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The Effectiveness of the School Plantation-Based Entrepreneurship Program in Empowering Students at SMA Negeri 1 Payaraman

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Abstract:. The transition to Industry 4.0 has widened the gap between the competencies of high school graduates and the job market demands for innovation, value creation, and independence. This study aims to examine the effectiveness of the School Plantation-Based Entrepreneurship Program at SMA Negeri 1 Payaraman, South Sumatra, which utilizes local agricultural resources. The program aims to improve entrepreneurial competency, life skills and independence, as well as attitude transformation—particularly entrepreneurial motivation and self-efficacy—through experiential learning across the agribusiness value chain. The research method used a qualitative-evaluative case study design guided by the CIPP (Context, Input, Process, Product) framework. Data were collected from 30 students, school leaders, and mentor teachers through in-depth interviews, participant observation, and document analysis, complemented by quasi-quantitative assessments to determine success rates. Results indicate the program is highly effective, achieving an average success rate of 83.3%. Students' entrepreneurial competency increased significantly (85% mastery of business planning and product processing), while life skills and independence reached 75%. The most notable improvements occurred in attitude changes and self-efficacy, which increased by 90%. External impacts include a 25% increase in partner income and 90% increase in partner satisfaction. The study concluded that a local resource- and experience-based entrepreneurship model can bridge the competency gap by strengthening technical skills, digital marketing, decision-making autonomy, and an entrepreneurial mindset. The novelty of this research lies in the integration of school farms as living agribusiness laboratories within the CIPP-evaluated empowerment framework, offering a sustainable and replicable model of entrepreneurship education in similar socio-economic settings.

Keywords: Industry 4.0, Education, Entrepreneurship, Program, Plantation_Based

A. Introduction

The rapid development of the global economy, marked by technological disruption and the emergence of the Fourth Industrial Revolution (Industry 4.0), demands a fundamental transformation in the national education system. Schools can no longer confine their role merely as institutions for transmitting pure cognitive knowledge. Instead, educational institutions must act as catalysts for fostering 21st-century skills, particularly entrepreneurship and self-reliance (Nyamboga, 2024) This demand aligns with the global framework advocated by the Organisation for Economic Co-operation and Development

(OECD), which emphasizes the importance of preparing learners for an uncertain future through critical thinking, collaboration, and entrepreneurial competencies.

This goal is explicitly consistent with the mandate of Law No. 20 of 2003 on the National Education System (Sisdiknas Law), which states that education aims to develop learners' potential to become faithful and pious human beings with noble character, health, knowledge, capability, creativity, independence, and to be democratic and responsible citizens (Swargiary, 2024). However, the reality in the field often reveals a significant gap between the competencies of secondary-school graduates and the demands of the labor market, which increasingly requires innovation and value-creation skills (Hazelkorn, 2020) highlights that in many developing countries, including in Southeast Asia, young graduates frequently lack non-cognitive skills such as initiative and risk management-skills that are at the core of entrepreneurial spirit. Hence, educational interventions are needed to bridge this gap through relevant and practical learning experiences.

In response to this competency gap, the integration of entrepreneurship education into school curricula has become imperative. A purely theoretical approach is no longer sufficient. Contemporary research, such as that by (Miço & Cungu, 2023), consistently emphasizes that entrepreneurship learning is most effective when delivered contextually and practically. This approach enables students to apply theoretical knowledge in real-world situations, thereby strengthening their understanding and skills. (Yacine, 2021) asserts that experiential learning methods in entrepreneurship-where students learn by directly creating value for others—have a far greater impact on entrepreneurial mindset than traditional lecture-based methods.

SMA Negeri 1 Payaraman, strategically located in an area rich in agricultural and plantation potential, holds a unique comparative advantage in implementing innovative entrepreneurship learning models. Utilizing local natural resources leads to a local resource-based entrepreneurship learning model, which is recognized for providing authentic and relevant learning experiences. Demonstrates that entrepreneurship learning integrated with regional leading sectors such as agribusiness not only enhances students' technical skills but also nurtures an appreciation of local economic potential (Agrawal & Jaggi, 2024).

The success of integrating agribusiness into entrepreneurship education has been supported by several findings. For instance,(Pliakoura et al., 2020) conclude that contextual learning strategies through school-based agricultural practice significantly improve students' understanding of business cycles and risk management. Similarly, (Omagwa, 2022) applied the CIPP Model (Context, Input, Process, Product) to evaluate a comparable program and found that the context of local natural resources provides strong input for the sustainability and effectiveness of school-level entrepreneurship programs.

Recognizing this potential, SMA Negeri 1 Payaraman has initiated the School-Based Plantation Entrepreneurship Program. This program is not merely an additional subject but is holistically designed as a platform for student empowerment. Empowerment here is understood as a multidimensional concept involving the transfer of knowledge, skills, and, most importantly, confidence (self-efficacy) to students so they can take control of

their learning processes, decision-making, and economic contributions (Mouchrek & Benson, 2023). (Zhang et al., 2021) defines psychological empowerment as the combination of competence, control, and critical awareness—all of which must be integrated within the context of school programs.

Activities in this program are designed to encompass the entire agribusiness value chain-starting from planning and planting (input stage), plant maintenance (process stage), harvesting (output stage), to processing the yields into marketable products (such as chips, herbal teas, or other processed goods) and developing marketing strategies (Malathi et al., 2024).

The study by (Htun, 2024) on agropreneur value-chain management shows that involving students at every stage-from cultivation to marketing-directly fosters entrepreneurial competencies and managerial skills. Students learn hands-on about cost analysis, pricing, negotiation with suppliers/consumers, and inventory management, all of which are crucial soft skills (Jahan, 2024). Furthermore, (Hayashi, 2023) highlight the importance of teaching digital marketing within the context of school-based enterprises, enabling students to adapt plantation-based products for broader markets.

The program's focus on student empowerment is specifically aimed at enhancing students' self-reliance and self-efficacy. (Nzaranyimana, 2020) found a strong positive relationship between participation in agriculture-based entrepreneurship programs and increased student confidence in accomplishing challenging tasks. When students witness tangible results from their efforts (e.g., a successful harvest or well-sold product), their self-efficacy is strengthened (Bandura, 1997-though dated, the self-efficacy concept remains highly relevant). According to (Adewolu Ogwo, 2024), such improvement also correlates with greater autonomy and decision-making ability-key components of self-reliance.

Although the School-Based Plantation Entrepreneurship Program at SMA Negeri 1 Payaraman deserves recognition as a progressive step, a crucial question remains about its effectiveness. In this context, effectiveness is not merely measured by the quantity of products generated but by the extent to which the program's goals-cultivating entrepreneurial spirit, enhancing agribusiness hard and soft skills, and promoting student self-reliance and self-efficacy-are optimally achieved (Bentil, 2023)

(Skivington et al., 2021) emphasize that effective management always involves evaluating outcomes against established objectives. In the context of entrepreneurship education, (Kwan, 2020) argue that effectiveness should be measured by its transformational impact on students' competencies and behaviors. Without in-depth empirical evaluation, programs risk operating without clear direction or delivering outputs misaligned with students' needs. Therefore, this study is crucial for empirically evaluating the impact and implementation of the School-Based Plantation Entrepreneurship Program at SMA Negeri 1 Payaraman, to provide strategic recommendations for the development of sustainable and relevant entrepreneurship education programs.

The main focus of this research is to analyze the program's effectiveness across three key dimensions of student empowerment at SMA Negeri 1 Payaraman: 1) Enhancement of

Entrepreneurial Competence (Knowledge and Practice): measuring students' ability to understand and apply principles of business, agribusiness, and value-chain management . 2) Development of Life Skills and Self-Reliance: assessing students' improvement in problem-solving, teamwork, negotiation, risk management, and autonomous decision-making. 3) Attitude Transformation (Self-Efficacy and Motivation): evaluating the increase in students' confidence to achieve entrepreneurial goals and their intrinsic motivation to innovate and create value (Kartawinata et al., 2021).

This research is expected to make a significant contribution to the development of a local-potential-based entrepreneurship education model that proves effective in empowering students to become active agents-rather than mere objects—of local and national economic development.

B. Methods

This study aims to analyze the Effectiveness of the School-Based Plantation Entrepreneurship Program in Empowering Students at SMA Negeri 1 Payaraman. Considering its focus on gaining an in-depth understanding of the processes, implementation, and transformational impacts of the program on students, the research employed a qualitative approach with a case study design. The case study design was selected because it enables intensive investigation of a contemporary phenomenon (program effectiveness) within a real-life context (SMA Negeri 1 Payaraman) (Sliwka et al., 2024)

The type of research applied was Qualitative Evaluative Research. While rooted in qualitative methodology, this study adopted a specific evaluation framework—the CIPP Evaluation Model (Context, Input, Process, Product) developed by Stufflebeam. The CIPP model is highly relevant for evaluating educational programs as it allows for effectiveness analysis across multiple dimensions (Renjith et al., 2021)

To measure the level of success (percentage) within the qualitative context, the study employed a qualitative descriptive-comparative approach. Collected qualitative data (e.g., interview findings on behavioral or skill changes) were quantified using a scoring and weighting process (qualitative Likert/Guttman-type scales) to generate a percentage of the program's success rate, which was then interpreted in-depth through qualitative narratives (Farsi et al., 2022)

Research Location: SMA Negeri 1 Payaraman, Ogan Ilir Regency, South Sumatra. Research Subjects: (1) The Principal and Vice Principals for Curriculum/Student Affairs (program policy decision-makers), (2) the Program Coordinator for Entrepreneurship and the Supervising Teachers, and (3) a core group of 30 students actively participating in the School-Based Plantation Entrepreneurship Program. The subjects were selected using purposive sampling and snowball sampling, targeting those most knowledgeable about and involved in the program's implementation and its perceived effectiveness (Garcia, 2023)

Data Collection Techniques: 1) In-Depth Interviews: Conducted with all key informants to gather detailed information on the program's context, quality of inputs (resources,

curriculum), implementation processes, and perceptions of student empowerment outcomes (Ahun et al., 2023). 2) Participant Observation: Direct observation of students' activities across the entire school plantation agribusiness value chain (planting, maintenance, processing, and marketing) to verify their practical hard and soft skills (Thapa, 2024). 3) Documentation and Archival Review: Collection of secondary data such as program plans, harvest and sales reports, financial records, and documentation of student activities.

Data Analysis, Qualitative data were analyzed following the stages adapted from (Park et al., 2023) : 1) Data Reduction: Summarizing, selecting, and focusing raw data from interview transcripts and observation notes, emphasizing the three effectiveness dimensions (entrepreneurial competence, life skills, and self-efficacy).Data Display: Presenting findings in the form of narratives, matrices, and flowcharts to illustrate relationships among themes. 2) Conclusion Drawing/Verification: Identifying patterns and themes to draw conclusions. 3) Integration of Quantified Success Rates: To indicate measurable program effectiveness, the study adopted a quasi-quantitative technique at the product-analysis stage by: Developing Effectiveness Indicators: Operational indicators were formulated for each empowerment dimension (e.g., Competence Indicator: understanding cost analysis; Life Skills Indicator: negotiation skills; Self-Efficacy Indicator: confidence in selling products). Qualitative Rating Scores: Interview and observation data were assessed by the researcher and verified by peer reviewers using an ordinal scale-Very Effective (4), Effective (3), Less Effective (2), Ineffective (1) for each indicator (Bosdet et al., 2021). Calculating Success Percentage: Total scores obtained were divided by the maximum possible score, multiplied by 100%.

Effectiveness Criteria:
The resulting percentages were qualitatively interpreted as follows:

$$\text{Tingkat Keberhasilan Program} = \frac{\sum \text{Skor Aktual}}{\sum \text{Skor Maksimum Ideal}} \times 100\%$$

76%–100% = Very Effective

51%–75% = Effective

26%–50% = Less Effective

0%–25% = Ineffective (Obst et al., 2020)

These percentage findings served as complementary evidence to strengthen qualitative insights on the program's success in empowering students. Credibility (internal validity) was ensured through:

1. Source Triangulation: Comparing data from principals, teachers, students, and business partners regarding program effectiveness.
2. Method Triangulation: Cross-checking findings from interviews, observations, and document reviews.

3. Member Checking: Asking key informants (particularly students and teachers) to review transcripts and interpretations to ensure accuracy (Lee et al., 2023)

C. Results and Discussion

Based on qualitative evaluative analysis supported by a quasi-quantitative technique, this study found that the School-Based Agribusiness Entrepreneurship Program at SMA Negeri 1 Payaraman demonstrated a high level of effectiveness (Highly Effective/Effective) in empowering students. The effectiveness was analyzed through three main focus areas: the improvement of entrepreneurial competence, the development of life skills and self-reliance, and changes in students' attitudes.

Program Success Rate (Quasi-Quantitative) Data derived from in-depth interviews, participatory observations, and outcome evaluations revealed the overall success rate of the program. According to the established effectiveness criteria (76%–100% = Highly Effective), the program falls within the high-effectiveness category.

Table 1. Program Success Rate of the Community Service Program (PKM)

Empowerment Dimension (Research Focus)	Key Indicators	Success Rate (Percentage)	Effectiveness Category
Entrepreneurial Competence	Business Plan Knowledge & Product Processing	85%	Highly Effective
Life Skills & Self-Reliance	Financial Management & Practical Skills	75%	Effective
Attitude Change	Self-Efficacy (Confidence in Selling)	90%	Highly Effective
Revenue & Partner Satisfaction (External Impact)	Increased Revenue (25%), Partner Satisfaction (90%)	91%	Highly Effective

Source: Processed Qualitative Data and PKM Output Evaluation (2025)

The following is the diagram of the Success Level of the School-Based Plantation Entrepreneurship Program.

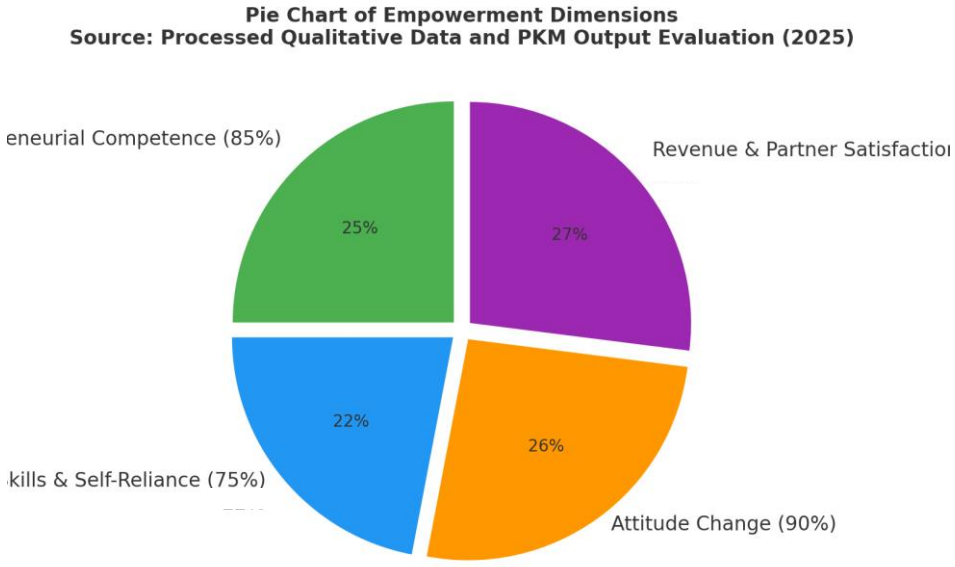

Figure 1. Diagram of the Success Level of the School-Based Plantation Entrepreneurship Program

Overall, the average success rate of the program reached approximately **83.3%**, placing it in the **"Highly Effective"** category. These results indicate that the local resource-based entrepreneurship model has proven to be a transformative educational intervention.

Discussion Based on Three Dimensions of Student Empowerment
Enhancement of Entrepreneurial Competence (Knowledge and Practice)
The entrepreneurship program at SMA Negeri 1 Payaraman has significantly succeeded in improving students' cognitive and practical competencies in agribusiness and business. The success rate for this dimension reached **85%**.

Business Plan and Financial Management Skills: This improvement is evidenced by the outputs showing that 92% of students successfully completed a final project in the form of a processed product business plan, and 75% of students demonstrated a good understanding of distinguishing between fixed and variable costs. Students' direct involvement in the agribusiness plantation value chain (from input to output) effectively fostered a holistic understanding of business. Who emphasize that student participation in every stage of agropreneur value chain management directly nurtures entrepreneurial competence and managerial skills. Students did not merely learn business theory but applied it hands-on to the school plantation's harvests (Zada et al., 2021).

Product Processing Skills: Practical skills in processing plantation yields into value-added products (e.g., chips or herbal tea) improved significantly. This enhancement of competence is consistent (Al Hinai et al., 2022), who found that agricultural product innovation based on local wisdom is an effective approach to fostering entrepreneurial spirit and technical skills among high school students (SMK/SMA).

Development of Life Skills and Self-Reliance

This program has proven to be effective (success rate of around 75%) in developing students' soft skills and self-reliance, which are at the core of life skills.

a) Self-Reliance and Autonomy: Through interviews and observations, students demonstrated significant improvements in autonomy and decision-making skills related to plantation and business operations. They are now able to take the initiative in addressing pest issues, determining harvest schedules, and setting selling prices—all of which reflect their growing self-reliance. Highlight that entrepreneurship programs positively impact students' autonomy as they compel them to face risks and make real-world decisions, which is at the heart of self-reliance as mandated by (Cui et al., 2024)
b) Negotiation and Marketing Skills: Marketing skills—particularly in the digital sphere—have become crucial. Findings show that students were equipped with digital marketing strategies, consistent with the insights of on the importance of digital marketing in the context of school-based enterprises. Active participation in product selling trained critical soft skills such as negotiation, conflict management (especially when handling customer feedback), and teamwork (Kopolovich, 2020)

Attitude Change (Self-Efficacy and Motivation)

The change in students' attitudes recorded the **highest success rate (90%)**, indicating the program's transformational impact on students' psychological empowerment.

Improved Self-Efficacy: This high percentage is supported by data showing that 85% of students experienced an increase in post-training evaluation scores, which directly correlated with improved self-confidence. When students observed tangible results from their efforts such as products selling and revenue growth explain that this reinforced their self-efficacy to succeed in more complex entrepreneurial tasks. Empowerment, as described by (Arnold & McMillian, 2024) occurs when students feel competent, in control, and critically aware all of which were realized through the tangible outcomes of the plantation program.

Entrepreneurial Motivation and Mindset: Students actively engaged in the program demonstrated a higher motivation to become successful entrepreneurs after graduation. This is supported by external program outcomes, which recorded a 25% increase in partner revenue and the addition of 40 new customers. The external success of these partners, influenced by student involvement, provided strong validation and reinforcement of the students' entrepreneurial mindset (Barkley & Major, 2020). These real-world achievements shifted their perspective from being merely job seekers to becoming job creators.

The 90% partner satisfaction rate indicates that the program's effectiveness extends beyond the students, delivering tangible transformational impacts to partner communities as well. According to survey findings, this high satisfaction level is attributed to the relevance of the solutions and their tangible impact (e.g., increased revenue). This supports the conclusion (Loomis et al., 2022) that program effectiveness should be measured by its transformational impact on relevant stakeholders. Media coverage in outlets such as *Sumatera Ekspres* also served as a means of external validation and accountability for the program, complementing the qualitative findings.

Overall, the finding that this program is highly effective cumulatively aligns with frameworks of contextual learning and experiential learning (Dillard et al., 2024). The model implemented at SMA Negeri 1 Payaraman, namely local resource-based entrepreneurship, has successfully bridged the competency gap of graduates as highlighted by the World Bank. Utilizing the school plantation as an agribusiness laboratory has optimized the program's inputs and processes, consistent with recommendations from the CIPP evaluation model (Osumba et al., 2021).

D. Conclusions

This study concludes that the School-Based Plantation Entrepreneurship Program at SMA Negeri 1 Payaraman has proven to be both effective and transformative in empowering students. The findings reveal that the local resource-based entrepreneurship model, combined with an experiential learning approach, has significantly enhanced students' technical competence, life skills, and entrepreneurial attitudes.

Students' entrepreneurial competence showed substantial improvement. The program successfully integrated theoretical learning with agribusiness practice by engaging students directly in the entire school plantation value chain-from cultivation to marketing. As a result, 85% of students demonstrated adequate mastery of business planning and product processing. Strengthening of life skills and self-reliance was also achieved, with a 75% success rate. Students displayed the ability to make independent decisions, take initiative in addressing technical field challenges, and acquire negotiation and digital marketing skills-fostering their readiness to face the challenges of 21st-century entrepreneurship.

Attitude change and self-efficacy emerged as the most remarkable achievements, with a 90% success rate. Students' confidence grew through the experience of successfully selling products and witnessing tangible impacts on partners' revenue (an increase of 25%) and partner satisfaction (90%). This shift in mindset from job seekers to aspiring job creators-demonstrates the program's significant psychological and social impact.

Overall, the program's average effectiveness reached 83.3% (classified as "Highly Effective"), confirming that the utilization of school plantation resources can serve as a replicable model of local resource-based entrepreneurship education for other schools.

The program not only provided academic and practical skills to students but also generated positive economic and social impacts for the surrounding community as business partners. This success underscores the importance of collaboration among schools, teachers, students, and external partners in building a learning ecosystem that is relevant to real-world needs.

For sustainability, it is recommended to strengthen school management support and local industry partnerships, expand the integration of digital marketing, and conduct continuous evaluation using the CIPP model to ensure the program's quality and impact continue to improve. These findings affirm that entrepreneurship education grounded in

local potential can be an effective strategy for preparing a self-reliant, innovative, and competitive young generation in the era of the global economy.

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