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TPS 3R Management Development Model: Social Learning, Collaboration and Partnership, Zero Waste Lifestyle for a Sustainable Future

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Abstract

The implementation of PKM as a critical concern related to the classic problem of waste disposal. The text of this article is a synthesis of reports from two community service (PKM) implementations carried out continuously in two academic periods, regarding the issue of developing TPS 3R management and the dominance of household waste composition. The results of the implementation of the first edition of PKM and the second edition of PKM based on social learning, coolaboration and partnership consistently lead to a zero waste lifestyle in the future in a sustainable manner. Small surveys, conservation and socialization are part of the methodological aspects of both PKM implementation, social learning, environment, dynamic interaction and community learning methods are adopted, future expectations of the results of the implementation are both synthesized. To improve sustainable waste management, the TPS3R management development model is based on social learning through collaboration and partnership minimization towards zero waste by involving four actors (quadruple helix) who consider social and environmental elements in an innovative collaboration framework, relevant to be adopted, implemented and developed, towards a zero waste lifestyle in a sustainable future. The aspects needed to achieve the success of this process emphasize several keyword aspects, including socialization, culture, awareness, consumtion pattern (smart consumer), wise lifestyle, mindset, social learning, adaptive & innovative, immitation &; evaluative models, consistency.

Keywords: Management development model, TPS 3R, social learning, collaboration, partnership, zero waste lifestyle

Introduction

The text of this article is a synthesis of reports from two community service implementation activities (PKM) carried out on an ongoing basis on the issue of developing the management of *Reduce, Reuse* and *Recylce* Waste Treatment Sites (TPS 3R) which highlights the dominance of household waste composition (organic and non-organic) versus community behavior and habits as the dominant producing domain, and its impact on elements of the Final Disposal Site (TPA) and other parties involved in this work cycle. This is a classic problem domain that requires mutual attention, which can potentially have an effect on zero waste lifestyles in a sustainable manner in the future, or vice versa. Such conditions are undoubtedly that continue to occur along with the certainty of a generational shift to the modern human narrative socially that interacts with each other in their environment according to the times throughout life from time to time. These issues are the core points and general problem statements that have underpinned the implementation of two PKM activities by our team which ended with the preparation of this paper report.

The implementation of the first PKM related to this issue was carried out with the theme "Model Pengembangan Pengelolaan TPS 3R: Kolaborasi dan Kemitraan Minimalisasi Menuju *Zero Waste*". The results and evaluation of the implementation of the PKM concluded that to improve sustainable waste handling, the TPS3R management development model through minimization partnerships towards zero waste by involving four relevant actors (quadruple helix) to be adopted and developed. The successful implementation of this model considers the partnership and involvement of the role of the 3R TPS manager, the community as the largest contributor to waste, to the involvement of the relevant Dinas Lingkungan Hidup (DLH) dan PKM Team.

Meanwhile, the implementation of the second PKM as a follow-up was carried out with the theme "Edition II of TPS 3R Management Development Model Based on Social Learning: Collaboration and Partnership". In the implementation of this advanced PKM, elements of the social environment are considered and social learning is included as a media base that facilitates and bridges cognitive aspects with behavior. Because, in the course of each individual's activities towards success and success cannot be separated from aspects of awareness, learning process, experience, dynamic interaction, social and environmental aspects. The ability and willingness to learn, imitate and adopt good waste disposal management methods are needed as part of a growing mindset. This is interpreted as goals and outputs that are expected to be achieved in the implementation of this edition of PKM. Evaluation of the results based on the stages of PKM activities that have been carried out in this edition, it is concluded that with the development of mindset, knowledge, learning culture, dynamic interaction with the social environment and sustainable innovative behavior in sorting non-organic waste is needed for and realizing this model. The impact if done consistently, the generation of waste disposal will be regular, even can be reduced so that cleanliness, health and environmental sustainability will be well maintained.

Following Firmansyah et al., (2023), that waste disposal will continue to be an endless problem throughout human activities, if not accompanied by awareness of the importance of cleanliness and environmental sustainability, both in urban and rural areas. In fact, irregular

waste generation is a very serious environmental problem in Indonesia and requires special attention and involvement of all roles in waste management (Firmansyah et al., 2024), although various new innovations in waste management in the era of technology and digitalization have begun to develop, but only occur in a few regions so they have not been able to overcome this problem evenly. Referring to data from the Sistem Informasi Pengelolaan Sampah Nasional (SIPSN) Kementerian Lingkungan Hidup and Kehutanan (KLHK), Indonesia produced 35.83 million tons of waste generation during 2022 (Databoks, 2023). The volume of waste generation increased by 21.7% compared to 2021, as well as being the highest level in the last four years from 2019 to 2022. Where there are 68 million tons of waste produced by the Indonesian people (for example, according to Ruhulessin, 2023).

In West Java province with an area of 5.43 million ha inhabited by 49.4 million people. The correlation is in line with the number of populations, the waste produced in a day can reach 24,790 tons (Nindita, 2023), and throughout 2022 waste generation reaches 4,894.6 tons (SIPSN, 2022). Previously in 2021, the most waste-producing area in West Java was Sukabumi district, which ranked first of the five most waste-producing regions in West Java, with waste generation reaching 397.9 thousand tons (Rizaty, 2022). The waste can be seen from the type and source, with the composition dominated by household waste including food waste, then plastic waste and paper waste. Therefore, the core point that needs and must be able to be done by the community and other related parties is how the composition of household waste including food waste and plastic waste can be reduced. Both intrinsic and extrinsic factors from individuals and society can be triger.

To strengthen this trigger, it is necessary to involve various parties to develop the management and handling of these two types of waste, both by handling sorting, collecting, transporting, limiting the use of plastic bags among households and communities, transportation, waste banks to *Reduce*, *Reuse* and *Recylce* (TPS3R) Waste Treatment Sites, and various other types of waste processing innovations (Firmansyah et al., 2024). Although it is recognized that public authorities through related departments and units have succeeded in managing and reducing waste problems as a waste management program that continues to be developed. Good environmental or organizational management is the achievement of progress according to goals and subjectively that the people or communities in it still have happiness, live in a clean and peaceful environment and are healthy outwardly and mentally (Firmansyah & Wahdiniwaty, 2023). Where in this case, health and hygiene are related to the pattern of waste disposal management behavior.

In fact, the development of waste management must still be socialized to the community and household environment as the largest producer of waste, even education deserves to be given from an early age. Social learning theory (SLT) and social cognitive theory (SCT), identify learning as a dynamic interaction between people, environment, and behavior (Firmansyah & Saepuloh, 2022). Social learning contributes directly to the development of interaction skills, multileration, cooperation, communication and conflict management, innovation capabilities and competitiveness, interaction of organizational and community actors linking learning and knowledge management into one continuous process (Hamburg et al., 2014; Firmansyah & Saepuloh, 2022).

It is no exaggeration if the concept of social learning is associated with a culture of social learning for the purpose of improving waste management in the community, because waste is part of community and environmental activities, even the principle of *zero waste* is important to be realized throughout its life activities. Where people learn from each other through observation, imitation and modeling influenced by factors such as attention, memory, motivation, attitudes and emotions, as Bandura (1977) theorized about social learning. The relationship is that the culture of learning by individual communities, imitation and piloting in good sorting and disposal behavior, consistently carried out can bring people to a zero waste lifestyle today and in the future, aware and applicable to the 5R principles (*Refuse, Reduce, Reuse, Resycle*, and *Rot*). Even accustomed to evaluating lifestyle, being careful, clean behavior and attentive to the effects of something purchased (smart consumer or no), consumption patterns and products consumed on the environment, in this world.

Through the role of RT / RW and TPS3R managers spread in various regions, it is very potential for socialization to be carried out appropriately and continuously by various related parties (DLH district / city, academics and other parties and communities), because from the role of these three actors information and socialization of the importance of waste management awareness will come down to individuals, communities and households to avoid the dangers of health problems, environmental damage (earth, water and air elements). The role of district / city DLH in managing and handling waste problems is clear. Meanwhile, various contributions from academics are needed, one of which is through the implementation of community service (PKM). Of course, on the basis of attention that the problem of waste as a classic problem has a long-term effect, it must be known and realized by many parties, it is also possible to be handled more appropriately together on an ongoing basis so that it can provide results, outcomes and long-term benefits. Willingness to learn, culture of innovation and adaptive to the environment are part of the driving factors in an effort to achieve success (Firmansyah, Ahman, et al., 2023).

Therefore, referring to the problem statement described above, that the report of this paper is prepared referring to two PKM implementations that have been carried out continuously carried out in Sukabumi (see the description of paragraphs 2 and 3 in this section), involving the managers of TPS3R Gading Sukabumi RW 15 (consisting of 5 RTs) and RW 17 (consisting of 5 RTs) as partners in implementing activities, with the aim of increasing development in TPS3R management as an effort to minimize household waste in the community towards a zero waste lifestyle and zero residue in a sustainable future can be started immediately at the implementation level.

The development of waste management can be done by involving several parties (actors). This model is inspired and adopts the involvement of helix roles framed in synergy and continuous innovative collaboration in finding solutions, solving problems and achieving goals done together. For example, what Saepuloh et al., (2022), did, suggested a solution to national economic recovery after COVID-19 by involving four actors *(quadruple helix)*; Wahdiniwaty et al., (2022), considering the involvement of five *helixes (quintuple helix)* in efforts to find solutions to national economic recovery after COVID-19; and Firmansyah et al., (2022), who consider the role of the six helix *(hexa helix) as a* model of collaboration, innovation and multi-

actor synergy initiatives to help find solutions to national economic recovery after COVID-19 in implementing government policies. The social element in learning and being close to society Bandura (1977), in the study of Firmansyah & Saepuloh (2022), seems to be relevant for individuals and society, because it is very suitable for their learning habits in the social environment, their behavior and activities.

The multiactor engagement and cooperation model above has been adopted in these two PKM activities in a similar way that is developed sustainably, where both activities are carried out with the same purpose, namely to help manage and reduce waste waste through the development of TPS3R management, by involving TPS3R managers, communities (households) and academics, DLH actors as aggregators who are part of public authorities. Where dual roles clearly apply to be able to solve this problem. The social learning element is included as a basis that bridges the mindset and knowledge of the community with adaptive and innovative behavior to support waste disposal management at the TPS3R level which is growing rapidly. The output expectation of these two PKM activities is the emergence of individual habits of the community with a zero waste lifestyle in the future in a sustainable manner.

Method

In practice, the implementation of these two PKM activities begins with conducting a small survey, where observation is chosen to be carried out as a method of implementing activities for the initial stage related to searching and extracting information, potential, identifying and determining the theme and objectives of PKM implementation. Small observations and surveys aimed at the sub-subject ecosystem of a particular area to seek preliminary information and identification of current social phenomena (Hibberts et al., 2012; Firmansyah, Suryana, Rifa'i, & Susetyo, 2022), the aim of knowing the opinions of individuals/samples/subjects, the observation area can be supplemented by observation and face-to-face interviews (Firmansyah, 2022).

At the observation stage, information about site conditions and waste problems among social units was obtained, complemented by the results of interviews that have shown a participatory response from PKM partners as involved actors, namely TPS3R managers and household communities so that information faced related to waste management problems at TPS3R is obtained, which realistically may be minimized through the stages of implementing PKM activities by the team The first PKM implementation service with the theme "Model Pengembangan Pengelolaan TPS 3R: Kolaborasi dan Kemitraan Minimalisasi Menuju *Zero Waste*". Continued in the next period with the theme "Edition II of TPS 3R Management Development Model Based on Social Learning: Collaboration and Partnership". Therefore, the implementation of PKM is both carried out through a series of activities starting from surveys and observations, identification, analysis of information and waste management problems faced by PKM partners, selection of alternative solutions as a basis for determining possible PKM themes, stages of PKM implementation, evaluation of results as feedback and outputs as targets to be achieved in the long term.

In simple terms, the method of implementing these two PKM activities is carried out through several stages: (1) conducting small surveys, observations, interviews and socialization to PKM partners; (2) identification and analysis of problems and needs of partners that have relevance to the theme of PKM; (3) discussion with TPS3R managers regarding problems, ideas and development of alternative solutions; (4) implementation of PKM activities by socializing and implementing alternative waste management solutions that can be done today, both for TPS3R and the community (5); learning, piloting, imitating and adopting TPS3R management methods in other developed areas/cities; and (6) evaluation of results and outputs.

Picture 1. TPS3R Building Gading Resik Madani; Generation of Non-organic Waste with Post-Sorting Value

Result and Discussion

The implementation of activities was carried out with surveys and observations equipped with face-to-face interviews carried out together with the service team on weekends. The first PKM will be carried out during September 2023 regularly every weekend. The implementation of PKM will be carried out from October 7, 2023 to November 04, 2023. Meanwhile, observations and interviews for the implementation of the second edition of PKM activities will be carried out in the next period, namely in January 2024. The implementation is from January 19, 2024 to February 16, 2024. For both PKM activities, it is carried out by a service team with the same formation, consisting of four people who specifically have multiple actors/roles in accordance with competence, concentration of scientific fields, and willingness to carry out each task during the implementation of service.

The two implementation of PKM activities are carried out through several stages, namely:

1. **Discussion and Information Extraction Stage** (full description can be accessed through reference sources: Firmansyah et al., 2024; and Firmansyah, Suryana, et al., 2023).
2. **Socialization Stage of Alternative Social Learning-Based TPS 3R Management Solutions** (full description can be accessed through reference sources: Firmansyah et al., 2024).
3. **Socialization of the Importance of Sorting Non-Organic Waste that Has Selling Value at the TPS3R Management Level Useful for Working Capital** (full description can be accessed through reference sources: Firmansyah et al., 2024; and Firmansyah, Suryana, et al., 2023).
4. **Evaluation Phase of Results and Outputs**

In this section, the description of the evaluation of the results and outputs of activities is taken from the two PKM implementations, namely the first (1st) PKM and the second edition (2nd) of the advanced PKM that was synthesized.

Evaluation of the results and outputs of the implementation of the first PKM activity with the theme *"*Model Pengembangan Pengelolaan TPS 3R: Kolaborasi dan Kemitraan Minimalisasi Menuju *Zero Waste",* is explained in the following section.

One of the feedback that has become a concrete output that can be seen within a few weeks is the additional generation of non-organic waste that has selling value, both the results of elections made by TPS3R managers and purchases as a form of contribution from the household community in the surrounding area which began to show an increase in awareness of waste disposal management into a shared responsibility to maintain health, cleanliness and preserve the environment.

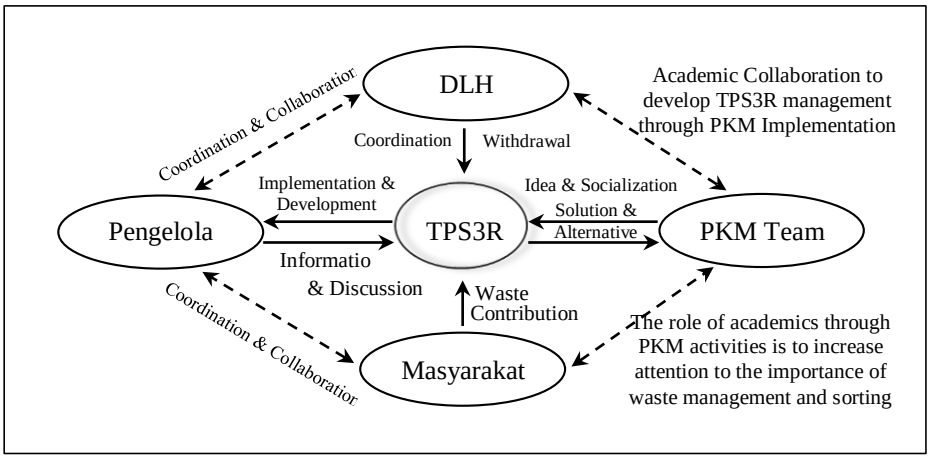

Figure 2. TPS3R Management Development Model, *Quadruple Helix* Involves Four Actors
Source: Synthesis results from the stages of implementing PKM activities, adapted from the 2023 PKM TEAM

There are *multiple effect* benefits from increasing public awareness about the dangers of waste generation and the importance of waste handling, at least with the habit of sorting organic and non-organic waste disposal: 1) has facilitated waste management and handling at the TPS3R manager level to the DLH level related to the landfill area. 2) sorting of non-organic waste with selling value if it can be done consistently at the TPS3R management level in a routine and sustainable intensity, has the potential to open access to financial resources regularly, although not large, but can be planned and managed properly for working capital that is useful for financing TPS3R management operations, even in the future it can be distributed for managers to enjoy.

In addition, 3) the habit of sorting non-organic waste starting from the household community to the consistency and discipline of TPS3R managers related to this habit for the purpose of developing TPS3R management. So the next stage of handling non-organic waste that has no selling value is possible to be easy, in addition to socializing restrictions and reducing the use of plastic waste to the community, it can also focus more on advanced handling through the development of ideas, management and processing innovations that allow for readiness for adoption and investment including in the necessary technology, as well as by imitation of TPS3R other regions that have succeeded in innovating In handling and processing

waste towards zero waste and zero residue can be achieved evenly so that in the future there is no transportation of waste to the related landfill. However, to realize the handling of the problem of non-organic waste does not have this selling value through advanced processing, of course, it requires costs so it needs the attention and support of various parties, including academics through their contributions in absorbing grant programs for related themes or issues, potentially being able to use it to help finance the development of TPS3R management in handling and overcoming the problem of these types of non-organic waste.

Meanwhile, until now the contribution of waste, especially non-organic waste, is still high sent to the relevant landfill and is still far from implementing the zero residue principle and even the zero waste principle. Where DLH officers are concerned, it is seen that they routinely carry out waste transportation from the TPS3R waste disposal area, which shows that coordination and responsibility flow well according to their respective roles so that this area does not show any waste generation. Therefore, to improve waste handling in a sustainable manner, the TPS3R management development model through minimization partnerships towards zero waste by involving four relevant actors (quadruple helix) is to be adopted.

Meanwhile, the evaluation of the results and outcomes of the implementation of the first PKM activity with the theme "Edition II of TPS 3R Management Development Model Based on Social Learning: Collaboration and Partnership", is explained in the following section.

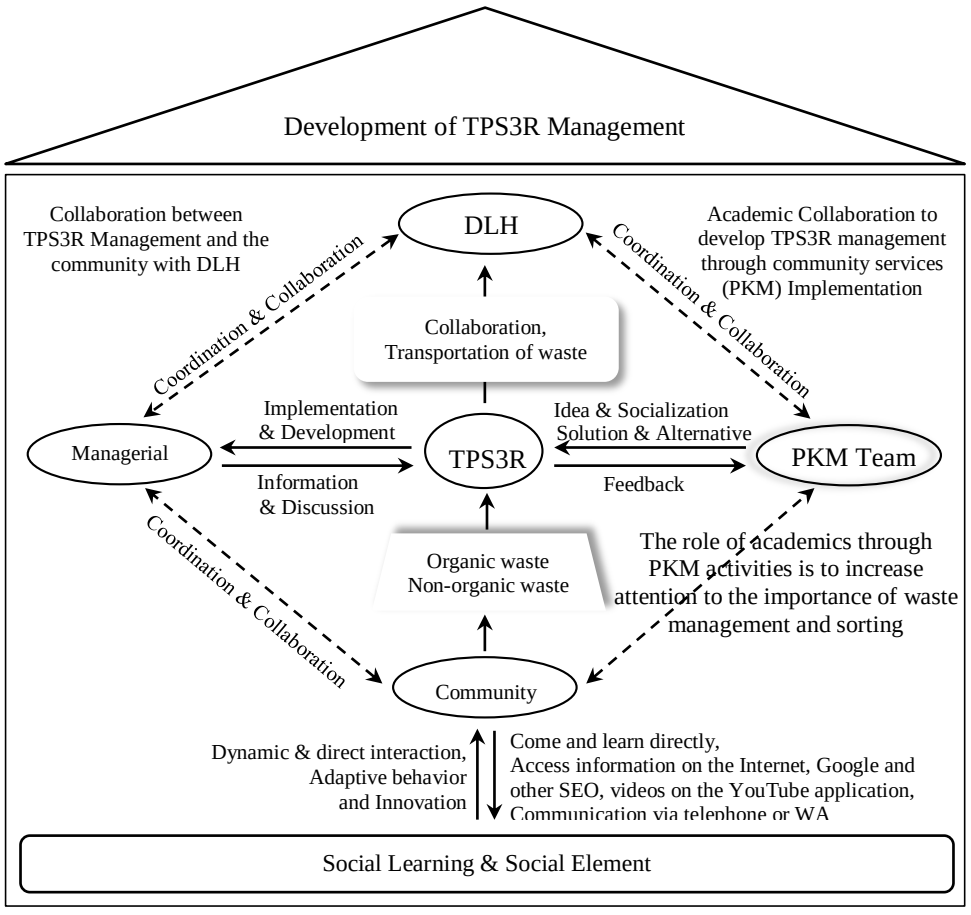

Figure 3. TPS3R Management Development Model Based on Social Learning, *Quadruple Helix* Involves Four Actors, adapted from the results of PKM 2024 implementation

Evaluation of the results and outputs of PKM continued edition II as a continuation of the stages of PKM implementation activities in the first edition, by including elements of social learning. Social learning implemented to improve learning culture, adaptation and dynamic interaction with outside community elements who have good experience in waste management and TPS3R has facilitated and bridged the creation of imitation, adaptation and innovative behavior patterns in TPS3R management. To improve sustainable waste management, the TPS3R management development model based on social learning through minimization partnerships towards zero waste by involving four relevant actors (quadruple helix) is to be adopted. The social learning element is the basis for the development of knowledge and mindset of all actors so as to facilitate the creation of habits, adaptation behaviors and innovations in the development of TPS3R management.

5. Synthesis of PKM Results and Outcomes Towards Zero Waste Lifestyle for a Sustainable Future

Efforts to improve waste handling in a sustainable manner in order to trigger the growth of zero waste lifestyle habits in the future, the " Model Pengembangan Pengelolaan TPS 3R: Kolaborasi dan Kemitraan Minimalisasi Menuju *Zero Waste*" (figure 2). Furthermore, efforts to implement further PKM activities were expanded with the theme "Edition II of TPS 3R Management Development Model Based on Social Learning: Collaboration and Partnership" (figure 3). Model development of social learning-based TPS3R management through minimization partnerships towards zero waste by involving four relevant actors (quadruple helix) to be adopted. The social learning element is the basis for the development of knowledge and mindset of all actors so as to facilitate the creation of habits, adaptation behaviors and innovations in the development of TPS3R management (see figure 3). The importance of socializing alternative waste management development solutions, social learning activities offer two imitation models to be adapted and developed.

The difference in the implementation of PKM II edition activities is more focused on the importance of adapting realistic and wise waste disposal behavior that can be done consciously by each individual community at no cost, but has the potential to bring additional income (passive income), is to increase awareness of consumption patterns and awareness in implementing a culture of waste sorting between organic waste and organic waste. Multiple effect benefits from increasing public awareness: it will facilitate waste management and handling at the TPS3R management level to the related DLH level for the landfill area towards zero waste to zero residue in the future will soon be realized; the development of mindset, knowledge, learning culture, dynamic interaction with the social environment and sustainable innovative behavior in sorting non-organic waste for sale value if it can be done consistently at the TPS3R management level has the potential to open access to financial resources regularly even though it is not large.

The two implementations of PKM activities open and remind management in minimizing waste generation. Starting from the implementation of the first edition of PKM, continuously with similar issues continued in the implementation of the second edition of PKM. The results of the evaluation of both models in the themes implemented in PKM activities that have been carried out towards a sustainable zero waste lifestyle in the future, interpreting the keywords

socialization, awareness, consumption patterns, mindset, social learning or learning culture, adaptive and innovative, imitation and pilot in the evaluative model on dynamic behavior that has a positive effect on relevant content.

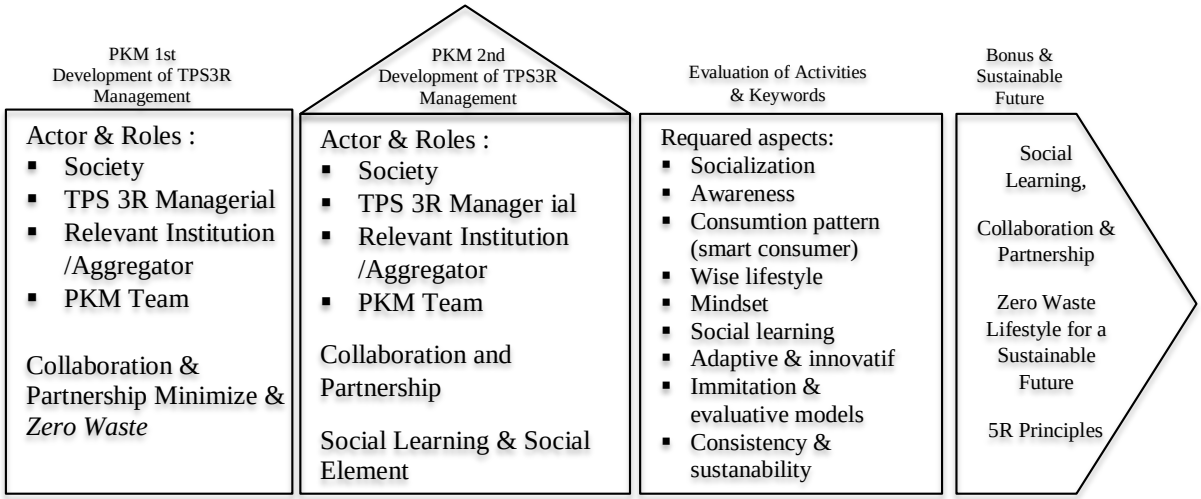

Figure 4. The 3RTPS Management Development Model: Social Learning, Collaboration and Partnership, Zero Waste Lifestyle for a Sustainable Future

Source: Synthesis Results of Implementation of the 1st of PKM 2023, & 2nd of PKM 2024 (Authors, 2024)

The continued consistency of this culture and behavior will be in line with the 5R zero waste lifestyle principles (Refuse; Reduce, reduce; Reuse, reuse; Recycle; and Rot is rotting garbage). In short, it will shape a zero waste lifestyle by using natural resources wisely. Because zero waste lifestyle is an awareness concept that invites individuals and all elements of society to use products more footed and environmentally friendly in order to minimize the composition, amount and adverse effects of waste, so that they can still manage resources and preserve nature.

Conclusion

The results of the evaluation of both models in the themes implemented in PKM activities that have been carried out towards a sustainable zero waste lifestyle in the future, interpreting the keywords socialization, awareness, consumption patterns, mindset, social learning or learning culture, adaptive and innovative, imitation and pilot in the evaluative model on dynamic behavior that has a positive effect on relevant content. The result of the synthesis of several implementations in the two PKM activities that have been carried out, to improve waste handling in a sustainable manner, the TPS3R management development model based on social learning through collaboration and partnership minimization towards *zero waste* by involving four actors *(quadruple helix)* who consider social and environmental elements in an innovative collaboration framework, relevant to be adopted, implemented and developed, towards a zero waste lifestyle in a sustainable future. The aspects needed to achieve the success of this process emphasize several keyword aspects, including socialization, culture, awareness, consumtion pattern (smart consumer), wise lifestyle, mindset, social learning, adaptive & innovative, immitation &; evaluative models, consistency & sustainability.

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