

From Waste to Empowerment: Social Innovation and Sustainability Impact of WISE Waste Bank in Karawang, West Java, Indonesia

Taufik Ismail¹, Jauhari Ali², Cita Insaniah Muhammad³, Arizky Rachmad S⁴, M. Zakky A. M⁵

^{1,2,3,4,5}(PT Pertamina Patra Niaga Fuel Terminal Cikampek)

ABSTRACT: The WISE Waste Bank (Waste Innovation for Social Empowerment) is a community-based waste management initiative established through the Corporate Social and Environmental Responsibility (TJSL) program of PT Pertamina Patra Niaga Fuel Terminal Cikampek in Pasirtanjung Village, Karawang, Indonesia. This study analyzes the social, economic, and environmental impacts of the WISE program as a form of social innovation for sustainable development. Using a qualitative descriptive case study, data were collected through interviews, participatory observation, questionnaires, and document analysis, supported by triangulation to ensure validity. Findings show that WISE has transformed waste management behavior from open burning and dumping into participatory and circular practices. Socially, it enhances community participation, strengthens gotong royong values, and empowers women and vulnerable groups. Economically, it provides waste-based savings, increases household income, and fosters local entrepreneurship. Environmentally, it reduces open burning in more than 17 sites, improves irrigation quality, and turns organic waste into valuable products. Recognized through the 2024 ProKlim Utama Award, WISE demonstrates how CSR-based social innovation can effectively integrate empowerment and sustainability in rural communities.

Keywords - Corporate Social Responsibility (CSR); Social Innovation; Community Empowerment; Circular Economy; Waste Bank

1. INTRODUCTION

Waste management has become one of the most pressing challenges faced by almost all regions in Indonesia, including Karawang Regency. With a daily waste generation of approximately 1,100 tons, Karawang faces significant environmental pressures driven by population growth, industrial expansion, and increasing social and economic activities. Without a proper waste management system, waste accumulation can lead to water, air, and soil pollution, degrading public health and environmental carrying capacity. This condition indicates that waste management is not merely a technical problem but also a social, economic, and environmental issue that requires an integrated approach.

At the national level, regulatory frameworks have shifted toward a more sustainable paradigm in waste governance. Previously, waste management relied heavily on the “collect–transport–dispose” system focused on final disposal. However, Law No. 18 of 2008 on Waste Management mandates a systematic, comprehensive, and sustainable approach emphasizing waste reduction at its source. Government Regulation No. 81 of 2012

further outlines the technical management of household and similar waste, while Presidential Regulation No. 97 of 2017 targets a 30% reduction and 70% handling rate by 2025. In addition, Ministerial Regulation No. P.75/2019 requires producers to develop waste reduction roadmaps by 2029. With such a clear regulatory foundation, the next challenge lies in translating these policies into actionable practices at the local level, particularly through community participation.

Locally, Karawang Regency faces limitations in waste management infrastructure, including landfill capacity and waste transportation facilities. As a result, much of the waste remains unmanaged, often ending up in open burning or illegal dumping practices. This situation not only exacerbates environmental degradation but also lowers community well-being. Therefore, strengthening community-based waste management has become an urgent solution.

One innovative form of community-based waste management increasingly adopted in Indonesia is the waste bank (*bank sampah*). The concept of a waste bank not only emphasizes sorting and collecting recyclable waste but also serves as an instrument for community empowerment. Arumdani et al. (2021) note that waste banks encourage residents to regularly sort and deposit inorganic waste in exchange for incentives. Similarly, Saleh et al. (2023) highlight that waste banks are not merely technical mechanisms but also social spaces that enable communities to actively participate in environmental management. Putra and Ismaniar (2020) further assert that waste banks can become empowerment tools that improve livelihoods while enhancing environmental awareness.

Consistent with these perspectives, several studies confirm the success of waste banks as participatory approaches. For example, Mulyana et al. (2022) emphasize that community empowerment in waste management can be effective when supported by continuous non-formal education. Lukman (2021) adds that community participation is key to ensuring program sustainability, especially when residents develop a sense of ownership and collective responsibility. Thus, waste banks can be understood as social innovations integrating environmental, social, and economic dimensions.

In Karawang Regency, Pasirtanjung Village in Lemah Abang District has emerged as a successful example of community-based waste management through the establishment of the WISE Waste Bank (Waste Innovation for Social Empowerment). This program was initiated through collaboration between the village government, local communities, and PT Pertamina Patra Niaga Fuel Terminal Cikampek under its Corporate Social and Environmental Responsibility (TJSL) program. The WISE initiative demonstrates that Corporate Social Responsibility (CSR) is not limited to financial assistance but can also take the form of capacity building and empowerment to address environmental issues.

The WISE Waste Bank adopts community empowerment as its core strategy. Empowerment is understood as a process in which individuals or groups previously limited in access to development resources are given opportunities and support to enhance their capacity, independence, and quality of life. According to Putra and Ismaniar (2020), community empowerment in waste management allows people to gain direct social, economic, and environmental benefits. This aligns with Mulyana et al. (2022), who view empowerment as a continuous learning process involving knowing, acting, living together, and evolving.

In practice, the WISE Waste Bank generates impacts across three major dimensions. First, environmental impact, where the initiative reduces waste sent to landfills, eliminates open burning previously conducted at over 17 sites, and improves irrigation channels previously clogged by waste. Organic waste processing into compost, planting media, eco-enzymes, maggot cultivation, and biogas production adds both environmental and economic value. Second, social impact, reflected in increased participation across diverse community groups—farmers, housewives, youth, and vulnerable populations. This participation strengthens awareness of the 3R

principles, revives the gotong royong (mutual cooperation) culture, and creates inclusive social engagement, particularly empowering women and marginalized groups. Third, economic impact, marked by increased household savings, diversification of circular economy-based enterprises, and the strengthening of village social enterprises. Waste, once seen as worthless, now generates income and opens new opportunities such as maggot and catfish farming, eco-enzyme production, and biogas utilization for small enterprises.

Based on these findings, this research aims to analyze the social, economic, and environmental impacts of the WISE Waste Bank CSR program in Pasirtanjung Village, Karawang. This study provides a comprehensive understanding of how community empowerment-based CSR can deliver sustainable solutions to waste challenges while improving rural livelihoods. Moreover, it enriches academic literature on community-based waste management and offers practical insights for local governments, businesses, and civil society in developing effective and inclusive replication models.

In essence, the WISE Waste Bank is not merely a waste management program but a social innovation that integrates environmental, social, and economic dimensions within the framework of sustainable development—making it a relevant model not only for Karawang but also for broader national learning on the role of CSR and community empowerment in addressing Indonesia's waste crisis.

2. RESEARCH METODOLOGY

This study aims to analyze the social, economic, and environmental impacts of the Corporate Social Responsibility (CSR) program *WISE Waste Bank (Waste Innovation for Social Empowerment)* in Pasirtanjung Village, Lemah Abang District, Karawang Regency. To achieve this objective, a case study method with a qualitative descriptive approach was employed. This approach was chosen based on the consideration that qualitative methods allow for a deep understanding of complex and multidimensional phenomena, particularly in the context of CSR program implementation. The case study design was deemed appropriate as it enables detailed exploration of the dynamics, processes, and outcomes that emerge from the implementation of the *WISE Waste Bank* across social, economic, and environmental aspects.

The data for this study were obtained from two main sources: primary data and secondary data. Primary data were collected through in-depth interviews with the *WISE Waste Bank* managers, community members, village officials, and key stakeholders such as PT Pertamina Patra Niaga Fuel Terminal Cikampek and the Environmental and Sanitation Agency of Karawang Regency. In addition to interviews, participatory observations were conducted on waste sorting, weighing, recording, and distribution activities, as well as on organic waste processing into compost, planting media, *eco-enzyme*, biogas, and maggot cultivation. These observations provided empirical insights into waste management practices while also enabling an understanding of social interactions and community participation in daily activities. Furthermore, questionnaires were distributed to residents to measure participation levels, perceived benefits, and the extent to which the program impacts social, economic, and environmental dimensions.

Secondary data were obtained from official village documents, *WISE Waste Bank* logbooks containing records of activities, waste volume, and financial transactions, as well as national regulations and policies on waste management, including Law No. 18 of 2008, Government Regulation No. 81 of 2012, Presidential Regulation No. 97 of 2017, and Ministerial Regulation of Environment and Forestry No. P.75/2019. These data were used to provide policy context and to strengthen the validity of field findings.

Data collection was carried out using a triangulation technique, combining interviews, observations, and document studies. Triangulation was applied to ensure data credibility so that the findings accurately represent real conditions in the field. Semi-structured interviews were used to capture the perceptions and experiences

of informants, while direct observations allowed the researcher to observe the dynamics of activities on site. Documentation complemented and enriched the data with formal written records.

Data analysis employed the interactive model of Miles and Huberman (1994), which consists of three stages: data reduction, data display, and conclusion drawing/verification. During data reduction, field data were selected and focused on information relevant to the research objectives. In the data display stage, the findings were organized into descriptive narratives to facilitate interpretation. Finally, conclusions were drawn by interpreting the data to answer the research questions and verified by comparing the results of interviews, observations, and documentation.

This research design is expected to provide a comprehensive understanding of the implementation of the *WISE Waste Bank* as part of a CSR program that not only focuses on waste management but also contributes to sustainable development through the integration of social, economic, and environmental dimensions.

3. RESULTS AND DISCUSSION

1. The WISE Waste Bank Program

The WISE Waste Bank (Waste Innovation for Social Empowerment) represents a community-based waste management model that originated as a local initiative in Pasirtanjung Village, Lemah Abang District, Karawang Regency, and has since evolved through the support of the Corporate Social and Environmental Responsibility (TJSL) program of PT Pertamina Patra Niaga Fuel Terminal Cikampek. The establishment of the WISE Waste Bank demonstrates that waste management should not be perceived merely as a technical issue related to sanitation, but rather as a platform for social innovation, economic empowerment, and community development.

Initially known as *Gemka*, the waste bank was established in 2022 under the Village Head Decree No. 148.12/032/II concerning the Formation and Designation of the Village Waste Bank. The creation of *Gemka* marked the village government's initial step, together with the community, to establish a structured and sustainable waste management institution. The organizational structure was formalized by appointing Endang Sutisna as Chairperson, Alfin Septian as Secretary, Nizar Aulia as Treasurer, Deden Juanedi as Administrative Officer, and Anugrah Pekerti as the person in charge of sorting, weighing, and recycling. This structure became an essential foundation, emphasizing that waste bank management is a collective effort requiring clear organizational governance, rather than an individual activity.

At the beginning, *Gemka*'s activities focused on inorganic waste management—such as plastic bottles, cardboard, gallons, and scrap metal—in Krajan 1 Hamlet, which served as a pilot area. Organic waste was also processed into compost and planting media. The positive outcomes from this pilot project encouraged the expansion of the program to the entire village. However, as the scale widened, various challenges emerged, including limited infrastructure, human resources, and fluctuating community participation.

To overcome these challenges, the waste bank partnered with PT Pertamina Patra Niaga Fuel Terminal Cikampek through its CSR program and collaborated with the Environmental and Sanitation Agency (DLHK) of Karawang Regency. This collaboration became a turning point in *Gemka*'s development, transforming it into the WISE Waste Bank. The program expanded its operations by integrating circular economy activities. Organic waste was not only processed into compost but also used for maggot cultivation, producing animal feed for fish and poultry. Additionally, eco-enzyme production, improved planting media, and the utilization of rice straw waste into biogas were introduced to support local micro, small, and medium enterprises (MSMEs). This transformation marked the shift of WISE from a simple waste deposit system into a center of social and economic circular innovation.

The success of the WISE Waste Bank in integrating environmental, social, and economic dimensions was

recognized nationally. In 2024, it was selected as part of the Climate Village Program (ProKlim) organized by the Ministry of Environment and Forestry (MoEF) and received the ProKlim Utama Award, acknowledging its contribution to emission reduction, climate adaptation, and waste management policy targets under Presidential Regulation No. 97 of 2017.

Further development occurred in 2025 when the WISE Waste Bank was officially recognized by the Karawang Environmental Agency under Decree No. 600.1.173/Kep.965-Bersih/2025 on the Designation of WISE as an Official Waste Bank Unit. This recognition expanded its operational scope from the village level to contributing at the regency level, including managing non-hazardous waste (non-B3) from PT Pertamina Patra Niaga Fuel Terminal Cikampek. Thus, WISE's evolution illustrates a multi-stakeholder collaboration model that began as a village initiative and grew into a regional movement with national recognition. Each stage of this development signifies improvements in institutional capacity, activity diversification, and measurable impact—demonstrating that CSR programs can effectively foster community-based waste management models that generate environmental, social, and economic benefits.

2. Social Impact

The WISE Waste Bank has not only served as a technical mechanism to reduce waste accumulation in Pasirtanjung Village but also as a platform for social transformation. Since its establishment in 2022, it has gradually and consistently changed local mindsets, behaviors, and social relations. It has strengthened collective participation, nurtured ecological awareness, expanded empowerment opportunities, and revitalized social capital rooted in communal cooperation (*gotong royong*).

A major social change is reflected in the growing community participation. Initially, only a few dozen households in Krajan 1 joined as pilot participants. Over time, membership expanded to include farmers, housewives, youth, and vulnerable groups. This cross-group participation signifies a shared awareness that waste management is a collective responsibility. As Saleh et al. (2023) noted, waste banks function as social spaces that promote collective community engagement in economically valuable waste management. In Pasirtanjung, this participatory shift has fostered a strong sense of ownership toward community-driven environmental solutions.

WISE has also increased knowledge and awareness of the 3R principles (reduce, reuse, recycle) through workshops, continuous training, and hands-on activities. This has resulted in behavioral change, as households now routinely sort organic and inorganic waste. Some women's groups process organic waste into liquid fertilizer and eco-enzyme products for domestic use and income generation. This aligns with Mulyana et al. (2022), who emphasized that community empowerment is closely linked to lifelong learning processes that enhance both technical competence and critical social awareness.

The program has also been instrumental in empowering women and vulnerable groups. Women are not merely passive members but key actors in managing and developing social enterprises. Their involvement in producing eco-friendly products has improved household income and self-reliance. Similarly, vulnerable groups who previously lacked access to economic opportunities are now engaged in collection and sorting activities, enabling inclusive participation across the community.

WISE has also revitalized social solidarity. Communal activities such as collective waste collection, training, and product development fostered strong social interactions. This revived the cooperative spirit characteristic of rural communities. Moreover, collaboration with village authorities, DLHK Karawang, and PT Pertamina Patra Niaga has expanded social networks, reinforcing that waste management is part of a broader multi-sectoral partnership involving government, business, and civil society.

Overall, the social impact of the WISE Waste Bank can be summarized in four dimensions:

- 1) Increased community participation across social groups.

- 2) Enhanced knowledge and behavioral change regarding 3R practices.
- 3) Empowerment of women and vulnerable groups, contributing to household and social resilience.
- 4) Strengthened solidarity and partnership networks among community members and institutions.

These outcomes demonstrate that community-based waste management can serve as an effective instrument for social development, fostering inclusiveness, self-reliance, and collective well-being.

3. Economic Impact

Beyond its environmental and social contributions, the WISE Waste Bank has generated significant economic impacts in Pasirtanjung Village. It has created a community-based economic mechanism that enables households to save, earn additional income, and develop new businesses, while strengthening the village's institutional economy.

First, the program increased the economic value of waste. Through a structured deposit system, households can exchange recyclable materials such as plastic, paper, and metal for monetary value recorded as savings. These savings can be withdrawn for household expenses, education, or emergencies. The waste bank's financial logbook shows a steady rise in monthly transactions, reflecting both membership growth and higher waste volume—turning waste banking into a grassroots microfinance mechanism.

Second, the program contributed to household income enhancement. Although not a primary income source, the additional savings are meaningful, especially for low-income families. Women often use them for daily needs, while farmers allocate them for agricultural inputs. This shows that the waste bank strengthens financial resilience among rural households.

Third, WISE promoted business diversification based on the circular economy. Supported by PT Pertamina Patra Niaga's CSR program and DLHK Karawang, WISE evolved into a hub for productive innovation. Organic waste is processed into maggots (sold as animal feed), catfish farming, eco-enzyme, and organic fertilizer production. Agricultural residues like rice straw are converted into biogas, supporting MSMEs as a renewable energy source—reducing production costs and advancing local energy resilience.

Fourth, WISE fostered the formation of community-based enterprises such as the *Gemka Group* (producing planting media and compost), *Gapoktan* (developing agricultural and mushroom businesses), *Women Farmers Group* (producing snacks and home gardens), *Pansimas* (clean water and sanitation services), and *Hidayatul Burhan School* (funded by waste-based revenue to support underprivileged children's education). This illustrates the rise of social enterprises that strengthen local economic structures and community welfare.

In broader terms, these impacts demonstrate the realization of a circular economy model at the village level where waste becomes a renewable resource that sustains livelihoods and local enterprise.

4. Environmental Impact

The WISE Waste Bank has made a tangible contribution to improving environmental quality in Pasirtanjung Village. Before its establishment, waste was often disposed of in open areas or burned near residences, causing air pollution, clogged irrigation channels, and health problems. With limited municipal waste services, communities relied on unsustainable methods. WISE transformed this situation by introducing waste sorting, recycling, and reusing practices, creating significant ecological benefits.

A major environmental achievement was the reduction of open burning at over 17 known sites. Through household-level sorting, residents now separate inorganic waste for recycling and process organic waste into compost, eco-enzyme, maggot feed, and biogas. This system drastically reduced waste residue reaching landfills or open dumpsites.

Additionally, the program influenced agricultural practices. Farmers who once burned rice straw now repurpose it for mushroom cultivation, planting media, and organic compost—some marketed under the brand “Jeks.” This transition reflects the community’s shift from waste disposal to sustainable resource utilization.

WISE also improved the village irrigation system, which was frequently clogged by plastic waste. With consistent waste segregation, water flow improved, boosting agricultural productivity. These outcomes highlight the interconnection between waste management, environmental restoration, and agricultural sustainability.

The program’s achievements were recognized nationally when WISE received the ProKlim Utama Award in 2024 from the Ministry of Environment and Forestry, acknowledging its success in climate adaptation and mitigation. The program aligns with Presidential Regulation No. 97 of 2017, which targets a 30% waste reduction and 70% waste handling rate by 2025.

Thus, WISE’s environmental impact can be understood at three levels:

- 1) Local – reduced open burning, cleaner air, and improved water systems.
- 2) Community – behavioral change fostering an eco-conscious culture and sustainable farming.
- 3) National – contribution to 3R-based waste management and climate change mitigation goals.

In summary, the WISE Waste Bank demonstrates that community-based waste management can effectively address rural waste problems while contributing to national sustainability and climate resilience. The program exemplifies how collaboration among communities, government, and private sectors can create a cleaner, healthier, and more sustainable environment through grassroots ecological transformation.

Figure 1: Organic Waste Processing for Maggot Production, Ezoenzyme Products, Planting Media, Compost, Mushroom Cultivation, and Biogas



4. Conclusion

The WISE Waste Bank in Pasirtanjung Village, Karawang, demonstrates that community-based waste management is not only a technical solution to environmental problems but also an empowerment instrument that generates mutually reinforcing social, economic, and ecological impacts.

From a social perspective, the presence of the WISE Waste Bank has brought about tangible transformation in village life. The program has increased community participation across various groups, including farmers, housewives, youth, and vulnerable groups, creating an inclusive space that strengthens the sense of shared ownership over environmental programs. Through non-formal education and regular training, community members gain an understanding of the 3R (Reduce, Reuse, Recycle) principles, which then translate into daily behaviors in sorting and managing waste. Women and vulnerable groups are not only beneficiaries but also key actors in productive waste-based activities, creating sustainable empowerment. Furthermore, the WISE Waste

Bank has revitalized the culture of mutual cooperation and social solidarity, which had declined, while strengthening partnerships with local government, PT Pertamina Patra Niaga, and the Karawang Environmental and Sanitation Office.

From an economic perspective, the WISE Waste Bank has shifted the community's perception of waste from something worthless to a valuable economic resource. Through a waste-based savings system, residents can exchange inorganic waste for rupiah, which can be used for household needs, education, or urgent requirements. The economic impact is also reflected in tangible contributions to household income, which, although supplemental, strengthen family financial resilience. Moreover, circular economy-based business diversification—such as maggot farming, catfish cultivation, ecoenzyme production, organic fertilizer, and the conversion of rice straw into biogas—opens new business opportunities that support village economic resilience. Social-economic institutions in the village have become stronger with the formation of business groups such as Gemka, Gapoktan, Women Farmers' Groups, and Hidayatul Burhan School, proving that waste management can transform into an instrument for strengthening the local economy while supporting basic community services, including education.

From an environmental perspective, the WISE Waste Bank has made a significant contribution to improving the village's ecological quality. Prior to this program, Pasirtanjung Village faced serious issues, including open waste burning at more than 17 sites and clogged irrigation channels due to household waste. The WISE Waste Bank has successfully reduced burning practices, minimized waste residues, and improved irrigation flow conditions. The utilization of organic waste for compost, planting media, ecoenzymes, maggot feed, and biogas has promoted environmentally friendly and sustainable management practices. The transformation of farmers' behavior in processing rice straw—from burning it to using it as raw material for mushrooms, compost, and commercial planting media—demonstrates positive effects that extend to the agricultural sector. This success received national recognition through the ProKlim Utama Award from the Ministry of Environment and Forestry in 2024, affirming the WISE Waste Bank's contribution to national targets for emission reduction and climate change adaptation as mandated in Presidential Regulation No. 97 of 2017.

Overall, the WISE Waste Bank is concrete evidence that CSR programs based on community empowerment can provide multidimensional solutions to waste problems. This innovation not only addresses technical waste management issues but also strengthens social cohesion, enhances economic resilience, and ensures environmental sustainability. This model is worthy of replication in other regions as a best practice example of integrated community-based waste management and as a tangible contribution to sustainable development agendas at both local and national levels.

5. REFERENCES

1. Arumdani, I. S., Puspita, A. S., & Budihardjo, M. A. (2021). MSW handling of top 5 leading waste-producing countries in Southeast Asia. *IOP Conference Series: Earth and Environmental Science*, 896(1).
2. Crysmayanti, D., Novia, L., & Andini, T. (2021). Descriptive analysis in social research. *Journal of Social Science and Education*, 5(3), 114–122.
3. Ministry of Environment and Forestry. (2008). Law of the Republic of Indonesia Number 18 of 2008 on Waste Management. Jakarta: KLHK.
4. Ministry of Environment and Forestry. (2012). Government Regulation Number 81 of 2012 on Household Waste and Household-Like Waste Management. Jakarta: KLHK.
5. Ministry of Environment and Forestry. (2017). Presidential Regulation of the Republic of Indonesia Number 97 of 2017 on the National Policy and Strategy for Household Waste and Household-Like Waste Management. Jakarta: KLHK.
6. Ministry of Environment and Forestry. (2019). Ministerial Regulation P.75/MenLHK/Setjen/Kum.1/10/2019 on the Roadmap for Waste Reduction by Producers. Jakarta: KLHK.

7. Lukman, A. I. (2021). Community empowerment through nonformal education at PKBM Tiara Dezzy Samarinda. *Diklus: Journal of Nonformal Education*, 5(2).
8. Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage.
9. Mulyana, M., Pawan, A. P., & Maabuat, E. E. (2022). Community empowerment through the development of Tondok Bakarlu tourism village in Mamasa District, West Sulawesi Province. *J-3P (Journal of Government Empowerment Development)*, 7(2), 16–32. <https://doi.org/10.33701/j-3p.v7i2.2929>.
10. Putra, W. T., & Ismaniar. (2020). Community empowerment through waste management at waste banks. *Jambura Journal of Community Empowerment*, 1(2), 1–10. <https://doi.org/10.37411/jce.v1i2.83>.
11. Saleh, A., Mujahiddin, M., & Hardiyanto, S. (2023). Social construction in plastic waste management for community empowerment and regional structure. *JPPI (Indonesian Journal of Educational Research)*, 9(2), 1082–1096. <https://doi.org/10.29210/020232249>.
12. World Bank. (2018). *What a waste 2.0: A global snapshot of solid waste management to 2050*. Washington, DC: The World Bank. <https://openknowledge.worldbank.org/handle/10986/30317>.

INFO

Corresponding Author: **Taufik Ismail**, Community Development Officer at PT Pertamina Patra Niaga Fuel Terminal Cikampek, Indonesia.

How to cite/reference this article: **Taufik Ismail, Jauhari Ali, Cita Insaniah Muhammad, Arizky Rachmad S, M. Zakky A. M**, From Waste to Empowerment: Social Innovation and Sustainability Impact of WISE Waste Bank in Karawang, *Asian. Jour. Social. Scie. Mgmt. Tech.* 2025; 7(5): 170-178.