

Article

Vocational village model: Bridging the gaps towards sustainable rural development

Agus Sudrajat^{1,*}, Retnayu Prasetyanti², Alih Aji Nugroho², Noor Shaky Iskandar²¹ National Institute Public Administration (NIPA), Jakarta 10110, Indonesia² NIPA School of Administration Jakarta, Jakarta 10260, Indonesia* Corresponding author: Agus Sudrajat, agus.iuj@gmail.com

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Abstract: This study intends to explore the idea of a vocational village strategy to foster sustainable rural development. Vocational villages, offering targeted skills training and economic opportunities, present a compelling soft approach to rural development, addressing the need for sustainable livelihoods and community empowerment. Drawing upon the collaborative governance (the penta-helix model); underpinning the social capital perspective; and highlighting the economic, institutional, cultural, environmental, technological, and institutional dimensions of sustainable development, a vocational village strategy is expected to level up village capacities and facilitate modernization. The research was narratively developed through a qualitative methodology using primary and secondary data sources. Primary empirical data was employed to analyze vocational village practices in Panggungharjo Village, Yogyakarta, Indonesia as a representative example. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) framework provided secondary data to present comparative literature on vocational village development. The findings determined a four-staged vocational village model includes initiation, training, business development, and independence. The success of this model is contingent upon political, bureaucratic, and sociocultural factors (social capital), as well as the effective collaboration of government, academia, industry, and community (penta-helix). This research contributes to the urgency of vocational village practices and models as a viable strategy for achieving equitable and sustainable rural development.

Keywords: sustainable rural development; vocational village; social capital; collaborative rural governance

1. Introduction

Decentralization has emerged as a pivotal force in rural development and transformation, fostering regional progress through increased local autonomy and decision-making. The role of villages has evolved significantly, necessitating a shift from traditional environmental management to a technology-driven approach that promotes sustainability and resilience. Building robust village capacities is imperative to achieve this transformation. This involves investing in human resource development, strengthening organizational structures, and implementing systemic improvements to enhance governance and service delivery.

A critical challenge hindering rural progress is the stark disparity in education levels between urban and rural areas. This educational gap is exacerbated by the concentration of development sectors in urban centers, often leading to a lack of opportunities and resources in rural communities. Despite this, rural areas constitute the vast majority of Indonesia's geography, with a staggering 83,794 villages

compared to 98 cities (BPS, 2022). Moreover, 122 of these villages are classified as 3T (Frontline, Outermost, Disadvantaged) regions, facing additional developmental hurdles due to their remote location, limited infrastructure, and socio-economic disadvantages.

To bridge this urban-rural divide and empower rural communities, it is essential to prioritize capacity building at the village level. This strategic approach aligns with the overarching goals of Law No. 4 of 2014 on Villages, underscoring the importance of strengthening rural governance and development. According to a 2019 FAO (Food and Agriculture Organization) report, over 80% of the world's impoverished population resides in rural areas (Ebrahimi et al., 2022). The surge in industrialization has precipitated a profound transformation of employment structures, prompting a substantial rural exodus from agriculture to non-agricultural sectors (Ramasamy and Pilz, 2019). This demographic shift has generated a demand for new skill sets, creating opportunities and challenges, particularly within the informal economy. Rural regions typically are less modern than urban centers, with education being the leading driving factor. Zhi and Zhao (2021) emphasize the critical role of education in poverty reduction, as it equips individuals with the knowledge and skills necessary to participate in the workforce and improve their livelihoods.

Rural communities often face significant challenges in adapting to rapid political, economic, social, and cultural changes. The majority of workers lack essential learning skills, hindering their ability to acquire new knowledge and skills. Consequently, impoverished individuals and groups struggle to adapt to changing times due to low levels of education, which is often exacerbated by identity-based constraints, policy deficiencies, and outdated norms. These factors can create barriers to participation and limit opportunities for economic advancement.

Education constitutes a cornerstone in poverty eradication, especially within rural contexts (Zhi and Zhao, 2021). Vocational skills training has been identified by Ramasamy and Pilz (2019) as a promising avenue for empowering marginalized populations in rural and informal economies by equipping them with the requisite competencies for securing employment or establishing entrepreneurial ventures. Rural areas often encounter challenges such as resource scarcity, lower educational levels compared to urban counterparts, and deeply ingrained cultural and social norms that impede participation rates. To address these hurdles and stimulate economic growth, vocational skills development is a strategic intervention for enhancing rural productivity and livelihood prospects (Ebrahimi et al., 2022; Ramasamy and Pilz, 2019).

Vocational village programs, typically structured into four sequential phases—initiation, course and training, business development, and independence—offer a potential framework for realizing these objectives. However, the widespread implementation of such programs remains relatively scarce. While institutional-level interventions have garnered significant attention in village development strategies, the critical role of individual-level capacity building has often been overlooked.

Several studies have demonstrated that vocational education can significantly contribute to economic growth and intergenerational social mobility, particularly in disadvantaged rural regions (Wang et al., 2023). Consequently, strategies aimed at expanding rural access to vocational education and establishing dedicated training

centers have garnered considerable attention. However, achieving sustainable development necessitates active community engagement (Ebrahimi et al., 2022).

Recognizing the imperative to cultivate high-quality, competitive human resources and capable village institutions, this paper focuses on developing a vocational village program model. This initiative aligns with government efforts to build and strengthen capacities at multiple levels within rural areas. The envisioned vocational village model seeks to serve as a blueprint for planning, implementing, and evaluating vocational village programs. The model aims to leverage local strengths in social, economic, cultural, and environmental spheres to foster sustainable development by establishing centers for vocational skills training and business management.

This article elaborates on the vocational village practices in Panggungharjo village, a trailblazing example of a smart village located in Bantul Regency, Yogyakarta, Indonesia, that has emerged as a regional leader in rural development and poverty alleviation. The village's pioneering efforts in integrating digital technologies into its governance and services have earned it widespread recognition, culminating in the prestigious 4th ASEAN (Association of Southeast Asian Nations) Rural Development and Poverty Eradication Leadership Award in 2019.

Since its digital transformation in early 2014, Panggungharjo has become a benchmark for other villages seeking to modernize their operations. Combining cutting-edge technology with time-honored local wisdom, the village has successfully delivered innovative public services while preserving its cultural heritage. Moreover, the visionary leadership of the village head has cultivated a strong sense of community empowerment and self-sufficiency. Panggungharjo may provide key learning opportunities for non-vocational villages to adopt its practices in empowering village entities and promoting sustainable development.

2. Theoretical framework

2.1. Sustainable rural development: Sustainable (Village) development goals

There have been countless critiques of the idea of sustainable development — many believe it is pie-in-the-sky or that a focus on ecological issues will come at the expense of economic growth and social equity. As a result, new models based on socialist or sustainable principles and tagged “earthy development” have been proposed. While universally applicable, the concept takes on unique dimensions in the context of Indonesia, particularly in rural areas.

Indonesia boasts a vast archipelago with a unique mix of ecosystems and socio-cultural landscapes. Rural Indonesia is characterized by its rich biodiversity, agricultural economy, and indigenous communities. Sustainable rural development in this context requires a holistic approach addressing economic growth, social equity, and environmental protection simultaneously. This involves promoting sustainable agriculture, improving rural infrastructure, enhancing access to education and healthcare, preserving cultural heritage, and mitigating the impacts of climate change.

Challenges such as poverty, inequality, deforestation, and land degradation are

prevalent in many rural areas. Therefore, sustainable rural development strategies must be carefully designed to tackle these issues while fostering resilience and self-sufficiency among rural communities. **Figure 1** below illustrates the core dimensions of sustainable development, encompassing economy, society and culture, environment, institutions, and technology. In the Indonesian rural context, these dimensions intersect in complex ways.

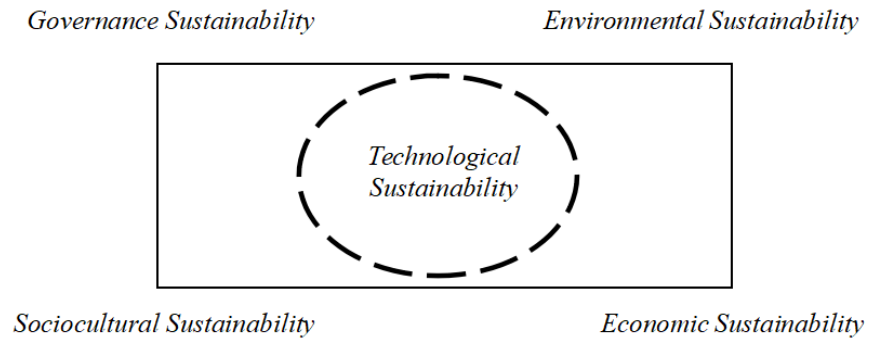


Figure 1. Five dimensions of sustainable development.

Source: Adapted from (Steward and Kuska, 2010).

The figure depicts a vast technological disruption and governmental action as leverages of sustainable development. These elements provide a more multi-generous perspective towards sustainable development frameworks. In Indonesia particularly, governance sustainability supports effective policies and ensures transparent, accountable management of resources. In rural Indonesia, strengthening local governance structures and reducing corruption could significantly improve development outcomes. Given Indonesia's rich biodiversity and the environmental challenges faced by rural areas (e.g., deforestation, and soil degradation), the environmental sustainability dimension is vital. Sustainable farming practices and forest management are key considerations.

Socio-cultural sustainability preserves respect and tolerance for local traditions and social structures while promoting inclusive growth. Economic sustainability is expected to net the local economic disparities. Developing sustainable local economies, improving market access for rural products, and diversifying income sources are important for long-term economic viability. Technological sustainability at the core, is increasingly relevant for rural Indonesia. Appropriate and accessible technologies can enhance agricultural productivity, improve education and healthcare delivery, and connect remote areas to broader markets and information networks.

Each of these dimensions interacts with the others. For instance, introducing new agricultural technologies (technological) must consider environmental impacts (environmental), be economically viable (economic), align with local cultural practices (socio-cultural), and be supported by appropriate policies (governance). Balancing these aspects is critical for achieving sustainable rural development in Indonesia's diverse and complex rural landscape.

Responding to the global sustainability issues, a set of universal development frameworks known as the Sustainable Development Goals (SDGs) has established an ideal development trajectory, designed to be constructed and monitored to achieve universal objectives. Sustainable development has been extensively discussed and

debated to foster a shared understanding of development across all domains. In practice, the SDGs have been widely adopted, with adaptations made at the local level. This is because all parties involved in development, especially governments, acknowledge that applying global standards frequently calls for alignment with various local circumstances and values. Consequently, global principles of sustainable development have been localized by adapting core SDG values to suit local governance, especially in rural areas. This localized framework is termed Sustainable Rural Development Goals, encompassing 18 objectives that require dynamic village institutions and adaptable village cultures. Achieving these 18 rural development goals demands a robust capacity-building strategy to enhance human resource development, strengthen village organizations, and reform village institutions. To gain a comprehensive understanding of sustainable rural development and its associated capacity-building strategies, this article focuses on the vocational village as a multi-faceted approach to realizing the 18 village SDGs.

2.2. Penta-helix collaboration model

The penta-helix model, a framework involving government, industry, academic practitioners, community, and media, is crucial for sustainable rural development in Indonesia. Each actor contributes uniquely. The government creates a supportive environment through policies, resources, and infrastructure. Industry invests in rural areas, providing jobs and economic growth. Academia offers research, expertise, and education. The community actively participates in decision-making and benefits from development initiatives. The media raises awareness, shares information, and facilitates stakeholder dialogue, contributing to successful rural development.

This model is more intricate than the triple and quadruple helixes. Penta-helix is similar to quadruple helix, both visualize the collective interaction and exchange of knowledge using the following four sub-systems (Carayannis and Grigoroudis, 2016):

- 1) Education system—refers to academia, universities, higher education systems, and schools (human capital);
- 2) Economic system—consists of industry/industries, firms, services, and banks (economic capital);
- 3) Political system—formulates the direction in which the state/country is heading in the present and future, as well as the laws (political and legal capital)
- 4) Civil society—media culture integrates and combines two forms of capital: culture-based public—tradition, values, etc. (social capital) and media-based public—television, internet, newspapers (capital of information).

The penta helix model has found extensive application in developing various domains (Nurhaida et al., 2024). Stakeholders ultimately civil society must put action in smart village development. The village development process involves the participation of all village communities with energy, thoughts, and ideas that support village work programs. Participation is formed from the positive perception of the community towards the village government. Positive perceptions are obtained from seeing, being involved in, and feeling the benefits of village development programs (Handayani et al., 2023a). **Figure 2** below describes the penta helix model in a village development context.

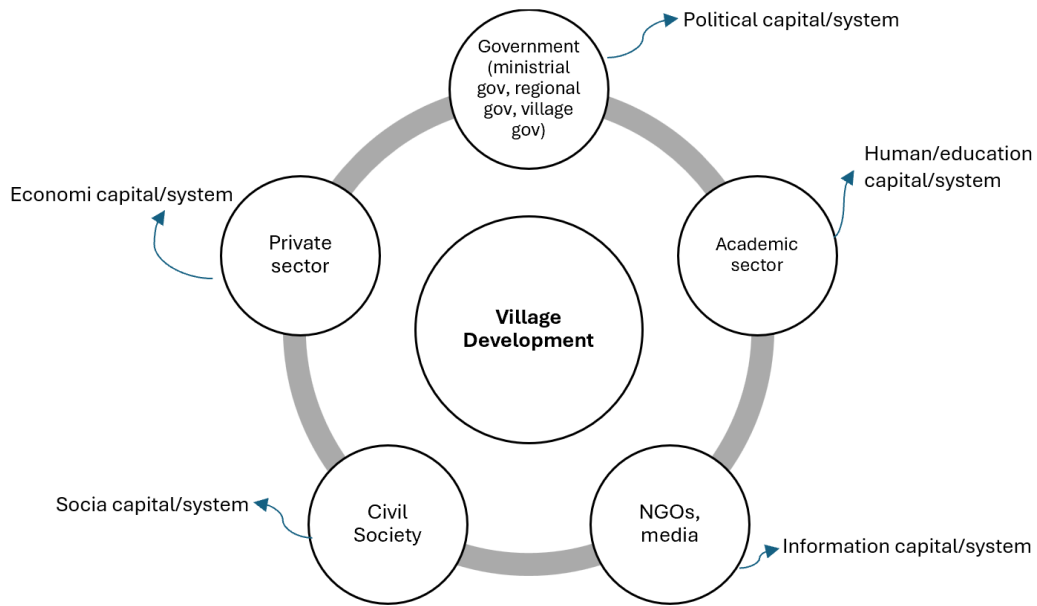


Figure 2. The Penta-helix model in village development.

Source: (Carayannis and Grigoroudis, 2016; Handayani et al., 2023b; Komorowski, 2022; Roidatua and Purbantara, 2022).

2.3. Capacity building

The concept of capacity building has been extensively defined and has undergone significant evolution. Capacity building is a process or activity that enhances the ability of individuals or organizations to effectively achieve their goals (Brown et al., 2001). It is often equated with strengthening the capabilities of groups and individuals to contribute meaningfully and sustainably to development projects at various levels, such as planning, implementation, monitoring, and evaluation. Another definition characterizes capacity building as the act of improving governmental administration and governance to accomplish objectives and missions more effectively (CIPP, 2015). The National Institute of Environmental Health Sciences (NIEHS) defines capacity development as “any activity that enhances an entity’s capacity to achieve its mission, involves stakeholder engagement, and ultimately includes various training for the community” (NIEHS, 2023).

Developing countries have widely adopted capacity-building as a strategic imperative for progress. Recognizing the necessity of enhancing capabilities to achieve developed nation status, these countries have integrated capacity-building into their growth strategies. Academic literature commonly delineates three core components of capacity building: human resources, organization, and system. Human resources encompasses skills, knowledge, attitudes, values, behavior, self-efficacy, and motivation. Organizational components include structure, process management, leadership, identity, and local culture. Lastly, the system component encompasses governance, financing, legal frameworks, public perception, worldviews, and the intricate interplay of political and social power structures.

Referring to Komorowski (2022), there are four major village resources determined as village capacity-building leverage (see **Figure 3**). These also are factors in scaling up vocational village capital.

- 1) Human—the skills, knowledge, abilities, competencies, and predispositions of all village residents and people potentially involved in the implementation of the smart village concept;
- 2) Financial—the funds that the local community uses to finance various projects; they include the local budget, grants, subsidies, and other external funding obtained by the community;
- 3) Material—physical assets that include buildings and other premises, as well as equipment that can be used for the rural area’s benefit;
- 4) Information—useful data needed for effective decision-making, for example, a resident group on social media, an external adviser, and all possible information channels.

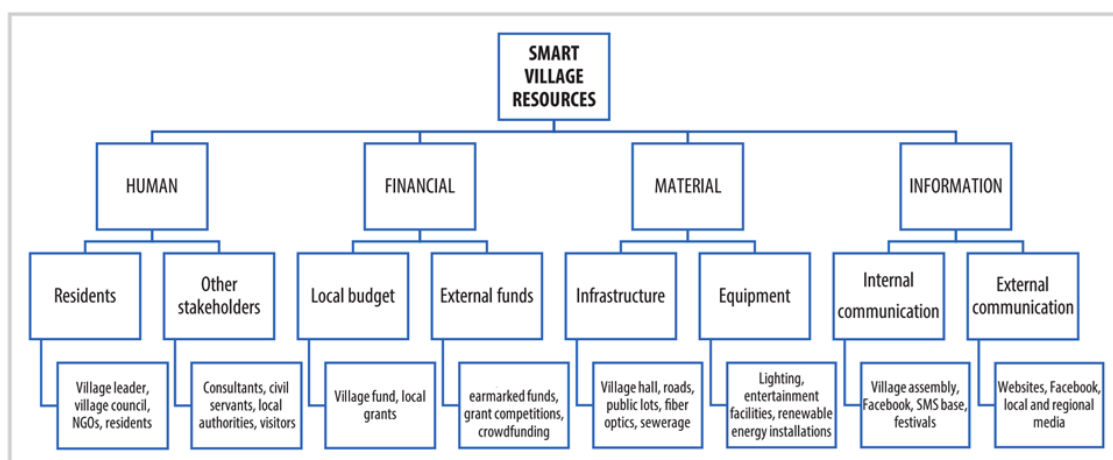


Figure 3. Village resources.

Source: Modified from (Komorowski, 2022).

2.4. Vocational village initiatives

In 2010, the Ministry of Education and Culture initiated the Vocational Village as a means of village capacity-building strategy. The program designates rural areas as centers for planning and implementing diverse vocational education and training programs. These villages also serve as platforms for managing production or service-based business units that align with the region’s social, economic, cultural, and environmental strengths.

Vocational villages aim to empower rural communities by equipping them with a diverse skill set in production and services. This, in turn, is intended to boost income generation, leading to enhanced quality of life and overall village development. Since 2010, various organizations, Course and Training Institute, and universities have been piloting vocational village models across different regions. These initiatives have yielded multiple approaches that effectively address rural community needs while offering practical implementation strategies.

The process of organizing vocational villages is divided into four stages as explained below. **Table 1** describes the vocational village strategy for village capacity building.

- a) Initiation stage: Socialization, mapping of village potential (natural resources, human resources, and goods/services markets), identification of relevant skill

types, and assessment of village demand.

- b) Course and training stage: Preparation of materials and tools, development of programs and schedules, implementation of courses and training, evaluation, limited production/service trials, and marketing exercises.
- c) Business stage: Development of limited products or services, marketing, business management, process improvement, and production/service innovation.
- d) Independence stage: Establishment of a permanent and decent livelihood and financial self-sufficiency for daily needs.

Table 1. Vocational village strategy.

Baseline	Level	Stage	Focus	Strategy	Output	Outcome	Impact
Less competent village apparatus, low community engagement	Human resource development/ individual	Initiation, course, and training stage	Professional village apparatus Village community empowerment and participation	Training, direct work practice, recruitment, performance monitoring, empowerment	Competent village apparatus, public participation		
Low organizational performance, less public transparency	Organizational strengthening	Business stage	Performance management; microstructures	Incentive system, HR system, local leadership, organizational culture, communication, social capital	Networking, accountability, alternative service delivery	Good village governance	Smart and sustainable village development
Urban-rural disparity, village autonomy	Institutional reform	Independence stage	Macro-institutional arrangement	Supra-village – sister village policies, digitalization			

Source: Modified from Grindle (1997).

Based on the “Vocational Village Strategy” presented in the figure above, sustainable village development appears to be a multi-staged, holistic approach that addresses various aspects of rural community growth. The following analysis presents the details of key ideas of the vocational village strategy.

- a) Tiered approach. The strategy employs a three-tiered system, progressing from individual capacity building to organizational improvement and finally to institutional reform. This graduated approach ensures a strong foundation at each level before advancing to more complex interventions.
- b) Human resource focus. The first stage emphasizes human resource development, recognizing that competent individuals are crucial for sustainable development. By focusing on training, direct work practice, and recruitment, the strategy aims to build a skilled local workforce.
- c) Organizational strengthening. The second level addresses organizational performance, which is essential for efficient governance. It introduces systems for incentives, HR management, and local leadership development. This stage also emphasizes building social capital and improving communication, which are vital for community cohesion and participatory development.
- d) Institutional reform. The final stage tackles broader institutional arrangements, addressing urban-rural disparities and village autonomy. This includes implementing supra-village policies and digitalization, suggesting a focus on connecting villages to wider networks, and modernizing governance structures.

- e) Community empowerment. Throughout all stages, there's a clear emphasis on community participation and empowerment. This bottom-up approach is crucial for ensuring that development initiatives are locally owned and sustainable.
- f) Holistic outcomes. The strategy aims for comprehensive outcomes, including improved village apparatus, public participation, networking, accountability, and alternative service delivery. This multifaceted approach addresses various aspects of village life and governance.
- g) Long-term vision. The ultimate impact of "smart and sustainable village development" indicates a forward-thinking approach that likely incorporates technological advancements and environmental considerations into rural development plans.
- h) Adaptability. By structuring the strategy in stages, it allows for flexibility and adaptability to different village contexts and rates of progress.
- i) Performance Monitoring. The inclusion of "performance monitoring" in the strategy suggests an emphasis on measurable outcomes and continuous improvement.

2.5. Previous research

Previous research has underscored the critical role of human resources and collaborative efforts in fostering sustainable rural development. Human capital, specifically the quality of human resources, emerges as a pivotal determinant of success in these endeavors. Rural communities are repositories of invaluable traditional knowledge, skills, and practices that serve as potent catalysts for development initiatives. As exemplified by Ba et al. (2018), mountain village communities in Vietnam have effectively harnessed their indigenous agricultural expertise to cultivate thriving businesses and tourism ventures, thereby stimulating economic growth while preserving cultural heritage.

Nevertheless, the mere presence of human resource potential does not guarantee successful rural development. Active community participation and engagement are indispensable for achieving sustainable outcomes. Damayanti and Syarifuddin (2020) underscore the pivotal role of community involvement in a case study from Indonesia. Their research demonstrates that when local communities are empowered to participate in project planning and implementation, development initiatives are more likely to be aligned with local needs and priorities, thereby enhancing their sustainability. Zavratnik et al. (2020) further emphasize the significance of community engagement in their framework for sustainable rural innovation. By incorporating local knowledge and fostering participatory processes, development efforts can effectively address the specific challenges faced by rural communities and build resilience.

The level of human capital within a region, characterized by factors such as education, skills, and knowledge, is a critical determinant of overall welfare and development. Klonowska-Matynia (2022) empirically demonstrates this correlation in the Polish rural context, revealing that regions with higher human capital endowments tend to exhibit superior socioeconomic outcomes. Investing in education, vocational training, and capacity-building initiatives for rural communities is therefore

imperative to enhance their capacity to contribute to and benefit from development processes. Moreover, a skilled and knowledgeable rural population can facilitate innovation, entrepreneurship, and the adoption of sustainable practices, thereby driving rural transformation and reducing disparities between rural and urban areas.

Collaboration and partnerships among diverse stakeholders, including non-governmental organizations, communities, government agencies, and the private sector, are indispensable for addressing the complex challenges inherent in rural development. Chung and Lee (2019) provide a compelling case study from Namyangju City, South Korea, demonstrating the efficacy of sector-wide collaboration in fostering sustainable rural development. Their research underscores the synergistic potential of amalgamating diverse expertise, resources, and perspectives to create more comprehensive and effective solutions.

Panday (2018) further highlights the critical role of stakeholder collaboration in the context of Nepal, asserting that sustainable rural development necessitates coordinated efforts among diverse actors, including local communities, government entities, and non-governmental organizations. By cultivating a collaborative environment characterized by shared responsibility, development initiatives can more effectively address the intricate social, economic, and environmental challenges prevalent in rural regions.

Furthermore, the educational attainment and human capital of rural communities exert a substantial influence on their overall well-being. Zhi and Zhao (2021) conducted a spatial econometric analysis in China, demonstrating a positive correlation between human capital and sustainable rural development. Their findings emphasize the imperative of investing in education and skill development programs for rural residents, as these initiatives empower individuals to actively participate in and steer their own development trajectories, ultimately culminating in enhanced socioeconomic conditions and quality of life.

In conclusion, sustainable rural development is a complex endeavor demanding a holistic approach involving active community participation, robust stakeholder collaboration, and strategic investments in human capital development. By recognizing and harnessing the inherent human resource potential within rural communities, fostering participatory processes, and cultivating synergistic partnerships, development initiatives can be more inclusive, contextually appropriate, and aligned with local aspirations. Such a multifaceted strategy is essential for achieving long-term sustainability, reducing rural-urban disparities, and enhancing the overall well-being of rural populations. Sustainable rural development is not merely an economic imperative but also a social and environmental imperative, crucial for building resilient and equitable societies.

3. Methods

A qualitative approach was determined most suitable for this research, given its aim to explore the complexities and nuances of sustainability challenges within a rural development context. By putting into specific situations, qualitative research allows for an in-depth understanding of the underlying issues, uncovering the reasons for failures, and providing insights into potential government interventions. This study

employed a systematic literature review (SLR) complemented by a case study of Panggunharjo village. Data collection involved both primary and secondary sources. Participant observations and semi-structured interviews with key stakeholders were conducted to gather firsthand information, while secondary data was compiled through a systematic analysis of 403 reputable, Scopus-indexed articles using the Watase Uake software. To achieve rigorous research, triangulation of data sources and methods was employed, coupled with rigorous peer review, ensuring data validity and credibility.

To ensure transparency and rigor in the conduct and reporting of the systematic literature review, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were adhered to. Following the PRISMA framework, the research team meticulously documented the search strategy, inclusion and exclusion criteria, study selection process, and data extraction. This systematic approach enhanced the quality of the review process and strengthened the credibility of the findings (see **Figure 4**).

Watase Uake is a software tool specifically designed to streamline the data access and screening processes integral to systematic literature reviews (SLRs). Aligning with the most recent SLR methodology, PRISMA 2020 (Page et al., 2021), Watase Uake facilitates the efficient gathering and synthesis of research findings on well-defined research questions. The SLR methodology itself condenses the literature review process into three core stages: assembly, organization, and assessment (Paul et al., 2021). Assembly involves the identification and acquisition of relevant literature, while organization pertains to the structuring and cleaning of the collected data. Finally, assessment encompasses the critical evaluation and reporting of the literature.

Adhering to PRISMA 2020 guidelines, Watase Uake guides researchers through a five-step SLR process: (a) article identification based on carefully selected keywords, (b) manual screening to sort relevant articles, (c) retrieval of full-text papers, (d) inclusion of final articles for review, and (e) a comprehensive analysis and reporting of the findings. By automating several aspects of the SLR process, Watase Uake significantly enhances efficiency and reduces the potential for human error, thereby contributing to the overall quality and reliability of the research.

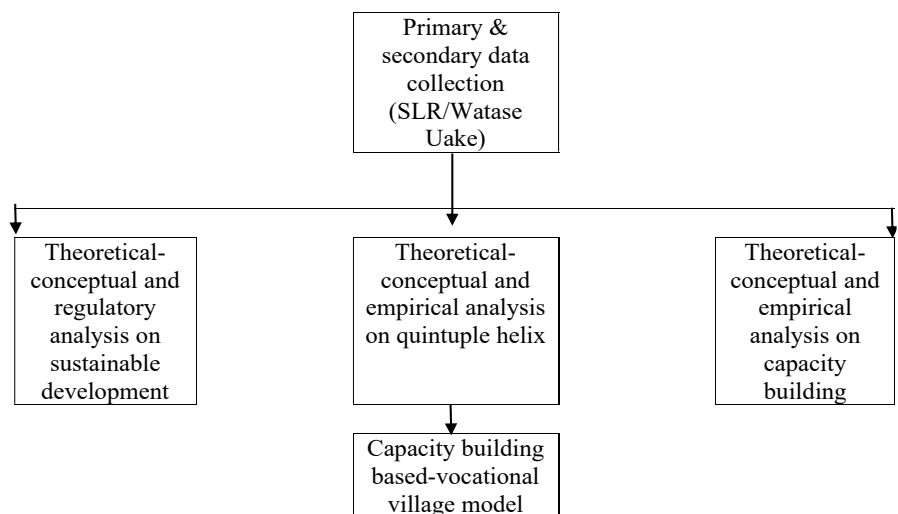


Figure 4. Research methodological framework.

Source: Analyzed by writer, 2024.

4. Results and discussions

4.1. Results

Displaying a systematic literature review on vocational village

A Scopus search using the keywords “village education,” “village community development,” “rural vocational education,” and “smart villages” generated 403 articles. Employing the Watase Uake tool, PRISMA automatically filtered out 1 duplicate, 202 articles published before 2018, 73 from the first to fourth quarters, and 8 lacking abstracts, resulting in 119 articles.

A subsequent manual screening of abstracts identified 41 relevant papers. Among these, 22 open-access articles were retrieved from the Watase Uake database and registries, while 3 additional papers were sourced elsewhere. A thorough manual review of all 25 papers indicated that only 10 from Watase Uake and 2 from other sources met the inclusion criteria. As a result, the PRISMA analysis determined that 12 articles were most pertinent to the topic of vocational villages. The report of PRISMA is displayed in **Figure 5** below.

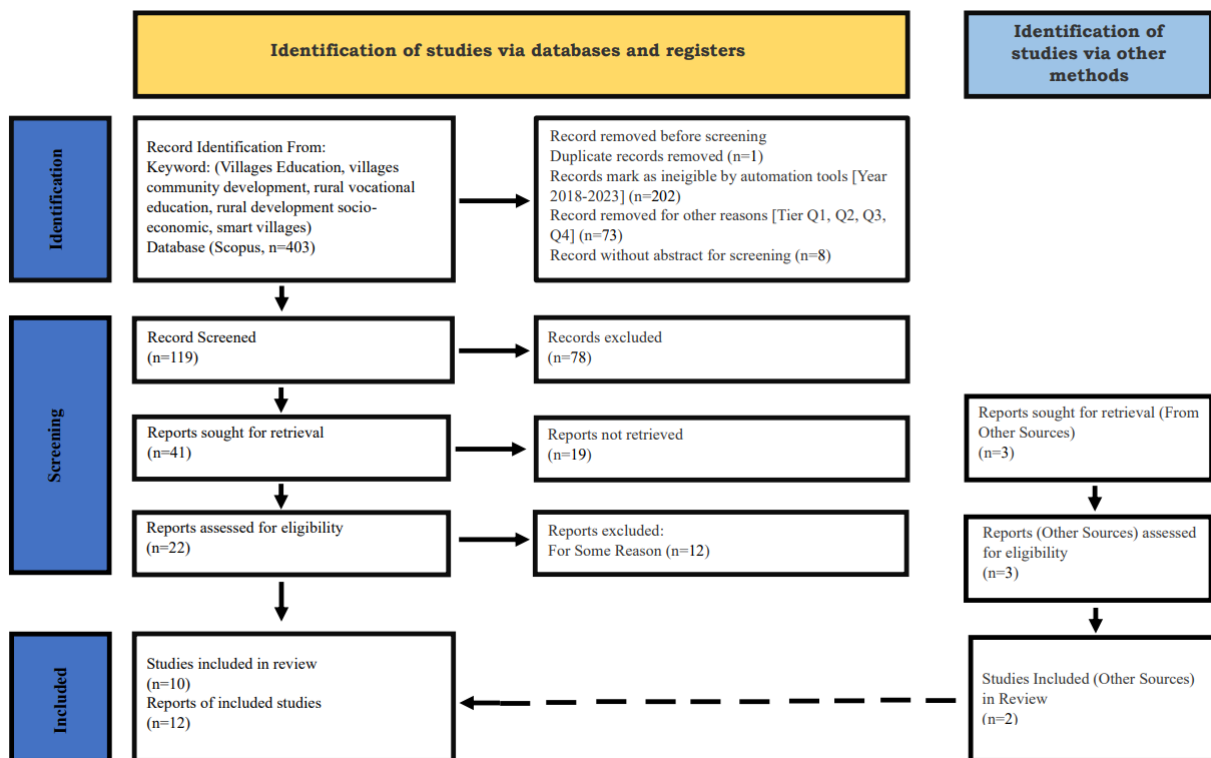


Figure 5. Report of PRISMA 2020 with Watase Uake.

Source: Analyzed by writer, derived from Watase Uake analysis report, 2024.

A convergence of findings emerged from the 12 papers that successfully navigated the systematic literature review process. Central to the success of village development programs is robust community involvement. However, achieving meaningful community participation is a complex process that requires deliberate and strategic efforts. The literature identifies key stages in this process, including approach building, awareness development, early engagement, trust cultivation, and ultimately, genuine participation. It is noteworthy that while these stages outline a potential

pathway to successful community involvement, the reality is that few villages demonstrate proficiency across all dimensions.

A common barrier to village development is the low quality of human resources. Compared to urban areas, villages often exhibit lower levels of formal education. Rural residents frequently grapple with economic challenges, prioritizing livelihoods over educational pursuits. Consequently, many children in remote regions terminate their education at the junior high school level (Zhi and Zhao, 2021). This limited educational attainment directly correlates with lower income potential, as individuals with insufficient expertise and specific qualifications face significant obstacles in securing well-paying employment.

The dearth of skilled labor in rural areas hampers the growth of local businesses and industries, perpetuating a cycle of poverty and underdevelopment. To address this issue, concerted efforts are required to enhance educational opportunities and vocational training programs in rural regions. By investing in human capital development, it is possible to break the cycle of poverty, create sustainable livelihoods, and drive overall rural development.

Education is a powerful catalyst for economic growth. However, due to factors such as age and familial responsibilities, not all individuals are inclined to pursue formal education. Klonowska-Matynia's (2022) research underscores the link between a region's marginalization and the quality of its human capital. To address this, village communities require specialized training programs that align with their unique economic, social, cultural, environmental, and historical assets (Ba et al., 2018; Chung and Lee, 2019). These training initiatives should be designed to equip villagers with the skills and knowledge necessary to capitalize on local opportunities and challenges. By investing in human capital development through targeted training programs, villages can enhance their capacity for self-sufficiency, innovation, and sustainable development.

Consequently, fostering self-reliance among Indonesian village communities is paramount. A strategic approach involves significantly enhancing human capital through the implementation of robust vocational education programs within these communities. By providing comprehensive instruction, training in diverse vocational fields, and cultivating expertise in business unit management aligned with the village's unique strengths in social, economic, cultural, and environmental dimensions, it is possible to empower rural populations. Therefore, vocational education that is meticulously tailored to the specific potential and resources of each village is indispensable for achieving sustainable rural development across Indonesia.

This necessitates a holistic approach that considers the broader socio-economic context of rural communities. By integrating vocational education with other development initiatives such as infrastructure improvement, access to financial services, and market linkages, it is possible to create a more enabling environment for rural entrepreneurship and economic growth. Moreover, ongoing monitoring and evaluation of vocational education programs are essential to ensure their effectiveness and to make necessary adjustments to address emerging challenges and opportunities (Figure 6).

LITERATURE REVIEW CLASSIFICATION

NO	SOURCE	CONTEXT AREA STUDI	COUNTRY	THEORETICAL FOUNDATION	FOCUS ON
1	Ba et al. (2018)	Sustainable Development	Taiwan	N/A	traditional farming practices
2	Chung and Lee (2019)	Sustainable Development	Japan	Sustainable Development	community cultural resources
3	Damayanti and Syarifuddin (2020)	Development Planning	Indonesia	N/A	Community participation in village
4	Hussain et al. (2022)	Community Development	Pakistan	N/A	Socio-Economic impacts
5	Klonowska-Matynia (2022)	Human Capital	Poland	Human Capital	factors inequalities in rural areas
6	Mordhorst and Jenert (2022)	Vocational Education	Germany	N/A	Curricular integration
7	Nugraha et al. (2022)	Community-Based Village Development	Indonesia	N/A	formulate the best strategies and programs
8	Panday (2018)	Innovations Work	Bangladesh	Local government-NGOs partnership	partnetship and collaborative governance
9	Ramasamy and Pilz (2019)	Competency-based Curricula	India	Competency-based cirricula	Skills training
10	Rizal et al. (2022)	Sustainable Development	Indonesia	N/A	local wisdom and community development
11	Zavratnik et al. (2020)	Sustainable And Community-Centred Deveelopment	Slovenia	N/A	smart cities and villages
12	Zhi and Zhao (2021)	Public Policy	China	Anti-Poor Theories	poverty allevation and vocational education

Figure 6. Literature review classification with Watase Uake.

Source: Analyzed by writer, derived from Watase Uake analysis report, 2024.

4.2. Discussions

Vocational village initiatives in Panggungharjo Village

The success of Panggungharjo Village extends beyond mere physical infrastructure; it is deeply rooted in robust community engagement. This is evident in the village's active participation in Village-Owned Enterprises (BUMDes) development, collaborative partnerships with creative sectors, and the preservation of local heritage. A holistic approach to development is prioritized, with a strong emphasis on enhancing the community's quality of life. To achieve this, the village has implemented a range of community empowerment programs aimed at fostering both economic prosperity and social well-being.

Effective village development hinges on strong village leadership. By strategically utilizing available resources and actively engaging the community, villages can significantly accelerate progress. Panggungharjo Village exemplifies this approach by harnessing local talents and assets. Its tourism sector, built upon rich culture and natural beauty, is a prime example. Events like the Dolanan Anak Festival have drawn significant tourist interest. Moreover, the village's focus on local products and human capital development underscores its commitment to holistic growth.

Panggungharjo Village is solely accountable for managing and protecting its assets and resources. This central role positions the village government as the primary architect of its development, tasked with recognizing opportunities, strengths, and creating detailed plans and financial strategies. Panggungharjo's approach to development is considered a prime example, as demonstrated in the following four phases:

a. **Initiation stage**

This stage involves identifying the village's thematic potential (human, natural,

and business resources), recognizing demands, initiatives, and interests, identifying facilitators, and assessing necessary community skills, including socialization. Initially, village authorities identified significant development potential from various economic, political, sociocultural, and ecological sources, both internal and external. A helix model analysis was employed to assess Panggungharjo's potential. The authors identified five helixes as supporting elements of Panggungharjo's vocational village development. Political potential emerged as the primary leverage. Panggungharjo's village authorities played a pivotal role in initiating knowledge and innovation initiatives, as well as course and training management. The head of the village was instrumental in transforming the village government. Political potential encompasses policy and decision-making, bureaucratic capacity, and public service delivery. From a social capital perspective, political potential can be viewed as a cornerstone for developing norms, trust, and legal frameworks.

Secondly, economic and technological potential serve as external driving forces for vocational village development. The involvement of private sectors in vocational village practices can significantly accelerate progress due to their capacity for accumulating economic resources and developing innovative technological tools. From a social capital perspective, economic and technological potential can be viewed as network potential, arising from effective partnerships between public and private sectors. Key contributors to the economic and technological potential in this context include Tirta Investama, Danone, and the village-owned enterprise, BUMDes Panggung Lestari.

Thirdly, the academic-human resource potential, is a crucial collaborator in innovation and knowledge creation. Both conceptually and practically, vocational village development necessitates the engagement of academic practitioners. A strong government-academic partnership is essential to ensure the sustainability of the development process and outcomes, including achieving significant impact. The University of Janabadra and the Polytechnic of the Ministry of Health exemplify the role of academic-human resource potential in this context. Within the social capital framework, the involvement of academic practitioners can be seen as a manifestation of network principles and a model of government-business partnership. Notably, the academic capacity of educational institutions can significantly enhance the quality of vocational village development through the strengthening of courses and training, business development, and strategies for village autonomy.

Fourthly, community engagement –a representative of sociocultural potential. In the realm of social capital, norms, trust, empathy, and strong personal and group bonds are essential for the success of vocational village initiatives. Community engagement, recognized as the most significant driving force, is indispensable throughout the entire development process, from initial input to final outcomes. BUMDes Panggung Lestari and the Family Welfare Empowerment (PKK) group have assumed active roles in all stages of the vocational village practices. To cultivate a thriving social capital, it is crucial to foster a sense of belonging and shared purpose among community members. This can be achieved through various activities such as community-building events, capacity-building workshops, and collaborative decision-making processes. By investing in social capital, villages can create a strong foundation for collective action, problem-solving, and sustainable development.

Lastly, technology and media potential. Sustainability principles underpin the core values of diverse development practices. External factors provide a foundation for internal elements, creating a sustained feedback loop within the vocational village system. While natural potential is intrinsically linked to a village's identity, Panggungharjo faces limitations in this regard. The arid landscape and reliance on tamanu oil and rice cultivation have necessitated the development of alternative strategies through technology and media. Digital innovations and platforms have emerged as significant drivers of Panggungharjo's development. Serving accountably to the public, the village government has developed a village website to pursue good (digital) village governance. The website as described in **Figure 7** can be accessed at <https://www.panggungharjo.desa.id/>.



Figure 7. Panggungharjo village website.

Source: Panggungharjo Village Website, 2024

In short, the following helix in **Figure 8** model can help identify the village's thematic potential.

The image above illustrates a complex model for rural sustainable development, presented as an interconnected system of five “helices” or key stakeholder groups. At the center is “rural sustainable development”, surrounded by five ellipses representing different sectors: village authorities/governments, Tirta Investama (business sector), academic practitioners, village communities, and technology/media. Each helix is characterized by its potential contribution, such as political-HR potential, economic potential, academic-HR potential, socio-cultural potential, and technological potential respectively. These helices are depicted as both knowledge/innovation creators and users. The model shows how these sectors interact through inputs and outputs, represented by arrows connecting the helices. The entire system is enclosed in a larger cycle labeled the “innovation cycle”, suggesting a continuous process of development and improvement. The diagram emphasizes sustainability, agility, and the creation of sustainable policy and legal frameworks as key elements linking the various components. This model appears to represent a holistic, multi-stakeholder approach to achieving sustainable rural development through collaborative innovation and

knowledge exchange.



Figure 8. Penta Helix’s collaboration in the initiation stage.

Source: Modified from Carayannis and Grigoroudis (2016).

b. Course and training stage

This stage encompasses the preparation of materials, tools, programs, schedules, a detailed curriculum, evaluation procedures, limited production or service offerings, and marketing training. Considering the interplay of actors—village authorities, business entities, and academic practitioners—the courses and training phase significantly benefit from the triple helix model. This collaborative approach enhances individual and organizational capacities. Courses and training are designed for specific candidates meeting predefined criteria. While achieving short and medium-term objectives is the primary goal, the selection process is crucial to ensure participants can surpass program expectations.

The collaborative management of courses and training in Panggungharjo village is facilitated by strong leadership and the proximity of capable academic partners. These include Sunan Kalijaga Yogyakarta State Islamic University, UPN Veteran University, Muhammadiyah Yogyakarta University, Gadjah Mada University, and many other institutions of higher learning. Notably, the Panggungharjo community actively participates in courses, training, and business development programs, taking on roles as both participants and committee members for initiatives like BUMDes

Panggung Lestari-KUPAS, Kampoeng Mataraman, and pasardesa.id.

Training and courses are offered free to all participants. Common programs encompass elderly training, digital creativity training, batik production training, certification for construction workers, and socialization on health, social, economic, and education programs, including family financial management and waste management. Beyond training, courses, certification, and socialization, Panggungharjo village provides benchmarking and training for other villages to facilitate comparative practices in village governance, development, and village-owned enterprise management.

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c. Business stage—The Panggungharjo’s Business Development Initiatives are as follows.

- Environmental Sustainability—KUPAS

A community-driven waste management business group, KUPAS is instrumental in preserving the village’s cleanliness and promoting eco-friendly practices. By effectively managing waste, KUPAS contributes to a healthier environment and sustainable community development. **Figure 9** describes KUPAS activities and facilities.



Figure 9. Solid waste management—KUPAS activities.

Source: Panggungharjo Village Website, 2024.

- Tourism and Cultural Preservation—Kampoeng Mataraman

This meticulously crafted historical tourism site offers an immersive experience of the rich cultural heritage of the Mataram Kingdom. By blending traditional architecture, culinary delights, and cultural performances, Kampoeng Mataraman not only attracts tourists but also serves as a platform for preserving local traditions and generating income for the community. **Figure 10** below reflects Kampoeng

Mataraman.



Figure 10. Solid waste management—KUPAS activity.

Source: Panggungharjo village website, 2024.

- Economic Empowerment—Pasar desa.id

This innovative online marketplace has empowered local producers by providing a direct channel to reach a wider market. By facilitating e-commerce, pasar desa.id has contributed to economic growth, job creation, and income generation within the village. The platform's adaptability during the COVID-19 pandemic highlights its resilience and potential for future expansion.

- Community Development—The Ratan

As a multipurpose facility, The Ratan serves as a vital community hub, fostering social interaction and supporting local events. By providing a well-maintained space for celebrations and gatherings, The Ratan strengthens community bonds and contributes to the overall well-being of the villagers.

These initiatives collectively demonstrate Panggungharjo's commitment to sustainable development, cultural preservation, economic growth, and community empowerment. diverse business units exemplify the success of Panggungharjo's vocational village development program. By leveraging the skills and knowledge acquired through training, the village community has not only created sustainable livelihoods but also fostered a sense of local pride and ownership. The Panggungharjo model serves as a compelling example for other villages seeking to empower their communities and achieve sustainable development.

d. Independence stage

Self-independence signifies a community's capacity to fulfill its own needs. BUMDes Panggung Lestari has demonstrated this capability, generating an annual revenue of approximately IDR 2.5 billion. The economic circulation fostered by the enterprise has positively impacted the neighborhood's economic growth, resulting in mutual benefits. Consequently, Panggungharjo village has achieved a degree of economic and social independence, establishing itself as a pioneer in village development. In alignment with the village's Mid-Term Development Plan (RPJMDes), the goal of achieving self-sufficiency for all families by 2024 is within reach. The community has made substantial progress in managing various aspects of their livelihood in a structured manner.

4.3. Force field analysis (FFA) on vocational village practices

In the realm of vocational village practices, disruption, and technological gaps pose significant challenges for most rural communities. A growing emphasis has been

placed on strategies to maintain rural vitality, revitalize public services, and stimulate grassroots engagement among rural populations (Komorowski, 2022). Concurrently, village governments often grapple with administrative hurdles and assert their authority, particularly in the management of village funds. Nevertheless, Law No. 6 of 2014 on Village Governance acknowledges the village government’s authority to govern and safeguard the interests of villagers, grounded in their inherent rights, customs, and socio-cultural values. Consequently, political will and leadership within the village bureaucracy are paramount, shaping the structure, procedures, and allocation of financial assistance. Furthermore, both tangible and intangible resources, including infrastructure, human capital, community skills, norms, and a commitment to fostering trust and shared values, are essential for successful implementation.

A force field analysis was conducted to prioritize influencing factors based on the findings of the systematic literature review and case study. Referring to **Table 2**, each force was assigned a score to quantify its impact within the given context. This analysis contributes to the exploration of potential leverage points and model development for vocational villages.

Table 2. Force field analysis on vocational village practices: Contextual and practical dimension*.

Internal	Consideration	Score of priority	External	Consideration	Score of priority
Politics and leadership	Driving forces	5	Technology/ disruption	Driving forces	5
Bureaucracy/institution	Driving forces	5	National and regional intervention on village development policy roadmap	Inhibiting forces	4
Norms	Driving forces	4	Crisis (economic, health, social sectors)	Inhibiting forces	5
Trust	Driving forces	5			
Networking	Driving forces	4			
(Less quality) Human (communities) capital	Inhibiting forces— challenge	5			
Natural resources	Driving forces	3			
(Less accommodated) physical resources (infrastructure)	Inhibiting forces— challenge	4			
Financial assistance	Driving forces	4			
Total (driving forces)		30 (inhibiting factors are excluded)	Total (driving forces)		5 (inhibiting factors are excluded)

*The FFA is discussed through a peer-reviewed analysis with key informant’s affirmation.

The findings underscore the pivotal role of the Village Head. Wahyudi Anggoro Hadi, the head of Panggunharjo village, initiated reforms within the village bureaucracy, including the establishment of eleven village institutions. To enhance individual capacity, he launched a “one-home-graduate” program, sponsoring one child per household to pursue higher education. To optimize bureaucratic efficiency and effectiveness, the Village Head implemented a performance-based incentive and allowance system outlined in a village regulation. Furthermore, to ensure governance accountability, Panggunharjo village partnered with the Development Finance Comptroller (BPKP) to review the Mid-Term Development Plan (RPJMDesa) as an internal control mechanism. A digital-based information system was adopted to

manage village performance and promote transparency.

4.4. A developed model for vocational village

This figure below could contribute to the academic literature on rural development models, vocational training, and community-based approaches to improving livelihoods in rural areas. It may offer a novel framework or methodology for designing and implementing effective vocational village programs that other researchers can study, refine, and build upon. The findings could inform theories and models related to the role of skill development, entrepreneurship, and community engagement in rural transformation.

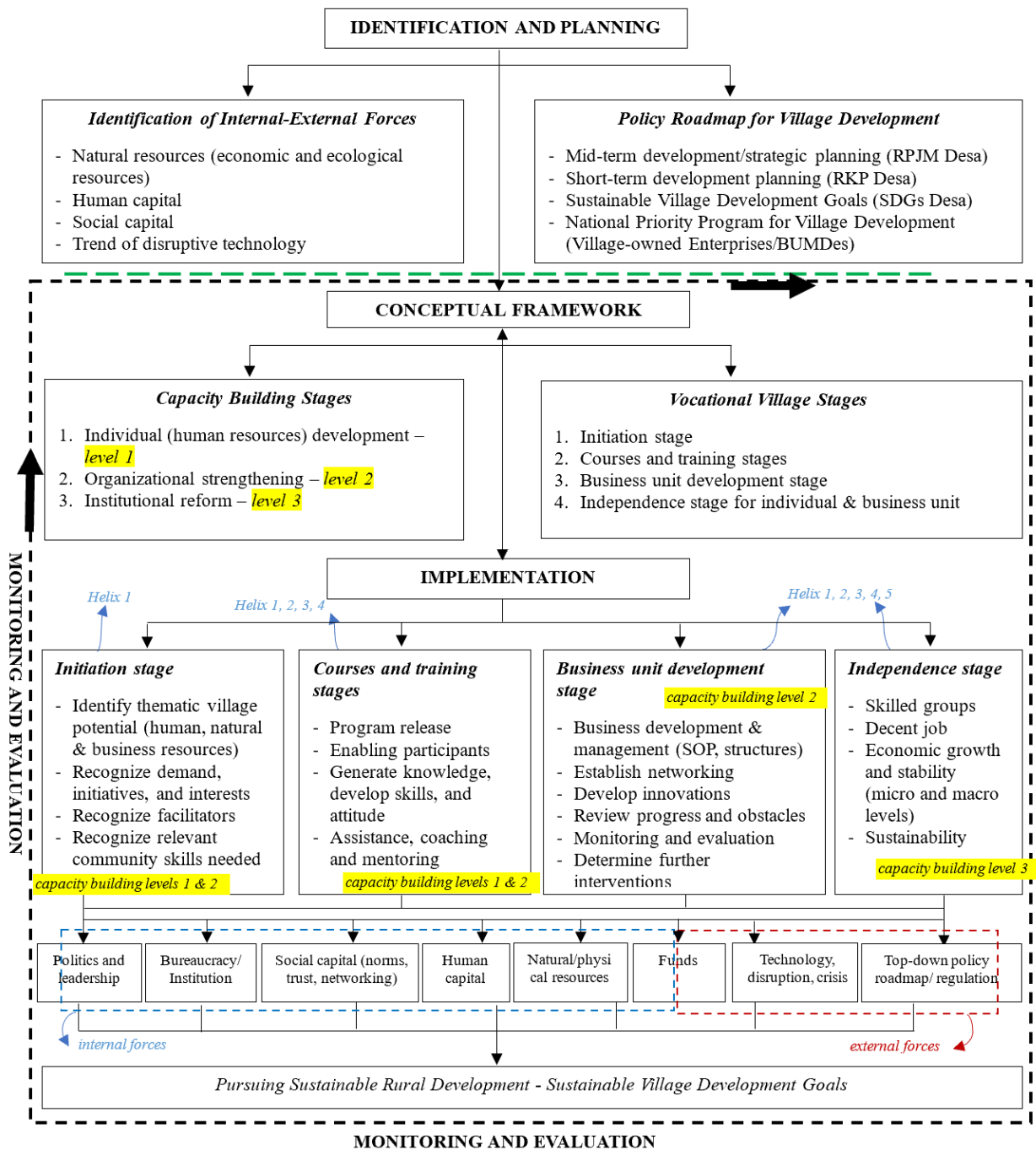


Figure 11. Model for vocational village development.

The developed model of the vocational village could provide a replicable blueprint for policymakers, development practitioners, and local governments to establish similar programs in other rural contexts. It may offer insights into effective strategies for integrating vocational training, livelihood support, and community empowerment to drive sustainable economic and social development in rural areas. The model could inform the design of rural development programs, vocational education curricula, and community-based initiatives to improve rural livelihoods and prosperity.

This research could inform policy discussions and decisions around the role of vocational training, entrepreneurship support, and community-driven approaches in rural development strategies. The findings may highlight opportunities for improving coordination and collaboration between government agencies, educational institutions, and local communities in the design and implementation of such programs. The model could provide a framework for evaluating the effectiveness of existing rural development policies and identifying areas for improvement or reform. To conclude, the detailed model and insights in **Figure 11** could help inform more effective and sustainable approaches to improving livelihoods and promoting prosperity in rural communities.

The following is a description of the model above:

- 1) Identification and planning
 - a) Identification of internal—external forces
It is essential to understand the internal and external forces influencing village development. Natural resources, social capital, community involvement, and technological trends are a few of these.
 - b) Policy roadmap for village development
Relevant recommendations for village development are provided under the National Priority Program for Village Development.
- 2) Conceptual Framework
 - a) Capacity building stages
 - b) Vocational village stages
- 3) Implementation
 - a) Initiation stage
At the initiation stage, helix 1 namely the government takes the most significant role to scale up individual and organizational capacities.
 - b) Courses and training stage
This stage relies on cultural aspects as the program approach, the actors participating in this stage are helix 1, 2, 3, and 4.
 - c) Business unit development stage mainly support the empowerment of village-owned enterprise as an attempt of village organizational strengthening.
 - d) Independence stage
The desired impact of the vocational village program is village institutional reform aimed at independence.

5. Conclusion

The findings of this study indicate that sustainable rural development starts from quality human capital, meanwhile investing in vocational village practices is a highly effective strategy for enhancing human capital. This research focuses on the development of vocational villages delivered through village-based forums, offering training programs tailored to the specific economic, social, cultural, technological, and environmental potentials of the respective communities. While this approach promises significant human capital development, it necessitates strong leadership from village governments to coordinate stakeholder collaboration.

The vocational village model implemented in Panggungharjo Village implies the critical importance of a penta-helix approach, involving government, business, academia, community, and media in rural development. Each of these stakeholders has played a pivotal role in the various stages of the vocational village, encompassing initiation, training, business development, and independence. Panggungharjo Village is a prominent exemplar of successful vocational village development in Indonesia, having established a diverse portfolio of micro, small, and medium enterprises (MSMEs) under the management of a village-owned enterprise, BUMDes Panggung Lestari. The village's achievement is attributable to the effective interplay of both internal and external factors driving the vocational village development process.

The factors influencing vocational village practices in Panggungharjo Village can be categorized as follows: (1) top-down policy framework and regulations; (2) technological advancements, disruptions, and crises; (3) natural and physical resources; (4) human capital; (5) social capital, including norms, trust, and networks; (6) bureaucratic and institutional factors; (7) political leadership; and (8) financial resources. A Force Field Analysis conducted by the authors revealed that leadership and political will emerged as the most critical driving forces among all internal and external factors. The Village Head of Panggungharjo demonstrated exceptional acumen in leveraging political capital to effectively manage village governance, development, and innovation. In conclusion, the development of a capacity-based vocational village model is imperative. This model should encompass distinct phases for planning, implementation, monitoring, and evaluation. Crucially, it should elucidate the intricate relationship between capacity building and each stage of vocational village development, drawing upon the invaluable lessons learned from the successful practices of Panggungharjo Village. By adopting such a model, the enhancement of human capital in rural areas through vocational education and training initiatives can be effectively realized.

Despite its value, this research faces several challenges. One major obstacle is the limited availability of relevant secondary data. There is lack of scholarly publications, articles, and news specifically focusing on vocational villages in Indonesia. This makes it difficult to conduct a comprehensive analysis. Additionally, the time frame of the available data is restricted, making it challenging to identify long-term trends in the development of vocational villages.

To address these challenges, this research will adopt a consistent definition of vocational villages and concentrate on the existing data within a specific period. The developed model might be closely relevant to middle-up level villages in Indonesia

and other developing nations, considering factors such as natural resources, infrastructure, and community involvement.

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