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MALAYSIA ASSESSMENT MEASURE FOR MODERN RURAL DEVELOPMENT (MAMRD): APPRAISAL INDEX AND INTERVENTION

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Abstract

Technology disruption makes it difficult for rural areas to cope with digital infrastructure and people's readiness to embrace changes. Indeed, technological advancements provide greater opportunities to transform rural areas into instinctive living environments - destinations to invest, work, live, and visit. However, a significant question arises: how far has this innovative technology been practised in rural activities? The current paper aims to demonstrate the application of a Malaysia Assessment Measure for Modern Rural Development (MAMRD); it incorporates the rural technology practices for appraising the score (index) towards a modern rural approach, thereby enabling lessons to be learned for further improvements. From this measurement, it was found that the aqua-tourism and smart community-based village (Kampung Padang Rumbia, Pekan, Pahang) scored 55.92% in the overall index, which could put it into a three-star rating village. The fishing-based village (Kampung Tepi Sungai, Sungai Muda, Kedah) gained two-star with 30.51%. The results become the self-checked intervention for them to move towards a modern rural approach. In the end, MAMRD shall assist all stakeholders who rely on rural and community transformation, such as Institute for Rural Enhancement (INFRA) and Jawatankuasa Pengurusan Keselamatan Kampung (JPKK). Undeniably, this paper also reveals the agendas of Sustainable Development Goals (SDGs) towards societal harmony and happiness.

Keywords: Modern rural, MAMRD, Resilient-liveable-and-smart, Technology practices, Rural actors' behaviour

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INTRODUCTION

A future transition-living environment of rural areas in Malaysia is characterised by two essential national policies, namely Dasar Perancangan Fizikal (DPF) Desa Negara 2023 with the vision of rural prosperity, nation prosperity (DPF Desa Negara, 2017) and Dasar Pembangunan Luar Bandar (DPLB) 2030, which promote a prosperous, inclusive, sustainable, and holistic rural transformation (DPLB, 2018). Both policies put a special recognition on rural transformation, and they remain as the upfront agenda in Malaysia's development blueprint. The biggest challenge today is to narrow the gap between urban and rural living standards; it is the core issue to be appropriately planned and it requires urgent intervention. However, the development progress towards creating a modern rural area is paramount as the digital technology practices, such as IoT (Internet of Things), have already been captured in rural footprint, especially in agricultural, business and tourism activities.

The term 'modern' has been added in rural development agendas for a long time since in 1971 under the National Economic Policy (NEP, 1971-1990) which promotes rural modernisation approach by bringing modern techniques into agricultural cultivation, improving drainage and irrigation for agricultural lands, the establishment of institutions for credit and marketing facilities, the development of rural infrastructure facilities, new transportation and communications facilities and the introduction of new secondary schools in the rural areas (Bruton, 2007). Then, the agenda continued with the strategies of people empowerment under the *Falsafah dan Strategi Baharu Pembangunan Luar Bandar* in 1994, that advocates the catalyst of programme *Gerakan Desa Wawasan* towards making villages more advanced, attractive, and beneficial through the process of raising awareness and changing the attitude of rural people towards rural transformation. In 2010, a strategic action plan blueprint for the so-called *Pelan Induk Pembangunan Luar Bandar* (PIPLB) was introduced to promote rural development based on three thrusts: sustainable and advanced economy, prosperous society, and environmental sustainability (KKDW, 2010). This effort has been put forward in the current policies of the DPF Desa Negara 2030 and DPLB 2030 with specific niches and discoveries.

Inspired by that, this research introduces a modern rural approach to link it to technology disruption in rural development, particularly IoT, robotics and big data analytics used in various fields. These technologies are expected to lead, support and solve many everyday life problems in different sectors in rural regions, such as farming, SMEs, energy usage, and healthcare (Alabdali et al., 2023). In this case, the term smart is added to both terms used in the DPF Desa Negara 2030, namely resilient and liveable rural becoming a modern rural based on the three dimensions namely, resilient, liveable, and smart. Rashid (2021) and Rashid et al. (2021) provided the details on this matter. Based on the reports found

in the DPF Desa Negara 2030 and DPLB 2030, the technology practices in rural activities are less emphasised. The smart concept is adopted from the smart village approach. It is about rural communities taking the initiative to find practical solutions to enhance livelihoods – both to the severe challenges they face and, significantly, to exciting new opportunities that transform rural areas (Figure 1) often using the power of digital technologies and innovative thinking beyond the village itself.



Figure 1: Smart village approach
Source: Rashid (2021)

From this, the MAMRD is formulated as a synergising tool for rural development transition to a modern approach. It is a tool that complements PLANMalaysia's Spatial Characteristics of Rural Malaysia System (S-CHARMS) by incorporating innovative technology practices for a star rating index. Hence, this paper attempts to demonstrate the applications of the MAMRD to appraise the score (index) towards a modern rural approach, which will enable lessons to be learned for further improvements and expediting rural transformation, societal harmony and happiness to cope with the SDGs aspiration (United Nation, 2015).

MALAYSIA ASSESSMENT MEASURE FOR MODERN RURAL DEVELOPMENT (MAMRD)

The MAMRD refers to the modern rural measurement tool (Figure 2) developed by Rashid et al. (2020) that is tailored to the future rural assessment in Malaysia. It offers a measurement tool for synergising rural change to meet the rural

people’s desires within the three dimension-objectives measure: D1-Resilient (Rural economic booster and catalyst infrastructures), D2-Liveable (Rural characters and social well-being infrastructures), and D3-Smart (Smart and green technology practices). It is constructed on the 141 performance criteria from the dimensions above (Figure 3). The formulation of the MAMRD is the missing approach for implementing existing government policies, such as the DPF Desa Negara 2030 and DPLB 2030. Rashid et al. (2021) and Rashid (2021) further explained the framework for the MAMRD formulation.

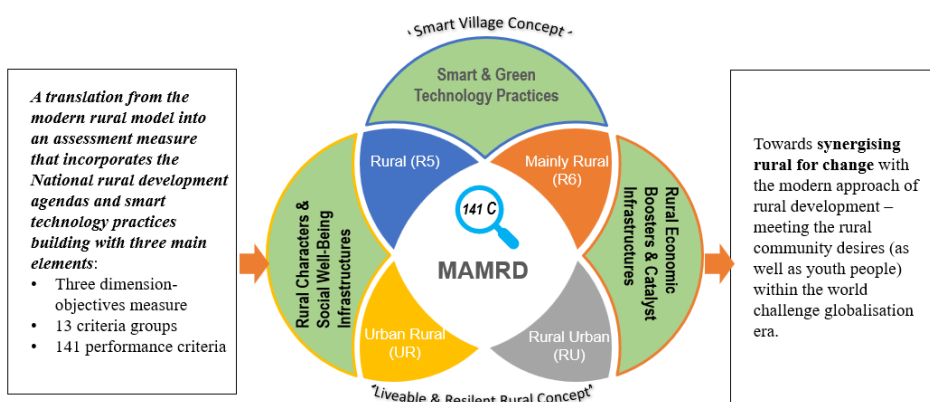


Figure 2: The MAMRD’s three dimension-objectives measure for village index
 Source: Rashid (2021)

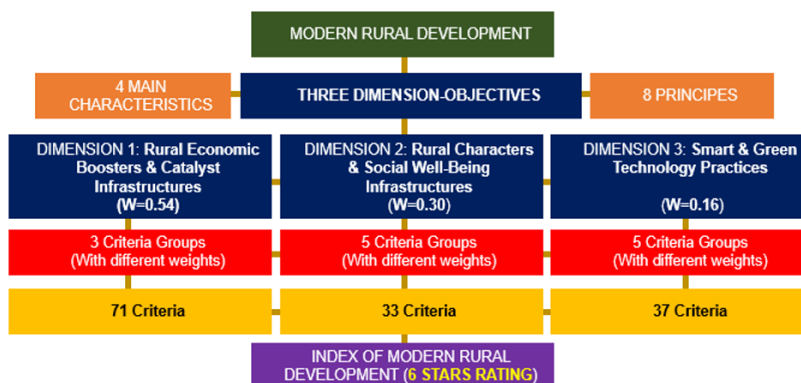


Figure 3: MAMRD’s structure
 Source: Rashid (2021)

Based on Figure 3, Resilient criteria (D1) rely on the readiness and preparedness of rural areas and their community in all aspects (physical, social, economic, etc.) to face uneven scenarios like disasters - ability to recover or speed

of recovery (fast). Liveable criteria (D2) involve preserving rural characters, attractiveness, comfort, adequate infrastructures and supports, and economic opportunities as desired by all, including entrepreneurs, investors and urban residents. Moreover, Smart criteria (D3) rely on smart technology practices (intelligent rural supports), providing solutions to enhance livelihoods, increasing rural productivity, new job creation, income, rebranding, marketable products, and rural visibility, nationally and globally. Thus, the MAMRD exercise shall benefit all stakeholders who rely on rural transformation, particularly in assisting their decision-making on budget and resource allocation, utilising the available digital technology, designing training programmes, improving needed services, and so on. The relevant stakeholders are Institute for Rural Enhancement (INFRA), *PLANMalaysia*, *Jawatankuasa Pengurusan dan Keselamatan Kampung* (JPKK), and others. This research shall reveal the agendas of Sustainable Development Goals (SDGs) towards achieving societal harmony and happiness and KEGA 10 of the Shared Prosperity Vision 2030 - which aims to empower centres of excellence in synergising rural areas for changes.

METHODOLOGY

The Application Process

The application of the MAMRD is made through the Focus Group Discussion (FGDs) (Figure 4) on two case studies: Case 1 *Kampung Padang Rumbia* – as aqua-tourism and smart community-based village, and Case 2 *Kampung Tepi Sungai* – as a fishing-based village. Rashid (2020) in his study provided details on the FGD implementation. The primary purpose is to determine the score (index) for each participating village in order to move towards a modern rural approach, in which lessons are offered to be learned for further improvements.

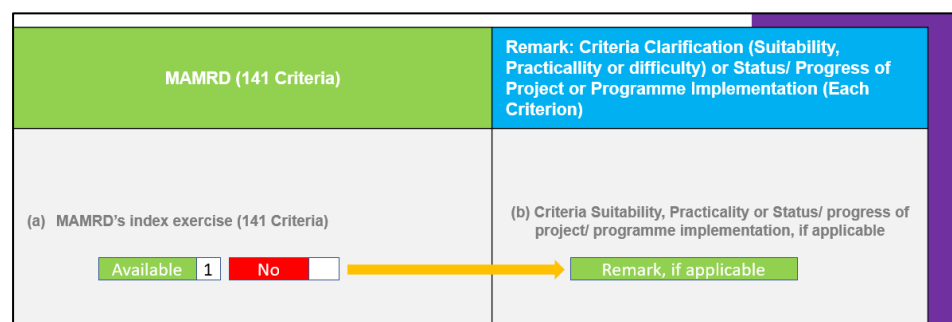


Figure 4: MAMRD application through an FGD

As shown in Figure 4, each criterion's availability in the case study would be assigned one point. The total score was then weighed according to the

dimensions and criteria groups. Dimension 1 is worth 54% of the total marks, Dimension 2 is 30%, and Dimension 3 is 16%. All marks were added together and summed to determine the final score or overall index for each case study. The village is assigned a star rating based on its final score, which reflects its MAMRD index performance. As shown in Table 1, the star ratings range from 0 to 6, and this corresponds to a score of 0 to 100.

Table 1: Star rating to pursue in the MAMRD index

Star Rating	*MAMRD Rating Range (%)
☆☆☆☆☆☆	>90 - 100
☆☆☆☆☆	>75 - <90
☆☆☆☆	>60 - <75
☆☆☆	>45 - <60
☆☆	>30 - <45
☆	>15 - <30
	>0 - <15

Note: *This star rating is adopted from Malaysia Research Assessment Instrument (MyRA) – an established rating index in Malaysia.

Source: Shamsir (2021)

Introduction to the Case Studies

Case 1: Kampung Padang Rumbia – As Aqua-Tourism and Smart Community-Based Village

Kampung Padang Rumbia is located in Penyor Mukim, Pekan District, Pahang. It is categorised as a main village with less than 2,500 people. The basic economy for this village is based on palm oil plantation, farming, and caged fish farming, which has been receiving high demand for fish such as Patin and Kelah. Moreover, aqua-tourism activities are expanding in line with the integration of caged fish farming and floating chalets: there are also ATV activities on the small islands and boat rentals for fishing. In fact, it is the first village in Malaysia to become the pilot for a smart village project based on flood sensor devices installed along the Sungai Pahang to prepare for evacuations. The government has also installed a Wi-Fi substation for surveillance systems in 10 community hotspots, including schools, clinics, police stations, mosques, fish farms, computer centres, and Sungai Pahang. Local people using a smartphone will be notified through an application (App) when the river in their area reaches a critical level.

Case 2: Kampung Tepi Sungai – as a fishing-based village

Kampung Tepi Sungai is a small fishing village in the Township of Kuala Muda, located at the mouth of Sungai Muda. As a fishery collection centre and selling market, this fishing village contributes significantly to the local economic

development. Historically, Kuala Muda is an essential port in Kedah, and it is well known for its whispering market (Pasar Bisik), which is named after the whispering sales practice, which is found only in a few places around the world. However, this fishing village suffered the effects of the Tsunami in 2004 which had left the community and their village devastated.

RESULTS AND DISCUSSIONS

Results for Overall Index

An overall index (a composite score) for the MAMRD is calculated similarly to other index measures by adding all dimension scores derived from the overall weighted scores of the criteria groups. Table 2 displays the overall MAMRD index score for Kampung Padang Rumbia and Table 3 for Kampung Tepi Sungai. It is known as the overall composite index, and it is the sum of the final sub-total score of each dimension. The marks for each final sub-total score are the sum of the weighted scores for each criteria group. Each criteria group derives its scores from the sum of the total criteria score, which is determined by the availability of measured criteria on the site.

Table 2: Overall MAMRD’s index gained for Kampung Padang Rumbia and observations

Dimensions	Final Score Gained	Criteria Groups	Raw Score Gained (%)	Observations
D1: Rural Economic Boosters & Catalyst Infrastructures <i>Weight = 0.54</i>	31.89	CG1-D1: Economic and Rural Services Centre (Small Town) <i>Weight = 0.50</i>	41.67	There is no small town located within 20-40km to Kampung Padang Rumbia, thus, people obtain their goods and services in Pekan, Pahang. So, the score gained is referred to the services offered by the Pekan town.
		CG2-D1: Rural Growth Centre (RGC) <i>Weight = 0.25</i>	6.67	There is no dedicated RGC developed for the community within the Pulau Manis Mukim. Kampung Padang Rumbia has the potential to be promoted as an RGC with economic-services enhancement. The score gained is based on the existing functions served by Kampung Padang Rumbia.
		CG3-D1: Rural economic cluster (agricultural, entrepreneurial, tourism) <i>Weight = 0.25</i>	10.71	Only 3 out of 7 criteria were available. To diversify rural economic activities and infrastructures, there is a room for potential exploration offered by the MAMRD.
Sub-Total Score			59.05	
Reduced to 54%			31.89	Or only 59% achieved

Dimensions	Final Score Gained	Criteria Groups	Raw Score Gained (%)	Observations
D2: Rural Characters & Social Well-Being Infrastructures <i>Weight = 0.30</i>	18.37	CG1-D2: Rural spatial characters and heritage <i>Weight = 0.064</i>	2.40	Only 3 out of 8 criteria were available. Follow MAMRD's proposed criteria to enhance the rural characters and heritage.
		CG2-D2: Transportation networks of rural-town-city, and rural accessibility <i>Weight = 0.275</i>	15.71	Only 4 out of 7 criteria were available. Follow MAMRD's proposed criteria to improve and strengthen rural-town-city linkages.
		CG3-D2: Efficient infrastructure <i>Weight = 0.402</i>	26.80	Only 6 out of 9 criteria were available. Follow MAMRD's proposed criteria to enhance rural infrastructures concerning sustainable community practices.
		CG4-D2: Internal village amenities <i>Weight = 0.098</i>	5.60	Only 4 out of 7 criteria were available. Follow MAMRD's proposed criteria to accommodate everyone with suitable support services.
		CG5-D2: Rural governance (JPKK) and database <i>Weight = 0.161</i>	10.73	Only 2 out of 3 criteria were available. Rural village database is required to enhance rural governance.
Sub-Total Score			61.25	
Reduced to 30%			18.37	Or only 61% achieved
D3: Smart & Green Technology Practices <i>Weight = 0.16</i>	5.66	CG1-D3: Rural agricultural, infrastructures, technologies and innovations <i>Weight = 0.40</i>	16.67	Only 5 out of 12 criteria were available.
		CG2-D3: Rural entrepreneurial technologies and innovations <i>Weight = 0.29</i>	8.29	Only 2 out of 7 criteria were available.
		CG3-D3: Rural marketing and e-commerce <i>Weight = 0.13</i>	3.25	Only 1 out of 4 criteria were available.
		CG4-D3: Village smart and green technology practices <i>Weight = 0.12</i>	6.00	Only 4 out of 8 criteria were available.
		CG5-D3: Community-IoT-based smart technology practices <i>Weight = 0.06</i>	1.20	Only 1 out of 5 criteria were available.

Dimensions	Final Score Gained	Criteria Groups	Raw Score Gained (%)	Observations
Sub-Total Score			35.40	
Reduced to 16%			5.66	Or only 35% achieved
Overall Index (Overall Composite Index)			55.92	3 Stars

As indicated in Table 2, Kampung Padang Rumbia scores 55.92% in the overall index, which can put it into a three-star rating village (see Table 1). It carries a good score for Dimension 1 (D1), which is 31.89% out of 54%, followed by 18.37% out of 30% (D2) and only obtains 5.66% out of 16% for D3. The fact that the low-level result for D3 is already expected is due to multiple factors, such as the readiness of rural actors for the adoption of the technologies (Salemink et al., 2017, Abdul Rashid, 2016), the inadequacy of digital infrastructures, mindset, and behaviours, as well as others (Alabdali et al., 2023). This indicates that the MAMRD distinctively assesses the strengths and weaknesses of Kampung Padang Rumbia's performance with regard to the specific dimension measure. It shows that Kampung Padang Rumbia exhibits a positive example in developing the village for rural modern living, besides the future initiatives or strategies in providing infrastructures, facilities and services of higher standards. For that matter, the MAMRD matches this aspiration for synergising and boosting rural areas and community changes.

Table 3: Overall MAMRD's index gained for Kampung Tepi Sungai and observations

Dimensions	Final Score Gained	Criteria Groups	Raw Score Gained (%)	Explanations
D1: Rural Economic Boosters & Catalyst Infrastructures <i>Weight = 0.54</i>	20.62	CG1-D1: Economic and Rural Services Centre (Town) <i>Weight = 0.50</i>	26.04	Only 25 out of 48 criteria are available for this group. The criteria related to economic services have not fulfilled the conditions for the MAMRD such as gas station, souvenir shop, hotels, and others. Furthermore, the infrastructure facility criteria such as recreational park and playground were also unavailable.
		CG2-D1: Rural Growth Centre (RGC) <i>Weight = 0.25</i>	5.00	It was learnt that weak sub-criteria of economic development, infrastructure facilities, services and human development centres cause the RGC of that village to not be working and accommodating for the local residents.
		CG3-D1: Rural economic cluster (agricultural, entrepreneurial, tourism)	7.14	The Whispering Market becomes the pulse of this criterion, but it was not supported by other criteria. Only 2 out of 7 criteria were available.

Dimensions	Final Score Gained	Criteria Groups	Raw Score Gained (%)	Explanations
		<i>Weight = 0.25</i>		
Sub-Total Score			38.18	
Reduced to 54%			20.62	Or only 38% achieved
D2: Rural Characters & Social Well-Being Infrastructures <i>Weight = 0.30</i>	9.36	CG1-D2: Rural spatial characters and heritage <i>Weight = 0.064</i>	3.20	Only 4 out of 8 criteria were available. Follows MAMRD's proposed criteria to enhance the rural characters and heritage.
		CG2-D2: Transportation networks of rural-town-city, and rural accessibility <i>Weight = 0.275</i>	11.79	All 7 criteria were available. No bus stop is provided because public transportation is no longer provided and it does not enter the village area.
		CG3-D2: Efficient infrastructure <i>Weight = 0.402</i>	13.40	Only 3 out of 9 criteria were available. Infrastructure facilities are still insufficient, especially IT-related services and sites for solid waste disposal and recycle centre.
		CG4-D2: Internal village amenities <i>Weight = 0.098</i>	2.80	Only 2 out of 7 criteria were available. The provided facilities are unable to satisfy the residents' needs, especially places for recreation, transit in the event of disaster and other suggestions in the MAMRD.
		CG5-D2: Rural governance (MPKK) and database <i>Weight = 0.161</i>	0.00	All criteria were unavailable.
Sub-Total Score			31.19	
Reduced to 30%			9.36	Or only 31% achieved
D3: Smart & Green Technology Practices <i>Weight = 0.16</i>	0.53	CG1-D3: Rural agricultural, infrastructures, technologies and innovations <i>Weight = 0.40</i>	3.33	Only 1 criterion was available which is drainage management. The respondents agreed that it is the time to prepare the village environment towards modern rural orientation that can attract the youths to involve in the village development.
		CG2-D3: Rural entrepreneurial technologies and innovations <i>Weight = 0.29</i>	0.00	All the evaluated criteria were not available. The criteria in MAMRD are extremely required by the villagers to improve their youth and the development in the village.
		CG3-D3: Rural marketing and e-commerce <i>Weight = 0.13</i>	0.00	All the evaluated criteria were not available. The criteria in the MAMRD offers the local residents facility to improve the village's business and economic activities, as

Dimensions	Final Score Gained	Criteria Groups	Raw Score Gained (%)	Explanations
				well as accommodate the bumiputra entrepreneurs.
		CG4-D3: Village smart and green technology practices <i>Weight = 0.12</i>	0.00	All the evaluated criteria were not available. The criteria in the MAMRD enables youths to have the basics, as well as knowledge and skills required by the village. Furthermore, the village was once hit by a tsunami in 2004, hence, the disaster risk warning is crucial.
		CG5-D3: Community-IoT-based smart technology practices <i>Weight = 0.06</i>	0.00	All the evaluated criteria were not available. The criteria in the MAMRD could broaden the village youths' mind and its implementation is suggested thoroughly.
Overall Score			3.33	
Reduced to 16%			0.53	Or only 0.3% achieved
Overall Index (Overall Composite Index)			30.51	2 Stars

Furthermore, Table 3 shows that Kampung Tepi Sungai scores 30.51% in the overall index or achieves a two-star rating. It was learnt that Kampung Tepi Sungai was left behind in D3 with 0.3%. It indicates the lack of the younger generation involvement in rural economic livelihoods and programmes. Moreover, three groups of criteria in D2, which are efficient infrastructure, internal village amenities, and rural governance (JPKK) and database, also score low. For D1, there is also a group of criteria that recorded a low score, which is the rural economy cluster (agriculture, entrepreneurial, tourism) because most of this group's criteria do not exist. The same situation is recorded for the criteria of the provision of infrastructure facilities to offer the best service to residents.

Additionally, both case studies indicate that the younger generation lacks skills and trainings. They are also less involved in the rural development activities. A fundamental issue is to address this need for knowledge sharing by the concerned parties, local champions, and experts, particularly on the most recent technologies and agricultural equipment. This issue has been well addressed in the MAMRD criteria and it has also dedicated programmes, particularly sharing tips and methods from successful entrepreneurs (among villagers or outsiders), as well as benchmarking trips, which could improve the relevant individuals' way of thinking and technology practices in agriculture and other ventures. Hence, JPKK has a significant role in being proactive by acting and turning an issue into an opportunity for the welfare and prosperity of the community. Efforts to transform those in rural areas must be managed by the community and the corresponding agencies collectively.

Implications and Interventions

From the above discussions, the implementations of the MAMRD for both case studies have led to the following implications and results would also point to intervention strategies for rural change. They are summed up as follows:

- The RGC is dysfunctional and to an extent, inexistent. The community has to rely on the nearest town or city centre to get goods and services. This issue is also highlighted in the DPF Desa Negara 2030 (The DPF Desa Negara, 2017).
- The future focus should be more on D3 (smart and green technology practices) to ensure that rural development will lead to the emergence of modern village and knowledge-based society, which is believed to amplify productivity, income, investment, and prosperity of the rural community living. This matter is given less focus in the DPF Desa Negara 2030 and the DPLB 2030.
- The MAMRD is applied to assess modern rural characteristics and is applicable for all village types.
- Implementing the MAMRD brings rural actors towards implementing strategies and action plans outlined in the DPF Desa Negara 2030 and the DPLB 2030 – the missing link is the significant approach at the implementation stage.
- Now is the time to build a society based on passion, compassion, and Islamic values to ensure responsible and productive rural future generations.

To the best of our knowledge, the MAMRD is a pioneer project in Malaysia providing a rating tool index for rural development progress towards modern approach-incorporating technology practices for rural livelihoods and solutions. As the above-mentioned, the current measurement by PLANMalaysia through S-CHARMS only focuses on the spatial characteristics of rural areas, which have nothing to do with the rating index, which is the most crucial dimension of rural progress assessment.

Furthermore, there are crucial issues of rural actors' behaviours, especially the youths: only some have been proactive and not many are interested in accelerating rural transformation programmes by joining sectors such as entrepreneurship, agriculture, and tourism (Abdul Malek et al., 2022; Rashid et al., 2021). Both case studies find similar scenarios among the youths. Therefore, this issue calls for an urgent study to assess the relationship between rural actors' behaviour and rural development progress in materialising the rural transformation agendas, namely closing the rural-urban gap (remain one of the UN DESA agendas) (UN DESA, 2021) and increasing household income and

rural prosperity. However, rural transformation progress crucially relies on the planning and execution levels, as well as specifically on the way rural actors proactively respond (take action) to the government's agendas. This is a big challenge in rural transformation assessment which will be the next research project in the path of achieving a society 5.0@rural Malaysia – societies' behaviours, are capable of expediting the rural transformation - the adoption of high technology, learning society, global minds set, modern-society attributes, business and SMEs minded, market profiteering, and the others will provide a shift from a government-centric to rural-actor-centric initiatives or actions.

CONCLUSIONS

This paper has discovered the capabilities of MAMRD to assess rural change by using a modern approach that reflects the three main dimensions namely resilient, liveable, and smart. The results show rural development progress, particularly the case studies, requires future interventions to cope with its weaknesses, especially in the technology practices and local champions or experts as well as the youth participation in driving rural transformation. With the 141 performance criteria, the MAMRD can be a pocket master checklist promoting a modern rural approach and guiding the concerned rural parties for their full support in rural transformation. Therefore, this research has significant impacts on Quintuple Helix that are listed as follows:

- a. Society: The formulation of the MAMRD directly empowers the rural actors and society as a whole, where the index measure would guide them on how to respond to find rural solutions.
- b. Academia: It has added to the new theoretical knowledge and knowledge expansion regarding the modern rural approach and the best practices to cater to the rural transformation agendas.
- c. Government: As stated, the MAMRD is tailored to rural national government policies at the implementation level as a monitoring/assessment tool for rural progress towards a modern rural approach.
- d. Industry: This research forms linkage and collaboration activities between academia, and industry/agencies to find solutions for rural development based on the win-win partnering benefits.
- e. Environment: The model also provides guidelines for preservation strategies for Malaysian rural characters.

Future research would focus on the behaviours of rural actors in utilising and empowering a people-centric approach by adopting and innovating digital technologies in materialising rural development agendas in Malaysia. This

can still be incorporated with the MAMRD exercise to optimise the rural transition towards a modern rural@resilient-liveable-and-smart.

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