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Examining Grassroot Innovation: A Case Study of the Curry Puff Maker Machine Project from a Socioeconomic Perspective

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Abstract: Grassroots innovation is a customised innovation programme aimed at empowering the community by demonstrating creativity, resourcefulness, and technological proficiency to tackle issues that impact their daily life. Yayasan Inovasi Malaysia (YIM) is a prominent institution in Malaysia that serves as an anchor for this endeavour. This study examines a project that was awarded an innovation grant to produce curry puff makers and distribute the machines to individuals from marginalised demographics, including single moms, handicapped individuals, and others. The methodology of research for this study involves using a qualitative method, namely a descriptive case study approach, to engage with the grant recipient. The feedback was evaluated using thematic techniques. The project has successfully achieved its objectives across the four examined categories: social, economic, environmental, and technological adoption.

Keywords: *Grassroots, innovation, curry puff, funding, YIM*

1. Introduction and Background

The Yayasan Inovasi Malaysia (Innovation Foundation of Malaysia) is a government-appointed institution responsible for promoting innovation among Malaysians, with a special focus on grassroots-level initiatives. This esteemed agency is collaborating closely with many government organisations like the Ministry of Science, Technology, and Innovation (MOSTI), the Small and Medium Enterprises Corporation (SME. Corp.), the Malaysian Technology Development Corporation (MTDC), and numerous more.

The National Science, Technology, and Innovation Policy (NSTIP) 2121-2030 of Malaysia places significant emphasis on the utilisation of science and technology, together with creative mindsets and cultures, to stimulate the economic development of the country. The second objective of the NSTIP is to coordinate the collaborative endeavours of key stakeholders, including the government, business, academia, and the community, in the fields of research, development, commercialization, and innovation (R&D&C&I) to strengthen the nation's technological advancement capabilities. An effective approach is to prioritise social innovation as a means of delivering advantages to marginalised and underprivileged populations. The initiative has specified that funding would be allocated to social innovation initiatives that may generate social impact via the utilisation of science, technology, and innovation.

Grassroots innovation refers to the generation and implementation of novel and imaginative concepts by local groups or people within a society. The creative solutions are driven by the community's needs and barriers, to tackle social, environmental, and economic concerns at the local level (Seyfang & Longhurst, 2015). Grassroots innovation in Malaysia can exert a substantial societal impact (Syah et al., 2021). Small-scale farmers in rural parts of Malaysia have adopted cost-effective and ecologically sustainable farming practices (Zainoddin et al., 2018; Syah et al., 2021). These locals have integrated conventional agricultural methods with contemporary technologies to optimise their crop production while minimising ecological impact (Singh et al., 2019). Engaging in this practice not only enhances their well-being but also fosters sustainable farming methods, ensures food security, and promotes ecological conservation in their respective areas (Prasetyo, 2016).

In addition, the emergence of grassroots innovation in Malaysia has fostered the creation of renewable energy

initiatives that are based on community involvement. These efforts utilise local resources like solar electricity and biomass to deliver clean and cost-effective energy to rural regions. This reduces reliance on non-renewable sources and enhances the living conditions of the local population (Hossain, 2018). In addition, grassroots innovation has empowered underprivileged groups in Malaysia, providing them with a platform and the resources to tackle their social and economic obstacles.

Grassroots innovation is closely linked to the Sustainable Development Goals (SDGs). Marini et. al. (2022) did a study which revealed that over 68% of grassroots innovation efforts have at least one explicit environmental effect that corresponds to the components of the Sustainable Development Goals (SDGs). Sustainable food production methods, sustainable natural resource management, and equitable land access all exert a substantial influence. This study provides conclusive evidence that the utilisation of SDG-based categorization is an advantageous instrument for quantifying the environmental consequences of grass-roots innovation.

The corpus of the article starts with a literature review to discuss the notable determinants that have been examined in previous studies. It is then followed by method, discussion, and conclusion.

2. Literature Review

This section examines four often cited criteria, drawing on past research. Similarly, the same criteria are also employed in evaluating the performance of innovation initiatives that received funding from the government's innovation award. The considerations include technical acceptability, environmental impact, social influence, and economic implication.

Acceptance of Technology

When analysing the elements that affect the acceptability of technology in grassroots innovation, it is essential to consider the social and cultural settings in which these innovations are being accepted (Shin et al., 2019). The community's attitudes and opinions regarding technology have a substantial impact on its adoption and integration. Furthermore, the accessibility and cost of the technology, together with its perceived usefulness and simplicity of use, play a crucial role in determining its adoption (Chauhan & Kar, 2019).

The acceptance of technology among grassroots communities is influenced by cultural norms, beliefs, and traditions. It is crucial to thoroughly examine the particular dynamics of each community and comprehend how technology corresponds to their current behaviours and beliefs (Shin et al., 2019). Moreover, the significance of local leaders and influencers should not be underestimated, as their support for a certain technology may significantly influence its adoption among community members.

Essentially, to thoroughly analyse the elements that affect the acceptability of technology in grassroots innovation, it is necessary to have a profound comprehension of the community's social, cultural, and economic structure, together with an appreciation of the possible consequences of integrating technology (Singh et al., 2019). Grassroots innovation is a method of technical advancement that originates from the community itself, considering the group's unique demands and conditions. Hence, to gain a comprehensive understanding of the determinants that impact the acceptability of technology in grassroots innovation, it is imperative to actively include community members in participatory research. By engaging the local populace in the study procedure, one might acquire a more profound understanding of their distinct viewpoints, requirements, and apprehensions about the implementation of technology (Patnaik & Bhowmick, 2019).

Furthermore, it is important to analyse the historical record of technology interventions in the community to get insight into both previous accomplishments and shortcomings. The historical context can offer useful insights and guide decision-making on the implementation of new technology. Furthermore, it is important to consider the effects of external factors, such as government regulations, funding prospects, and collaborations with external groups, to comprehend the wider environment in which grassroots innovation functions (Prasetyo, 2016). The Chinese government's endorsement of grassroots innovation, demonstrated via regulations and financial backing, has been essential in the country's achievements and extensive acceptance (Shin et al., 2019).

Although social and cultural factors certainly influence the acceptability of technology in grassroots innovation, it is crucial to acknowledge the possible disadvantages and obstacles that come with integrating technology in these communities (Zelenika & Pearce, 2011). A major issue revolves around the possible loss of conventional behaviours and values as a result of the use of new technology. Oftentimes, the swift assimilation of technology can result in the erosion of cultural identity and history, since societies may favour modernity at the expense of safeguarding their distinct cultural legacy. Countries like India have acknowledged and tackled this issue by advocating for a "technology with tradition" strategy, which involves incorporating modern technologies in a manner that is consistent with and honours old customs and values (Shin et al., 2019).

Environmental impact

The environmental effects of grassroots innovation may be observed from several viewpoints. To begin with, grassroots innovation can serve as a viable strategy for achieving sustainable living. The reason for this is that grassroots innovation focuses on resolving the specific challenges faced by local communities. These efforts can encourage the adoption of sustainable living habits, resulting in a beneficial environmental influence (Gupta & Sharma, 2007). Furthermore, grassroots innovation has the potential to result in the preservation and efficient use of resources. This phenomenon arises from the fact that the majority of grassroots innovation concepts encompass do-it-yourself endeavours like rainwater collection, composting, and energy-efficient technology. These initiatives together contribute to the reduction of total resource consumption (Sareen & Nathan, 2016).

Furthermore, grassroots innovation can facilitate the adoption of renewable energy by employing small-scale solar panels, wind turbines, and bioenergy projects. Consequently, these initiatives have the potential to diminish reliance on fossil fuels and promote the adoption of cleaner energy alternatives (Smith, Raven & Vergragt, 2010). Furthermore, grassroots innovation has the potential to enhance the preservation of biodiversity. This is highly pertinent, as certain endeavours entail the advancement of sustainable farming methodologies that may have a good impact on ecosystems and contribute to the preservation of biodiversity (Hazra & Choudhury, 2015). Finally, grassroots innovation can promote the adoption of waste reduction and recycling measures. This statement is valid because grassroots innovators frequently generate inventive ideas or solutions to decrease waste and encourage recycling habits. Consequently, these efforts contribute to the reduction of environmental contamination and the preservation of resources (Acosta & Giurco, 2017).

From the preceding discussion, it can be inferred that grassroots innovation plays a substantial role in tackling environmental issues through the use of local expertise and community involvement. These programmes, which are frequently customised to address particular requirements, enable communities and cultivate a feeling of accountability towards environmental concerns. Grassroots ideas offer efficient, localised solutions and possess the capacity to spark wider transformation when duplicated in different places. Although there are obstacles such as a scarcity of resources, these endeavours can be enhanced by smart collaborations and institutional backing. It is essential to acknowledge and promote bottom-up innovation to establish a more sustainable and balanced connection between humans and the environment.

Social Effect

The effects of grassroots innovation in Malaysia on society are significant since it not only tackles local issues but also enhances the general welfare of the community (Syah et al., 2021). By implementing these cutting-edge solutions, communities are empowered to generate enduring transformation from the grassroots level, cultivating a feeling of ownership and resilience. Furthermore, grassroots innovation fosters inclusion and social fairness by guaranteeing that disadvantaged and impoverished groups have access to essential resources and opportunities (Prasetyo, 2016). Grassroots innovation in Malaysia has a favourable social influence since it tackles local obstacles, advocates for sustainability, and empowers marginalised people (Rami et al., 2018).

Nevertheless, there are obstacles and difficulties in the extensive implementation and expansion of grassroots innovation in Malaysia (Prasetyo, 2016). Several obstacles encompass restricted availability of financing and resources, insufficient recognition and backing from governmental institutions, and the necessity for legislative frameworks that acknowledge and encourage grassroots innovation. However, the capacity of grassroots innovation in Malaysia to stimulate social and economic progress is enormous. The technology possesses the capacity to improve the conditions of disadvantaged populations, tackle social and economic obstacles, and

make a positive impact on the long-term progress of Malaysia. Similarly, other nations are encountering the same obstacles. India, China, and Brazil possess dynamic grassroots innovation movements that actively tackle local concerns and propel societal change (Smith et al., 2014). Grassroots innovation has a notable societal influence since it tackles specific local problems, empowers underprivileged people, advocates for sustainability, and encourages diversity.

Prasetyo (2016) emphasises that the social effect of grassroots innovation is significant because it empowers underprivileged groups, promotes sustainability, and fosters inclusion. Frequently, grassroots innovation functions under a constrained financial framework. Consequently, the innovators must exhibit resourcefulness by extensively utilising locally available resources to tackle the challenges faced by the community. This strategy not only results in practical solutions for communities but also cultivates a feeling of responsibility and adaptability among individuals (Smith et al., 2014; Patnaik & Bhowmick, 2020). Moreover, grassroots innovation possesses the capacity to generate a cascading impact, stimulating and encouraging others to engage and become catalysts for transformation in their respective communities. Grassroots innovation can facilitate favourable societal transformation by tackling local obstacles, advocating for sustainability, empowering underprivileged groups, and promoting inclusiveness (Prasetyo, 2016).

Economic Implication

Grassroots innovation is also expected to bring positive economic implications to the nearby society that resides in the same vicinity as the innovators. This is essential because innovation must be able to change the economic lifestyle of the community through better ways of dealing with daily problems. In the context of Malaysia, YIM has emphasised on this component by ensuring that every project that receives funding, must incorporate this component into their innovation plan (Mohamed Salleh et al., 2020). Therefore, many successful grassroots innovation projects under YIM will also depict economic transformations of the innovator as well as the community involved in the project.

Furthermore, tax incentives and subsidies directed towards the private sector have been consistently identified as viable strategies to stimulate innovation. The efficacy of tax incentives in fostering innovation has been well-established in several wealthy nations. However, their effectiveness in developing countries is still under investigation. The World Bank Institute's analysis indicates that tax incentives exclusively benefit certain developing and low-income nations (OECD., 2019).

This is particularly true in nations characterised by non-specialized economic sectors and inept tax administrations (Taufik et al., 2022). Granting research bodies with particular resources would be more advantageous for the government in this scenario (Kouam & Asongu, 2022). In their work, Borras and Edquist (2019) have expressed similar views on the importance of a comprehensive innovation policy. According to research by the United Nations University, Rhyner (2017) argues that grants and tax incentives might help stimulate innovation in poor countries. However, tax incentives may be more impactful when the government specifically targets the financial and private sectors to foster economic growth. Allocating the funds towards innovation expenditures would be wasteful, whereas using them for other purposes would be more beneficial.

To summarise, tax incentives primarily focus on promoting the advancement of research and development (R&D). These incentives are particularly advantageous for emerging countries that possess a substantial tax administration and a thriving private sector. Nevertheless, in nations characterised by substantial informal economies, feeble tax administrations, and significant disparities between large and small enterprises, it may be necessary to allocate R&D funds on a more limited basis. R&D grants provide significant potential to support grassroots entrepreneurs aiming to into the formal economy.

3. Research Methodology

This research used a qualitative approach, specifically the case study method by interviewing the innovation grant recipients who in this study as the key informants, to gather feedback and contextualise it according to the themes. A descriptive case study provides a comprehensive understanding of intricate problems and explains natural occurrences based on the facts under investigation (Zainal, 2007). The objective of qualitative descriptive research is to capture and convey the personal experiences of persons or participants in a manner

that is comprehensible to others (Lambert and Lambert, 2012). This methodology offers comprehensive accounts of the experiences provided by the primary sources to the interviewer (Yin, 2013). The qualitative method also is commonly used in many countries and settings for grassroots innovation assessment (Song, Xu, Chen, Xu & Jiang, 2024; Hausmann & Schwab, 2024).

There are several types of case studies, and this research is based on a descriptive case study. The process is guided by research protocol to ensure that the study adheres to the highest ethical standard and that the key informants are treated properly, as well as to ensure the information collected is handled professionally.

The project team of innovation grant for curry puff maker was a start-up company that was attached to the local university in Malaysia. The start-up company has two key persons which are the CEO and director (the postgraduate student was the Chief Executive Officer (CEO) and the lecturer was the director). A set of questions were asked to them which was then analysed based on thematic procedure.

4. Results and Discussion

This project was awarded to a start-up company that is attached to one of the public universities in Malaysia to manufacture curry puff maker machines. The fund was channelled from the SME. Corp. to YIM to be managed under a scheme which is known as Inclusive SME Ecosystem (i-SEE). The i-SEE scheme is a continuation of the innovation grant, the High Impact Programme 6 (HIP 6) which was ended in 2020 parallel with the SME Masterplan 2012-2020.

The goal of i-SEE is to empower the lowest 40% of the income pyramid (B40) via innovation. The project aims to promote community development, specifically focusing on small businesses in rural regions, by offering advice, technical assistance, and financial aid. In this context, the curry puff maker was intended to be manufactured and distributed to the pre-identified beneficiaries who belong to vulnerable groups such as single parents, low-income communities, disabled people, and others.

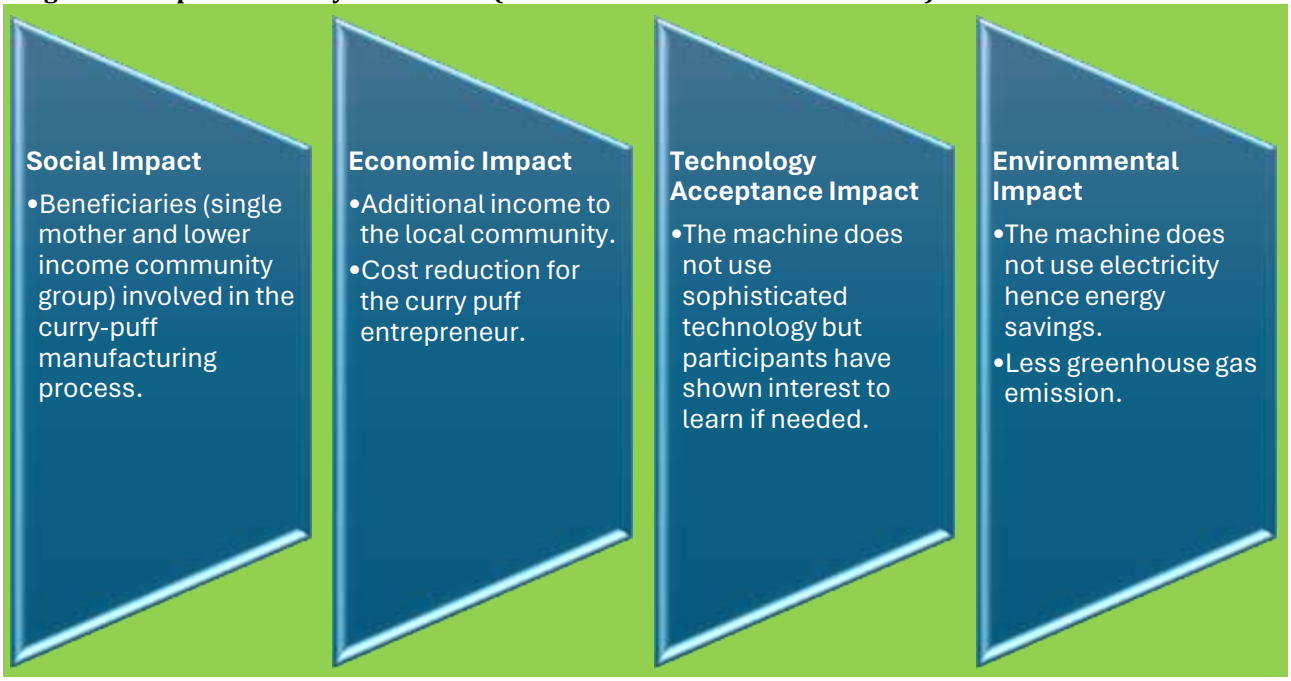
Based on the four factors used as reference criteria when evaluating this project, it signifies that every component has been met. For social effect, this curry puff maker has been distributed to the beneficiaries and has been used by them to make the food for commercialization. It has helped their production capacity and income generation, which contributes to a better lifestyle.

As for economic implications, they are related to social effects. The machine can produce 150 pieces of curry puff in one hour, compared to 25 pieces when done manually. The machine has 12 slots, which can be replaced with several sizes of curry puff mould. This has contributed to economies of scale for production and a reduced requirement to hire workers. Hence, the production cost can be maintained at a reasonable level with better pricing to get more profit. This machine does not require electricity, so another important component of cost reduction is its ability to reduce.

In terms of technology acceptance and adoption, this machine does not use a sophisticated system, but it is easy to use in all walks of life, especially for those involved in this cottage industry who are from a lower education background. Thus, handling sophisticated machinery can be a problem for them. Nevertheless, the machine is developed based on the innovator's observation and transformed through the use of technology to manufacture it.

The last component, which is environmental impact, is given serious consideration by the funder so that the money is used wisely for not only addressing the gap that happened in the business or society setting but also contributing to improving the environment. The curry puff maker does not use electricity, thus contributing to better environmental preservation in the form of less energy use, resulting in less greenhouse gas emissions resulting from non-renewable energy use for electricity.

Diagram 1: Impacts of Curry Puff Maker (Receiver of i-SEE Innovation Grant)



5. Conclusion

It is exciting to note that the curry puff maker project has been able to meet the project's objectives prescribed by the innovator. To preserve the relevance of its role and remain competitive in the market, the machine requires ongoing modification.

The project team's perseverance, together with the solid backing from the funder, YIM, deserves commendation for initiating the project even during the COVID-19 outbreak while strictly adhering to limited engagement and social distancing protocols.

It would be advantageous if the relevant government agencies and private institutions, including cooperatives and banks, continued to provide substantial support for this type of innovation grant and participated actively in this social endeavour. This will accelerate grassroots innovation development in a particular country (Roysen, Bruehwiler, Kos, Boyer & Koehrsen, 2024).

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