advantage that allows them to flourish in the marketplace (Kreiterling, 2023). It is important to acknowledge that successful digital entrepreneurship depends on its solution to fulfil the needs, values, and expectations of the users, customers, and stakeholders. Thus, digital entrepreneurs need to consider a viable approach to becoming socially responsible, and sustainable development in their activities in society (Zahra & Wright, 2015).

In the dynamic environment of digital entrepreneurship, a variety of underlying circumstances impact the entrepreneurial landscape. Emerging digital technologies, including but not limited to blockchain, big data analytics, Artificial Intelligence (AI), and the Internet of Things (IoT), afford entrepreneurs novel instruments and functionalities to foster innovation and develop environmentally sustainable solutions (George et al., 2020). Access to funding, talent, and infrastructure can influence the outcome of digital entrepreneurial endeavors. Entrepreneurs require access to resources that facilitate innovation and sustainability initiatives (Neumann, 2020).

In addition, entrepreneurial activity and outcomes are influenced by cultural norms, social attitudes, and community support networks. Entrepreneurship is valued and promoted in certain cultures, whereas risk aversion and fear of failure dominate in others. Societal expectations, gender conventions, and social network access can influence business paths. Cultivating an entrepreneurial environment that values variety, promotes innovation, and facilitates taking risks can unleash entrepreneurial abilities in many groups and societies (Si et al., 2023). The regulatory framework, encompassing legislation concerning data privacy, intellectual property, e-commerce, and cybersecurity, influences the operational terrain for digital entrepreneurs. Adhering to laws is crucial for ensuring sustainable growth and managing risks (Chang et al., 2021).

2.3 RRI in Entrepreneurship

RRI can be considered as a framework in the entrepreneurial process that provides guidelines to help ensure that entrepreneurial efforts strive to be ethical and socially responsible. RRI encourages entrepreneurs to evaluate their projects' broader impact, which includes societal, ethical, and environmental issues. This approach aims at more sustainable and equitable business models, to build public trust, and promote stakeholder participation. Thapa and Iakovleva (2023) have previously discussed the RRI frameworks and the integration in entrepreneurship creation and business development.

Anticipation entails developing foresight skills that can assist entrepreneurs in forecasting future industry trends, opportunities, and obstacles. Furthermore, anticipation encourages entrepreneurs to identify and assess potential hazards connected with emerging technology early on (Guston, 2013). It encourages entrepreneurs to think about the ethical consequences of their ventures, especially in new technological areas. Anticipation helps entrepreneurs be agile and adaptable in the face of fast technological change (Martin, 2010). Besides, anticipation empowers entrepreneurs to engage in innovative thinking and encourages them to carefully assess the unexpected societal ramifications of their innovations and business endeavors, going beyond mere financial gains and losses (Thapa & Iakovleva, 2023).

Reflexivity allows entrepreneurs to establish reflexive arrangements by interacting with stakeholders such as consumers, employees, investors, and partners to obtain varied viewpoints and ideas. Furthermore, reflexivity practices constantly reflect on an entrepreneur's activities, decisions, and results. Self-awareness can assist entrepreneurs to learn from experiences, adjust plans, and develop entrepreneurial skills (Weber & Rohracher, 2012). Entrepreneurs can enhance their decision-making process, discern recurring trends, and gain knowledge from their mistakes by engaging in reflexivity regarding previous decisions and their results (Stahl, 2013).

Deliberation in the context of entrepreneurship refers to the cognitive process by which individuals assess and resolve entrepreneurial opportunities through the application of logical and analytical reasoning. The process entails engaging in deliberate introspection, scrutinizing data, contemplating diverse viewpoints, and evaluating the advantages and disadvantages of numerous alternatives before reaching a definitive conclusion (Fisher & Neubert, 2022). Deliberation becomes essential in entrepreneurship for resource acquisition, team relationships, and funding strategies. Entrepreneurs need to participate in thoughtful decision-making processes to negotiate the intricacies of emerging circumstances, manage risks, and capitalize on the opportunities afforded by digital technologies (Giones & Brem, 2017).

Responsiveness practice in entrepreneurship refers to entrepreneurs' capacity to detect market changes, comprehend consumer preferences, and alter their strategy, products, and services accordingly. Responsiveness in entrepreneurship means that they are quick to experiment, iterate, and pivot in response to feedback and new information, allowing them to stay ahead of the competition and remain relevant in rapidly changing markets (Eisenhardt & Martin, 2000). By being responsive, entrepreneurs can improve their standing in society and position themselves as responsible entities and enhance their long-term sustainability. Therefore, responsiveness improves the practicality and effectiveness in creating opportunities and developing entrepreneurship (Thapa & Iakovleva, 2023).

Participation entails strengthening the collaboration of stakeholders, including entrepreneurs, researchers, and others, to co-create innovative solutions and business models. Besides, it involves relevant parties in the process of designing and developing products, services, and processes to ensure that entrepreneurs satisfy the various market demands (Warnke et al., 2022). Participation emphasizes the importance of inclusivity and engagement with diverse stakeholders in ensuring that innovation processes are transparent, accountable, and responsive to societal demands and values. By incorporating various perspectives and skills, entrepreneurs may improve the quality and impact of their innovations while also instilling trust and legitimacy in their processes (Nazarko, 2020).

The implementation of RRI in entrepreneurship can result in more responsible and sustainable innovation outcomes that are consistent with societal values and needs. By extending the discourse on RRI and paying explicit attention to the role of innovators and entrepreneurs, policymakers may ensure that RRI contributes to tackling humanity's major issues and increasing the acceptability and desirability of research and innovation (Stahl & Brem, 2013)

2.4 RRI in Global South Countries

Global South refers to the nations and regions that are socio-economically less advantaged in comparison to the core of economies of the world. Countries that have undergone marginalization in the global context and were formerly colonies are frequently associated with that term. Typical locations for these nations include Oceania, Africa, Latin America, and portions of Asia. A focus on development issues, challenges associated with poverty, inequality, and restricted access to resources are defining characteristics of the Global South (Haug et al., 2021).

RRI in Global South incorporates a transformative strategy to ensure that scientific research and innovation practices correspond with societal requirements and ethical norms. RRI initiatives in the Global South should prioritize the resolution of local societal issues, including but not limited to poverty, inequality, healthcare accessibility, and environmental sustainability (Robinson et al., 2022). Through the synchronization of research and innovation endeavors with the requirements of local communities, RRI has the potential to contribute significant and influential solutions. Many countries in the Global South have long histories of indigenous knowledge and practices. RRI should recognize and include indigenous views, knowledge systems, and practices in research and innovation processes, acknowledging their importance and contribution to sustainable development. (Wakunuma et al., 2021).

Furthermore, RRI can facilitate the amplification of marginalized communities' voices and guarantee the incorporation of their perspectives in decision-making processes through the promotion of inclusive deliberation, equitable participation, and empowerment of diverse stakeholders (Pandey et al., 2020). The implementation of RRI in the Global South underscores the importance of a systematic and inclusive approach that prioritizes the needs and perspectives of end users, encourages substantive participation, and establishes ethical and accountable research practices (Robinson et al., 2022).

In the Global South, the diverse socio-economic, cultural, and political environments provide rise to the intricate web of challenges and opportunities for the implementation of RRI. Even though the objective of RRI, which is to guarantee that the process of research and innovation is ethical, inclusive, and responsive to society's needs, is consistent with the overarching principles of sustainable development, its

implementation encounters distinct hurdles. According to Foulds et al. (2023), the challenges are the Global South's researchers' capacity to undertake socially responsible research and innovation may be adversely affected by disparities in access to education, healthcare, and basic services. Then, technological capabilities, research infrastructure, and financial resources may be inadequate, impeding the implementation of RRI practices. Next, insufficient governance structures and regulatory frameworks in certain countries could present obstacles to the implementation of ethical research practices and the enforcement of accountability.

Moreover, the Global South also offers an environment conducive to the proliferation of RRI practices. According to Prasad (2020) for the study in India, the opportunities are Global South presents prospects for significant involvement of local communities and stakeholders in research and innovation endeavors, thereby encouraging participatory and inclusive methodologies. RRI practices in the Global South may prioritize the resolution of main development concerns, such as environmental sustainability, healthcare, and agriculture. Researchers and scholars based in the Global South frequently possess indigenous specializations and knowledge that are instrumental in advancing sustainable development and tackling societal issues via RRI.

Indonesia, as a country in the Global South, has the research and innovation perspective adopted from a legal framework in the implementation of Law Number 18 of 2002, which aims attention to the National System of Research, Development, and Application of Science and Technology. Article 22 of this legislation imposes upon the government a legal obligation to safeguard the environment's sustainability through the application of science and technology, with a particular focus on the interest of society (Indonesia, 2002). The law defines the institutional aspects of science and technology in Indonesia as one of the practical implications, which include universities, research and development institutes, business organizations, and supporting institutions. These institutions play an important role in coordinating human resources, research and development, innovation, and technological diffusion, recognizing interaction among academics, business, and government (Putera et al., 2015).

Setiawan (2020) has previously discussed the application of RRI in the context of CO² utilisation in Indonesia. Indonesia's diverse culture, social, and environmental milieus offer prospects and obstacles for scientific inquiry and innovative endeavors. To effectively utilize the nation's abundant natural and cultural assets, foster sustainable development, and cater to the unique requirements of its heterogeneous population, the innovation framework assumes a critical role. This provides the lesson that it is essential to consider Indonesia's national culture when using RRI aspects, as cultural elements have a considerable influence on how RRI processes are carried out in the country. For example, the study mentions that Indonesia is well-known for its collectivist culture which focuses on collective harmony,

cooperation, and consensus. In the RRI process, this cultural feature can influence how stakeholders collaborate, produce collective decisions, and prioritize shared interests over individual profits (Setiawan, 2020, p.10). It emphasizes the significance of incorporating cultural concerns, stakeholder participation, and contextual elements into RRI processes to foster ethical, inclusive, and long-term research and innovation practices in Indonesia.

To sum up this chapter, the theoretical background offers crucial insights for investigating the research questions about the application of RRI in the context of Indonesian digital entrepreneurship. Through an examination of RRI framework and its key dimensions, we can recognize the principles of anticipation, reflexivity, deliberation, participation, and responsiveness. Those dimensions operate as standards for assessing the actions and strategies employed by digital entrepreneurs. The discussion on the digital entrepreneurship and innovation highlights the distinctive challenges and opportunities inside the entrepreneur's situation. This informs the examination of barriers and stakeholder engagement methods employed by digital entrepreneurs in Indonesia. Besides, examining RRI frameworks in entrepreneurship offers the explanation to evaluate how the digital entrepreneurs effectively manages the social responsibilities and the societal impact for their innovations. Finally, exploring the RRI framework in the Global South, particularly in Indonesia places the findings within the specific local socio-economic, cultural, and regulatory context. This discussion enables people to assess the extent to which Indonesian digital entrepreneurs act according to RRI and its key dimensions, identify their specific challenges, investigate how they engage and manage their stakeholders, determine their prioritization on societal challenges, and comprehend how the local contexts either facilitate or hinder the relevance of RRI framework in conducting innovation.

After conducting a detailed examination of the theoretical framework, this study aims to tackle several specific sub-questions that will guide the investigation. The purpose of these sub-questions is to reflect the RRI dimensions discussed in this section and recognize the relevance of implementing RRI dimensions in Indonesian digital entrepreneurship.

- a. How do digital entrepreneurs engage stakeholders in their innovation process?
- b. How do digital entrepreneurs identify and prioritize societal challenges and opportunities for innovation?
- c. How do the digital entrepreneurs' innovations contribute to social impact?
- d. To what extent do the specific conditions in Indonesia facilitate or impede the use of RRI framework ?

These sub-questions will provide a comprehensive understanding of how digital entrepreneurs in Indonesia relate to RRI dimensions and the specific challenges they encounter, thereby addressing the main research question.

3. METHODOLOGY

This methodology section provides an extensive explanation of research design, data collection, participants, and data analysis. This explanation aims to provide thorough guidelines for the research process and facilitate the reader to comprehend and evaluate the research.

3.1 Research Design

In this study, the researcher uses a qualitative methodology to promote a better comprehension of the interplay between RRI, digital entrepreneurship, and the distinctive context of the Global South, with an emphasis on Indonesia. The utilization of the qualitative methodology aims at a profound investigation capturing the complexity and nuances of social phenomena (Yadav, 2021). This research can offer an initial exploration of the subject, provide significant insights, and identify issues that require further examination in a broader study. Indonesia is confronted with various socioeconomic difficulties such as inequality, poverty, environmental degradation, and infrastructure gaps (Sparrow et al., 2020). Simultaneously, these difficulties offer potential for innovative solutions and entrepreneurial endeavors that emphasize social and environmental accountability. Moreover, Indonesia hosts a dynamic network of entrepreneurs, information and technology (IT) firms, and digital platforms, fueled by rising internet usage, smartphone ownership, and a youthful, technology-savvy demographic⁵. This situation provides an opportunity to examine how RRI frameworks interface with digital entrepreneurship.

The qualitative methodology will concentrate on the thematic analysis of the interviews. Thematic analysis is an analysis used to recognize, examine, and explain patterns or themes in a dataset. It entails methodically arranging and categorizing data to provide significant insights and understandings (Naeem et al., 2023). In the Data Analysis section, the researcher systematically organizes and structures the methodology to process the material effectively. The qualitative methodology and thematic analysis research method will facilitate the analysis of entrepreneurs' comprehension and relevance of RRI and the recognition of obstacles, facilitators, and distinctive adjustments of RRI dimensions to specific local circumstances.

⁵ <https://techcollectivesea.com/2023/12/13/indonesia-thriving-startup-ecosystem/>

3.2 Data Collection

This research uses the semi-structured interview as data collection method. The employment of semi-structured interviews with digital startup companies allows to recognize diverse perspectives and offers insight into the use of RRI frameworks in the local context. The semi-structured interviews offer a targeted approach while allowing the interviewer to delve into relevant topics that may emerge throughout the interview (Adeoye-Olatunde & Olenik, 2021). The data collection includes extracting information from various sources such as scanning company websites or reports related interviewed company. To achieve a more thorough and precise knowledge of how Indonesian digital entrepreneurs act according to the RRI framework, the researcher analyze and compare data collected from interviews with publicly available information from company websites and reports. Besides, the researcher also validate the findings from interviews with insights from secondary data collection approach.

This research obtained approval from the Ethics Committee of the Faculty of Behaviour, Management, and Social Sciences, University of Twente on 8th March 2024, with request number 240236. After the approval process, the interviews were conducted in an online platform in a private setting, involving participant and researcher. The interview used the Indonesian language. Before commencing the interview, the researcher asked the oral recorded informed consent, indicating the participant's willingness to serve as research subjects and to have the session recorded with Microsoft Teams. The researcher explicitly declared that data would be handled anonymously. Interviews with digital startup companies were held with an average time of 60 minutes. Several open questions were asked to explore the practices of responsible innovation processes in digital startup companies.

The questions in the interview for this research provide a range of crucial topics to delve into how digital entrepreneurs manage technology and innovation while considering societal impacts and ethical considerations. Through investigating dimensions such as anticipation, participation, reflexivity, deliberation, and responsiveness, the interview seeks to investigate how these companies interact with their stakeholders, anticipate forthcoming challenges, evaluate and reflect on their process, and adapt based on feedback to achieve ongoing enhancement. Gaining a comprehensive understanding of the specific circumstances in Indonesia, such as cultural influences and economic variables, offers significant insights into the distinct obstacles and possibilities encountered by digital entrepreneurs. In addition, the interview aims to evaluate the level of understanding and incorporation of RRI frameworks. It also provides insights on the motivations driving responsible innovation practices and the evolving role of those practices in shaping the future of digital entrepreneurship in Indonesia. The list of interview questions is included in Appendix part of this research.

3.3 Participants

This research's participants held innovation and technology development roles in digital startup companies based in Indonesia. Digital startup companies function within a dynamic and fast-paced environment, where innovation is fundamental to their survival (Sreenivasan & Suresh, 2023). This circumstance provides ample opportunities to examine the relevance of RRI dimensions for the innovation process in rapid technological development, possible challenges encountered and how they are addressed. Moreover, individuals working in innovation and technology development have a direct impact on the creation and shape of new technologies and products. This hands-on experience provides insightful lessons on how to incorporate RRI principles into the innovation process.

The companies were chosen for their innovative approaches in sectors such as education, finance, healthcare, and IT services in Indonesia. All the company's participants are profit-based companies. Out of 12 digital startup companies that were contacted, 9 agreed to participate. These companies act as subjects for analyzing the relevance of the RRI framework, showcasing how they incorporate RRI dimensions into their technology and business strategies. This analysis aims to gain a deeper understanding of how digital entrepreneurs in Indonesia navigate and contribute to societal and economic advancements by using responsible innovation practices. After briefing the participants via LinkedIn and WhatsApp messages, they were asked about their availability. The interviews were mostly scheduled in the afternoon hours according to Indonesian time (GMT+7). An overview of the demographics of participants is given in the table as follows.

Table 1 Demographic of Participants

Participants	Gender	Job Title	Tenure in Position	Company's sector	Company's size
1	Female	Co-Founder and Chief Operating Officer	3 years	IT Services and Consulting	2-10 employees
2	Male	Co-Founder and Chief Executive Officer	4 years	IT Services and Consulting	2-10 employees
3	Male	Head of Technical Project Management	3 years	IT Services and Consulting	500-1000 employees

4	Male	Co-Founder and Chief Executive Officer	6 years	IT Services and Consulting	50-200 employees
5	Male	Chief Product Officer	4 years	Education Technology	500-1000 employees
6	Male	Co-Founder and Managing Director	3 years	Financial Services	50-200 employees
7	Female	Product Manager	2 years	Digital Healthcare	10-50 employees
8	Female	Lead Product Manager	3 years	Digital Healthcare	10-50 employees
9	Female	Co-Founder and Chief Operating Officer	2 years	Digital Healthcare	10-50 employees

As visible in table 1, this research has a balanced gender composition. Even though gender is only one aspect of diversity, it provides both men and women with a voice and an opportunity to contribute to this study. In addition, the mostly similar tenure in position among interviewees enables comparability between the participants' practices and experiences. Table 1 also shows the company's size based on number of employees. It demonstrates a balanced approach, ranging from micro groups from 2-10 employees, small groups from 10-50 employees, middle groups from 50-200 groups to large groups from 500-1000 employees.

3.4 Data Analysis

Data analysis was conducted in several steps. After interviews were done, the transcripts were transcribed manually and coded inductively using thematic analysis with ATLAS.ti software. Thematic analysis can be facilitated by Computer-Assisted Qualitative Data Analysis Software (CAQDAS) programs like ATLAS.ti. The tools help in sorting and examining extensive amounts of qualitative data, making it easier to identify patterns and linkages (Castleberry & Nolen, 2018). The transcripts were coded in the original language, which is the Indonesian language, to maintain the context and detail. The steps of thematic analysis are familiarizing with the data, generating codes, searching for themes, reviewing themes, defining and naming the themes, and producing the report (Nowell et al., 2017). First, the researcher read the transcript interviews to gain a comprehensive understanding and made several notes of initial impressions from the data. The data units or quotations are identified and extracted from the material.

Then, these quotations are coded into categories. Specific quotations are employed to illustrate each code. After creating the codes, the researcher constructed the themes derived from the research questions. The researcher reviewed the themes and codes to examine patterns and relationships. This included grouping related codes together to the relevant themes. As outlined by Clarke and Braun (2016), the researchers examine the data in search of recurring themes, concepts, or patterns that are relevant to the research questions. After codes, quotations, and themes were generated, they were translated into English using DeepL software. The researcher also establish the connection between the themes and appropriate theoretical frameworks, specifically in each RRI dimensions, to enhance comprehension and gain a more profound contextual understanding.

4. RESULTS

This chapter aims to provide an extensive analysis of the empirical results from experiences and narratives of 9 selected digital startup companies in Indonesia in managing their technology and innovation. The chapter starts with a discussion of each theme and the related codes that emerged from the data.

Based on the interview as data collection which processed by Atlas.ti, this research results are 177 quotations, 34 codes, and 4 themes. The themes consist of challenges encountered by digital entrepreneurs in Indonesia, digital entrepreneurs' strategies to involve stakeholders in the innovation process, digital entrepreneurs' approaches to identify and prioritize societal challenges and opportunities for innovation, and digital entrepreneurs contribution to social impact. Those themes are derived from main research questions in Chapter 1 and sub-research questions as mentioned in Chapter 2 , which seek to thoroughly investigate the practices, challenges, and impacts of Indonesian digital entrepreneurs in managing technology and innovation processes. A detailed breakdown of how each theme derived is explained in Table 2.

Table 2 The Explanation of Themes

#	Themes	Derived from	Explanation
1	Challenges Encountered by Digital Entrepreneurs in Indonesia	<i>Main Research Question</i> : To what extent do digital entrepreneurs in Indonesia act according to the	This theme delves into the comprehensive investigation with particular emphasis on the challenges that digital entrepreneurs encounter.

		dimensions of RRI and which challenges do they encounter?	By comprehending the challenges, this theme also delves into the context in which Indonesian digital entrepreneurs operate and the difficulties they are overcome to adhere to the RRI key dimensions
		<i>Sub-Question (d) :</i> To what extent do the specific conditions in Indonesia facilitate or impede the use of RRI framework?	
2	Digital Entrepreneurs' Strategies to Involve Stakeholders in the Innovation Process	<i>Sub-Question (a) :</i> How do digital entrepreneurs engage stakeholders in their innovation process?	This theme examines the methods and strategies that digital entrepreneurs employ their innovation processes, reflects variety of perspectives and needs
3	Digital Entrepreneurs' Approaches to Identify and Prioritize Societal Challenges and Opportunities for Innovation	<i>Sub-Question (b) :</i> How do digital entrepreneurs identify and prioritize societal challenges and opportunities	This theme investigates the process that digital entrepreneurs used to identify which issues to address, emphasizing their role to the advancement of social good through innovative solutions
4	Digital Entrepreneurs Contribution to Social Impact	<i>Sub-Question (c) :</i> How do the digital entrepreneurs' innovations contribute to social impact ?	This theme assesses the outcomes of digital entrepreneurs innovations, evaluating how their contributions can be beneficial for society and social objectives

Specifically for the Theme 1 at Table 2, the researcher acknowledges that the findings about challenges encountered by digital entrepreneurs in Indonesia appear in the most of participants. Hence, the researcher provides the challenge summary into five classification and strategies which digital entrepreneurs overcome in each classification. Moreover, the discussion continues to explain the rest of the themes as presented in Table 2 and codes. Each explanation is supported by several quotes as

examples from participants to demonstrate the context and meaning. The overview of codes, definition of codes, and sample quotation for each theme are provided in the Appendices.

Second, the discussion is the results of to what extent Indonesian digital entrepreneurs act according to RRI frameworks in managing innovation process which is explained by the key dimensions of RRI from Chapter 2. Third, the discussion delves into Indonesia's context as Global South country for the relevance of RRI dimensions. This section presents the finding about another RRI key dimension which appears in the practices of Indonesian digital entrepreneurs and discusses about the specific circumstances in Indonesia which may influence the relevance of RRI framework. Last from this chapter, the discussion recognizes additional insights from the company's participants.

4.1 Challenges Encountered by Digital Entrepreneur in Indonesia

This chapter starts with a discussion of the challenges encountered by digital entrepreneurs in Indonesia. They have distinct hurdles due to the dynamic of the digital economy and the country's diverse socio-economic landscape. As one of the fastest-growing economies in Asia⁶, Indonesia presents encouraging opportunities for digital entrepreneurs to innovate and thrive in industries, such as financial technology, digital health, and education technology. However, navigating this thriving but complicated environment presents several challenges. In this section, the researcher explores the specific challenges faced by digital entrepreneurs in Indonesia based on empirical results.

4.1.1 Political Barrier

Digital entrepreneurs encounter formidable challenges in the form of intricate administrative and bureaucratic procedures as political barriers that impede the establishment and operation of their businesses. For instance, registering the company, securing operational practices and licenses, and laws regarding labor and tax regulations. Those hurdles can often be time-consuming, confusing, and open to interpretation, resulting in delays and inefficiencies that hinder entrepreneurial activities. This situation can delay the utilization of innovation as digital entrepreneurs spend their time navigating administrative obstacles. The political barriers within specific sectors might hinder innovation, leading entrepreneurs to search for more favorable conditions for their initiatives. This type of challenge is mentioned by 6 out of 9 interviewees.

⁶ <https://www.msn.com/en-us/money/markets/20-fastest-growing-economies-in-asia-in-2024/ar-BB111xRy>

Participant 1 elaborated : *“For example, when we have user from education sector. We faced school politics. That is such challenges, because there are many aspects of school, you have to go everywhere, with procedural stuffs. There are many things, it's difficult to understand directly. So finally we pivoted to assessments for another sector, such as companies, to get into work, more practical. No matter how good the innovation is, if they don't support it, we can't do anything. Then, we pivot to a place where they are more open”*

Participant 4 elaborated : *“Establishing a tech startup in Indonesia may involve bureaucratic hurdles. Registering our company and getting all required permits resulted in several delays and demands for extra proof. Securing operational licenses proved especially challenging since it requires many layers and agencies for approval. Also, following the labors laws and tax rules adds administrative burdens. These obstacles may slow down the development and innovation of our business process..”*

4.1.2 Society Education Gap

The educational disparity within Indonesian society presents a major obstacle for digital entrepreneurs. It leads to limited awareness and comprehension of digital products and services in specific population segments. Urban and educated users tend to adopt digital platforms such as, for commerce, communication, and entertainment more readily than rural and less educated users who may have obstacles in accessing and using the technologies successfully. This challenge is mentioned by 7 out of 9 interviewees.

Participant 5 elaborated : *“Education in Indonesia is still unequal in rural and cities. The infrastructure of education is different between them. The most challenging thing is educating potential users. That this technology is not a burden. It's there to help our performance. To educate Indonesia's citizen need support system from various stakeholders, including us, as digital companies. We want to serve equal opportunities for all society despite realising that needs time and extra efforts. We provide training for societies that probably facing difficulties in using our solutions because we realized everyone can have different understanding ”*

4.1.3 Lack of Government Support

Digital entrepreneurs in Indonesia frequently encounter obstacles to inadequate government support. Despite the country's rapidly expanding digital economy and the potential for innovation development, entrepreneurs face challenges due to regulatory clarity and inconsistent government initiatives. This situation also underscores government support programs may have unclear or volatile regulations which

might provide an uncertain business environment. That lack of transparency may not effectively reach all segments of digital entrepreneurship in Indonesia. This challenge is mentioned by 7 out of 9 interviewees.

Participant 2 elaborated : *“From the Indonesian government there is no special support. And we inevitably must adjust to existing policies, for instance in data privacy. It enhances consumer protection, but we have to invest in new systems to the next step to ensure the compliance. This adaptation is not really easy in the beginning, it can be resource intensive and complex. I think somehow it might be difficult for us to plan long term strategies due to uncertainty. Most of the policies that were made are not supportive and we don’t really understand about the policy’s background. We also don’t know whether to what extent that kind of government support really matters in other sectors.”*

Participant 1 elaborated : *“Being a digital company, we often feel the insufficient of government support. Although encouraging creativity, innovation, and entrepreneurship is much discussed, in reality we find ourselves struggling to get access for the resources and assistance we need. For example, there are very few grants or funding opportunities specifically aimed at tech startups, and those that exist have demanding application procedures. In addition, the lack of clear policies in the sector often makes hard for us to invest in long-term innovation. We need more tangible support and incentives from the government in order to compete and thrive in national and global scale”*

4.1.4 Limited Internet Coverage

Digital entrepreneurs in Indonesia face a substantial obstacle in the form of inadequate internet coverage, especially in rural and remote regions where access to reliable internet infrastructure is uncommon. Indonesia experiences a significant disparity in digital access between rural and urban areas. The causes for this phenomenon are multifaceted. Rural regions are excessively isolated and there is a deficiency of essential infrastructure.⁷ This challenge is mentioned by 6 out of 9 interviewees

Participant 3 elaborated : *“The challenge of technology adoption in Indonesian society is about signal or network. Because not all areas in Indonesia are covered by cellular networks. This situation must also be adjusted technologically. So when there is no signal, any process that occurs in the field must still be captured. In developing the technology, there is a manual storage mechanism first, then later when there is a signal connection, information can be obtained. But we hope this mechanism won’t be long lasting, the condition will be so much better if areas in Indonesia can be equally have internet coverage. It will be easier for us as a company who wants to develop technology”*

⁷ <https://www.bmz-digital.global/en/news/wie-indonesien-digitale-bruecken-zwischen-laendlichen-gebieten-baut/>

4.1.5 The Absence of Regulations Concerning Technologies

With the continuous evolution of emerging technologies, Indonesia faces a challenge in the form of inadequate regulations about them. Digital entrepreneurs might confront regulatory deficiencies or incongruities that complicate their comprehension of legal responsibilities and hinder their ability to navigate the compliance environment. This uncertainty may restrict the adoption of innovative solutions and impede experimentation. Moreover, the absence of technological regulations can foster an environment conducive to the development of legal and regulatory uncertainties. Digital entrepreneurs encounter difficulties and liabilities in domains including data privacy, cybersecurity, intellectual property rights, and consumer protection in the absence of well-defined guidelines and standards. This challenge is mentioned by 7 out of 9 interviewees

Participant 4 elaborated : *"In Indonesia, there is no strict regulation on technology that we use the most as our core of business, which is AI. So, what we do is we communicate to every stakeholders, especially when it is related to legal and compliance. Sometimes, it is a very tiring process and not so efficient. We must approach one by one regarding the use of AI, make every stakeholders understand what's the function of AI and its relevance to the services that we offer"*

Participant 7 elaborated : *" As a young company, we continuously negotiate the complexity of consumer protection, intellectual property rights, data privacy, and cybersecurity. Unfortunately, in these fields, the lack of well-defined rules and norms presents major obstacles for us. For example, making sure one complies with data privacy rules is difficult when laws vary and not clear. Similarly, protecting our intellectual property becomes a legal minefield without robust enforcement mechanisms. Of course we confuse seeing this condition. We extremely hope that stronger assistance and better rules will enable us to handle these important concerns "*

4.1.6 Gaining Public Trust

Gaining public trust is essential for digital entrepreneurs and reliability plays a critical role in achieving this. When the public questions an entrepreneur's reliability, it typically indicates concerns about the entrepreneur's capacity to consistently fulfil commitments, satisfy expectations, and maintain high standards of quality and integrity. This challenge is mentioned by 4 out of 9 interviewees

Participant 1 elaborated : *"We have to be reliable in platform, technology and quality. That's the reason why we want to measure and monitor. If it's not true, it's usually not good, so actually holding public trust is the most difficult so far. It challenges us to do better and reach highest standards in performing the*

quality of our service. We also believe that doing capacity building to increase digital literacy for our users is essential. We do care about them when they face obstacles in using technology that we develop. It promotes trustworthiness of our company. We can be seen as a reliable company by societies”

4.1.7 Resistance to Transition from Complexity to Simplicity

Humans have an inherent tendency to resist change, particularly when it requires moving away from familiar systems or routines (Warrick, 2023). Digital entrepreneurs may face opposition from consumers, employees, and other stakeholders who are hesitant to adopt easier solutions because of fear of the unfamiliar, perceived lack of control, or worries about interrupting established habits or workflows. Moreover, in Indonesia, there are still gaps in technological literacy, particularly among older and younger generations as well as rural and urban societies. Unfamiliarity with digital technology can cause resistance to adopting easier, user-friendly solutions, as users may choose familiar yet complicated systems. This challenge is mentioned by 5 out of 9 interviewees.

Participant 2 elaborated : *“So usually the challenge is that users can't move on from a system that is already complex to simple things. They are used complex things so they are afraid that if they use simple things, it will be wrong or for example the calculation is not correct or maybe an error. Even though when they use it, there will be a possibility that they are very dependent on a simpler system that we develop based on innovative ideas. But in the beginning, it is quite difficult to ensure them to do changes from difficult things to easy things”*

4.1.8 Concerns about Automation and Job Displacement

Automation and digital technologies are often seen as potential risks to job stability, causing opposition and doubt among employees even end users of the companies. This challenge is mentioned by 4 out of 9 interviewees.

Participant 1 elaborated : *“Our company can automate the system, but if it is automated, some customers think they don't even do anything because their work has been automated. There are thoughts like ‘we don't need to innovate because we are afraid that the work will be reduced or we can be replaced by machines’ However, this is not always the case. Automation will help them, not eliminate them”*

4.1.9 Cost Factors in Innovation and Technology

Digital entrepreneurs may confront hurdles in acquiring and maintaining the essential technology infrastructure to support their innovative endeavors. It can be expensive to build and maintain the digital

infrastructure which includes servers, networking equipment, hardware, and software. This challenge is mentioned by 4 out of 9 interviewees.

Participant 3 elaborated : *“Talking about innovation, of course, there is a matter of cost, there must be such a thing as the goods or services will have to be imported or we developed. That goods or services we considered as our infrastructure to support our business. In this case when we do import for example, the interest rate, the exchange rate will be very important to be considered. Sometimes that condition may become our barrier. It will impact our ability to develop, implement, and scale innovative solutions”*

4.1.10 Importance of Consumer Retention for Financial Stability

Consumer retention refers to the ability of digital entrepreneurs to maintain customer’s loyalty and satisfaction over an extended periode of time. That is essential for financial stability that every entrepreneurs face as it directly impact the long-term viability and success of the business. This challenge is mentioned by 7 out of 9 interviewees

Participant 2 elaborated : *“ We have to really maintain our customers and if we can't maintain them in the next following year and so on, it will be an obstacle in our financial stability. If our financial condition not really stable because of we lose our customers, the company won't be sustain. That's the thing that we don't want to happen”*

4.1.11 Complexity of Managing Competing Priorities

Managing competing priorities is a compelling challenge for digital entrepreneurs in Indonesia, as they navigate the dynamic and diverse demands of creating and scaling a successful business in a rapidly changing digital market. Digital entrepreneurs engage in interactions with a wide range of stakeholders, including consumers, employees, partners, and regulatory bodies. Different stakeholders may possess distinct requirements, expectations, and preferences, necessitating entrepreneurs to balance competing interests and viewpoints effectively. This challenge is mentioned by 4 out of 9 interviewees

Participants 8 elaborated : *“The challenging thing is which priority we want to prioritize from the demands of the stakeholders. Which higher priority do we want to set whether we want to serve the needs of users, or there are internal needs occurred? We have to navigate this complexity though sometimes it makes us confused. But we believe that we have to focus on initiatives that drive the most significant impact on our business growth and sustainability”*

In order to gain a deeper comprehension of the scope of those challenges, the researcher categorized them into more general classification. Besides, the strategies in each classification also described in the next discussion.

4.1.12 The Classification of Digital Entrepreneurs’ Challenges and Strategies that Digital Entrepreneurs used to Address the Challenges

From the findings of specific challenges that digital entrepreneurs in Indonesia encountered during their innovation processes, the researcher summarizes the challenges into five classifications in the Figure 1. These classifications are provided to be more focused in explanation. There are regulation and technology policy, infrastructure and internet access, education and social disparities, technology adoption and transition, and business and financial considerations. In this section, the researcher also investigates how the digital entrepreneurs addressed their challenges in each classification with the evidences elaborated from participants.

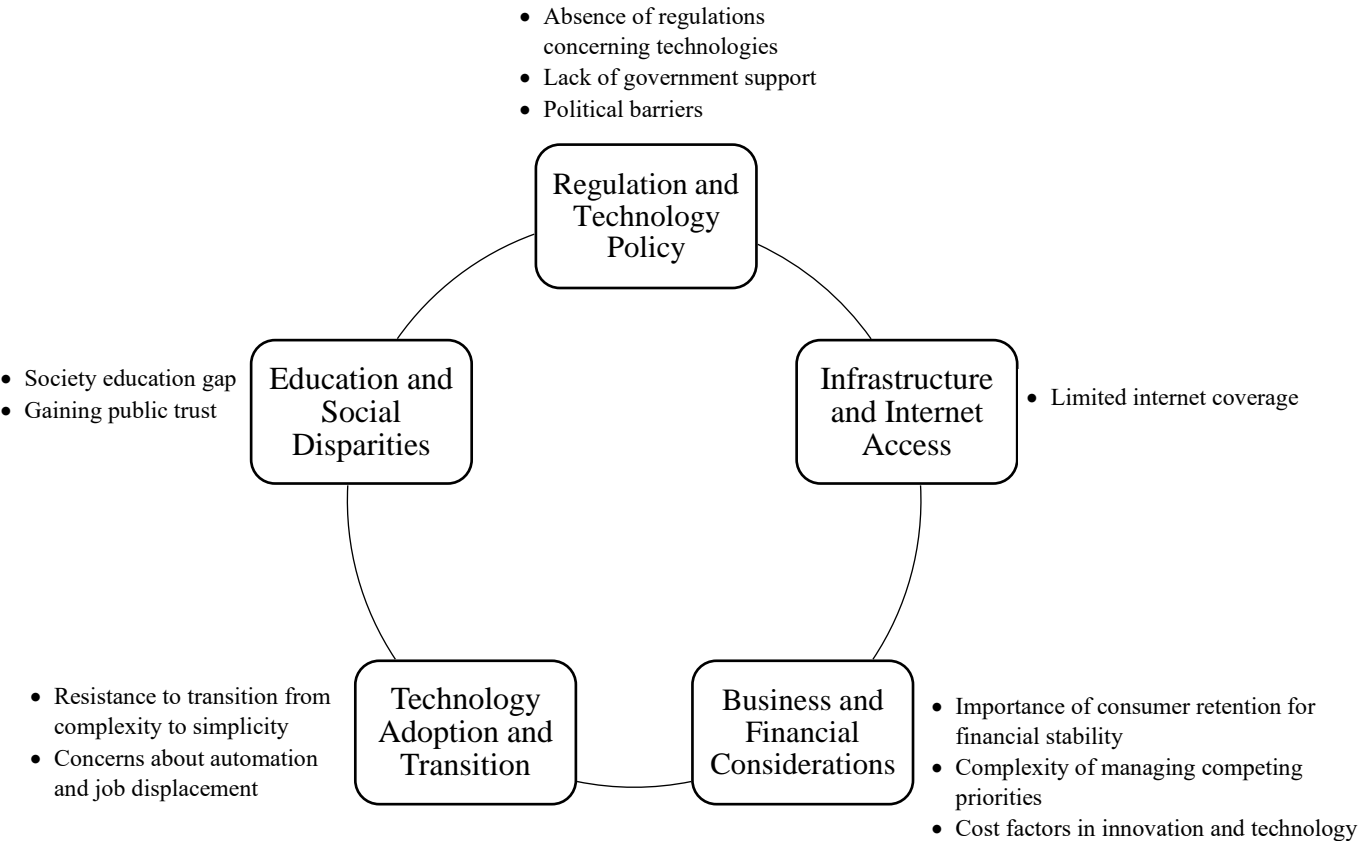


Figure 1 The Classification of Digital Entrepreneurs’ Challenges in Innovation Process

Regulation and Technology Policy

Digital entrepreneurs use diverse strategies to tackle these challenges posed by regulation and technology policy, specifically in circumstances marked by the absence of regulation concerning technologies, lack of government support, and political barriers. First and foremost, in reaction to the lack of technology regulation, digital entrepreneurs state to communicate intensively with their users, particularly regarding legal and compliance issues. This proactive communication strategy aims to mitigate the potential negative impacts of their innovation activities. Despite the limitations of a time-consuming and sometimes inefficient communication process, digital entrepreneurs prioritize stakeholder involvement to assure transparency, compliance, and responsibility.

Participant 4 elaborated : *“The emerging technology we use does not yet have clear regulations from the government. But that technology makes us different from other service providers in similar fields to ours. We are confident that the services we bring to this community will be beneficial. For this reason, we are trying and working hard to involve the public in socializing it and educating them on how to use it. We also monitor how this technology is used appropriately for our customers”*

In addition, digital entrepreneurs proactively adjust their business operations to meet legal requirements and preserve regulatory compliance even though there is insufficient government support and unclear regulations. This could include developing internal business processes, changing product and services offerings, and adopting specific practices to comply with government requirements and standards. These responsive and adaptive strategies reflect the digital entrepreneurs resilience and commitment to keep in line with a constrained regulatory environment.

Participant 2 elaborated : *“We try to comply with government’s regulation even though we have to adapt and adjust that regulations to our operational circumstances. But we try not to take risks in this aspect, we believe that we must comply with the regulations where we are”*

Moreover, digital entrepreneurs do the pivot towards more open stakeholders such as consumers and users, in their business practices. That reflects a pragmatic response by digital entrepreneurs to navigate political barriers and regulatory challenges. They can maintain business development and innovation practices by finding and targeting user niches that offer greater flexibility and acceptability.

Participant 8 elaborated : *“We want to open up opportunities for people to use the products we offer. However, there are obstacles when we want to approach certain groups of customers who have their own procedures. Because our services can be tailored to the business-to-business market segment, so we have to be clever at seeing opportunities here. We do not force our services to be limited to just one party, if there are other opportunities that can offer flexibility, we will do that”*

Infrastructure and Internet Access

Digital entrepreneurs employ a variety of ways to address infrastructure and internet access constraints, notably limited internet coverage. They prioritize offline-capable solutions to guarantee accessibility and usability for users in regions with limited infrastructure and internet access. The technologies are created to function without needing constant internet access, utilizing local data storage, and processing capabilities to provide necessary services and features. The focus on offline usability enhances user experience, encourages inclusion, and supports the implementation of digital advancements in many settings.

Participants 5 elaborated : *“We aim that our services can be provided in rural areas in Indonesia since that is our objective to reach the underserved segments. However, we are constrained by the fact that internet access is predominantly concentrated in big cities. For this reason, we developed technology that can be accessed offline. Hence, we can serve cities and rural areas even though there may be differ but we try to improve day by day. We hope that internet access can also expand to remote areas in Indonesia”*

Business and Financial Considerations

Digital entrepreneurs employ strategic initiatives to tackle business and financial considerations by optimizing resource allocation, securing financial stability, and enhancing consumer retention. They enhance resource allocation by skillfully overseeing competing priorities and investments. This entails focusing on high-impact activities that offer substantial returns on investment and optimizing operational processes to enhance efficiency and cost-effectiveness. This strategy approach demonstrates their commitment to efficiently allocating resources and enhancing the success of innovative efforts, even in the face of cost factors challenges in processing innovation and technology. Besides, they focus on consumer retention strategies to provide financial stability and drive sustainable growth. Digital entrepreneurs improve revenue streams and profitability by prioritizing excellent consumer experiences, personalized services, and value-added solutions to develop consumer loyalty and minimize consumer turnover.

Participant 9 elaborated : *“We try to maintain consumer loyalty so that they continue to use our services, not switch to others. We do this of course to maintain financial stability and sustainability. In particular, we realize that there are cost factors that arise in the business processes carried out so we have to find ways to cover them”*

Furthermore, digital entrepreneurs actively engage with stakeholders particularly to leverage consumers feedback for improvement and innovation. They demonstrate participation approach to improving consumer experiences by integrating consumer insights into product and service development and

business operations. Digital entrepreneurs maintain regular communication with stakeholders through various channels, such as social media and consumer feedback platform. Through stakeholder involvement, digital entrepreneurs collect insights, address concerns, and demonstrate responsiveness, which contribute to the augment of consumer satisfaction and loyalty.

Participants 6 : *“We believe that we can learn from our consumers. We try to improve our services by listening the suggestion from the consumers. We let them to take the position in providing us the critics or feedback. We have channel communication through our customer touch point and socia media as well”*

Moreover, reflect on the findings, the company’s size also influence the business and financial considerations. Large companies require more cost on technology and infrastructure due to the maintenance of their operational activity rather than small and micro groups. That costs evidently affects the business considerations to ensure company’s strategic and objectives.

Participants 5 elaborated : *” We try to invest the infrastructure on technology such as the specific platform to integrate our business. We do that since we believe that development of our business may grow and our employees increase until approximately 1000ish. So, we need sophisticated technology overall. We also think that our infrastructure may influence how we conduct innovation and affect our objectives”*

Technology Adoption and Transition

Digital entrepreneurs addressed the challenge of technology adoption and transition by educating stakeholders on the potential benefits of technology adoption. They strive to generate confidence and trust in society to use new technologies. They frequently launch pilot projects to establish the viability and usefulness of new technologies prior to full-scale implementation. Digital entrepreneurs do that strategies to improve user experience which encourages increased uptake and acceptance of new solutions.

Participant 5 elaborated : *“Before we launch our services, we invite and engage the consumers and representative expertise to assess the technology that we develop. So, we will feel confident when the time to real launch will come. We gain feedback from user experience from the selected representative to improve the services before we launch to the public”*

Moreover, digital entrepreneurs interact with consumers to gain feedback and insights into their concerns about job automation because of technology. They exhibit responsiveness to actively listening their users to effectively addressing concerns. They also promote ethical automation practices that focus on consumer well-being and safety. By integrating protection and quality controls, digital entrepreneurs persuade consumers that automation is designed to augment human connection and oversight, rather than replace them.

Participant 4 elaborated : *“Society seems to feel afraid that technology we develop can replace the function of specific role in the working environment, especially when we talk about job automation. We realize that situation may be happen because the lack of socialization. So, we are trying to promote our services while we also asking about the society’s concerns. We educate them by doing socialization and campaign which demonstrate that technology we offer is safe and helpful to assist their work as long as they can use it properly”*

Education and Social Disparities

Digital entrepreneurs realize the challenges related to education and social disparities, which influence the adoption of innovative solutions. Regarding that, they prioritize inclusive design principles to ensure their ideas are accessible and user-friendly for everyone with diverse level education and digital proficiency. Digital entrepreneurs promote inclusivity and expand the reach of their innovations by considering diverse user needs and capabilities. In addition, they invest in capacity building programs, such as technology use and application training, that enable users from undeserved societies to participate and benefit from their innovations.

Participant 9 elaborated : *“We build platform for our users in order to integrate the services we offer, so our users can easily access them. Before the platform launch, we also engage the users to contribute in making the platform by providing discussion and feedback. We trained them how to use it. Besides, we provide offline platform so our users can access our services in every condition. We aim higher to provide them the convenience”*

Furthermore, digital entrepreneurs adhere to ethical guidelines when developing and deploying their innovation. They frequently do public communication through social media channels about their business practices and inventive ideas to build credibility and establish trust with the public. They also collaborate with trusted partners, such as academic institutions and non profit organizations to develop their credibility and extend their reach. With collaboration as mentioned, digital entrepreneurs utilize the existing networks and resources to build their promotion and reputability.

Participant 4 elaborated : *“Our company cooperate with researcher from universities to test our solutions and learn about the ethical guidelines. We collaborate with specific expertises since it relates to our core technology that we offer to society. We also promote the solutions in public through our websites, so the society can judge to what extent our solutions can solve their needs”*

As we reach the end of the discussion about the challenges that Indonesian digital entrepreneurs encountered and strategies that they addressed, the discussion now turns to the digital entrepreneurs strategies to involve stakeholders in managing innovation processes.

4.2 Digital Entrepreneurs' Strategies to Involve Stakeholders in the Innovation Process

Digital entrepreneurs in Indonesia utilize many strategic methods to engage stakeholders efficiently in the innovation process. By employing the strategies, digital entrepreneurs can leverage the combined knowledge and resources of stakeholders. Hence, they are capable of making more informed decisions, facilitating cycles of innovation, promoting greater market acceptance, and enhancing their competitive edge in the digital domain.

4.2.1 Collaboration with Scholars

Digital entrepreneurs utilize collaboration with scholars as a strategic method to engage stakeholders in the innovation process. By collaborating with academic professionals and researchers, digital entrepreneurs have access to specialized expertise and cutting-edge research findings, that can inform and improve their innovation efforts. This strategy is mentioned by 8 out of 9 interviewees.

Participant 4 elaborated : *"We collaborate with universities, especially with faculties related to our business domain, to see and also calibrate whether the solutions we offer are suitable or not. We are also open and want to facilitate research conducted on campus, especially those that are in line with our business, to be promoted into commercial products"*

This collaboration facilitates the exchange ideas, stimulate multidisciplinary insights, and encourages the enhancement based on strong theoretical foundations and empirical facts. Collaboration with scholars can assist digital entrepreneurs validate their ideas, investigate emerging trends, and develop academic networks for additional resources and support. This collaborative strategy allows digital entrepreneurs to leverage the amount of intellectual capital in academic institutions to effectively advance their innovative ideas.

4.2.2 Stakeholders Engagement Approach

As became visible already above, the digital entrepreneurs in our study recurrently involve stakeholders in the innovation process. This approach emphasizes engaging a range of stakeholders, such as consumers, employees, government, and society throughout the innovation process. The effective

stakeholders engagement approach promotes cooperation, establish trust, and assure that innovation process meets genuine needs and concerns. This strategy is mentioned by 8 out 9 interviewees

Participant 5 elaborated : *“We conduct meeting with stakeholders to testing together, doing demo to observe, and there will be feedback too. We can together know what are the things missing here. That is also feedback for us. It's not just about the concept, but also about the features. The stakeholders are, for example, our end users of course, other employees in our company. In some occasions, we also invite the government for doing discussion about our program.*

Participant 8 elaborated : *“ When we plan to conduct the new solution related our services, we invite our users, especially the loyal users. We do focus group discussions and provide them the opportunity to talk, make questions, reflect about the things that they are really need related to our products. Besides, we also invite the representative from government to see the opportunity that can be combined between the government program and our solution”*

Digital entrepreneurs can collect beneficial insights, feedback, and suggestions for developing and improving innovative solutions by including stakeholders from the beginning and maintaining regular communication. In addition, the engagement of stakeholders in co-creation endeavors, including beta testing, seminars, focus groups, or conferences, serves to not only authenticate the innovation but also foster a sense of ownership among stakeholders, thereby augmenting its adoption and diffusion (Kujala et al., 2022).

4.2.3 Consumer Involvement

Digital entrepreneurs can gain useful insights and views for refining and developing products and services by involving consumers effectively. This strategy is most highlighted since all of the interviewees mentioned this. Consumer involvement can manifest in different ways including contributing ideas through crowdsourcing on web platforms. This initiative can offer direct feedback on prototype and enable consumers to participate creatively to the design and functionality of the innovation ideas.

Participant 7 elaborated : *“We have the strong online community in Facebook and Telegram Group. What we did once was when we wanted to develop a group chat feature in our community group. Our admin asked the group ‘What if we make a chat in the application, would you like to use it?’ Then we'll see the feedback. Most of our consumers said yes, so we develop the feature”*

Involving consumer in innovation process enhances product-market fit, increase consumer satisfaction, and promotes brand loyalty (Roberts et al., 2021). Hence, involving consumers in the innovation process

can enhance digital entrepreneurs' comprehension of consumer expectations and enable them to provide products and services that meet consumer preferences and values, resulting in increased customer satisfaction. Moreover, engaging consumers in the innovation process by actively seeking and using their feedback is an important method for digital entrepreneurs, this is also a form of consumer involvement. Consumer feedback offers crucial perspectives into their preferences, challenges, and unfulfilled requirements, which are essential for improving and advancing innovative solutions.

Participant 1 elaborated : "The best practice is actually to listen to feedback a lot. One of the sources is from user feedback but also we have the feedback from internal. The forms can be by surveys, reviews or from social media interactions There is also a feedback priority, such as how big the impact on our business and the development effort"

By utilizing feedback channels including surveys, reviews, and online interactions, digital entrepreneurs can collect direct input from their target audience throughout the product development cycle and innovation ideas. They can use that iterative process to make well-informed decisions, prioritize features, and customize innovations to better align with society's needs. Consumer feedback is a compelling tool for promoting customer-focused innovation and ensuring that digital entrepreneurs provide solutions that connect with their users and lead to business success.

Besides, learning from consumers become strategy for digital entrepreneurs for developing ideas and driving innovation since consumer are the end-user and beneficiaries of each new product and service. This strategy is the form that digital entrepreneurs engage and involve their consumers as lesson learned. Consumers frequently contribute unexpected insights and ideas as well as sparking innovation. Their comments can spark new features, functionalities, or even entirely new product concepts. Consumer-driven innovation inspires digital entrepreneurs to think creatively and outside the box.

Participant 2 elaborated : "In our process we especially have to learn more from our customers, especially we are most happy if there are customers who come from new segments that we have never visited before. We learn from them about their business and what they really need. Then, we gather that information, discuss with team, select the relevant insights and consider that learning process to build something different for our consumers"

By learning from consumers, digital entrepreneurs can validate their ideas and concepts before completely developing or launching them. Digital entrepreneurs who gather input early in the process can assess consumer interest, identify potential roadblocks, and improve their services accordingly. Besides, they can examine opportunities for innovative solutions and differentiated offers that distinguish themselves in the market.

After the discussion explores about the digital entrepreneurs strategies to involve their stakeholders ,the next discussion investigates on how digital entrepreneurs approach to identify and prioritize societal challenges and opportunities in their innovation process.

4.3 Digital Entrepreneurs' Approaches to Identify and Prioritize Societal Challenges and Opportunities for Innovation

Digital entrepreneurs in Indonesia employ strategic approaches to examine and set up societal concerns and opportunities for innovation. In this section, the research highlights the findings that digital entrepreneurs have a holistic approach that enables them to establish solutions, such as products and services, that resonate with communities, drive sustainable change, and contribute to more prosperous and inclusive society.

4.3.1 Integrated Innovation Process, Top Down and Bottom Up Approach

Digital entrepreneurs adopt top down and bottom up innovation process to investigate and prioritize societal challenges and innovation opportunities. This strategy is mentioned by 3 out of 9 interviewees. Top-down innovation involves innovative strategies and directions that originate from senior management or policymakers and are subsequently implemented throughout the organizational structure. In this strategy, innovation ideas, strategies, and goals are generated at the highest levels of the organization and then disseminated and put into action across the organization (Saari et al., 2015)

Participant 6 elaborated : *“In our company, innovation is usually top-down. From the CEO, then there is the product team. The product team's approach is to design based on the user's needs. There are coordination from various teams to develop products based on the innovation idea from the CEO. The process is transparent. We can coordinate everything though the main idea comes from CEO. The CEO also open if the employees want to provide feedback, before the employee execute the ideas”*

This situation highlights that a CEO in digital entrepreneurship can have a critical role in setting the strategic direction and priorities for innovation initiatives. They are responsible for allocating resources, setting goals, and defining the innovation vision for the organization. Besides, the CEOs cultivate a culture that prioritizes creativity, risk-taking, and experimentation.

Furthermore, bottom up approach involves ideas, insights, and initiatives originating from people at different levels within a business, rather than being exclusively pushed by top management or a centralized innovation team (Wei et al., 2011). Thus, digital entrepreneurs in this strategy enable employees at all levels of a business to provide ideas and insight to contribute into innovation ideas.

Participant 6 elaborated : *“We also have an Innovation Award in our company. We facilitate our employees to create innovations. Innovation doesn't have to be related to creating a new product, but it can also be an improvement of the business process in the company itself. We encourage the employees to share their ideas, perspectives, and experiences to develop something new and fresh in our business process, even products”*

Participant 9 elaborated : *“Our teams work as cross functional teams from different levels and departments who acknowledge different perspectives and expertises in problem solving and innovation. We work together on specific initiatives, so we can leverage our collective knowledge to produce the idea or innovation”*

This situation highlights that adopting bottom up approach allows digital entrepreneurs to rapidly adjust to evolving societal challenges. As societal priorities and new challenges arise, digital entrepreneurs can identify and prioritize areas for innovation by utilizing the collective ideas of their teams. In addition, this approach promotes a sense of ownership and active involvement among employees within the organizations, thereby stimulating an ongoing cycle of enhancement and adjustment. Digital entrepreneurs can maintain their responsiveness and relevance in a dynamic market by fostering decentralized innovation process and encouraging participation from their employees.

4.3.2 Recognizing the Importance of Maintaining Human Touch in Certain Situations

Digital entrepreneurs acknowledged the crucial significance of preserving human touch in certain situations while utilizing technology and innovation to tackle societal challenges. Although digital solutions have the capacity to streamline operations, automate procedures, and increase overall effectiveness. Digital entrepreneurs recognize that certain societal challenges demand more just technological solutions, the social issues also require empathy, personal connection, and understanding of human needs. This strategy is mentioned by 4 out of 9 interviewees.

Participant 1 elaborated : *“Actually, we try to follow the rules. So, for example, the kind of test program that we offer as a service to end user still cannot be assessed 100% by a computer or by technology. We encourage the end user to involve human inside. This means we also acknowledge that the assessment as a part of our service, still needs a human touch in order to be balanced. We can't suddenly eliminate the portion of human regarding the use of technology”*

Participant 4 elaborate : *“Since we operate in the health sector, the technology we develop also involves health workers, especially doctors, in this case. For example, when there is a need for health analysis from the output of the AI technology that we use and develop, it does not necessarily become the most*

important decision used for the patient, but the doctor must take over and analyze it as a comparison. Doctors must also consider the patient's condition in communicating results”

This situation highlights the significance of human-centered approach and empathy in developing situations that genuinely improve the lives of society. Digital entrepreneurs recognize maintaining a human touch to ensure that their ideas are effective and respectful of the complexity and sensitivities involved in tackling societal challenges.

4.3.3 Evaluation Management for Product Quality and Service Excellence

In the current competitive environment, maintaining high product quality and exceptional service delivery is essential for sustainability and consumer satisfaction. Digital entrepreneurs utilize innovative tools and methodologies to continuously improve and evaluate their products and services to society. This strategy is mentioned by 7 out of 9 interviewees.

Participant 8 elaborated : *“We measure and evaluate the effectiveness and quality of our product with comparison method, daily month and daily week, whether transactions increase or not. We examine the consumers feedback of course. Then with new features which we build, do they also have an impact on the evaluation matrix or not. Additionally, like we have a new product, but it turns out that only a few people make it, does this need to be developed again or do we just stop, then just discard it? We do those things as part of our journey to build consumer loyalty and satisfaction”*

This situation underscores that through closely observing critical performance and obtaining consumer insights, digital entrepreneurs can promptly pinpoint opportunities for enhancement and novelty. By taking this proactive approach, they are not only ensure the delivery of exceptional products and services, but also nurture a consumer-centric culture that propels ongoing innovation and growth. Evaluation management enables digital entrepreneurs to overcome societal challenges and capitalize emerging possibilities to create relevant solutions that are inline with the society needs.

4.3.4 Internal Mechanisms Employed for Continuous Improvement and Optimization of Processes

Digital entrepreneurs adopt agile approaches and iterative development practices to foster ongoing enhancement. By assessing the processes, they can quickly adjust to shifting circumstances and stakeholders feedback. The iterative method speeds up innovation cycles and maintains the solutions are aligned with changing society needs and preferences. This strategy is mentioned by 6 out 9 interviewees.

Participant 5 elaborated : *“We measure our process effectiveness by doing the internal evaluation. In Scrum, our agile project management tool, it's called retrospective. This retrospective is important to*

evaluate what we've done right or not, that is an iterative process. We also have tools for product development and evaluate more on the product development process, for instance, what we need to fix from this product development flow"

Participant 8 elaborated : *"From the product engineering team, we have sprints for product development and evaluate more of the product development process, such as what we need to improve on the development flow. we make sure that this product meets the user's desired needs. We continuously improve our process and product since we aim to not only achieve business goals but also contribute positively to societal change by ensuring our products are beneficial and sustainable to the society"*

This situation underscores that the internal mechanisms for continuous improvement and optimization within digital entrepreneurs allows them to adapt to societal change and position themselves as drivers of positive change and innovation in society. Moreover, digital entrepreneurs can pinpoint inefficiencies, bottlenecks, and opportunities for improvement in their operations.

4.3.5 Conducting Product Research with a Focus on Understanding User Needs and Solving Their Problems

Conducting product research with a keen focus on understanding consumer needs and solving their problems is essential to digital entrepreneurs. They can acquire significant insights into the pain areas, preferences, and behaviours of target societies through comprehensive research. Digital entrepreneurs can use this research-driven approach to create creative solutions that directly target the specific demands and issues of people in society. This strategy is mentioned by 7 out 9 interviewees.

Participant 8 elaborated : *"We think about how the product that we offer can solve the user's problem. We definitely do product research, it's all about finding the user needs through surveys or interviews and also we prepare about the challenges. We focused on what we can deliver to people which we aim to be beneficial for them"*

This circumstance underscores that digital entrepreneurs utilize various methods such as survey and interview to collect comprehensive consumer feedback. They might discover hidden needs and innovation potentials by attentively listening to consumers being empathy with consumers experiences. Hence, they can develop impactful solutions that tackle societal issues, lead to beneficial societal results and enhanced quality of life.

4.3.6 Multifaceted Perspectives in Product and Service Development

Digital entrepreneurs adopt multiple perspectives in product and service development which integrating various viewpoints from business and stakeholders. By acknowledging a wide range of perspectives, the digital entrepreneurs can gain a comprehensive understanding of market dynamics and societal need to deliver the ultimate solutions. This inclusive approach not only improve the relevance and effectiveness of entrepreneurial solutions but also fosters creativity and innovation. This strategy is mentioned by 4 out 9 interviewees.

Participant 3 elaborated : *“The multiple perspectives will ensure that the solutions we provide are really fit, reliable, in accordance with the problems faced in the field. The basic multiple perspectives we used are usually three. First, the technology perspective, the second is commercial perspective, the third is the social perspective. Even though the company has a commercial target, there will always be a social impact measurement. Now the perspectives from all of that enrich the solutions that are ultimately provided to the society. Those perspectives are related to our stakeholders, I mean, we cannot use them partially, but we try to see them as a whole. They are useful to make us balance and we aim to be successful in every line”*

Moreover, considering diverse viewpoints assists digital entrepreneurs anticipate the upcoming trends and adjust preemptively to evolving sociocultural environments. This approach allows them to utilize combined knowledge and resources to solve intricate societal challenges more effectively. Besides, they can encourage positive change and contribute to the development of society through entrepreneurial initiatives.

4.3.7 Strategic Planning and Reflection Process

Digital entrepreneurs practice strategic planning by establishing precise objectives, determining desired results, and detailing practical measures to accomplish them. By creating strategic roadmap, digital entrepreneurs align their activities with societal needs and priorities. In addition, they also ensure that their innovations effectively tackle the challenges. This strategy is mentioned by 5 out 9 interviewees.

Participant 3 elaborated : *“The reflection of the company vision will later be derived into several objective strategies that may change every year. Then the key results, targets, and initiatives will also be set. And every year a strategic management meeting mechanism is held to reflect on these things, including how far we have achieved the vision measurement”*

Furthermore, digital entrepreneurs recognize reflection as learning phase throughout their innovation journey. They can derive useful insights for future decision-making and strategy formulation by contemplating prior experiences, mistakes, and accomplishments. Additionally, they can use this

reflective method to improve their comprehension of social obstacles and possibilities, which helps them adjust and modify their innovation strategies effectively.

4.3.8 Comparing and Analyzing Competitors' Strategies

Digital entrepreneurs strategically analyze competitors' strategies to find and prioritize social concerns and innovation opportunities. They use competitive research to pinpoint gaps and chances for differentiation in their offers, enabling them to develop unique solutions that appeal to consumers and stakeholders. This strategy is mentioned by 4 out of 9 interviewees.

Participant 8 elaborated : *“We conduct benchmarking against competitors to identify challenges and opportunities. We also conducted a SWOT analysis where we have to recognize the threats that might come from the existence of competitors. We try to stay informed about what our competitors do, then we reflect on our process. For example, if there are something good, we can adapt but we have to assess that’s suitable or not for us, not copying but improving”*

This situation underscores that this method of comparison and analysis promotes a culture of ongoing enhancement and creativity, motivating digital entrepreneurs to create distinctive and convincing solutions that effectively tackle social issues better than their competitors. Digital entrepreneurs can make well-informed judgments on resource allocation and strategic investments by keeping up-to-date on competitors actions and industry trends. This proactive strategy ensures that entrepreneurial endeavours stay competitive and adaptable to changing societal demands, ultimately promoting sustained growth and influence.

4.3.9 Adaptive Technology Implementation and Continuous Learning

Digital entrepreneurs embrace the adoption of technology and continuous learning as vital components of their approach to identifying and prioritizing societal challenges and innovation opportunities. The technology-driven approach enables them to investigate emerging trends, acknowledge user behaviour, and reveal opportunities for innovation. Moreover, they also prioritize continuous learning by fostering a culture of assessment. That process enables them to refine their acknowledgment of societal challenges and refine their innovation ideas. This strategy is mentioned by 5 out of 9 interviewees.

Participant 2 elaborated : *“We apply technology that suits our needs. If there is a new technology that appears but it doesn't suit us, sometimes we don't immediately implement it. We need to learn first and assess whether or not it is suitable for use or development in the company and also becoming good*

impact for our stakeholders. Through this learning process, we can decide which technology that become main priority for us to develop and implement for users”

This situation highlights that by combining technology-driven insights with organizational learning, digital entrepreneurs are empowered to create new solutions that tackle important challenges and have a positive impact on society. Digital entrepreneurs can establish themselves as agents of change and promoters of innovation in societies by adopting adaptation and learning as fundamental principles.

4.3.10 Data-Driven Decision Making and Technology Utilization

To successfully identify and prioritize social concerns and innovation possibilities, digital entrepreneurs rely on data-driven decision making and utilization of technology. The implementation of data-driven decision making enables digital entrepreneurs to effectively allocate resources and prioritize endeavors related to innovation by relying on empirical evidence. Through the utilisation of data, entrepreneurs can evaluate societal impacts, competitive environments, and market demand to have better information and make informed decisions. This strategy is mentioned by 4 out of 9 interviewees.

Participant 6 elaborated : *“If we don't have a database or based on research then we will oscillate based on assumptions, because we are also a data company so everything for development in the company must have a data baseline for making better decision. We are an innovation-driven enterprise that must be based on research and also based on technology. So, we also try to continue to utilize technology because this technology causes us to be able to scale quickly”*

Furthermore, digital entrepreneurs employ technology to simplify procedures and streamline operations, allowing them to devote more resources to innovation and problem solving. Technology enables digital entrepreneurs to scale their firms rapidly. By leveraging technology, digital entrepreneurs may overcome hurdles, capture opportunities, and achieve long-term growth and success.

After we discuss how digital entrepreneurs approach to identify and prioritize societal challenges and opportunities for innovation, the explanation is now about the digital entrepreneur's contribution to social impact.

4.4 Digital Entrepreneurs Contribution to Social Impact

Digital entrepreneurs are significantly influencing the trajectory of societal advancement by harnessing the power of innovation and technology to drive beneficial social impact. They are not solely generating economic value through their ventures and initiatives, but they are also addressing social challenges and promoting sustainable development objectives. This section explores the diverse ways in which digital

entrepreneurs in Indonesia contribute to social impact. Through a comprehensive analysis of the impact that digital entrepreneurs are having, this research discusses valuable insights into the profound capacity of digital entrepreneurship to promote inclusive and equitable development within Indonesian societies.

4.4.1 Commitment to Support Education Initiatives

Digital entrepreneurs are actively contributing to social impact by demonstrating their commitment to supporting educational initiatives. This contribution is mentioned by 4 out of 9 interviewees. The commitment can come in any form, such as they are utilizing cutting-edge platforms and technology to develop scalable and easily accessible solutions that aim to improve educational opportunities in Indonesia. They are democratizing education through the use of online learning platforms, which offer flexible and affordable options for students from diverse backgrounds.

Participant 5 elaborated : *“We develop online schools because there is a reflection that we are also able to provide something affordable and accessible for society. We want to show that though we come from private sector, I mean not government, we also care about education development in this nation. We collaborate with expertise such as educator and institutions to develop resources that cater to diverse learning needs”*

This situation highlights that by partnering with expertises in education, digital entrepreneurs not only bridge the digital divide but also establish pathways for communities to access quality education. Moreover, digital entrepreneurs commitment to education initiatives underscores the profound impact that digital innovation can have on furthering educational objectives and fostering sustainable development. Digital entrepreneurs are not only revolutionizing the field of education but also contributing to the formation of a well-educated society that is more equitable and inclusive for forthcoming generations.

Participant 6 elaborated : *“As a form of social responsibility, our company provides bootcamp open and free for public who are interested in becoming data scientists. Because we realize that data is important, we don't want to make it just a profit for company. We see the opportunity to master this data will be something valuable in the future. We think society especially younger generation needs to learn about this and we want to facilitate it”*

4.4.2 Equal Opportunity

Digital entrepreneurs are driving initiatives aimed at advancing the principle of equal opportunity. This contribution is mentioned by 4 out 9 interviewees. For instance, they are significantly contributing to the

advancement of diversity and inclusive recruiting practices as they offer to society. They design the services that facilitating opportunities for individuals who might have been disregarded in traditional employment environments. Fundamentally, digital entrepreneurs advocate for equal opportunity by leveraging their platforms to grant individuals and communities the same access to job assessments.

Participant 1 elaborated : *“With the services we are developing, we aim to equalize employment opportunities. By providing a test for job seeker assessment, we are actually making it more likely for everyone to get the test at the beginning of the assessment. So that the assessment is done objectively since everyone get a chance to have same test tools from the beginning“*

Through the promotion of equitable practices, the facilitation of inclusivity, and the encouragement of technology access, digital entrepreneurs are catalyzing constructive social transformation and establishing trajectories towards a more fair and prosperous future for society.

Participant 9 elaborated : *“We build platform and capacity building which can be accessed easily through online and offline choices. From company, we provide mentorship for our consumers to help individual build skills in using emerging technology. It also means we have a chance to learn for ourselves to strengthen our digital skills. We believe that strategy will be beneficial for us to embrace and build the digital company”*

4.4.3 Founder’s Motivation

The founder’s motivation has an important role in driving digital entrepreneurs to create significant contributions to the field of social impact. This reflection appeared in all interviewees. Digital entrepreneurs are driven by a powerful desire to address critical societal challenges and become the sustainable business. This motivation is based on values, experiences or perception of inequities in the society.

Participant 4 elaborated : *“Because we believe that good business has integrity. We want the technology to be really useful for society. And before it becomes useful, we have to do the bare minimum first. Don't abuse the consumer's data, don't abuse the consumer. We want our business become long-lasting and sustainable of course”*

The founder’s motivation acts as compass, shaping strategic choices within the business and compelling the digital entrepreneurs to provide equal weight to social responsibility and profitability. They recognize the fact that their entrepreneurial pursuits may aid in resolving systemic problems and further sustainable development objectives.

4.4.4 Expansion of Services Offer

The expansion of services offer by digital entrepreneurs constitutes a substantial social impact contribution. This contribution is mentioned by 7 out 9 interviewees. As they scale their business and diversify the services, digital entrepreneurs prioritize initiatives that specifically advantage societies and tackle societal issues. Hence, digital entrepreneurs can effectively address urgent social issues and expand their reach to a wider demographic by diversifying their services offerings.

Participant 6 elaborated : *“This year, we launched data consulting services. Previously, we didn't issue data consulting services. Since we have that capability, we finally issued the services this year. So if there are companies that really need data consulting, we can do it. We make diversification of our services since we see that there are might be some needs from consumers that still uncover. We aim to assist our consumers”*

This situation underscores that as businesses grow and diversify, digital entrepreneurs develop resources from their business, stimulate entrepreneurship, and impact social outcomes by addressing service delivery gaps. Besides, they also drive innovation and competitiveness in the market. By expanding their reach and scope of services, digital entrepreneurs can serve and empower societies that benefit the communities.

Participant 2 elaborated : *“We learn from the needs of the customers, of course from their suggestions and feedback. And that is the most important things that we can diversify our services from their input and our observation. We aim to serve the society with our solution efficiently and effectively which beneficial for them at large”*

4.4.5 Offline Accessibility and Security Measures

In several parts of Indonesia, access to a stable internet and digital infrastructure remains a concern. As a result, digital entrepreneurs are creating solutions that can function effectively offline, allowing consumers in remote or underprivileged areas to still benefit from their services. This offline accessibility not only broadens their reach but it also promotes inclusivity by bridging the digital gap and empowering societies who have limited internet access. This contribution is mentioned by 5 out 9 interviewees.

Participant 4 elaborated : *“We made a system that can be accessed offline. So, when you get to an area where the signal is not good, you can still use it. Then we make it flexible, those who don't have the budget to buy a laptop or computer, we have a mobile version, so it can be used on cellphones or tablets so that*

it is also easier to use by users who may not have the budget to buy a laptop For security, we use well-known servers, cloud service providers, but the servers are in Indonesia”

This situation underscores that digital entrepreneurs are also taking proactive initiatives to improve security and privacy on their platforms. In light of the ongoing risks posed to businesses and individuals by cyber threats and data breaches, digital entrepreneurs are allocating resources toward encryption technologies and secure data protection protocols to ensure the protection of user information. Prioritizing security helps digital entrepreneurs build trust with their consumers while also creating a safer online environment for transactions and service access.

4.4.6 Ethical Data Handling and Compliance with Local Laws

In today’s digital age, where data privacy and security are top priorities, digital entrepreneurs recognize the necessity of respecting user data and adhering to rules designed to protect individuals privacy rights. They establish trust with their consumers and demonstrate the commitment to ethical standards. This contribution is mentioned by all interviewees.

Participant 6 elaborated : *“On the data side, our company follows data protection legislation in Indonesia. We want the data that we use and develop not to hurt the social, economic and environmental sides around the community since we also realize that our core business is the data”*

Furthermore, by following local rules and regulations governing data processing and privacy, digital entrepreneurs help to create a safer and more accountable digital environment. They understand the necessity of adhering to cultural norms and legal frameworks in the locations where they operate, which promotes better openness and accountability in their business operations. By demonstrating ethical data handling and compliance, digital entrepreneurs promote responsible business practices and urge industry-wide adoption of optimal data protection methods.

This is the end of explanation about how digital entrepreneurs contribute to social impacts. After we explore the themes, codes and quotations generated from the interviews. The discussion now turns to the relevance of the RRI key dimensions in Indonesian digital entrepreneurship.

4.5 Anticipation, Reflexivity, Deliberation, Responsiveness, and Participation as RRI Key Dimensions in the Innovation Process of Indonesian Digital Entrepreneurship

In this section, the researcher discusses the relevance of the RRI key dimensions as mentioned in Chapter 2 which are visible in the innovation process of digital entrepreneurship in Indonesia. There are anticipation, reflexivity, deliberation, responsiveness, and participation. All of the interviewees mentioned

that they did not know about the RRI framework beforehand when the researcher asked about it. However, digital entrepreneurs in Indonesia are integrating responsible concepts into their business activities, even if they do not officially identify it as RRI, since they are also not familiar with that framework.

Participant 7 elaborated : *“ RRI framework seems not familiar for us, probably in Indonesia too, I think. But we believe, if RRI stands for responsible research and innovation as you mentioned, our practices, business practices as whole, are already responsible. Or at least, if we are not in ideal condition, we are trying to put responsibility in every activities that we conduct, especially when related to our consumers”*

Digital entrepreneurs frequently prioritize sustainability, stakeholder engagement, and ethical considerations in their innovation process. For instance, they develop solutions that promote collaboration and empower local communities. They exemplify a comprehensive business approach that extends beyond the pursuit of profit, incorporating societal effects into their core strategies.

Anticipation

Indonesian digital entrepreneurs engage in research related products and services that they offer to society. This proactive method entails comprehending market demands, user preferences, and the potential social implications of their innovations. They examine factors such as business sustainability, ethical concerns, and social impact assessment to ensure that their innovations and technology development align with responsible and sustainable practices. The company recognizes emerging market trends and potential future needs. They integrate anticipatory elements into their research by proactively examining and addressing long-term challenges and opportunities. This is relevant to anticipation as RRI key dimension, and appears in all of the participants from their practices regardless of the company size. The evidences on anticipation are also mentioned on how digital entrepreneurs prioritize and identify opportunity to innovation as one of themes provided. For instance, they conducted product research to understand and solve the user problems. They analyse the preferences and needs of consumers to create the value of their product and services that they offer. In addition, digital entrepreneurs in Indonesia identifies the risk of exacerbating the digital divide. They develop an offline access to their platform to ensure that their products and services are available to society, specifically for those in remote areas which may lack access to the internet. They anticipate potential problems and establish solutions to ensure their innovations are accessible.

Participant 8 elaborated : *“We discuss how the product that we offer can solve the user's problem. We definitely do product research, to find the user needs and prepare for the challenges. We need to challenge ourselves to have capability in predict and anticipate the future of our consumers, that's why we conduct planning and research to manage them”*

Participant 3 elaborated : *“We realized that not all of the areas in Indonesia have internet connectivity, while our service aims to serve all the citizens, not only in urban but also in remote areas. So, we try to develop offline access in our platform in order to anticipate the potential issue if society in remote areas can't access it. This ensure that our products are available to everyone, regardless of their internet connectivity”*

Reflexivity

Digital entrepreneurs in Indonesia demonstrate self-evaluations which are essential in reflexivity. For example, the entrepreneurs describes how they use comparative techniques and consumer feedback analysis to assess and measure the efficacy and quality of their products. The entrepreneurs also emphasize their flexibility and readiness to modify their plans in response to finding of their assessments. That decisions will lead to the choice whether to continue developing a new product or to stop it entirely if the product is not meeting the needs of consumers.

This reflexivity approach, which is being aware to acknowledge user's concerns, enables digital entrepreneurs to modify and enhance their inventions based on growing society's requirements and preferences, creating greater relevance and acceptance. This is relevant to reflexivity as RRI key dimension and demonstrated by all participants. The evidence of reflexivity is shown in the way digital entrepreneurs prioritize and identify opportunity to innovation as one of themes provided. They have evaluation management for product quality and service excellence.

Participant 9 elaborated : *” We constantly gathered from our users and stakeholders in our development process. This continuous conversation helps us to evaluate our presumptions and make required changes to our products if necessary. We try to ensure that our innovation open to critiques and ready to pivot if needed based on insights “*

Deliberation

Furthermore, digital entrepreneurs understand the significance of including stakeholders in meaningful discussions to incorporate multiple viewpoints, values, and ethical issues in the innovation process. They attempt to gain insights and promote conversations for their innovation initiatives by integrating stakeholders such as consumers, scholars, experts, and policymakers in their decision-making processes. These diverse dialogues foster digital entrepreneurs to produce more informed decisions by involving a richness of perspectives and specialized knowledge. This deliberative process fosters transparency and accountability in decision-making processes which increases the quality and relevance of the solutions that digital entrepreneurs offer to the communities. This is relevant to deliberative as RRI

key dimension and appears in the participants. The evidence of deliberative mentioned in digital entrepreneurs strategies to involve their stakeholders in innovation process as one of themes. They have stakeholder engagement approach which frequently involve stakeholders to plan, test, and ask suggestions related to product and services they offer.

Participant 9 elaborated : *“We have communication channels through our social media for our consumers. In those channels, usually we make interactive sessions for them. We ask about their feedback and ask for suggestions. For instance, when we plan to develop new feature in our platform, we invite them to group discussions talking about what are they need in the feature. In other chances, we invite them to get user trials when we finish develop the feature. For specific issue such as regulation, we also maintain the relationship with government, we connect with them to update the regulations that we may probably adjust in the process that we face if needed”*

Responsiveness

Digital entrepreneurs in Indonesia exhibit responsiveness by fostering a culture of ongoing enhancement and adaptability in the business. This is relevant to responsiveness as RRI key dimension and shown in all participants. The evidence of responsiveness mentioned on how digital entrepreneurs prioritize and identify opportunity to innovation as one of themes provided. They demonstrate a sophisticated grasp of responsiveness by integrating technology, continuous learning, and a human-centric approach. They aim to develop innovations that utilize cutting-edge technology, align with human values, and improve social well-being. They recognize that technology may improve efficiency and scalability but they must learn first which technology priority they have to develop. Besides, it is crucial to consider the human touch to ensure that the solutions are inclusive, accessible and respectful of diverse societies.

Participant 2 elaborated : *“We believe that technology is develop and grow. That is our challenge to adapt and adopt. When we know about the emerging technology, the first thing is we have to learn about the technology then we plan to develop and test if there are needs in the market. We also believe that we can not fully depend on technology. In other words, technology may be harm if there is misconduct. In our roadmap, we are trying to always involve human in developing technology. We make a human-centric design in our platform to make it as user-friendly and we accompany our consumer when they use our services especially for the first timer”*

Participation

In addition, digital entrepreneurs in Indonesia acknowledge the essence of building relationships and networks that allow for significant participation from diverse stakeholders. This is relevant to participation

as RRI key dimension and appears in all participants. The evidence of participation mentioned in digital entrepreneurs strategies to involve their stakeholders in innovation process as one of themes. They utilize collaboration and involvement from a variety of stakeholders to leverage collective knowledge, resources, and feedback to tackle multifaceted societal challenges more effectively. For instance, digital entrepreneurs organize meetings to engage users in testing innovative solutions. Also, they facilitate their employees to contribute in generating ideas regarding the enhancement of existing business flow or new solutions which include in innovation processes.

Participant 4 elaborated :” *We have regular meetings that we also invite user representatives. Usually our loyal users to provide us knowledge about their needs and what are things that we need to improve. We also invite the experts regarding the solutions that we create. What we do is we will always share what we release and what we will develop. In our company, employees have rights to contribute and generate idea actively in the business process. That is also the reason why we have cross-functional team structure in several projects. We let the ideas spread among us as an employee to create the innovation conducive in our company”*

We reach the end of discussion about the relevance of RRI framework in Indonesian digital entrepreneurship. Based on the findings, examples and explanations above, the five key dimensions of RRI framework, such as anticipation, reflexivity, deliberation, responsiveness and participation, are evident in the innovation process of Indonesian digital entrepreneurship, even if they do not explicitly label them as RRI and they do not recognize each of the dimensions. The next discussion turns to explain about the Indonesia’s context for the relevance of RRI framework.

4.6 Indonesia’s Context as Global South Country for the Relevance of RRI Framework

In Indonesia, digital entrepreneurs have demonstrated that they already have a commitment to the RRI framework as explained beforehand. They have shown a responsibility to ethics, collaboration, and sustainability in their entrepreneurial practices to provide effective solutions to fulfil consumer needs and preferences as well as tackle societal challenges. In addition, this research finding demonstrates that digital entrepreneurs in Indonesia promote inclusivity in their innovation practices. This circumstance is evident in the digital entrepreneurs contributions to social impact as one of the themes. Based on Koch (2020), inclusivity encompasses the broader concept of representing and integrating varied perspectives, voices, and expertise into decision-making processes. Digital entrepreneurs encounter the reality that in the context of Indonesia, there are still education and social gaps, specifically between urban and rural societies. They initiate capacity building and training initiatives which they consider important to facilitate individuals from varied backgrounds and provide them with the resources and support needed to actively

participate in innovation activities. Hence, inclusivity is evident as key dimension and can be added to the relevance of RRI framework in the context of Indonesia.

Participant 4 elaborated : *“Our service is not only for society in cities, but also in rural areas. We aim to reach users until remote areas in Indonesia. We know that such a big challenge. We open to suggestion and feedback from our consumers and also expertise, such as from universities that we collaborate to improve our service. For the rural areas, we have a strategy to involve more users and create the collective knowledge. We invite representative and train them as agent of change to use our technology that we offer. Then the agent of changes can deliver their knowledge to their surrounding”*

This is Figure 2 that describe RRI framework in Indonesian digital entrepreneurship with inclusivity as the additional key dimension in the context of Indonesia.

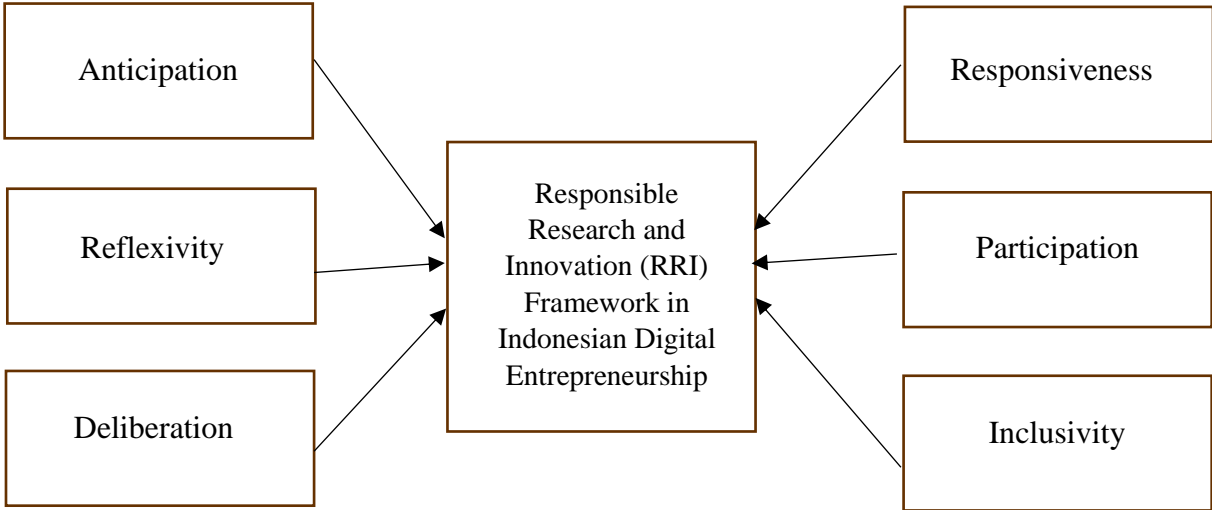


Figure 2 The Responsible Research and Innovation (RRI) Framework in Indonesian Digital Entrepreneurship

After we recognize the RRI framework in the context of Indonesian digital entrepreneurship, the explanation moves to the reflection about the specific conditions in Indonesia which may influence the relevance of RRI framework in digital entrepreneurship.

In Chapter 1, it is mentioned that in Indonesia’s innovation landscape is governed by Law Number 18 of 2002 in Article 22, which mandates that research, development, and application of science and technology must align with societal interests and environmental sustainability. This legal framework ensures that technological and innovation development must benefit the society and protect the environment. Considering the results in relation to this law, it becomes apparent that the responsible innovation practices found among Indonesian digital entrepreneurs may not be purely coincidental. Alternatively, they may result of the national policies established by this law. However, significant challenges still remain

as identified in this research. Those challenges underline the need for ongoing support and reform to enhance the technological and innovation development, specifically in digital entrepreneurship.

Moreover, in several organizations in Indonesia, especially in established companies and government institutions, there is an organizational structure that follows a hierarchy which respect to authority and seniority⁸. However, based on the empirical results which participants come from digital startup companies, it is evident that digital startup companies which can be stated as younger companies are shifting towards a more egalitarian structure. Startup companies, particularly in the digital sector, are characterized by a more informal and flexible work environment⁹. For example, they cultivate a cooperative atmosphere whereby the employees are urged to share their ideas and support initiatives. This openness for participation is relevant to the RRI, as it ensures varied perspectives are included in the innovation process.

While the results imply that digital entrepreneurs in Indonesia are innovating responsibly and adhering to the principles of the RRI framework, it is essential to recognize and address the possible constraints and issues they encounter. For instance, there may be a limited awareness or understanding of the RRI framework among several entrepreneurs, which could result in an inconsistent application of its dimensions. This limitation can lead into different interpretations of RRI dimensions. It is challenging to establish a standardized approach for responsible innovation and to compare best industry practices due to this inconsistency.

Another consideration is the potential for unintended consequences of innovation, which may not be fully anticipated despite the best efforts. For instance, while new digital products and services are supposed to improve user experiences, they might inadvertently exacerbate digital divides or create privacy issues. In addition, the rapid pace of digital innovation can sometimes surpass the ability to conduct ethical and societal effect evaluations, resulting in reactive rather than proactive responses to emerging issues.

Despite efforts, certain problems and circumstances continue to exist that may influence the relevance of RRI dimensions in Indonesian digital entrepreneurship. It is vital to comprehend and overcome these challenges to create a supportive environment that empowers digital entrepreneurs to succeed while maintaining responsible innovation practices.

First, stronger government support for the use of RRI dimensions is needed. The significant challenge is the absence of comprehensive regulations concerning emerging technologies. The rapid technology advancement often surpasses the creation of regulatory frameworks. Emerging technologies such as

⁸ <https://investinasia.id/blog/business-culture-indonesia/>

⁹ <https://online.hbs.edu/blog/post/startup-vs-corporate-culture>

artificial intelligence, provide challenges that established regulatory frameworks may find difficult to handle effectively. However, Indonesia has a decentralized governance structure which may affect the implementation and efficiency of regulations compared to the countries which have centralized structures or other legal regulations (Talitha et al., 2019). The divergence in how various regions in Indonesia interpret and implement regulations might provide extra obstacles for entrepreneurs.

Besides, a potential lack of specialized knowledge and skills could exist within government entities for crafting regulations. Comprehending the complexities of inventive technologies necessitates the cooperation of policymakers, industry professionals, researchers, scholars, and other stakeholders. That is a process that can prove difficult to coordinate efficiently. In addition, the regulatory process may encounter obstacles in the form of competing priorities, budget constraints, and bureaucratic inefficiencies. The factors such as significant time, resource allocation, and political determination are required to develop responsive and comprehensive regulations. These factors may not always align with immediate concerns or objectives. That situation may be similar in other countries.

Furthermore, cultural and background elements may impede the use of RRI dimensions in digital transformation initiatives and contribute to resistance to the new technologies based on empirical results. Embedded traditions and societal habits comprise the culturally diverse landscape of Indonesia, which may impact attitudes and perceptions of technological innovations. There is reluctance when new technologies come to replace the old ones since people may be afraid to change and face digital transformation, or probably eliminate their existing jobs. Concerns regarding the potential effects of technology on cultural values, identity, and community cohesion may contribute to resistance to change (Sunny et al., 2019). Besides, the socio-economic disparities and digital literacy gaps in various regions of Indonesia may lead to resistance to digital transformation initiatives. Limited access to knowledge and resources can impede the equitable involvement of underprivileged people in the digital economy. Issues about data privacy, cybersecurity, and ethical considerations of emerging technologies could increase the resistance among individuals and society.

Additionally, Indonesia is acknowledged for its expanding number of internet users, with a substantial section of the population being able to access the internet as mentioned in Chapter 1. Nevertheless, there are still significant discrepancies in internet coverage and access quality among various parts of the country despite the general trend. Urban areas generally possess superior internet infrastructure compared to rural areas, where access is sometimes restricted and inconsistent. This digital gap leads to unequal chances for participation in the digital economy as a whole for Indonesian society.

Society education gaps in Indonesia also pose significant barriers to the application of RRI dimensions in the realm of digital entrepreneurship and innovation. These educational gaps take many forms, including discrepancies in access to quality education, digital literacy levels, and opportunities for skills development. This situation can limit individuals' ability to engage effectively in research and innovation.

Despite several hurdles in Indonesia's context which can influence or impede the application of RRI dimensions within the digital entrepreneurial landscape, several digital entrepreneurs survive and intentionally integrate RRI dimensions into their operations. Digital entrepreneurs' intrinsic motivation, vision and mission, which frequently leads to creative innovation and problem-solving approaches to overcome challenges and capitalize on opportunities, is a fundamental reason for their resilience. They may naturally include aspects such as inclusion, sustainability, ethics, and governance in their business practices.

4.7 Additional Insights from The Companies Participants

When investigating the relevance of RRI dimensions in this research, it is crucial to consider and reflect on other aspects of the participants involved in data collection, such as companies' backgrounds. The companies' backgrounds specifically the type of companies and industry sector, can considerably influence their approach towards RRI. First, the participants specifically come from digital startup companies which established in less than ten years which means relatively fresh and have the most priority in innovation and growth. Startups are generally formed on novel ideas, products, or services that aim to disrupt existing markets or create entirely new ones. Startups can disrupt existing sectors and business models, upsetting the status quo and encouraging innovation (Zaheer et al., 2022). They have similar concepts which focus on emerging technologies, product development and market expansion, as well as have considerations related to collaboration, inclusivity, and sustainability. Reflecting on the findings, this innovation-centric approach inherently facilitates the incorporation of RRI dimensions as these startups seek creative solutions while considering ethical implications, sustainability, and societal impact.

The industry sector in which digital entrepreneurs operate can have a considerable influence on the application of RRI dimensions, particularly given the distinctive backgrounds of participants from areas such as education, finance, health, and information technology. In the education sector, digital entrepreneurs may focus on improving innovative learning platforms, tools or services to strengthen educational access and quality. In this setting, deliberation and participation are critical for ensuring that educational technology reaches underprivileged groups and fulfils various learning needs. Digital entrepreneurs in the education sector may focus on user engagement, feedback mechanisms, and

collaboration with educators to provide solutions that respond to societal demands and educational objectives.

Other examples from the finance sector, which provides opportunities for digital entrepreneurs to leverage technology to promote financial inclusion, digital payments, and alternative financing models. The anticipatory approach in ethics and governance are essential in ensuring transparency, accountability, and users protection in financial services innovation. Besides, in the health sector, digital entrepreneurs frequently work on healthcare technologies, telemedicine platforms, and wellness solutions to enlarge healthcare delivery and outcomes. They may integrate participation dimension and collaborate with healthcare professionals, scholars, and policymakers to develop technologies that adhere to medical ethics and societal values, resulting in improved healthcare access and patient empowerment.

In addition, digital entrepreneurs in the information technology sector play an essential role in offering advice and technical assistance to consumers from various industries, helping users in optimizing technology to leverage operations, improve efficiency, and accelerate innovation. Governance and compliance are key issues in the information technology sector in terms of legal frameworks, industry standards, and best practices. They may prioritize responsiveness and anticipation to navigate the complicated legal and ethical norms to ensure adherence to data privacy rules, intellectual property rights, and professional code of conduct.

By acknowledging the insights from company's participants based on the industry sector, it becomes apparent that their inherent characteristics and operational focuses support the relevance of RRI dimensions in the findings. The drive for innovation, market disruption, and commitment to collaboration, inclusivity, and sustainability naturally corresponds with the RRI dimensions. This alignment explains why the participants in this research appear to be already adhering to RRI dimensions, as these values are fundamental to their business models and strategies.

5. DISCUSSION

This study aims to explore the role of relevance of the RRI framework in Indonesian digital entrepreneurship. Through investigating how digital entrepreneurs in Indonesia act according to the RRI framework in managing their innovation and technology, this study provides beneficial knowledge into the current state of responsible innovation practices in non-Western contexts. This chapter aims to relate and interpret the results to research questions and objectives, contextualise them with the theoretical

framework, and provide valuable insights for both theoretical and practical implications. Besides, this chapter is open to addressing limitations and exploring insights into areas where future research efforts could focus on improving the robustness and validity of the findings

5.1 Theoretical Implications

This research provides significant contributions to the exploration of integrating RRI dimensions in the innovation process within the context of Indonesian digital entrepreneurship. The findings in this research demonstrate that in Indonesia, digital entrepreneurs act according to the RRI key dimensions, even though unintentionally. It highlights that the RRI framework is inherently relevant in Indonesian digital entrepreneurship. The findings in this research are in line with prior research conducted by Setiawan (2020) that examines the five dimensions of RRI as mentioned in Chapter 2. That study suggests the five dimensions of RRI are applicable but may need adjustment to align with the cultural context and values of Indonesian society. The findings of this research in the context of Indonesian digital entrepreneurship also evident that those five dimensions are applicable. Additionally, there is the inclusivity dimension which can be added based on the empirical results. One of the notable challenges identified is the disparity in education, social, and technology infrastructure, especially between rural and urban areas. This challenge presents the opportunity for digital entrepreneurs to develop tools which can be accessed online and offline for everyone, provide capacity building and training, and include feedback scheme that involves everyone to provide diverse perspectives in creating solutions. Hence, inclusivity is relevant to include in the RRI framework in the context of Indonesian digital entrepreneurship.

Furthermore, this research advances our comprehension of RRI's adaptability across a variety of cultural and economic settings. Indonesia's distinctive entrepreneurial landscape which is characterized by the circumstance of digital transformation and cultural nuances, provides ground for investigating how RRI dimensions might be applied and adjusted in a non-Western context. This study enriches the prior research from Wakunuma et al. (2021) which found that variations in cultural values impact the relevance of the RRI framework in the Global South regions.

This research highlights the transformative capacity of RRI to enhance inclusive and sustainable digital entrepreneurship practices. This research underscores how the RRI dimensions can promote and enable ethical decision-making, responsible innovation, and stakeholder engagement within the digital domain. While the fundamental principles of RRI are being utilized by Indonesian digital entrepreneurs, their relevance and effectiveness can be improved through contextual adaptations. Customizing the framework to recognize local factors, such as disparities in digital access or limitations in regional resources, can enhance the effectiveness and sustainability of the implementation.

By contextualizing RRI within specific socio-cultural contexts, this research emphasizes the need for approaches pertinent to the local environment. In essence, this research enhances the broader discourse on RRI by widening its scope and significance in diverse global contexts, providing valuable perspectives for policymakers, scholars, and practitioners to foster responsible innovation, specifically in Indonesian digital entrepreneurship.

5.2 Practical Implications

While the finding demonstrates that Indonesian digital entrepreneurs are integrating RRI dimensions even unintentionally, there remain significant opportunities for learning and development to enhance their practices. This research underlines the importance of deepening their comprehension of the underlying reasons behind the RRI framework. For instance, grasping the long-term societal and environmental impacts of their innovations can strengthen their commitment to ethical and sustainable practices. Indonesian digital entrepreneurs can promote more thoughtful and ethical innovations by considering the broader impacts of their technology solutions on society.

Moreover, the landscapes of business and technology are evolving. Ongoing education can assist digital entrepreneurs remain relevant in unexpected and novel challenges, such as changes in regulatory framework, shifts in market dynamics, and technological advancements. This proactive approach ensures they remain competitive and responsible in their innovations. Besides, ethical and social responsibility can be further reinforced. Education on ethical framework and social responsibility can assist digital entrepreneurs in navigating complex ethical dilemmas, ensuring their business practices align with societal values and expectations.

This research underscores that cultivating a learning culture within organizations can help digital entrepreneurs stay adaptable and resilient. This includes capacity building, such as regular training and development opportunities, to formalize the principles, facilitate knowledge, and keep up with best practices of RRI and innovation management. The formalization ensures that RRI dimensions are not only coincidental but also embedded into core strategic planning and operational strategies of digital entrepreneurship. Besides, continuous improvement and learning are essential for digital entrepreneurs to not only maintain their current success but also to be well-equipped for future challenges and opportunities.

In addition, this research highlights that the relevance of RRI in digital entrepreneurship can encourage policymakers to organize the framework into national innovation policies and strategies. For instance, specifically in technology regulation, the policymakers can create guidelines for evaluating and controlling

technologies which are considered to impact digital innovations on society and the environment. Conclusively, the practical implications underline the potential of RRI in shifting the trajectory of digital entrepreneurship in Indonesia towards more responsible, inclusive, and sustainable practices.

5.3 Limitations

This research aims to examine the relevance of RRI dimensions in the Global South context, with a specific focus on Indonesia. The distinctive socio-cultural and economic conditions of Indonesia may not fully represent the diverse context across the broader Global South. This specificity aligns with the study objectives of conducting the focused analysis while acknowledging the need for a broader investigation to address the research questions comprehensively.

Besides, this research also focuses on digital startup companies, which may differ significantly from established companies in terms of resources, capabilities, and operational circumstances. Established companies frequently have diverse innovation processes, regulatory compliance frameworks, and stakeholder engagement practices from startup companies, which may influence the implementation and efficacy of RRI dimensions. Hence, the research findings from digital startup companies may not fully convey the greater spectrum of challenges and opportunities associated with responsible innovation in Indonesian digital entrepreneurship.

Moreover, the digital entrepreneurial landscape in Indonesia encompasses numerous industries. The participants in this research come from the education, health, finance, and information technology sectors. Studying a few sectors may not completely encompass the specific details and complexities of responsible innovation practices and challenges. In addition, evaluating the use of RRI dimensions in digital entrepreneurship might provide measurement difficulties. Qualitative methods used to examine RRI's relevance may not have the standardized validity and reliability as quantitative metrics.

5.4 Suggestion for Future Research

There are numerous promising avenues through which future research on the relevance of RRI in the Global South, specifically in Indonesian digital entrepreneurship. It is imperative to conduct additional research in other countries in the Global South to recognize the relevance of the RRI framework in different settings. Besides, examining the role of local and national policies in facilitating or hindering the RRI dimensions is essential. Future research can investigate the effectiveness of policy frameworks to support responsible innovation. This would include evaluating regulatory environments, government initiative programs, and policy interventions to foster the relevance of the RRI framework.

Moreover, conducting comparative analysis across various sectors of the digital mature companies in Indonesia would enhance our comprehension of the distinctive obstacles, best practices, and opportunities associated with the responsible adoption of innovations within each sector. It is also can be considered to examine discrepancies in technological and infrastructure development between urban and rural areas on the relevance of the RRI framework. Future research could explore innovative approaches to bridge the digital divide and ensure equitable access and resources essential for responsible innovation.

Additionally, future research may develop innovative approaches to combine qualitative and quantitative methods to thoroughly evaluate the relevance of RRI dimensions on digital entrepreneurship outcomes. Quantitative analysis can discover correlations and trends between variables, for instance, the relationship between the utilization of RRI dimensions and company performance metrics, such as revenue growth, and market share. Qualitative analysis can provide intricate narratives that clarify how RRI dimensions affect decision-making processes, innovation strategies, and societal impacts within digital entrepreneurship in Indonesia. Also, it is advisable to conduct longitudinal studies to monitor the impact and development of responsible innovation strategies on the outcomes of digital entrepreneurship.

5.5 Conclusion

Regarding answering the research questions in this study, digital entrepreneurs in Indonesia typically act following the RRI framework, even if unintentionally. They integrate RRI dimensions such as anticipation, reflexivity, deliberation, participation, responsiveness, and inclusivity, in managing technology and innovation. However, they encounter significant challenges, including disparities in education and social, regulatory and policy gaps, limited technology and internet access, and business and financial considerations. These concerns emphasize the need for contextual adaptation of the RRI framework to better suit local circumstances.

Indonesian digital entrepreneurs engage stakeholders by involving them in the decision-making process, acknowledging diverse perspectives and inclusivity. They identify and prioritize societal challenges through product research, maintaining human-centric technology use, and conducting evaluations to address critical challenges and opportunities for improvement. Their innovations contribute to social impact by creating tools accessible offline to bridge the digital divide, supporting education initiatives and promoting ethical data handling and compliance with local laws.

The specific conditions in Indonesia both facilitate and impede the relevance of RRI framework. The legal framework established by Law Number 18 of 2002, which mandates that innovation aligns with societal

interests and sustainability, inherently supports RRI dimensions. In addition, the transition towards more egalitarian and cooperative structures in digital startup companies promotes stakeholder engagement and inclusivity. However, substantial challenges persist, such as disparities in educational, social, and technological infrastructure between urban and rural regions, the absence of regulation for emerging technologies and cultural resistance to change.

To summarize, the research of RRI dimensions within Indonesian digital entrepreneurship offers a compelling opportunity to promote ethical, sustainable, inclusive innovation practices. This study, which uses an interdisciplinary lens between business administration and philosophy of science, technology, and society, underlines the relevance of using RRI dimensions such as anticipation, reflexivity, deliberation, responsiveness, participation and the additional finding which is inclusivity, in the context of Indonesian digital entrepreneurship to address societal needs and foster responsible innovation. However, several challenges that digital entrepreneurs encounter and limitations of this study highlight the need of nuanced methodologies and continuous collaboration among entrepreneurs, policymakers, researchers, and society to tackle the obstacles collectively.

Furthermore, this research contributes to the broader context of Global South countries by demonstrating practical approaches which digital entrepreneurs in Indonesia do in their innovation practices. The best practices and lessons learned from Indonesia's experience can serve as a model for policymakers, entrepreneurs, and researchers in other locations, guiding them through the complexity in the face of regulatory, cultural, and economic diversities. By emphasizing the relevance and utilization of RRI dimensions in a Global South setting, this study contributes to a more inclusive and equitable approach to innovation governance outside of Western contexts and encourages responsible practices that prioritize societal needs and digital entrepreneurs' sustainability. Thus, the insights gained from researching the RRI dimensions in Indonesian digital entrepreneurship can stimulate positive change and motivate collaboration initiatives to foster responsible innovation practices throughout the Global South countries.

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APPENDICES

Appendix 1 List of Interview Questions

Semi-Structured Interview

Introduction

Thank you for your participation in this study. My name is Luluk Aulianisa. Currently, I am doing research for my master's thesis at the University of Twente, Netherlands. I am interested in learning about several aspects of how digital companies conduct innovation. For example, whom do you involve in the innovation process and how do you anticipate future developments or impacts of your innovation. I would like to know your perspectives, strategies and experiences about managing the technology and innovation in your company and how the company navigates and contributes to societal and economic advancements. Please answer these questions as best as you can. If there are questions that you do not want to answer, please do not hesitate to let me know. Besides, if there is anything you want to add to the answers to the questions, feel free to do so. There are several things that I would like to explain before the interview starts :

1. Would you mind that the interview will be recorded? The recording will be used for making the interview transcript and will be deleted after the research is complete
2. The information that you provide will be used for research purposes only and will be handled anonymously. The actual interview data will not be shared outside of the research team, that is myself and my supervisors.
3. Your answers will not be judged right or wrong. Please simply answer based your experience and knowledge
4. You can withdraw yourself from participating in this study at any time without explanation.

Do you agree with this arrangement? If yes, we can continue with the interview. Otherwise, we can stop.

1. Background Information

1a. Could you please explain the core of business of your company?

1b. How long have you worked for this company?

1c. What is your current position ? How long have you been in that position ?

1d. Could you explain what your job entails?

1e. Could you describe an example of a remarkable innovation product/services that you manage in the company?

2. *Responsible Research and Innovation (RRI) Dimension - Anticipation*

2a. Regarding this innovation or other innovations of the company, how does your company anticipate the potential impacts of your innovation on society, be they positive or negative? Is this the common way to proceed for all innovations in your company?

2b. How do you identify and assess future challenges and opportunities related to your digital products or services? Do you use any particular tools or processes for that ?

3. *Responsible Research and Innovation (RRI) Dimension – Participation*

3a. How does your company engage with end-users, community groups, or other stakeholders to co-create or test new digital solutions for both products and services?

4. *Responsible Research and Innovation (RRI) Dimension – Reflexivity*

4a. Can you provide examples of how internal feedback mechanisms, for instance, team meetings and internal audits, are used to evaluate and adapt your innovation processes?

4b. How does your company reflect on its role, responsibilities, and societal implications of the business practices and innovation strategies?

5. *Responsible Research and Innovation (RRI) Dimension – Deliberation*

5a. Do you try to include diverse perspectives from both inside and outside the company into decision-making processes regarding innovation? How do you do this?

5b. Does your company collaborate with other organizations (e.g: NGOs, academic institutions, industry partners) in discussing the development or deployment of your product/services? How do you do this?

6. *Responsible Research and Innovation (RRI) Dimension – Responsiveness*

6a. Can you describe situations in which feedback/results/consequences led to significant modification in your business or innovation process ?

6b. Has your company adapted or modified the innovation strategies in response to any social, ethical, or environmental concerns that have been brought up, either from within the company or outside?

7. *General Responsible Research and Innovation (RRI)*

7a. Have you come across the term Responsible Research and Innovation (RRI) and its relation to digital entrepreneurship? If yes, could you explain from your perspective what this means (in general or for your company)?

7b. Do you think that your company is already applying RRI in managing technology and innovation? Could you elaborate further?

7c. If so, what is the motivation of your company to adopt responsible innovation practices?

8. *Integration and Overarching Perspectives*

8a. Reflecting on the processes we discussed , which entrepreneurial practices do you find most challenging to implement and why? What do you gain from it?

8b. How do you measure the effectiveness of your practices in each of those dimensions?

8c. Can you share any best practices or lessons learned from the integration of these processes into your business operation or innovation strategies?

8d. What are your thoughts about the role of RRI evolving in digital entrepreneurship, and what steps are your company taking to align with future developments?

9. *Understanding the local contexts*

9a. Are there any specific cultural or values aspects that influence the innovation processes in your company, in particular the processes we just discussed? ?

9b. Are there any economic incentives or barriers that impact the innovation processes in your company?

9c. Are there any supports from the government for your company, or specific innovations ?

10. *Concluding the interview*

10a. Is there anything you would like to add to what we have discussed already ?

10b. Would it be possible if I approach you once more in case any additional questions emerge ?

This is the end of the interview. I appreciate your participation and time to contribute in this study. I wish you success for your career path and stay healthy. Thank you very much and have a nice day.

Appendix 2 Theme Challenges Encountered by Digital Entrepreneurs in Indonesia

#	Codes	Definition	Sample Quotation
1	Political Barrier	Obstacles in the political sphere, such as bureaucratic red tape, legal constraints, or procedural impediments, impede the attainment of specific aims or goals.	<i>For example, when we have user from education sector. We faced school politics. That is such challenges, because there are many aspects of school regulatories, you have to go everywhere, with procedural stuffs. There are many things, it's difficult.... (P1)</i>
2	Society Education Gap	Discrepancies in educational achievement, availability of high-quality education, and educational results among various sectors or demographics within a society	<i>Education in Indonesia is still unequal in rural and cities. The infrastructure of education is different between them. The most challenging thing is educating potential users. That this technology is not a burden. It's there to help our performance.... (P5)</i>
3	Lack of Government Support	A condition in which the government does not give adequate support, resources, or policies to address a certain issue, need, or sector of society.	<i>The government also has limited appreciation, so it seems that there are indeed companies who take good actions based on their moral compass (P1)</i>
4	Limited Internet Coverage	A condition in which particular individuals or geographic areas have restricted or no access to the internet.	<i>The challenge of technology adoption in Indonesian society is about signal or network. Because not all areas in Indonesia are covered by cellular networks (P3)</i>
5	The Absence of Regulations Concerning Technologies	A situation characterized by the absence of precise regulations, policies, or standards that govern the advancement,	<i>In Indonesia, there is no strict regulation on technology that we use the most as our core of business, which is AI. So, what we do is we communicate to every stakeholders... (P4)</i>

		implementation, and utilization of technologies.	
6	Gaining Public Trust	The procedure through which institutions, organizations, or individuals strive to establish and uphold public trust in terms of credibility, dependability, and confidence.	<i>We have to be reliable in platform, technology and quality. That's the reason why we want to measure and monitor. If it's not true, it's usually not good, so actually holding public trust is the most difficult so far.... (P1)</i>
7	Resistance to Transition from Complexity to Simplicity	Reluctance faced when seeking to streamline or simplify existing complicated processes, systems, or structures.	<i>So usually the challenge is that users can't move on from a system that is already complex to simple things. They are used complex things so they are afraid that if they use simple things, it will be wrong or for example the calculation is not correct or maybe an error... (P2)</i>
8	Concerns about Automation and Job Displacement	Anxieties over the increasing use of automation and other technology that may result in the displacement or destruction of human occupations.	<i>Our company can automate the system, but if it is automated, some customers think they don't even do anything because their work has been automated. There are thoughts like 'we don't need to innovate because we are afraid that the work will be reduced or we can be replaced by machines'(P1)</i>
9	Cost Factors in Innovation and Technology	Expenses incurred by organizations when creating, adopting, and sustaining innovative technology.	<i>Talking about innovation, of course there is a matter of cost, there must be such a thing as the goods or services will have to be imported or we developed, of course the interest rate, the exchange rate will be very important to be considered. Sometimes that condition may become our barrier.... (P3)</i>
10	Importance of Consumer Retention	The significance of consumer retention in securing the financial health	<i>We have to really maintain our customers and if we can't maintain them in the next following</i>

	Financial Stability	and stability of an organization or business over the long term	<i>year and so on, it will be an obstacle in our financial stability (P2)</i>
11	Complexity of Managing Competing Priorities	The difficulty of managing and placing importance on numerous objectives, aims, tasks, or demands that may rival or conflict with one another as part of the obligations of an organization or an individual.	<i>The challenging thing is which priority we want to prioritize from the demands of the stakeholders. Which higher priority we want to set whether we want to serve the needs of users, or there are internal needs occurred... (P8)</i>

Appendix 3 Theme Digital Entrepreneurs' Strategies to Involve Stakeholders in the Innovation Process

#	Codes	Definition	Sample Quotation
1	Collaboration with Scholars	The act of collaborating among academic specialists or scholars in a specific discipline to achieve common goals, develop knowledge, and produce high-quality scholarly output.	<i>We work with academicians to assist measure the social impact of our business. We also work together to test and validate the concepts that we will create for business development (P3)</i>
2	Stakeholders Engagement Approach	Strategies employed by entrepreneurs to actively include stakeholders in a range of areas related to their products or services	<i>We conduct meetings with stakeholders to test together, doing demos to observe, and there will be feedback too. We can together know what are the things missing here. That is also feedback for us. It's not just about the concept, but also about the features (P5)</i>
3	Consumer Involvement	The involvement can be consumer thoughts, remarks, recommendations, and assessments about their interactions with product or service. Entrepreneurs acquire comprehension, insights, and knowledge regarding consumer preferences, interactions, feedback, and behavior in order to improve customer experiences, products, and services, and to guide decision-making.	<i>For end users, we have a WhatsApp group, so it's like a mini community there, we can listen what their insights and involve end users there when we try to initiate ideas or develop new services (P2)</i>

Appendix 4 Theme Digital Entrepreneurs' Approaches to Identify and Prioritize Societal Challenges and Opportunities for Innovation

#	Codes	Definition	Sample Quotation
1	Integrated Innovation Process, Top Down Bottom Up Approach	A technique in which an organization's senior leadership or management initiates and cascades innovation initiatives and strategies down its organizational structure as top down approach. Moreover, the bottom up approach is the method that aims to utilize the ideas and perspectives of employees at every level	<i>In our company, innovation is usually top-down. From the CEO, then there is the product team. The product team's approach is to design based on the user's needs. There are coordination from various teams to develop products based on the innovation idea from the CEO (P6)</i>
2	Recognizing the Importance of Maintaining Human Touch in Certain Situations	Acknowledging the value of human connection, empathy, and social interaction, especially in situations where automation or technology may otherwise dominate	<i>We are a digital clinic but that doesn't mean we want to eliminate the real clinic because not all problems can be solved with technology, we still need human interaction. We also continue to provide facilities so that the service still has a human touch approach. (P8)</i>
3	Evaluation Management for Product Quality and Service Excellence	Evaluation, monitoring, and enhancement of the quality of services and products provided by entrepreneurs.	<i>There is a master list of all feedback both internally and externally. The goal can track the feedback whether it has high priority or not. This is not only to ensure the product is good but also we want to provide service excellence (P4)</i>
4	Internal Mechanisms Employed for Continuous	The systems, processes, and practices used in an organization to consistently improve and	<i>We measure our process effectiveness by doing the internal evaluation. In Scrum, our agile project management tool , it's called</i>

	Improvement and Optimization of Processes	simplify its operations, procedures, and workflows.	<i>retrospective. This retrospective is important to evaluate what we've done right or not.....(P5)</i>
5	Conducting Product Research with a Focus on Understanding User Needs and Solving Their Problems	Analysis of the needs, preferences, and challenges of specific consumers to guide the enhancement or creation of a product or service.	<i>We think about how the product that we offer can solve the user's problem. We definitely do product research, it's all about finding the user needs and also we prepare about the challenges... (P8)</i>
6	Multifaceted Perspectives in Product and Service Development	This approach acknowledges the importance of taking into account many perspectives, experiences, and requirements in order to develop more thorough, creative, and successful solutions.	<i>The multiple perspectives will ensure that the solutions we provide are really fit, reliable, in accordance with the problems faced in the field. The basic multiple perspectives we used are usually three. First, the technology perspective, the second is commercial perspective, the third is the social perspective. Even though the company has a commercial target, there will always be a social impact measurement. Now the perspectives from all of that enrich the solutions that are ultimately provided to the society (P3)</i>
7	Strategic Planning and Reflection Process	The systematic and deliberate creation, execution, and assessment of plans and projects aimed at achieving long-term objectives.	<i>The reflection of the company vision will later be derived into several objective strategies that may change every year. Then the key results, targets, and initiatives will also be set.....(P3)</i>

8	Comparing and Analyzing Competitors' Strategies	Assessing the methods, strategies, and projects used by competitors in the same market or industry.	<i>We conduct benchmarking against competitors to identify challenges and opportunities. We also conducted a SWOT analysis where we have to recognize the threats that might come from the existence of competitors (P8)</i>
9	Adaptive Technology Implementation and Continuous Learning	The process of incorporating innovative technological solutions into an organization's operations and workflows while encouraging a culture of continuous learning and skill development in order to leverage the benefits of these technologies.	<i>We apply technology that suits our needs. If there is a new technology that appears but it doesn't suit us, sometimes we don't immediately implement it. We need to learn first and assess whether or not it is suitable for use or development in the company and also for our stakeholders (P2)</i>
10	Data-Driven Decision Making and Technology Utilization	The implementation of data analytics and technological tools to provide information and assistance for an organization's decision-making process.	<i>.....We are an innovation-driven enterprise that must be based on research and also based on technology. So we also try to continue to utilize technology because this technology causes us to be able to scale quickly (P6)</i>

Appendix 5 Theme Digital Entrepreneurs Contribution to Social Impact

#	Codes	Definition	Sample Quotation
1	Commitment to Support Education Initiatives	A commitment on the part of communities, organizations, or individuals to actively advocate for the enhancement of educational access, outcomes, and resources for students of all ages.	<i>We develop online schools because there is a reflection that we are also able to provide something affordable and accessible for society.... (P5)</i>
2	Equal Opportunity	The principle of ensuring equitable and unbiased treatment, access to resources, opportunities, and opportunities for all individuals, irrespective of their origin, characteristics, or circumstances.	<i>With the services we are developing, we aim to equalize employment opportunities. By providing a test for job seeker assessment, we are actually making it more likely for everyone to get the test at the beginning of the assessment. So that the assessment is done objectively (P1)</i>
3	Founder's Motivation	The individual ambitions, values, targets, and wishes that motivate an entrepreneur to commence the process of establishing and developing a company.	<i>We want to have business that long lasting and sustainable. We don't want to survive today but no for tomorrow (P1)</i>
4	Expansion of Services Offer	The deliberate act of expanding the entrepreneurs' offers in terms of goods, services, or solutions in order to satisfy changing user demands, seize new revenue streams, and spur company expansion	<i>This year, we launched data consulting services. Previously, we didn't issue data consulting services. Since we have that capability, we finally issued the services this year. So if there are companies that really need data consulting, we can do it... (P6)</i>

5	Offline Accessibility and Security Measures	The technological implementations, protocols, and strategies that guarantee the accessibility and security of data, systems, and resources, even in environments that are disconnected or unavailable.	<i>We made a system that can be accessed offline. So, when you get to an area where the signal is not good, you can still use it....For security, we use well-known servers, cloud service providers, but the servers are in Indonesia (P4)</i>
6	Ethical Handling Compliance Local Laws	The proper process and protection of data according to ethical principles, privacy legislation, and legal requirements applicable to a certain geographical location or country.	<i>On the data side, our company follows data protection legislation in Indonesia. We want the data that we use and develop not to hurt the social, economic and environmental sides around the community.... (P6)</i>

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