

# Pentahelix collaboration on environmental perspective: Handling underdeveloped villages in conservation forests

*Auradian Marta*<sup>1\*</sup>, *Wan Asrida*<sup>1</sup>, *Raja Muhammad Amin*<sup>1</sup>, *Rury Febrina*<sup>1</sup>, and *Zulfa Harirah MS*<sup>1</sup>

<sup>1</sup>Faculty of Social Science and Political Science, University of Riau, Pekanbaru, Riau, Indonesia

**Abstract.** This research is motivated by the empirical fact that there are still many underdeveloped and very underdeveloped villages in Kampar District. This research discusses two main things: first, why are there still underdeveloped and very underdeveloped villages in Kampar Regency, and second, how are underdeveloped villages in Kampar Regency handled from a Penta helix perspective? Village backwardness can be overcome with a development strategy that is carried out in an integrated manner by emphasizing investment and cooperation from various actors, namely government actors from multiple levels and different local actors such as the private sector and NGOs. The empirical phenomenon shows that the number of underdeveloped and very underdeveloped villages in Riau Province, especially in Kampar Regency, is still the highest compared to other regions in Riau Province. Requires the design of policy issues and Penta helix collaboration models in collaborative handling efforts, considering not only economic, social, and environmental aspects but also village development that is in line with the Bukit Rimbang and Bukit Baling Conservation Forest Management Units (KPHK) in Kampar District.

## 1 Introduction

Village underdevelopment can be overcome with an integrated development strategy [1–3]. According to the OECD (2006), the new paradigm in rural development emphasizes the importance of rural competitiveness, strengthening local assets, and exploiting untapped resources. The target of rural development has shifted from agriculture to various economic sectors such as rural tourism, the ICT industry, and so on. In this regard, investment and cooperation from multiple actors are needed, namely government actors from various levels and local actors such as the private sector and NGOs.

Ziemiańczyk & Krakowiak-Bal explain that in rural development, the critical factor lies in organizational learning, which can give rise to innovation and competitiveness [4]. For this reason, networking and partnerships are also needed from various parties in rural development [3,5–7]. Meanwhile, an approach is also known in rural development, namely

---

\* Corresponding author: [auradian.marta@lecturer.unri.ac.id](mailto:auradian.marta@lecturer.unri.ac.id)

integrated rural development (IRD). IRD, according to Jacob [8], includes the involvement of various sectors that focus on a holistic approach to improving the quality of life.

This IRD has characteristics summarized by Jacob as follows [8]:

- 1) Target-oriented: identification of poor rural communities, mainly small-scale farmers as the main clients and beneficiaries, and those who live in remote and geographically disadvantaged areas.
- 2) Comprehensive and multisectoral: IRD projects that simultaneously consider social, economic, and political development and all rural sectors as interacting and mutually reinforcing.
- 3) Decentralization: IRD chooses a bottom-up planning and program implementation model. It emphasizes local initiatives and resource allocation for program implementation, evaluation, and sustainability.
- 4) Participatory, community-centered, and community-based: IRD encourages the participation of those in rural areas during all phases of the project or program life cycle.
- 5) Multisectoral infrastructure improvements: by focusing on foundation projects or infrastructure development in critical social sectors (e.g., health, education, and economic sectors), IRD initiatives often help improve people's overall quality of life.

This research is motivated by an empirical phenomenon that shows that there are still many underdeveloped and very underdeveloped villages in Kampar Regency. Based on data from the Kampar Regency Village Empowerment and Community Service, there are 12 underdeveloped villages and 23 very underdeveloped villages in Kampar Regency in 2021-2022, as seen in Table 1.

**Table 1.** Village status in Kampar Regency 2021-2022.

Village Status	2021		2022	
	Number of Villages	%	Number of Villages	%
Independent	6	2,48	14	5,79
Forward village	58	23,97	84	34,71
Developed villages	136	56,20	109	45,04
Underdeveloped villages	19	7,85	12	4,96
Very underdeveloped villages	23	9,50	23	9,50

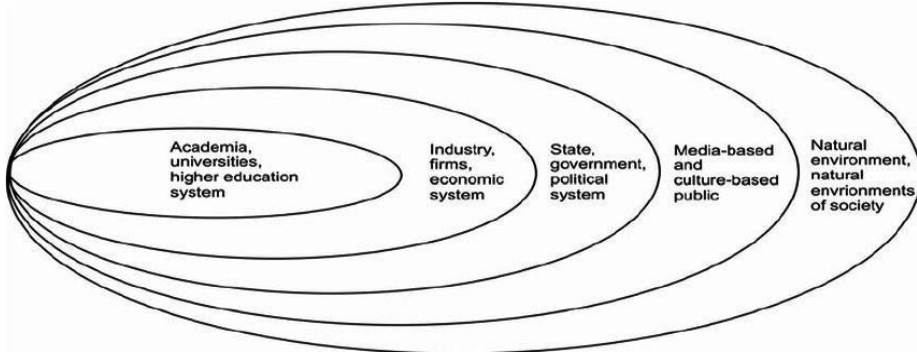
Data source: Expose of the Kampar Regency Village and Empowerment Service (2022)

The number of underdeveloped and very underdeveloped villages in the Kampar Regency puts the Kampar Regency Developing Village Index (IDM) into the developing category with an average value of 0.6808 (Kemendes PD TT, 2022). The IDM assessment for Kampar Regency has increased from 2021, which was 0.6565; however, the number of underdeveloped and very underdeveloped villages in Kampar Regency has not changed from before. Indicates that the regional government's program intervention in dealing with underdeveloped villages can be said to have failed.

Research on underdeveloped villages has been carried out by many experts with various perspectives and approaches. The first is to discuss overcoming underdeveloped villages using an economical method [9–11]. Second, from a rural sociology approach [12]. Third, from the administration and policy side [13].

The penta helix model is a development of the triple helix model of innovation referring to a series of interactions between academia, industry, and government to encourage economic and social development [14]. Furthermore, this triple helix model was transformed into a quadruple helix, as Carayannis & Campbell stated, by adding media actors in the collaboration process [15]. In the end, the development of this concept subsequently gave

rise to the Penta helix or quintuple helix model proposed by Carayannis & Campbell [16], which is a collaboration of 5 (five) essential actors, namely the state (government), the private sector, academics, media, and society. In the context of this research, penta helix collaboration will be analyzed in handling disadvantaged villages in the Kampar Regency. The following is the penta helix model discovered by Carayannis & Campbell [16].



**Fig. 1.** Penta helix model [16].

The Quintuple Helix or Penta Helix model is interdisciplinary and transdisciplinary at the same time. The complexity of the penta helix structure implies that a complete analytical understanding of all actors requires the continuous involvement of the entire spectrum of disciplines, from the natural environment to the social sciences and humanities (becoming society, democracy, and economics). The Quintuple Helix is also transdisciplinary because it can be used as a frame of reference for decision-making related to knowledge, innovation, and the environment [16]. Therefore, the Penta Helix has the potential to serve as an analytical framework for sustainable development and social ecology by connecting knowledge and innovation conceptually to the environment.

Based on the classification of previous research, it can be stated that the characteristics of this research are that it discusses in more depth the model for handling underdeveloped villages carried out by multi-actors using the penta helix approach. This research argues that the regional government managing underdeveloped villages in Kampar Regency must involve various parties. Carayannis & Campbell revealed that the administration of government requires the cooperation of 5 (five) essential actors, namely the state (government), private sector, academics, media, and society [15].

## 2 Method

Experts have researched Village or rural development. Marta et al. discussed village development by analyzing the process of formulating village development planning policies. The results showed that the Buluh Cina RPJMDES resulted from participatory planning involving all elements of community groups. Participatory development planning becomes capital in realizing the vision of village government [17].

Furthermore, specifically regarding handling underdeveloped villages from a policy perspective, it has also been researched by Tambuwun et al. [18], who explained that the development of underdeveloped villages is carried out by carrying out various forms of activities in economic empowerment, setting clear targets or target groups, and implementing organizational factors. Environmental factors contribute to the successful development of underdeveloped villages.

Lastly, research conducted by Fauzanna & Indrayati [19] describes that underdeveloped villages are caused by regional typology factors with environmental characteristics that are

prone to disasters. This condition is exacerbated by the social aspects of the community, where participation is low. The recommendation from this study is the involvement of various parties in developing underdeveloped villages. Based on this explanation, this research is to fill the gap in analyzing the model for handling disadvantaged villages with a penta helix perspective. Jacob's [8] analysis strengthens this theory, which explains the dimensions of targets, multisectoral development, planning, community-based development, and improving development infrastructure.

This study uses a qualitative method. Creswell [20] suggests that qualitative research is an approach to exploring or understanding the meaning individuals or groups ascribe to a social or human problem. Qualitative research methods with a phenomenological approach are carried out to reveal the phenomena that occur and explain them with relevant theories. Phenomenological research is a design of inquiry from philosophy and psychology in which the researcher describes the lived experiences of individuals about a phenomenon as described by participants. This description culminates in the essence of the experiences of several individuals who have all experienced the phenomenon [20].

This research is focused on Kampar Regency, which follows the empirical facts that there are still many underdeveloped and very underdeveloped villages. Research data comes from primary data sourced from research informants and secondary data in documents, research results in journals, audio-visual recordings, and reports.

Specifically, primary data sources obtained from interviews with informants were obtained from representatives of the regional government of Kampar Regency (Regent of Kampar, Community and Village Empowerment, Leadership of the DPRD of Kampar Regency), the Department of Community, Village, Population and Civil Registration of Riau Province, the sub-district head and village head in Kampar Regency, elements from universities, media groups, and the private sector. This research collected data through in-depth interviews, documents, archival recordings, interviews, and online or electronic media. Regarding the selection of informants who were interviewed, it was carried out using purposive and snowball methods. Data analysis in this research uses an interactive model. The interactive data analysis model starts from collecting, condensing, displaying, and describing/verifying data to conclude.

### **3 Results and discussion**

Community development and development carried out by the government depends on planned programs and available budgets, availability of resources, technology, or innovation. The government cannot solve all problems, so the government needs to collaborate with other competent parties to help resolve public issues. Collaboration is solving complex problems by bringing together multiple stakeholders with diverse attitudes, behaviors, and resources to achieve consensus for a common goal.

One of the government's priorities, which emphasizes a collaborative approach, can be seen in the draft strategy for accelerating the increase in the Village Development Index (IDM). IDM is used as a measuring tool to assess the status of village progress/independence through the availability of primary village development data. Economic, social, and environmental indicators are aligned with sustainable development goals, and several variables and indicators form these three dimensions. The three hands are mutually reinforcing components of village community empowerment and sustainable development. Clarity of the progress and independence status of the Village will make it easier for development actors and Village community empowerment in managing growth and achieving the Village's development goals as regulated in the Republic of Indonesia PDDT Ministerial Decree Number 2 of 2016 concerning the Village Development Index.

Kampar Regency is one of the regencies in Riau Province, which is the locus for implementing interventions to improve the status of village development. The recommended IDM indicators in the Super Priority and Priority categories for intervention in Riau Province to improve village development status in 2022 can be seen in Table 2.

**Table 2.** IDM indicators for Riau Province in 2022.

Social Dimensions	Economic Dimensions	Environmental Dimensions
Availability of Health Personnel (midwives, doctors and other health workers) PKBM activities/Package A-B-C Availability of course activities in the Village Availability of a Community Reading Garden or Village Library Availability of Open Public Space Availability of Sports Groups and Sports Activities Availability of Internet Access for residents	Availability of Village Market Availability of Post Offices and Logistics Services in the Village Availability of Public Banking Institutions and BPRs in the Village Village Residents' Access to Credit Availability of Modes (Public Transport, Regular Routes, and Operating Hours) in the Village Roads that can be passed by four or more wheeled motorized vehicles Quality of Village Roads	Efforts/Actions to Mitigation of Potential Natural Disaster Events in the Village

Source: Expose Head of The PMD Department of Kampar Regency, 2022

Empirical phenomena show that there are still many underdeveloped and very underdeveloped villages in Riau Province, especially in Kampar Regency. Based on data, of the 24 very underdeveloped villages in Riau Province, 23 are in Kampar Regency, or 96%. Of the 87 underdeveloped villages in Riau Province, 14 underdeveloped villages are in the Kampar district, or 14%. The number of Very Disadvantaged Villages in Riau Province in 2022 is 24 Villages, and the status can be upgraded to Developing Villages, provided that Disadvantaged Villages in Riau Province are only found in 2 Regencies, namely Kampar Regency and Meranti Islands. Development Intervention I, Very Disadvantaged Villages, became 12 Developing Villages. Development Intervention II, Very Disadvantaged Villages became Developing Villages, increasing by 7 to 19 Villages. Development Intervention IV, Very Disadvantaged Villages became Developing Villages, rising by 5 Villages to 24 Villages. This intervention can be seen in Table 3.

**Table 3.** Alleviation of Very Disadvantaged Villages to Developing Villages with Intervention in Kampar Regency and Meranti Regency in 2022.

Regency	Number of Disadvantaged Villages	Alleviation of Very Disadvantaged Villages into Developing Villages with Intervention	Alleviation of Very Disadvantaged Villages into Developing Villages by Carrying Out Additional Interventions		
			Intervention II	Intervention III	Intervention IV
Kampar	23	11	7	0	5
Kepulauan Meranti	1	1	0	0	0

Source: Expose Head of The PMD Department of Kampar Regency

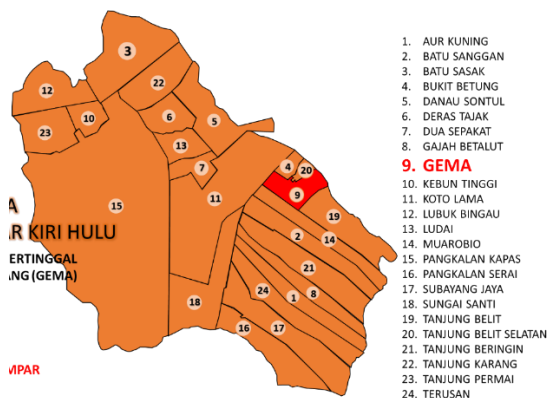
Based on data from the Ministry of Villages PDPT for 2022, the number of underdeveloped and very disadvantaged villages in Kampar Regency makes the Kampar Regency Developing Village Index (IDM) into the developing category with an average value of 0.6808 (KemendesPDPT, 2022). The distribution of Disadvantaged Villages and Very Disadvantaged Villages in Kampar Regency can be seen in Table 4.

**Table 4.** IDM development per sub-district in Kampar Regency (Disadvantaged Villages and Very Disadvantaged Villages) 2021-2022.

No	Regency	Very Disadvantaged Villages		Disadvantaged Villages	
		2021	2022	2021	2022
1	Kampar Kiri			10	8
2	Kampar Kiri Hulu	23	23	1	
3	Kampar Kiri Hilir			2	2
4	Kampar Kiri Tengah				
5	Gunung Sahilan				
6	Koto Kampar Hulu			1	
7	Xiii Koto Kampar				
8	Kuok				
9	Salo				
10	Tapung			1	
11	Tapung Hulu				
12	Tapung Hilir			1	1
13	Bangkinang Kota				
14	Bangkinang				
15	Kampar			1	1
16	Kampa			1	
17	Rumbio Jaya				
18	Kampar Utara				
19	Tambang			1	
20	Siak Hulu				
21	Perhentian Raja				
	Total	23	23	19	12

Source: Kampar Regency PMD Service, 2023

Based on the table 4 above, it can be seen that the distribution of very underdeveloped village locations is in Kampar Kiri Hulu District. It can be seen from the figure 2 below:



Data source: Study Report on Preparation of Development Potential for Disadvantaged Villages in Kampar Regency, Riau Province (2022).

**Fig. 2.** Map of village status in Kampar Kiri Hulu District, Kampar Regency, in 2022

Several problems based on the results of the assessment of the development potential of underdeveloped villages in Kampar Regency, Riau Province, include:

1. Geographical challenges and limited access to villages
2. Economic support facilities and infrastructure are still limited
3. Management of local resource potential is not yet optimal
4. The quality of human resources is still low
5. Coordination between development actors in underdeveloped areas is still weak
6. Access to growth centers in investment areas is shackled and still low

The above problems are also influenced by the location of the nine villages within the conservation area. The nine villages with Very Disadvantaged Village status are in Kampar Kiri Hulu District, Kampar Regency, precisely in the Bukit Rimbang Bukit Baling Wildlife Reserve Area, where management of the area is purely the central government's authority. Based on the Decree of the Minister of Environment and Forestry No.SK.3977/Menhut-VII/KUH/2014, the forest area designated as a Wildlife Reserve has an area of 141,226.25 hectares, an increase compared to the initial determination in 1982, which was 136 thousand hectares. The Bukit Rimbang and Bukit Baling Conservation Forest Management Units (KPHK) have also been established based on SK.468/Menlhk/Setjen/PLA.0/6/2016, and the management of the KPHK is under the authority of the Riau Province Natural Resources Conservation Center (BBKSDA). One of the challenges in village development in conservation areas is the limited options for carrying out an action that suits the existing needs and conditions of the Village where the access and interests of village communities that existed before this area was designated as a Wildlife Reserve cannot be accommodated so that it correlates with no change in status. from 9 Very Disadvantaged Villages.

The Riau Provincial Government and the Kampar Regency Government are carrying out interventions to develop Disadvantaged Villages into Developing Villages and Disadvantaged Villages into Developed Villages in Kampar Regency, which is sourced from Special Financial Assistance and budgets in the Kampar Regency OPD as explained in Table 5.

**Table 5.** Interventions for developing underdeveloped villages into developing villages and underdeveloped villages into advanced villages in Kampar Regency in 2022.

Sources of Funds and OPD	No.	Village Development Intervention	Number of Disadvantaged Villages to Developing Villages	Number of Underdeveloped Villages Becoming Developed Villages	Number of Very Disadvantaged Villages become a Developing Village
Village BKK and BPBD	1	Providing Natural Disaster Mitigation Facilities in Villages in the form of Disaster Early Warning	2	9	22
	2	Provision of Natural Disaster Mitigation Facilities in Villages in the form of Safety Equipment	3	8	23
	3	Provision of Natural Disaster Mitigation Facilities in Villages in the form of Evacuation Routes	3	9	23



Table 5. Cont.

	4	Handling/preventing forest and land fire disasters	2	1	1
Village BKK	1	Provision of Village Library Facilities/Community Reading Parks in the Village	3	4	19
	2	Providing Open Public Spaces for Citizens without the Need to Pay	3	5	13
	3	Activating Resident Sikamlang	1	5	15
	4	Additional Credit Facilities in villages (KUR/KUK/KKPE/BU MDesa SP Unit)	1	3	3
BKK and Education Department	1	Providing Community Learning Activity Centers Pursuing Packages A, B, and C in the Village	0	0	0
	2	Provision of Course Centers or Special Skills Training Centers in Villages	3	4	11
Public health Office	1	Assignment of at least one doctor to the Village	3	2	10
	2	Assignment of at least one other health worker besides the doctor and midwife in the Village	2	1	4
Village BKK and Ministry of Industry and Commerce	1	Market Construction with Semi-Permanent Buildings	1	1	2
	2	Increase in the number of micro/SME industries to $\geq 0.4\%$ of the number of families in the Village	0	0	0
Ministry of Communication and Information Technology	1	Development of Logistics Services and Post Offices	0	0	0
BKPMMD	2	Government/Private Bank Development Facilities	0	0	5
Ministry of Rural Affairs	3	Recognition of the BUMDesa Savings and Loans Business Unit as a BPR	0	0	2

Source: Expose Head of The PMD Department Of Kampar Regency, 2022



The Penta Helix collaboration in handling Disadvantaged and Very Disadvantaged Villages focuses on five elements that support the implementation of village development. The government as a policy maker, academics as the transfer of knowledge and research related to development problems, the community or society as a social and advocacy force, entrepreneurs as a force in market and investment mechanisms, and the media to promote the potential and vulnerabilities of the Village. In the Penta helix collaborative approach, handling underdeveloped and very underdeveloped villages cannot be separated from the role of stakeholders in the development process. 5 (five) Actors play an active role in the Village development process and increasing the Village's independent status, which can be seen in Table 6.

**Table 6.** Role of stakeholders in the development process of disadvantaged and very disadvantaged villages in Kampar Regency.

<b>Actor</b>	<b>Role</b>
Government	<ul style="list-style-type: none"> <li>➤ The government makes policies and regulations related to Village Development, empowering village communities and accelerating the development of underdeveloped villages and very underdeveloped villages outside conservation areas.</li> <li>➤ The government opens access to infrastructure and provides adequate facilities and infrastructure to support meeting the needs of village communities and the development of an environmentally friendly village economy.</li> <li>➤ Building government partnerships with civil society, media, academics, and the private sector to study, develop, and empower village communities within and outside conservation areas.</li> <li>➤ Optimizing resources and directly strengthening institutions to increase capacity and capability in formulating policies or regulations.</li> </ul>
Private	<ul style="list-style-type: none"> <li>➤ In the Village development process, the business world or private sector plays a critical role in running businesses that prioritize business and professional ethics, responsibility, and sustainability. The business world plays a profit-oriented role that will be responsible for environmental sustainability through activity programs within the scope of implementing Corporate Social Responsibility (CSR).</li> </ul>
Civil Society	<ul style="list-style-type: none"> <li>➤ People who are members of communities, non-government organizations, and NGOs play a role in supporting development and advocating policies that favor the people of disadvantaged villages. Participatory assessment, partnerships, and advocacy frameworks in realizing equitable village development are some of the movement goals of NGOs.</li> </ul>
Mass media	<ul style="list-style-type: none"> <li>➤ Media plays a role in the information and promotion of inclusive Village potential by utilizing the power of networks and publication media that can be accessed quickly. The press is oriented towards taking sides with the village community by presenting information that is accurate and based on objective data.</li> </ul>

## 4 Conclusion

The results of the research on handling underdeveloped and very underdeveloped villages in Kampar Regency are: First, the need for a working group that emphasizes penta helix collaboration in the study and handling of underdeveloped and very underdeveloped villages in Kampar Regency, which highlights the existence of a process or series of 5 (five) interactions and collaborations.) important actors: state (government), private sector, academics, media, and NGOs. Second, accelerating the implementation of cooperation between the Kampar Regency Government and the Riau BKSDA, Republic of Indonesia Ministry of Environment Number: NK. 372/K.6/BTU/KUM.3/03/2019 and 414.4/BUP KPR/2019/07 dated 13 March 2019 concerning the development of limited natural tourism as strengthening the function of the Bukit Rimbang Bukit Baling Wildlife Reserve area through the construction of interpretation roads and the action for enhancing the role of traditional communities, as an effort to alleviate the extreme poverty of people living in wildlife sanctuary areas in 9 villages in Kampar Kiri Hulu District. Third, integration of the RPJMDs, RPJMD, KPHK Management Plan, Rimbang Baling Ecotourism Master Plan, Traditional Rules, and Village Spatial Planning in Special Blocks into a particular Conservation-Based Village Development Plan for Villages in the Bukit Rimbang Bukit Baling Wildlife Reserve area. Fourth, strengthening the empowerment of village communities refers to the Minister of Environment and Forestry Regulation number P.43/MENLHK/SETJEN/KUM.1/6/2017 concerning Community Empowerment around Nature Reserve Areas and Nature Conservation Areas. Finally, the parties' involvement and joint commitment are needed to realize accelerated handling and development in disadvantaged and very disadvantaged villages in Kampar Regency, starting with building understanding and intensive communication. Scenarios and stages of the collaboration process need to be designed and carried out together so that the partnership and achievement of the goal of "Zero Very Disadvantaged Villages and Disadvantaged Villages" can be realized without neglecting sustainable area management.

## References

1. Y. Shao, Y. Chen, and J. Su, *Built Herit.* **6**, (2022)
2. S. Purwitaningsih, P. D. Nhindyasari, A. P. Sambodo, A. B. Santosa, A. S. Hilal, A. Wulandari, S. A. A. N. Fitriyah, R. A. Wijaya, J. Asano, J. Sartohadi, M. A. Setiawan, M. Sulaiman, and E. S. Pratiwi, *Geoenvironmental Disasters* **10**, (2023)
3. X. Ren, *Built Herit.* **7**, (2023)
4. U. Ziemiańczyk and A. K. Bal, *Int. J. Bus. Emerg. Mark.* **9**, 19 (2017)
5. A. min Zheng and Z. Li, *Eurasip J. Wirel. Commun. Netw.* **2022**, 13638 (2022)
6. Z. Chen, Y. Shao, M. He, J. Liang, Y. Jiang, Y. Wang, M. Zhou, Z. Gong, X. Zhou, F. Fang, and J. Guo, *Environ. Sci. Eur.* **32**, (2020)
7. T. Sabrina, C. Alessio, A. Chiara, P. Gigliola, F. Concetta, B. Federica, and P. Paolo, *Agric. Food Econ.* **9**, (2021)
8. W. J. Jacob, *Asian Educ. Dev. Stud.* **7**, 438 (2018)
9. L. Zhang, P. Lu, R. Lau, L. Yan, X. Li, R. Yang, H. H. Leung, P. Chen, and X. Wang, *Herit. Sci.* **9**, 1 (2021)
10. T. You, *J. Chinese Sociol.* **10**, (2023)
11. D. G. Zang, K. P. Paudel, Y. Liu, D. Liu, and Y. He, *Financ. Innov.* **9**, 1 (2023)
12. M. Moritz, *Pastor. Res. Policy Pract.* **2**, 24 (2012)
13. A. P. Pola, *Built Herit.* **3**, 64 (2019)
14. F. Momeni, A. A. M. Yazdi, and S. M. S. Najafi, *J. Innov. Entrep.* **8**, 1 (2019)
15. E. G. Carayannis and D. F. J. Campbell, *Int. J. Technol. Manag.* **46**, 201 (2009)

16. E. G. Carayannis and D. F. J. Campbell, *Int. J. Soc. Ecol. Sustain. Dev.* **1**, 41 (2010)
17. and H. S. A. Marta, K. Anwar, Nakhoda *J. Ilmu Pemerintah* **10**, 14 (2013)
18. V. Tambuwun, V., Rorong, A., & Londa, *J. Adm. Publik* **8**, (2022)
19. R. Fauzanna and A. Indrayati, *Geo-Image* **10**, 117 (2021)
20. J. W. Creswell, *A Concise Introduction to Mixed Methods Research* (SAGE publications, 2014)