

Triple Helix Analysis: Blockchain in Improving the Community's Economy after the Covid 19 Pandemic in Sungai Penuh and Kerinci

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Abstract: During the Covid-19 pandemic, the community's economy declined. It requires an immediate resolution. As three sets of development resources, the triple helix is also responsible for solving these problems. Blockchain technology is also an alternative technology to solve this problem. This research is to explain the interaction of universities, industry players, and local governments in solving this problem. This study uses qualitative analysis with a type of field research. Interviews were conducted with policymakers. The use of blockchain technology can be the right solution to improving the community's economy, especially in the field of tourism, which is indeed the foundation of the community in the Kerinci and Sungaienuh areas. On the other hand, each Helix has a different role which causes it not to be well coordinated. This paper also shows the weaknesses and evaluations that can be done using statistical analysis, especially in areas where the economy is not yet developed.


1 INTRODUCTION


Covid 19 has destroyed the global community's economy. The impact of the economic downturn reached its lowest point in society. Covid 19, in statistical data, affects increasing the community's poverty rate. Data shows that the number of poor people in Kerinci is still very high compared to several districts or cities in Jambi Province. According to data from the Central Statistics Agency (2019), the population of Kerinci Regency is 237,791 people. As much as 18.45 percent of that number is included in the category of poor people.


Uses the term deprivation trap to understand the core problem of poverty in third-world countries, where the elements of the ruins are closely intertwined in a chain of interrelated links, which see that poverty is experienced by people in the third world, especially rural communities who live in rural


areas (R Chambers, 1988). caused by the interrelationship of factors that cause poverty, such as a "vicious circle" so that they are trapped in poverty, which is divided as follows: Poverty is the most determining factor compared to other factors. The fulfillment of food, clothing, shelter, education, and health needs characterizes it. Inadequate income is caused by insufficient income for daily needs, creating weaknesses in other poverty. Weak physique, namely the existence of a high dependency ratio among family members in terms of earning a living, because the level of labor productivity is deficient. Alienation, as they are uneducated, live far away, or are out of reach of communication, thus perpetuating poverty, where government services or assistance do not reach them. Vulnerability usually, low-income families do not have reserves in the form of money or food to deal with emergencies. Powerlessness, poor people do not have the power or


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strength to face stronger (influential) people who often exploit themselves. Usually, low-income families do not have reserves in the form of money or food to deal with emergencies. Powerlessness, poor people do not have the power or strength to face stronger (influential) people who often exploit themselves. Usually, low-income families do not have reserves in the form of money or food to deal with emergencies. Powerlessness, poor people do not have the power or strength to face stronger (influential) people who often exploit themselves.

To overcome the problem of poverty, in the last few decades, there have been many collaborative programs between universities, local governments, and private companies, as well as state-owned enterprises which have been developed to address people's economic problems. The Triple Helix is an analytical model developed that describes and explains the dynamics of institutional arrangements between universities, industry, and government agencies, with the common goal of creating an innovative environment for the development of a knowledge-based economy (I.A. Ivanova & L. Leydesdorff, 2014).

There are three strategies in community empowerment: policy and planning, social and political action, education, and awareness (J Ife, 2013). Empowerment through policies and planning is accepted in the development or changes in structures and institutions for more equitable access to resources or services and opportunities to participate in community life. Empowerment through social action emphasizes the importance of political struggle and change in developing adequate power. At the same time, empowerment through education and awareness develops the importance of an educational process that can equip community members to increase their strength.

One community empowerment expert stated that the orientation of community empowerment is currently focused on helping people develop themselves and implement new innovations that continue to develop (Wilson B. Sikhondze, 1999). According to Sikhondze, this process must be carried out using participatory or engagement processes. The targets are individuals and groups, and the technology used is practical.

Another view of empowerment was "The expansion of assets and the ability of poor people to participate, negotiate with, influence, control, and hold responsible institutions that affect their lives" (M Porter et al., 2002). Empowerment is defined as an intervention that is an effort to strengthen resources and community participation in increasing their

capacity so that they can determine their future. The definition of community empowerment in development aims to carry out a process of change so that the community understands its benefits and role in development programs, can formulate needs with the potential or resources they have, and can determine development priorities—problems to be solved according to their needs and potential.

The PDRB of Kerinci Regency from 2016 to 2020 has continuously increased. It can be seen that in 2017 the PDRB in Kerinci Regency was Rp. 8,875.71 billion, which increased from 2016, amounted to Rp. 8,052.84 billion, and until 2020 the PDRB in the Regency will reach Rp. 10,447.13 billion (*PDRB Kabupaten Kerinci Menurut Pengeluaran Atas Dasar Harga Berlaku (Milyar Rupiah), 2018-2020, 2020*).

Agricultural information is the best application of knowledge to promote and create opportunities for development and poverty reduction. Effective integration of ICT in the agricultural sector will lead to sustainable agriculture by preparing timely relevant agricultural information, which can provide the right information to farmers in making farming decisions to increase their productivity. ICTs can quickly improve farmers' accessibility to market information, production inputs, and consumer trends, positively impacting their production quality and quantity. Marketing information, new livestock, crop management practices, plant/livestock diseases and pests, availability of transportation, information on market opportunities, and market prices of agricultural inputs and outputs are essential for economic production efficiency (Al-Hamidi et al., 2010).

Sustainable development has three main objectives, namely: economic objectives, ecological objectives, and social objectives (Bernal & Adames, 2017). Economic objectives are related to efficiency and growth issues; ecological goals are related to the problem of natural resource conservation; and social goals are related to poverty reduction (poverty) and equity (equity). Thus, the goal of sustainable development basically lies in the harmonization between economic, ecological, and social goals.

Blockchain technology can help provide solutions by overcoming visibility and traceability challenges (Hasanah, 2018) and ensuring food quality and safety management (YZ Surentu et al., 2020). Blockchain technology promises a transparent, tamper-resistant, secure system (F Casino et al., 2019).

Based on a survey conducted by the International Society for Horticultural Sciences (ISHS), obstacles in adopting ICT by farmers, especially horticultural farmers, namely: limited ability; gaps in training,

awareness of the benefits of ICT, time, cost of the technology used, system integration and software availability. Respondents from developing countries emphasized the importance of ICT technology costs and technological infrastructure gaps (N Taragola et al., 2009).

The research entitled *Community Empowerment Through Social and Educational Institutions* explores the role of social and educational institutions in Bajulmati in community empowerment (B R Simbolon et al., 2022). This study uses a qualitative approach. The informants in this study consisted of government agencies, empowerment activists from social and educational institutions, and the surrounding community. The study results show the role of social and educational institutions in empowering the Bajulmati community. Communities are empowered through exploiting the potential of nature and human resources, always to be optimistic and independent, and empowered through educational institutions. School education aims to increase competitiveness, They concluded that campuses or universities are crucial in community economic empowerment, especially in rural areas. One sector that has an impact when campuses enter society is the human resources sector. The campus recommendations in his research are said to increase farmers' income through financial management, infrastructure, and the suitability of potential and business strategies (Almasdi Syahz, 2003).

His research on SME empowerment concluded that the implementation of a community empowerment strategy policy, namely developing SMEs, would not be maximized if it was only carried out partially, for example, only in the field of capital economics, but would have more impact if the assistance was oriented towards a comprehensive view of the needs SMEs, for example, individual and group quality assistance including assistance in developing their potential (R Karsidi, 2007). With a process of involvement that is massive, participatory, and also more in favor of the bottom-up process, the results of the empowerment process are more visible. They will become independent when the mentoring ends and the business continues. Based on this thought, the author wants to examine further the effectiveness of campus collaboration with local government and the private sector in strengthening the community's economy in Sungaipenuh City and Kerinci Regency.

First, this study aims to determine the level of cooperation carried out by triple helix entities, namely universities, the government and the private sector, in terms of strengthening the technology-

based community economy. Second, to obtain data on weaknesses and obstacles to the triple helix collaboration process in improving the economy of a technology-based society. Third, find out the programs that can be carried out jointly between universities, local government, and the private sector in the future.

2 RESEARCH METHODS

The method in this study will use qualitative analysis with the type of field research where the findings are not obtained through mathematical or statistical procedures that favor calculation (A Strauss & J Corbin, 2003).

This research was conducted in the City of Sungaipenuh and Kerinci Regency. The selection of informants in this study was carried out using a purposive sampling technique. The researchers determined which informants felt that the informants were closely related to one another. Sources of data in this study are primary and secondary. Primary data comes from observation and interviews. To find primary data in this study are leaders and policymakers in tertiary institutions, local government, and the private sector in the City of Sungaipenuh and Kerinci Regency. Secondary data is obtained from Sungaipenuh City and Kerinci Regency, such as documents directly related to the object under study in Sungaipenuh City and Kerinci Regency.

The data analysis process in qualitative research is carried out after data acquisition and in detail inside and after the field. The technique used to analyze the resulting data is a qualitative data analysis technique modeled by Miles and Huberman: data condensation, data display, and inference or validation (Susilawati et al., 2020).

Observation, interviews, and documentation do data collection. This data collection is carried out for a certain period according to data validation needs. Data condensation refers to selecting, focusing, simplifying, abstracting, and transforming data contained in field notes in research. The next step after data condensation is data presentation. A set that states the relationship between categories of information that represents qualitative data. Furthermore, by making a detailed description of the case and its environment.

The final stage of data analysis is verification and drawing conclusions which are interpreted as drawing the meaning of the data that has been displayed. Thus the verification process is an effort to find meaning from the data that has been collected by looking for patterns, themes, similarities, differences, things that often appear, and so on.

3 THEORETICAL REVIEW

3.1 Triple Helix Perspective

The triple helix model can be conceptualized as components, relationships, or links built between actors and functions in the system (I.A. Ivanova & L. Leydesdorff, 2014). Links or engagement can be measured in several ways, including the number of citations to academic papers generated by industry; participation of academics in industrial research activities; university research grants awarded by industry or government (Y Kim et al., 2012). Regarding their functions, universities are responsible for new products, the industry generates wealth, and the government is responsible for legislative control (I.A. Ivanova & L. Leydesdorff, 2014). However, the potential for innovation does not originate from the institutional space of each Helix constituent actor but rather from areas that overlap due to their interactions (I.A. Ivanova & L. Leydesdorff, 2014). This institutional stakeholder role approach is considered a potential source for innovation and growth of the entrepreneurial ecosystem, which is critical for regional economic development and social transformation (A Brem & A Radziwon, 2017; I.A. Ivanova & L. Leydesdorff, 2014; J Kolehmainen et al., 2016). Less research-intensive areas increasingly realize that knowledge applied to local resources can enhance economic and social development, so institutions that produce knowledge are significant (I.A. Ivanova & L. Leydesdorff, 2014). Previous lessons show that higher education institutions can significantly impact the knowledge base development in rural and peri-urban areas (J (Kolehmainen et al., 2016; JJ Ferreira et al., 2017).

Learning dynamics are essential in the entrepreneurial ecosystem (G Secundo et al., 2017). Regarding the role of government, research shows that public policies that support entrepreneurship, in particular addressing knowledge and competency gaps, are essential for developing micro-rural enterprises that create jobs, alleviate poverty, mitigate populations, and contribute to economic growth (Bernal & Adames, 2017; FM Edoho, 2016). Industry's role in the Triple Helix is not only to develop knowledge but also to participate in regional innovation and development by supporting entrepreneurship through corporate social responsibility (CSR) programs, both voluntary and as a result of government agreements (R Steurer, 2010).

Although empirical analysis of the Triple Helix stakeholder effect is limited, several studies have

been conducted, focusing on various outputs, such as regional company formation (Y Kim et al., 2012), local niche innovation projects (A Brem & A Radziwon, 2017) and entrepreneurial innovation performance (M Guerrero & D Urbano, 2017).

3.2 Economic Development Phase

With this in mind, distinguish three specific phases of economic development: (1) Innovation-driven economy (IDE): rich countries versus developed countries. (2) Efficiency-driven economy (EDE): a country with high economic growth and development in recent years, such as strengthening the private sector and public incentives for economic development. (3) Factor-driven economy (FDE): countries with low levels of economic development which usually have a large agricultural sector that provides livelihoods for the majority of the population, most of whom still live in rural areas (M Porter et al., 2002; N Bosma & J Levie, 2010).

Thus, entrepreneurship is increasingly crucial for the development of a country (S Martínez-Fierro et al., 2016), and entrepreneurs are the best agents of change (Acs & Amorós, 2008; AJ Van Stel et al., 2005; N Bosma & J Levie, 2010). He introduces innovation, increases competitiveness and competition (Acs & Amorós, 2008; JJ Ferreira et al., 2017; N Bosma & J (Levie, 2010; PK Wong et al., 2005), pushes the competitiveness of the State to a higher level (JL Curbello & I Peña, 2012; JL González et al., n.d.).

3.3 Technology Transfers

Technology transfer is divided into two, namely horizontal transfer and vertical transfer. Horizontally is the transfer of technology from one field to another. Meanwhile, the vertical transfer is the transfer of technology from research to application, Grosse, (Robert Barr et al., 1977). The technology transfer process also needs to pay attention to the technology readiness level (technology readiness level) Arwanto and Prayitno (2013) as a criterion for when a technology can be widely used. Research generally focuses on stages 1-3, while production occurs when technology has reached at least stage 6. Bridging between stages 3 to 6 is the most difficult, whereas stages 4 and 5 include converting prototype components to mass production components for testing and further development.

4 DISCUSSION

4.1 Helix Readiness Levels

4.1.1 Local Government

The government has prepared organizational tools through offices and agencies, which are divided based on the object of the problem. For example, for economic and MSME issues, the government will give authority to the industry agency. For health issues, the government will give authority to the health service, and for tourism issues, the government will give authority to the tourism agency. Fajrann (Chairman of the Sungaipenuh City DPRD) said, "The government, through related agencies, is implementing a community empowerment program, especially MSMEs in Sungaipenuh City."

4.1.2 University

The collaboration built between the campus and the Kerinci Regional Government is still limited to research collaboration, where there is no further follow-up on any research by lecturers and students regarding the research. Rahmat Fauzi (Head of the Center for Religious and Cultural Studies at IAIN Kerinci) said, "Institutions have been formed on campus, but institutional work programs are still running alone in the process of strengthening the community's economy without concrete cooperation with local governments."

4.1.3 Private Sector

The private sector has two patterns to strengthen the local community's economy. Some directly form an organizational structure to manage CSR, while others still combine it with a general organizational unit. Both types of patterns have advantages and disadvantages of each. Companies that precisely form devices will be more planned and directed.

Mulyadi (Head of Bank Sembilan Jambi) said that "We must carry out the SME development program, namely UMKM Go Digital, but currently, there is no institution that can be invited to work together concretely to carry out the program,"

Institutionally, it can be concluded that the three helixes have prepared themselves by forming a structure in the management of cooperation. The structure has been equipped with a work program but has a different focus from one helix to another.

4.2 Triple Helix Partnership Program

Several campuses are in Sungaipenuh City and Kerinci Regency, namely IAIN Kerinci, STIE Alam Sakti Kerinci, AKPER, and others. Several companies are actively conducting business activities in the City of Sungaipenuh and Kerinci Regency, such as PTPN VI, Micro Hydro Power Plants, Banking, and others. Triple Helix faces challenges due to the economic conditions of the people still having difficulty getting up after the Covid-19 pandemic. In addition, there are problems on a local scale that must be resolved, such as waste and ecological damage. It is urgent because the City of Sungaipenuh and Kerinci Regency are centered on the tourism industry, so the natural beauty is a determining factor in improving its performance.

The Covid-19 pandemic is a challenge for the tourism industry. Restrictions on the movement of people have undermined the growth of the tourism industry. In the broad sense of service management, government policies cannot yet be felt in the tourism industry. The government provides many Direct Cash Assistance (BLT) to SMEs that sell goods, not services. Another thing that is problem in Sungaipenuh City and Kerinci Regency is the problem of accessibility. It must be immediately given a solution by making a particular strategy. It is acknowledged that all entities or those representing the role of the triple helix are highly anticipated to support the economic development of the people of Sungaipenuh and Kerinci. Several areas that are urgently needed to be resolved are community economic problems, especially SMEs that have been affected by the Covid-19 Pandemic. Then there is the ecological problem, where many forests are logging at the foot of Mount Kerinci, and the garbage problem, an obstacle in Sungaipenuh City.

This campus started a Community Service program a long time ago. IAIN Kerinci, for example, spends one billion rupiahs annually for lecturer service and research programs. IAIN Kerinci organizes the Real Work Lecture (KKN) program with thematic methods every year. This program allows students to carry out community service programs as one of the obligations to complete their studies. The program is expected to be able to answer the problems that exist in society.

The results of interviews with the leadership of the IAIN Kerinci show that the work program is more directed at improving education and religion in the community. Religious moderation is one of the crucial themes promoted by IAIN Kerinci in society. Work programs are more likely to lead to that theme.

The government sees the other side of the problems that exist in society today. The local Government's focus is on economic issues and waste. Kerinci and Sungaipenuh have great tourism potential, but the people's economy is still too low. MSME development is one of the strategies currently being promoted by the local government. The SMEs in question are more directed at the downstream tourism industry. It follows regional strength.

Apart from economic problems, waste is a significant problem in the cities of Sungaipenuh and Kerinci. As a tourist destination, it is an obligation that clean environmental conditions are the primary support. The comfort of the tourists is greatly disturbed by the garbage. Currently, the waste problem is big because there is no final waste disposal site the local government can manage. The private sector, represented by companies operating in the City of Sungaipenuh and Kerinci, has a slightly different trend. Even though the potential in the region is tourism, most corporate social responsibility programs focus more on developing the creative economy.

Hendi Fresco (Manager Mangun Jaya) said, "There are differences in the focus of work. Usually, the government helps in the licensing process if the Campus is more inclined to increase the capacity of Human Resources, both in strengthening morale and work skills, while if the company is more towards facility assistance". One of the mentoring programs carried out by Helix was carried out for members of the Barokah Coffee Cooperative, Kayuaro District, Kerinci Regency. Bank Indonesia for five years, providing assistance or programs where the programs are continuous; Development of Coffee Drying Domes, HR Capacity, exhibitions, export training, competitions, coffee production machines, and coffee marketing. Currently, the Koerintji Barokah cooperative has entered stage 5, where after the completion of stage 5, the ground coffee marketing program, Bank Indonesia will move to another target.

4.3 Farmer Quality Improvement Cooperation (Quality Control System)

The Koerintji Barokah Cooperative together becomes Rikolto Partners, a Non-Governmental Organization (NGO) from Belgium that focuses on increasing the capacity of Village Human Resources, which has the potential to improve the economy, increasing agricultural capacity, especially Koerintji Barokah Coffee Farmers together in Jernih Jaya Village which will make farmers better.

The Plantation Service has a budget for assistance to Farmer Groups, which is open yearly. However, each Cooperative requires samples of coffee seeds, solar purer domes, and other agricultural tools. The Plantations Service will provide 10,000 Arabica Coffee seeds to the Cooperative in 2022, distributed to coffee farmers. With each Helix's capabilities, duties and work portion, the government can play a role in training, capital, markets, and networking in community empowerment. Meanwhile, Higher Education can play a role in strengthening human resources, networking, innovation, and technology. At the same time, the private sector can take the role of investment, technology, and innovation. To unite these strengths, Helix can do business meetings, university meetings, and market meetings. Helix can manage joint programs and have a significant impact on MSME development.

4.4 The Triple Helix Barrier

Barriers occur due to several factors. First, there are differences in several interests based on each helix's point of view on societal problems. Second, the intensity of communication between the helices is still very minimal. Third is the lack of budget for each helix in implementing community service and CSR. Hendra Bustomi (Creative Economy Activator) said, "The regional government program, campuses, and private companies are still separate, running separately. No forum has been formed, so the program cannot focus."

So far, each helix seems to have not resolved the existing problems. In this case, the government has the most challenging task because the government must, of course, be the main engine in the empowerment process. The government is expected to be able to become a bridge for another helix for the technical process going forward. Inequality of knowledge in the application of technology still occurs in society. So at the application level, it is still challenging to implement. It is necessary to develop knowledge in the community in order to be able to use technology effectively.

4.5 Triple Helix Program Opportunity

Managers of local tourist destinations that are still traditional, for example, Village-Owned Enterprises (BUMDES) or individual tourism managers, have difficulty marketing the tourism objects they manage. In Kerinci, there are also hundreds of natural tourism objects managed by BUMDES and the local community, such as hot springs, waterfalls, and tea

and coffee plantation agro-tourism. However, this tourist attraction is starting to be empty of visitors because management is still carried out traditionally.

Opportunities for utilizing blockchain technology can be described with the following concepts;

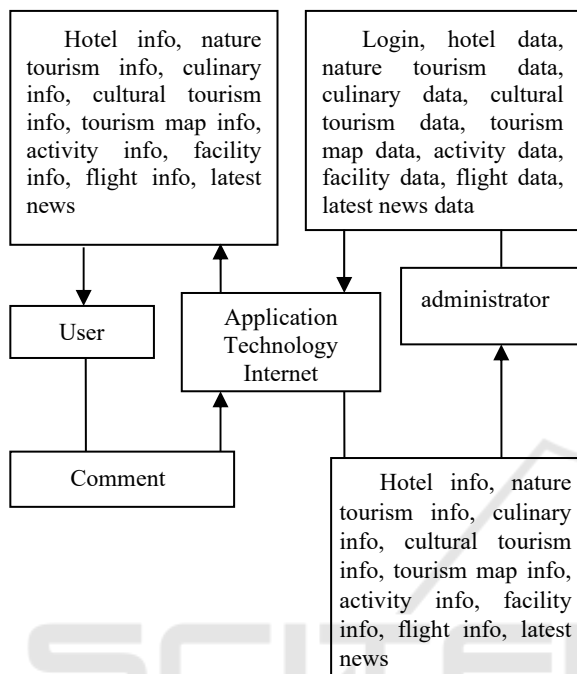


Figure 1: Opportunities for utilizing blockchain technology.

In addition to natural tourism potential, Kerinci's cultural tourism potential is promising. The socio-cultural life of the Kerinci people is still very much bound by custom. The community has inherited the Ancient Script, which is still used by the community in their daily communication. The Incung script is said to be a relic of the ancient Malay era. It can be proven through inscriptions and relics of historical objects, which are still neatly stored by traditional leaders, usually called *depatis*.

Technological developments enable virtual-based shared programs. Joint programs derived from digital methods can be further implemented and evaluated with each institution. Digital methods enable continuous work programs. Because all programs implemented are accessible, there is no longer any program overlap between institutions.

Fuad (Manager of Media *Piknikkerinci*'s social media accounts) said, "The potential for tourism in Kerinci is enormous, so it can still be developed. With technological advances, work programs must sync between the Government, Campuses, and Private Parties to strengthen the community's economy."

The Creative Economy approach is an option for developing existing regional potential. Entrepreneurship is a strategy that can be carried out if you look at the potential and economic strength of today's community. With minimal capital and technological resources, entrepreneurial nature is looking for opportunities to get maximum results with minimal capital. The government's role as an actor driving the Creative Economy as a Catalyst (Suryana, 2013) encourages SMEs can survive during a pandemic, namely in the form of providing financing, incentives, and protection.

4.6 Research Findings

In the research process, the triple helix program in the field was greatly influenced and received direct intervention from the Indigenous Institutions. For example, the decision-making process in rural areas still depends on local customary rules. It is consistent with that suggested by (Scioli et al., 1997). A fourth helix can be added to the model, representing Culture-based publics, Civil Society and Arts-Based Innovation. The Quadruple Helix model emphasizes the natural environment of society (Scioli et al., 1997).

Customary institutions participate in community economic development. In fact, according to prevailing social norms, *adat* is responsible for the economy of the community it shelters. *Adat* does not only provide input in development programs but also has resources that the community can utilize to develop the economy independently.

An example of a government program that strengthens the position of *adat* is the granting of customary forest management rights. The *Perhutani* program provides more substantial power to customary stakeholders or equivalent to the Regional Government.

Indigenous peoples regulate themselves in relations with their members through customary law, not only socially, but now indigenous peoples also have the right to manage their own resources such as customary forests, independently. The government has given them authority, even though it is still not optimal at this time, because indigenous peoples still have to receive assistance to manage their resources. Weaknesses in their skills and networks are points that can be corrected by the government, the private sector, and universities" (Interview with the Chairman of the DPRD Kota Sungaipenuh).

5 CONCLUSIONS

Several areas urgently need to be resolved immediately, and it is hoped that the role of the triple helix is to address community economic problems, especially SMEs that have been affected by the Covid-19 Pandemic and ecological and waste problems. The three helixes have prepared themselves by forming a structure to manage cooperation, but these structures are not yet related.

The structure has been equipped with a work program but has a different focus from one helix to another. Apart from these obstacles, what can be contributed by each helix is that the government can play a role in training, capital, markets, and networking in community empowerment. Meanwhile, Higher Education can play a role in strengthening human resources, networking, innovation, and technology. At the same time, the private sector can take the role of investment, technology, and innovation.

Customary institutions have become a force equal to other helices, especially in the Kerinci and Sungaipenuh areas. Therefore customary institutions can be included in the helix concept.

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