

Revisiting Grassroots Innovation Initiatives in Malaysia: Concepts and Applications

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ABSTRACT

This paper seeks to examine the status and main challenges of grassroots innovation initiative in a developing nation – Malaysia. It determines the concept and application of grassroots innovation model adopted in Malaysia's science and technology policies. The main research framework of this paper is conceptualised on the significant roles of local projects at niche areas to the emerging technical trajectories at the national level; and it recognises niche innovation (at the grassroots) takes many different forms that differs from the mainstream business paradigm. Findings from this paper indicate that a comprehensive model for grassroots innovations development – particularly that involves the participation of various innovation actors such as public sector organisations and business, community groups as well as individual householders – is remained elusive in the formulation of science and technology policies for grassroots innovations in Malaysia. In addition, the elements of shared rules and values that underpinned the social-led agenda are not clearly tackled in the existing policies. Base on this concern, this paper proposes a few policy directions to foster and upscaling the grassroots innovation initiatives in Malaysia.

Keywords: Social innovation, inclusive development, science and technology policy

1. INTRODUCTION

Examining the nature of grassroots innovation at the local context is crucial in mainstreaming grassroots innovation as one of the national sustainable development agendas. In this respect, efforts to create awareness and new knowledge of the specific characteristics of grassroots innovations at the local context – niche-based innovation at bottom of the pyramid, need to be formed through contextualised analysis of case studies. It requires the conceptualisation of a holistic innovation model to recognise grassroots innovations initiatives take in various forms at niche area – grassroots innovations occur in spaces where the rules and norms differ from the common mainstream business paradigm (Hargreaves, Hielscher, Seyfang, & Smith, 2013; Seyfang & Smith, 2007); and localised new technologies and technical know-how emerged as incremental technical steps in response to the local problems (F. Geels & Deuten, 2006). However, one of the challenges confronted by policy makers and community activists in the implementation and up-scaling grassroots innovations is on its surviving issue, let alone mission to generate a greater impact of grassroots innovations over wider unsustainable systems (Hargreaves et al., 2013).

From the perspective of S&T policy formulation, the impact of national S&T investment on society has always a main concern of policy makers. Despite of upholding and upgrading the mainstream cutting-edge research and development (R&D) and innovation capabilities of the research and economic entities at both national and districts levels, national S&T development agendas are also expected to enhance the quality of life of society – particularly among the disadvantaged, marginalised and vulnerable groups. Grassroots

innovations, which are widely considered as “low-tech” and “informal” initiatives, are scarcely linked to the national mainstream Science and Technology (S&T) agendas that seeks for scientific knowledge, technological applications and economy (and industrial) advancements. Thus, it is a great challenge for policy makers to reposition grassroots innovations in S&T policy from divider to provider, i.e. a mind-set and approach that reconstructs grassroots innovations as provider to the national innovation wealth and not as dividers of it (Jain & Verloop, 2012). Drawn upon the concept of National Innovation Systems (NIS), initiatives to form and nurture mutually beneficial relationships amongst the various grassroots intermediaries and niche activists need to be enhanced through the process of policy making (see Seyfang & Smith, 2007). As determination to mainstream grassroots innovations in national development is difficult and challenge to formulate effective all-inclusive S&T policies remind strong, this paper attempts to address a two main research questions: (a) How to create and capitalise on grassroots diversity within the national innovation system? and (b) How can policy interventions reward and stimulate inclusive science, technology and innovation behaviour at the grassroots’ level and lead to the emergence of new innovations as well as transitioning of socio-technical systems? By taking Malaysia as a case, this paper aims to construct a holistic grassroots innovations model and support evidence-based policy formulation for developing countries. The main findings and outcomes from this paper is both intellectual rich and practically important.

The remainder of this paper is organised as follows. Section 2 provides the theoretical background of grassroots innovations and the functionalities of S&T policies in grassroots innovations. The section also established a conceptual framework used for this paper. Section 3 elaborates the research method employed as well as introduces the case study of this paper, i.e. Malaysia’s S&T policies. Section 4 presents and discusses the key findings derive from the case study. The final section presents the conclusions and key policy implications from the study.

2. THEORETICAL BACKGROUND

2.1 Grassroots Innovations and Its Characteristics

The term ‘grassroots innovations’ emerged from the systematic and sustained work of the Honeybee Network in India – a symbiosis network of like-minded individuals, innovators, farmers, scholars, academicians, policy makers, entrepreneurs and non-governmental organisations (NGOs) that acknowledges the local traditional knowledge holders and grassroots innovators. It is a metaphor designating both ethical and professional values (see Gupta, 2016; Gupta et al., 2003). The term “grassroots” refers to individual innovators, who often undertake innovative efforts to solve localised problems, and generally work outside the realm of formal organisations like business firms or research institutes (Baark & Sharif, 2006). It refers to innovations emerging from the knowledge, experience and skills embedded in communities and individuals outside the formal institutions of education, scientific research and industry and is equated to innovation in a rural environment for solving problems of and within a small community (Jain & Verloop, 2012). In a NIS, grassroots innovations mostly represent minor or incremental changes in existing technological artefacts. It consists of both the local available traditional knowledge and minor modification of mainstream modern technologies. Grassroots innovators and their innovations arising from bottom of the pyramid might have a tremendous impact not only in terms of serving unmet and ignored consumer needs, but also longer term impacts to the nation through enhanced productivity, sustainability, poverty reduction and promoting entrepreneurship (Kaplinsky, 2011).

Grassroots innovations are generally based in the social economy (rather than the market economy) and they tend to focus on social and institutional innovation (rather than technological) (Seyfang & Longhurst, 2016; Seyfang & Smith, 2007). They are driven by social need and ideological commitment (rather than profit seeking). As such, grassroots innovation is often supported by local values and culture that involved a wide range of actors such as cooperatives, voluntary associations, and informal community groups (rather than firms). This

distinguishes grassroots innovations initiatives from market-based (or business) innovation which is targeting profitable idea and Schumpeterian rent (Pol & Ville, 2009; Seyfang & Smith, 2007). Table 1 summarises the main characteristics of grassroots innovation and in comparison to market-based innovations.

Within the realm of community-based innovation, the concept of “grassroots innovation” is still considered vague in both academia and policy studies. The term is interchangeably used and overlapping with other community-based innovations, e.g. social innovation, sustainable innovation, inclusive innovation, frugal innovation, etc. Table 2 provides the main characteristics of the various types of community-based innovations. In general, these community-based innovations shared similar characteristics in terms of value- and cultural- laden, social-technical paradigm, pro-poor and below-the-radar approach, and appropriate technology ideology. Nonetheless, they are different in terms of the dimensions of innovation (i.e. ranged from individual to system level) as well as the levels of innovation (i.e. ranged from incremental to disruptive innovation). Figure 1 attempts to illustrate the position of grassroots innovation as a subset to the general social innovations. It is crucial to differentiate the natures of and relationships between the various social innovation in order for policy makers to identify specific STI policies and programmes to strengthen the overall NIS.

Table 1. Comparing the Characteristics of Market-Based and Grassroots Innovations

Perspectives	Market-based Innovations	Grassroots Innovations
Context	Market economy	Social economy
Niche	The rules are different: tax and subsidy environment, competition. Shelter from full forces of the market	The rules are different: social and cultural values are different, expression of different values enabled within niche
Organisational form	Firms	Diverse range of organisational types: voluntary associations, coops, informal community groups
Resource base	Income from commercial activity	Grant funding, voluntary input, mutual exchanges, limited commercial activity
Driving force	Profit: Schumpeterian rent	Social need; Ideological

Source: Seyfang and Smith (2007)

Table 2. Typology of Community-based Innovations and Key Features

Typology	Key features	Literatures
Social innovation	Any new ideas with the potential to improve public good – either the macro-quality of life or the quantity of life. It meets the social need by providing a solution to a social problem that is more effective, efficient or sustainable. The value created accrues primarily to society as a whole rather than private individual. It facilitates changes in social relation and rebalancing power disparities of economic inequalities in society. It takes place from the individual to systems level (i.e. micro-, meso- or macro-level).	(Pol & Ville, 2009), (Phills, Deiglmeier, & Miller, 2008), (Mulgan, Tucker, Ali, & Sanders, 2007), (Nicholls, Simon, & Gabriel, 2015)

Sustainable innovation	The creation of new market space, products and services or processes driven by environment, social or sustainability issues. It ranges from incremental to radical, and takes sustainable well-being and sustainable development as the basic values, leaving economic growth with instrumental value. It is also referred as 'green innovation' or 'eco-innovation' – mainly in energy domain such as wind, solar and bio-power, alternative fuels and low energy housing.	(Oksanen & Hautamäki, 2015), (Keeble, Lyon, Vassallo, GibHedstrom, & Sanchez, 2005), (F. W. Geels, Hekkert, & Jacobsson, 2008), (Schot & Geels, 2008), (Nill & Kemp, 2009)
Inclusive innovation	A continuous effort in translating the outputs from innovation-related activities to all levels of communities especially the vulnerable groups or individuals. It emphasizes on equitable distribution of economic and societal outputs, usually in the informal sector and with a gender focus. It is considered as not-for-profit and community-based "innovation from below" – which is oriented for local needs and incremental in nature.	(Foster & Heeks, 2013), (Heeks, Foster, & Nugroho, 2014), (Chataway, Hanlin, & Kaplinsky, 2014), (Boon-Kwee, Thiruchelvam, Chan-Yuan, & Chandran, 2016)
Grassroots innovations	A niche-based symbiosis network of mostly like-minded individuals, NGOs and informal community groups at bottom of the pyramid that provides minor or incremental solutions to localised problems. It is generally informal and designates both ethical and professional values. Drawn upon the principle of innovation for the poor by the poor, it acknowledges the local traditional knowledge holders and innovators.	(Seyfang & Smith, 2007), (Gupta et al., 2003), (Gupta, 2012), (F. Geels & Deuten, 2006), (Hargreaves et al., 2013), (Seyfang & Longhurst, 2013), (Kaplinsky, 2011)
Frugal innovation	A process of reducing the complexity and cost of a good and its production. It is a "good-enough", affordable products that meet the needs of resource-constrained consumers, and based on the ideological movement of Appropriate Technology – a set of small-scale, labour-intensive technologies that are easy to operate and maintain, and have minimal harmful impact on the environment. The technological choices are people-centred, small-scale, labour-intensive, energy-efficient, environmentally sound, and locally controlled.	(Radjou & Prabhu, 2015), (Zeschky, Widenmayer, & Gassmann, 2011), (Soni & T. Krishnan, 2014)

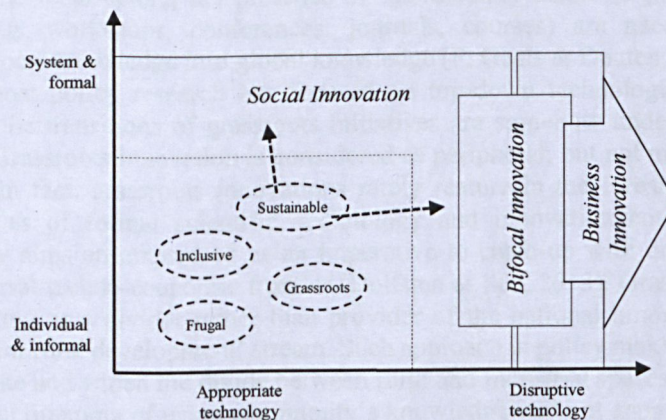


Figure 1. The Relationship between Types of Innovations

Grassroots innovation is characterised as niche-based innovation, and the existence of shared visions and expectations, networking and learning are the main motivation of grassroots innovations in niche building of development. Most of these hidden work consists of three crucial elements: (a) social networks and a sense of community in enabling information-sharing, (b) intermediary actors who represent the field and perform socio-cognitive work of knowledge aggregation, and (c) knowledge infrastructure to empower knowledge flows (Seyfang &

Longhurst, 2013). Intermediaries (e.g. government departments and organisations, NGOs and private sector) play three key roles in helping to build robust niches: aggregating lessons from across multiple local projects, establishing an institutional infrastructure for the innovation niche as a whole, and framing and coordinating action on the ground in local projects (Hargreaves et al., 2013). There is a need to develop a perspective that conceptualise the social and cognitive activities that make knowledge flow possible in grassroots innovations – with interactions between local and global levels, as well as dedicated activities by intermediaries' actors. In addition, as stressed by Hargreaves, et al. (2013), there is currently very little work has examined the role of intermediaries in sustainability niches and still less has examined the nature and extent of the roles they may play in helping grassroots innovations to develop and grow. Indeed, such development and growth is an important issue need to be sought by policy makers, scholars and community activists.

2.2 Policies for Grassroots Innovations

Grassroots innovations initiatives are characterised as niche-based innovation and extensively driven by social-technical system. Hence, policy formulation for grassroots innovations should acknowledge the fact that technical knowledge developed in a niche context does not circulate to other location easily. It requires the process of aggregation (e.g. standardisation model building, writing of handbooks, formulation of best practices, etc.) armed with dedicated socio-cognitive work (e.g. social networks with sense of community) to make the local knowledge and practices sufficiently context-free, or de-contextualised (F. Geels & Deuten, 2006). In addition, the uniqueness of niche-based in advocating bottom-up enthusiasm of grassroots innovations movement should be addressed and analysis focuses upon the social networks, learning processes, expectations and enrolments of actors and resources of niches needs to be established (Seyfang & Smith, 2007).

Specific package of policy instruments and mechanisms to target intrinsic (e.g. pro-social acts) and extrinsic (e.g. intellectual property protections, monetary support, rewards) motivations need to be made available in order to nurture and up-scale grassroots innovations initiatives. Indeed, a large number of innovation behaviour is derived by intrinsic motivations or the combinations of two. However, extrinsic incentives may feasibly lead to the crowd out of interpersonal cooperation that is not good for grassroots innovations (Bhaduri & Kumar, 2011). Besides the local actors, the presence of intermediary actors to provide knowledge infrastructure (e.g. workshops, conferences, journals, courses) are needed in gradually transformed the local knowledge into global knowledge (F. Geels & Deuten, 2006).

While most policy research has focused on top-down technological innovation in market settings, the transitions of grassroots initiatives are somehow underrated and under-conceptualised. Grassroots innovation is considered as peripheral, but not mainstream agenda in S&T policy. In fact, grassroots innovations rarely feature in the foresight exercises and innovation policies of formal scientific, technology and innovation communities. Often, innovation policy aims are expressed as an imperative to catch-up with or keep-up with an apparently universal techno-economic frontier (Dolfsma & Seo, 2013). Grassroots innovation has been presenting as a divider rather than provider of the national innovation wealth and located in 'S&T for rural development' stream. Such approach in policy making, if remain, will possible perpetuate and widen the divide between rural and industrial spaces (Jain & Verloop, 2012). The ethical dilemma of using community's knowledge without appropriate reciprocity and the terms of discourse with grassroots community have to be defined. For instance, once the local traditional knowledge of grassroots communities is documented and disseminated, they should receive share in any wealth that may generated and accumulated through value addition of their local knowledge and practices (Gupta et al., 2003).

There are several enduring problems and policy implications derived from previous grassroots innovations studies (i.e. Gupta et al., 2003; Seyfang & Smith, 2007; Smith, Fressoli, & Thomas, 2014). In this regard, S&T policies should foster and strengthen the following grassroots innovations movements:

- Locally specific, yet widely applicable – not only locally appropriate socio-technical configuration, but also standard technologies that seek to be widely applicable (and re-applicable in various location). This requires the transition of local project at the niche areas to national and global level;
- Appropriate to, yet transforming situations – not only locally appropriate innovations, but also at the same time needs to transform the local situation. Innovator should not only learnt to adapt and adjust to a constraint, but also transcend it; and
- Project-based solutions, yet seeking structural change – not only in a form of project basis, but also creates wider social structures that are the root cause of the constraint.

Nonetheless, the effectiveness of government’s policies are restricted if the grassroots innovators are not well organised. For instances, many grassroots innovators do research in their own interest that may not be aligned with the local development priorities, and therefore may not qualify for government supported. A reporting system is needed so that more grassroots innovators can be benefited through the S&T policies and programmes (Zhang & Mahadevia, 2014). In the same vein, grassroots innovators are constrained by several internal and external hampering factors. This includes, among others, contempt in society for someone who breaks out of the mould, lack of social networking among the innovators, weak general responsiveness from scientists as well as formal scientific institutions at national and international level, lack of micro venture capital and intellectual property protection. Also, education systems at a different level tend to ignore the subject of grassroots innovators in the curriculum or pedagogy (Gupta, 2012).

2.3 Conceptual Framework

Figure 1 illustrates the research framework adopted in this proposed study. In general, the framework is conceptualised on the roles of local projects at the niche areas to the emerging technical trajectories. It is about the aggregation of value-laden local project to context-free generic knowledge that is transferable across location and communities in generating a greater impact to the society. The framework focuses on the dynamics involving interactions between local and global levels, and dedicated aggregation activities by intermediary actors within a NIS. The social elements such as shared rules and values are also part of the main focus of the study (see F. Geels & Deuten, 2006). The various policy instruments are required in order to facilitate this aggregation and technology trajectory process.

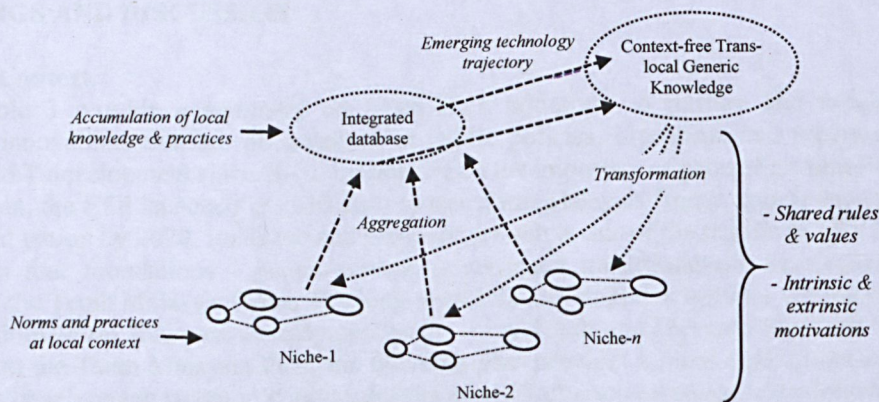


Figure 1. Research Framework

Source: Modification from Geels and Deuten (2006)

3. RESEARCH METHOD

This study draws upon the archives and literature associated with grassroots innovations in Malaysia. The current policies, blue prints and programmes related S&T development in Malaysia are obtained and its' contents are analysed to identified efforts allocated in grassroots innovations movement in the nation. The main policy documents examined are the Economic Transformation Programme (ETP), New Economic Model (NEM), Tenth Malaysia Plan (2011-2015), Eleventh Malaysia Plan (2016-2020), National Policy on Science, Technology and Innovation (NPSTI) (2013-2020), Third Industrial Development Plan (2006-2020), Malaysia Education Blue Print (2013-2025), Malaysian Social Enterprise Blueprint (2015-2018), Science Outlook 2015 and other documents related to national S&T development agendas. The study adopts the NIS approach that perceives the responsibility of S&T development is not solely on the shoulder of the Ministry of Science and Technology and Innovation (MOSTI), but the whole government machineries such as the Prime Minister Office, Ministry of International Trade and Industry (MITI), Ministry of Education (MoE), Ministry of Higher Education (MoHE), Ministry of Finance (MoF), Ministry of Rural and Regional Development, etc. In addition, the study tried to distinguished general efforts aimed for general social development and rural development with those for grassroots innovations by using Figure 1 as a guidance. The concept of public policies as living documents is also take into consideration in this study.

The analysis is performed based on the following policy observations:

- Strategies in aggregation stage such as documenting and promoting visibility to the existing grassroots innovations;
- Institutional settings in stimulating and accelerating and grassroots innovations
- Reward and recognition systems in promoting intrinsic and extrinsic motivation of innovators;
- Cultural and value preservations in transforming grassroots innovation at the local context; and
- Emergence of generic knowledge from niche-based innovation that lead to the transition of socio-technical systems at trans-location or national level.

4. FINDINGS AND DISCUSSION

4.1 Policy Context

Table 3 provide a summary on Malaysia's initiatives to nurture and accelerate grassroots innovations that are documented in public policies, blueprints and programmes related to S&T development since 2010. Emphasise on the important of generating benefits for all Malaysian, the ETP launched in 2010 aims to transform Malaysia from a middle income to an advanced nation by 2020. Inclusive and pro-poor growth is one of the tagline of ETP. ETP draws upon four foundations – people-centric, government transformation, new economic model, and the Tenth Malaysia Plans. The long-term ETP development agendas are translated into two middle-term five-year development plans – i.e. Tenth and Eleventh Malaysia Plan. Compared to the Tenth Malaysia Plan, the Eleventh plan provides a more explicit grassroots innovations development strategy. It advocates the need of programme on inclusive innovation in empowering microenterprises in rural areas and the B40 households (or bottom 40 per cent household income group) to leverage their innovation capabilities. The programme provides technical, financial, and management support to the target groups and encourage grassroots innovation. Concisely, these broad-based policies are focusing on the bigger sphere of sustainable development and social inclusiveness – which is, indeed, a global trends to sustainable development of both developed and developing economies.

Meanwhile, in the case of more domain-specific targeted policies such as NPSTI and Malaysian Education Blueprint, clear direction on grassroots innovation agenda is not

documented for implementation. Nevertheless, the Malaysian Education Blueprint that officially launched in 2015 stresses on developing the skills of reasoning, creativity, innovation and entrepreneurship of school students that is potentially nurture grassroots innovators. Relatively, the Malaysian Social Enterprise Blueprint – a three years roadmap to develop Malaysian social enterprise sector is seemed more relevant to grassroots innovations. Launched in 2015 by Malaysian Global Innovation and Creativity Centre (MaGIC), one of the key focus areas of the blueprint is on community and outreach programme that aim to create awareness and buy-in among the stakeholders, grassroots and rural communities on the potential and opportunities related to social entrepreneurship.

Table 3. Malaysia STI Related Policies and Elements for Grassroots Innovations

Policies, Blueprints & Programmes	Directions and Focus on Grassroots Innovations Movements
Economic Transformation Programme (ETP)	The programme was launched in 2010 and aims to transform Malaysia into a high-income nation that is both inclusive and sustainable by 2020. ETP adopts people-centric approach and the New Economic Model (NEM) is designed to enhance the quality of life of Malaysian through three goals, i.e. high income, inclusiveness and sustainability. The NEM upholds the need for pro-poor growth especially within marginalised groups in both urban and rural areas. However, there is no explicit strategies for grassroots innovations.
Tenth Malaysia Plan (2011-2015) & Eleventh Malaysia Plan (2016-2020)	These two five-year national development plans take social and economic perspective of inclusive development and enhancing inclusiveness for an equitable society. The Eleventh Plan suggests the implementation of inclusive innovation programme that aim to empower microenterprises in rural areas and the B40 households in leveraging their innovation. The programme offers technical, financial and management support to the target groups and motivate grassroots innovations.
National Policy on Science, Technology and Innovation (NPSTI) (2013-2020)	The policy guides the implementation of STI in creating a scientifically advanced nation for socio-economic transformation and inclusive growth. The development of grassroots innovation are not explicit stated in the policy.
Malaysia Education Blueprint (2013-2015)	The Blueprint emphases on reasoning, creativity, innovation and entrepreneurship of school students. Students are exposed to creative thinking and innovation skills – the ability to innovate, generate new possibilities and create new ideas.
Malaysian Social Enterprise Blueprint (2015-2018)	The blueprint aims to unleash the potential of social entrepreneurship to drive long-term benefits for society and the environment. One of the focus areas of the blueprint is on generating awareness and buy-in among the stakeholders, grassroots and rural community on the potential and opportunities related to social entrepreneurship.

4.2 Actors and Applications

The Science Outlook 2015, an independent review report on the S&T landscape in Malaysia conducted by the Academy of Sciences Malaysia (ASM), concludes that the existing ministries in Malaysia that responsible to S&T development are found not directly deal with the grassroots institutional and social stakeholders (ASM, 2015). This concern is evidenced in this study, in which the Malaysian Foundation for Innovation (or *Yayasan Inovasi Malaysia*) (YIM) established in 2008 is seemed the only main actor that directly organises and implements specific programmes to promote and inculcate innovation at grassroots level, particularly among the targeted youths, women and NGOs. In order to materialise this objective, YIM has initiated programmes on “Scouting for Grassroots Innovations” and “Grassroots Innovation Database”. The scouting programme (or Grassroots Innovation Walk) was first launched in 2011 with a group of Innovation Scouts consists of researchers, scientists, patent experts and

officials from MOSTI and YIM visiting targeted grassroots communities and assisting them to move up the economic value chain. Selected potential innovations are further developed via MOSTI's Innospace Centers that are located in various parts of the country. The Innospace Centers are platforms employed by MOSTI to embrace the culture of creativity and innovation amongst the grassroots communities. Currently there are four Innospace Centers established in the region of Sabah, Sarawak, Malacca and Federal Territory of Labuan. In conjunction of the Grassroots Innovation Walk programmes, there are also programmes on Grassroots Innovation Product Demonstration and Exhibition, Grassroots Innovation Intellectual Property (IP) Registration, innovation talks and workshops. At the same time, MaGRIs (or Mainstreaming Grassroots Innovations) was launched in 2017 to conducted competition to scout for potential grassroots innovations that can be further developed into commercial viable products. The individual or team winners will awarded Innovation Development Grant worth MYR 30 thousands in the form of capability building to improve their innovation as well as personal coaching from YIM officials. With the guidance from YIM, the winners will develop a business plan with an appropriate budget prior the receipt of the grant. For winners who choose not to get involved in any commercialisation plans, YIM will link them with local entrepreneurs as partners and this is subjected to consent from both parties. The outcomes from the innovation are solely own by the grassroots innovators.

On the other hand, the Grassroots Innovation Database is still in earlier stage. The database aims to highlight innovation projects at the grassroots level and facilitate in building linkages between grassroots innovator and formal entities in both public and private sectors. With the establishment of database, YIM also attempt to promote possible application of grassroots knowledge and practise commercially or in social and education advancements.

In terms of public research grants, the Community Innovation Fund (CIF) under the MOSTI is considered another better source of research financial support for grassroots innovators. In general, the aim of CIF is to help community groups in translating knowledge and ideas into products, processes or services that able to enhance the quality of life of the community. Innovators from registered associations, NGOs, registered cooperatives and community group are eligible to apply for a research grant that takes a maximum duration of 18 month with quantum MYR 500 thousands. The payment mode of approved application will be based on reimbursable basis and the IP rights, if any, registered at the end of the project are wholly owned by the recipient as specified in the fund agreement. Nonetheless, as any other research grants, CIF demand applicants to show proof of financial capability to finance any portion of project cost not funded by CIF, as well as information on possible risks in technology, financial and time associated with the project. Such requirements are tough for grassroots innovators to fulfill.

4.3 State of Grassroots Innovations Initiatives

The existing S&T development related policies aim to accelerate the sustainable and inclusive growth of the nation. These policies attempts to integrate the three agendas of development, i.e. high-income, inclusiveness and sustainable to form the NIS of the nation. While these broad-based and long-term policies are targeting the R&D and technological innovation advancements among the R&D communities (e.g. scientists and engineers) and industrialists (large corporates and small and medium firms), a comprehensive model for grassroots innovations development remains unclear. Although the presence of YIM and its programmes benefit the grassroots innovators in terms of scouting, promoting and aggregation various grassroots innovation efforts at the local context, efforts to generate a context-free and trans-local generic knowledge that benefit the larger community are seemed lacking and mainly in the forms of training workshops. The institutional setting is considered as public-driven with YIM (or MOSTI in general) as the main actors. NGOs as an important agent for grassroots innovations is not closely linked to the institution. The elements of embedded shared values and community-based localism that underpinned the social-led agenda are also not clearly addressed in the existing S&T policies. Figure 2 illustrates the status of grassroots innovations movements in Malaysia. Overall, the concern over the survival and sustaining the grassroots innovations initiatives (or in a bigger sphere – inclusive development) as suggested by

Hargreaves et al. (2013) is seemed not a great worry, at least for the existing policies itself, as all the main development agendas of the nation are constantly directed toward community-based innovation and equitable society.

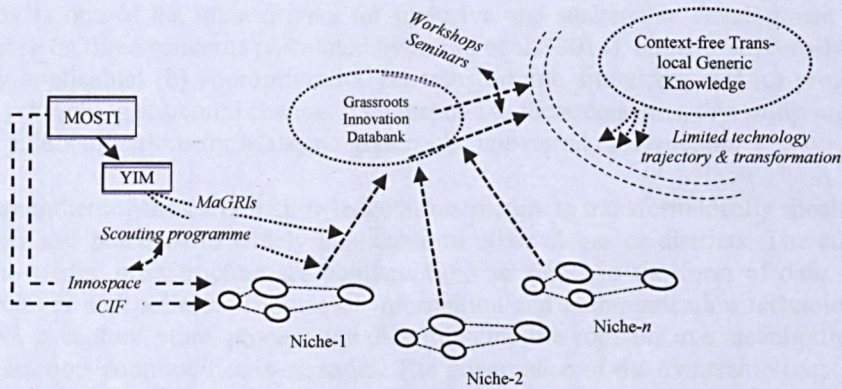


Figure 2. Status of Malaysia Grassroots Innovations Initiatives

At the operational level, grassroots innovations have been generally treated similar to other types of social innovations – which is actually not sharing the same characteristics. Most efforts are towards upgrading the capabilities of the grassroots innovators with the ultimate aim to increase their quality of life through sales generation, i.e. the commercialisation of their innovation. Such efforts, indeed, very much in line with call from Jain & Verloop (2012) on reconstructs grassroots innovations as one of the national innovation wealth providers, rather than dividers. In parallel to Gupta et al.(2003) work on the symbiosis networks between the grassroots innovators as local knowledge holders and the public users – or metaphor designating both ethical and professional values – the grassroots innovators are given the full ownership of the innovations to the innovator even though the project received public funding.

It is notable that efforts in strengthening the grassroots innovation capabilities are mostly taking place at the niche’s project level via the scouting programme and MaGRIs from YIM, or CIF funding and Innospace Centres provided by MOSTI. These programmes focus on the aggregation stage of grassroots innovation such as identification, accumulation and enhancing local knowledge and practices. However, translation of this local knowledge and practices into technology trajectory that lead to the formulation of context-free trans-location generic knowledge is lacking in Malaysia’s NIS. As a result, the disseminations of knowledge and best practices that may benefit other grassroots communities with similar local-specific set of issues, embedded shared values and community-based localism are not materialised.

5. POLICY IMPLICATIONS

Findings from this study shows that the broad-based STI related policies have set up efforts to propel the Malaysia in a high-income nation that is inclusive and sustainable. Grassroots innovations initiatives – or in its narrower sphere of inclusive and sustainable innovation – are somehow less explicitly documented in the policy directions. Despite of the setting up of YIM that play a relatively more active and influential roles in reaching the grassroots communities, the existing initiatives are toward the aggregation stage and capacity building at the project level. The stage of transformation and scaling up of the local projects that re-applicable in various locations is still lacking in the NIS of Malaysia. In general, there are two factors contribute to this shortfall. First, the natures of grassroots innovations with its embedded shared values and community-based localism are habitually difficult to scale up and spread beyond small niches. Second, the presence of limited number of actors as well as the

existing ministries that responsible to STI development are found not directly deal with the grassroots institutional and social stakeholders (see ASM, 2015). The first factor is attributed to the nature of grassroots innovations while the second factor is due to the policy and institutional inefficiencies. The policymaking and implementations to position grassroots innovations as one of the main drivers for inclusive and sustainable development could be revisited base on three concerns postulated by Smith et al. (2014), namely (a) locally specific, yet widely applicable; (b) appropriate to, yet transforming situations; and (c) project-based solutions, yet seeking structural change. As a respond to these concerns, this study suggests the following policy directions for Malaysia grassroots innovation movements:

- Strengthening the current knowledge infrastructure to transform locally specific know-how and practices to widely applicable in other niches or districts. The core of the knowledge infrastructure are contents (and services) in the form of data, manuals, archives and policies. The use of information and communication technologies as a tool to capture, store, process and disseminating the contents in a meaningful way for grassroots communities is essential. The governance of the ownership (e.g., IP rights and others type of informal protection methods) should be determined to ensure credits are given to the traditional knowledge holders, and at the same time, avoiding any potential risk in “crowd out” of interpersonal cooperation at the grassroots levels.
- Nurturing the cultural of innovation and capitalising the existing problem solving practices into a more organised and structured project. The concepts of grassroots innovations – together with the ideology of “Appropriate Technology” and “Frugal Innovation” – needs to be fostered the feasibility and visibility of the projects. By integrating skills of critical thinking in problem solving, school curriculum could be an efficient channel to disseminate these concepts particularly in the rural areas. Innovator, or the future talents, should establish the capabilities to transcend problems associated to their social needs, rather than try to adapt to those constraints. In addition, public institutions should working closely with NGOs in achieving this movement since they have better access to the communities and receive more trust from the grassroots.
- Upscaling of project-based solutions from grassroots innovators to form a structure change in NIS should be made as a long-term agenda. It requires the appropriation of dedicated socio-cognitive work. Apart of rewards that provide extrinsic motivations (e.g. grant, award, IP, etc.), recognitions that stimulate the intrinsic motivation (e.g. publicity, geographical indication, etc.) are equally important. Besides NGOs, universities students (together with their lecturers and supervisors) should play an important role to assist the upscaling of the existing project based on their field of study. This can be realised via the reconstruct of the existing social engagement projects that is more toward community services (rather than innovations) at its’ current stage. The identification of other potential actors (e.g. philanthropy, vocational schools, community colleges, etc.) in forming a more comprehensive NIS for grassroots innovation should also be an immediate task.

To conclude, a well appreciative of the local ingenuity and the endogenous mechanisms of grassroots innovations is in delivering and executing policies that do not do violence to the existing grassroots initiatives at the bottom of the pyramid.

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