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Prospective approach in determining potential economic sectors of East Timor as a new nation

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A B S T R A C T

East Timor is one of the youngest nations in the world, having been established in 2002. The majority of East Timor's population works in the agricultural sector, yet the mining sector (oil and gas) plays a dominant role in contributing to the country's GDP. The management of oil revenue in East Timor is adapted from the model implemented in Norway, known as Norway Plus. Aware that oil and gas resources must be supported by other economic sectors in the long term, this study aims to analyze potential scenarios for developing East Timor's key economic sectors, as well as to propose potential policy pathways. The research approach uses prospective methods (SMIC-Prob analysis and MULTIPOL), which are suitable for policy formulation due to their future-oriented nature. Data collection was conducted through Focus Group Discussions (FGD) involving experts from both the government and academia. The results from the SMIC-Prob analysis show that the oil and gas sector indeed has the highest probability. However, in the long term, the agricultural sector emerges as a crucial alternative. Furthermore, the MULTIPOL analysis indicates that in scenarios focusing on the development of non-oil and gas sectors, policies should prioritize the development of local economic sectors. The government of East Timor is recommended to seriously develop non-oil and gas sectors by utilizing revenue from oil and gas extraction. Additionally, environmental governance is also a critical consideration to achieve sustainable, inclusive development.

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1. Introduction

East Timor is one of the youngest countries in the world, having been established in 2002 after previously being under Portuguese Colonial Rule and 24 years of Indonesian governance. As a newly developing country, East Timor's economy is still heavily dependent on the primary sector, with the majority of the population working in agriculture. However, the main source of East Timor's economy is oil and gas.

The oil revenue management in East Timor adopts the Norwegian oil revenue model (Solidarity Alternative/SA – Oil Fund – Capacity Building), known as Norway Plus, with the mechanism shown in Fig. 1.

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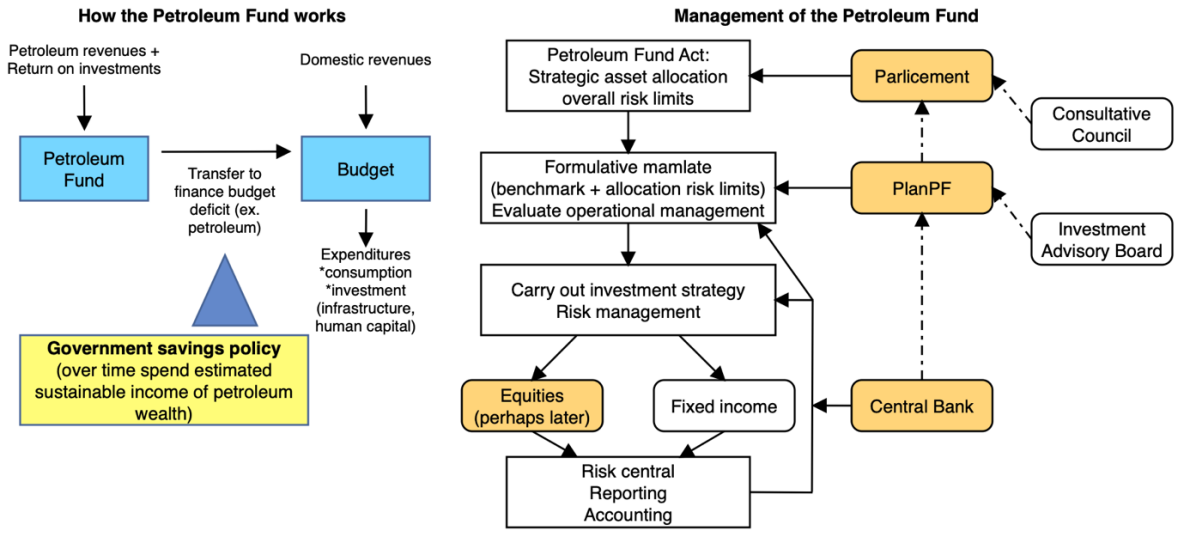

Fig 1. Norway Plus Oil Revenue Model
Source: RDTL establishes Petroleum Fund (laohamutuk.org)

Since its implementation in 2005, the Government of East Timor, through the ABP (Petroleum Fund) and the East Timor Central Bank, has fulfilled its obligation to deposit oil and gas revenues every quarter into the Reserve Bank of New York, USA. The revenues obtained from oil and gas have made a highly dominant contribution to the development of both the economy and governance of East Timor. In fact, oil and gas revenues have become the main determinant of the country's economic growth. While it is true that oil and gas revenues are crucial to achieving the goals set in East Timor's national development program, it is also true that these revenues present challenges for governance capacity. International experience shows that countries rich in natural resources (oil and natural gas) often face greater issues of wastefulness and corruption compared to other nations. The negative effects of such resource abundance are known as the "curse of natural resources" (Lewis, 1984; Davis, 1995; Yilanci et al., 2021).

The mining sector has proven to be a major contributor to East Timor's GDP. However, both the government and the people of East Timor naturally hope that other sectors will also develop in parallel with the mining sector. Therefore, this study aims to analyze the probability of developing East Timor's potential economic sectors, and subsequently formulate a policy roadmap that will serve as the basis for allocating oil and gas sector budgets for the development of East Timor's potential economic sectors.

2. Material and method

2.1 Natural resources theory

Natural resources (NR) play a crucial role in economic development, particularly in developing countries that are rich in natural resources. However, the phenomenon known as the "resource curse" indicates that countries with abundant natural resources often experience slower economic growth, high social inequality, and weak institutional quality. This phenomenon has been a central focus in development economics since it was first introduced by Richard Auty in 1993. The utilitarian approach to natural resources assumes that NR are assets that can be exploited for long-term economic benefits. In this view, NR are seen as commodities with the potential to increase income and improve economic welfare if managed well. Technology and innovation are considered key factors that can extend the lifespan of these resources, allowing for more efficient and sustainable exploitation. However, this approach is often criticized for overlooking environmental and social factors that could be neglected if the exploitation is not carefully regulated. For example, in cases of large-scale natural resource extraction, the environmental impact can harm the sustainability of local ecosystems, ultimately affecting the quality of life for local communities (Zhao, 2021a, 2021b). The neoclassical approach views NR as economic goods that should be allocated efficiently through market mechanisms. Within this theoretical framework, NR should be treated like other factors of production, which will be channeled to sectors that can generate the highest added value. The basic principle of this approach is that market prices, determined by supply and demand, will ensure that NR are used efficiently. This approach emphasizes the importance of market liberalization, reducing the state's role in managing NR, and strengthening clear property rights as a way to promote economic efficiency. However, critics of this approach argue that markets often fail to account for the external impacts of NR exploitation, such as environmental damage and social inequality. Furthermore, dependence on the market can exacerbate economic disparities, particularly when markets are not fully competitive or when the state fails to ensure a fair distribution of the benefits generated (Kohli, 2022).

The ecological approach to NR focuses on the importance of sustainable management, considering ecosystem limitations and the long-term impacts of resource exploitation. This approach emphasizes that although NR can provide short-term economic benefits, they also have limited capacity for replenishment and regeneration. Therefore, unsustainable management can lead to irreparable damage, which will harm future generations. In this theory, the balance between economic growth and environmental protection becomes key to sustainable development. This approach also often proposes the concept of a "green economy," which integrates economic growth with environmental protection through more environmentally friendly and efficient management of NR and resource use. One criticism of this approach is that it requires stricter policies and greater control over NR exploitation, which may conflict with free market principles (Wu et al., 2023). One of the concepts that arises from NR theory is the phenomenon known as the "resource curse." This term refers to the phenomenon in which countries rich in NR face significant challenges in terms of slow economic growth, high social inequality, and weak institutional quality. This often occurs due to excessive dependence on NR exports, making these countries vulnerable to global price fluctuations and hindering economic diversification. Some mechanisms leading to the resource curse include high commodity price volatility, which makes the economy more vulnerable to external crises, and the occurrence of Dutch Disease, where the appreciation of the exchange rate hampers the competitiveness of non-resource sectors. Additionally, large revenues from NR can trigger corruption and abuse of power, further worsening the quality of institutions and governance (Sachs & Warner, 2020). To address the challenges associated with NR management, various more sustainable management models have been proposed. One of these is a model that prioritizes economic diversification, where revenues from NR are used to finance the development of other sectors such as education, infrastructure, and technology. This approach reduces dependence on the NR sector and encourages more balanced and sustainable economic development. Furthermore, this model includes strengthening institutions that can manage NR revenues transparency and accountability, ensuring that the benefits from NR are shared by all layers of society. In sustainable NR management, it is important to involve various stakeholders, including the government, the community, and the private sector, in the planning and decision-making related to resource utilization (Barbier, 2022). Overall, natural resource theory provides a deep understanding of how NR can be utilized to support economic development, but it also warns of the potential negative impacts that may arise if management is not done carefully. This theory proposes various approaches, from the utilitarian approach, which emphasizes the maximum exploitation of NR, to the neoclassical approach, which encourages market efficiency, and the ecological approach, which stresses sustainability. The choice of the appropriate approach depends on the social, economic, and environmental context of the country in question, as well as its capacity to build strong institutions and manage resources efficiently.

2.2 Development theory

Development theory focuses on ways to improve the social and economic welfare of a country. Countries that have recently gained independence or are in the early stages of development face unique challenges in planning the stages of development to achieve sustainable progress. This article will examine several development theories and stages of development relevant to developing countries, as well as how these theories can be applied in the context of newly independent nations. Modernization theory is one of the earliest theories developed in development studies. According to this theory, development is a linear process that follows specific stages, starting from the traditional stage to the modern industrial stage. The theory assumes that all countries will follow a similar path toward economic and social development, with investments in infrastructure, education, and technology as key components. More advanced countries will serve as models that developing countries should follow.

For newly independent countries, applying this model might seem appealing. These countries need to build basic infrastructure and education systems to prepare their populations to compete in the global economy. In this context, modernization theory can offer guidance regarding resource allocation to key sectors that support economic development, although some critics argue that this approach overlooks social and cultural factors (Johnson, 2019).

One criticism of modernization theory is that not all countries follow the same development path. A more contemporary approach recognizes that each country has unique characteristics and challenges, requiring them to follow different development paths. This concept is known as “multiple pathways of development”. In the context of newly independent countries, this theory emphasizes the importance of developing a development path suited to local conditions.

This development model involves an inclusive process that considers the social, cultural, and economic diversity of the country, supporting policies based on local uniqueness, and strengthening domestic institutional capacity. The development of local capacity and economic diversification is key to ensuring successful development. Applying policies based on local analysis is particularly relevant for newly independent nations, given the need to build a more diverse and self-sustaining economy after years of relying on extractive sectors (Rodrik, 2022).

Development stage theory, proposed by economists such as Walt Rostow (1960), describes development as a sequential process through five stages: (1) traditional society, (2) preconditions for take-off, (3) take-off, (4) maturity, and (5) mass consumption. Newly independent countries may be at the first or second stage, i.e., traditional society or preconditions for take-off.

The importance of the preconditions for the take-off stage, according to Rostow, is the investment in sectors that can trigger economic transformation, such as education, infrastructure, and technology. Newly independent countries often require significant investments outside of the extractive sector to diversify their economies. Building agriculture, industry, and tourism could be a primary focus in creating sustainable jobs and spreading development across the country (Wang & Liu, 2021).

Dependency theory posits that developing countries are often trapped in detrimental dependency relationships with developed countries. Developing countries tend to rely on the export of natural resources and receive technology and goods from developed nations, which in turn worsens global inequality and prevents developing countries from achieving economic autonomy. This theory also emphasizes that development should be driven by policies independent of international economic dominance and should strengthen the domestic sector (Prebisch, 2020).

For newly independent countries with great potential in natural resource sectors, this theory provides valuable insights into the importance of reducing dependence on raw material exports. These countries need to encourage policies that focus on developing other sectors such as agriculture and tourism, while also strengthening domestic capacity for innovation and production, which will help reduce dependence on global economic powers (Duflo, 2021).

The sustainable development model offers an alternative to traditional approaches, emphasizing the importance of balancing economic growth, social sustainability, and environmental protection. Newly independent countries, particularly those with limited resources and potential vulnerability to climate change, need to consider sustainable development in their planning.

This model integrates social, economic, and environmental dimensions, with the goal of ensuring that development is not only focused on short-term gains but also on long-term sustainability. The main focus of this model is to create fair employment opportunities, reduce social inequality, and protect the environment for future generations (Keenan, 2022).

For newly independent countries, applying relevant development theories that align with local contexts is crucial. From modernization theory, which emphasizes gradual development, to more diverse and sustainable approaches, all these theories can provide guidance in designing policies suited to the needs of newly independent countries. Through a holistic and inclusive approach, countries can pursue development that is not only sustainable but also reduces dependence on extractive sectors.

2.3 Method

The prospective approach is a suitable method for designing a policy, as it analyzes based on possible future scenarios. This is different from the retrospective approach, which is widely used today, where policies or policy evaluations are based on previous data (Suasih et al., 2024). The prospective analysis techniques used in this research are SMIC-Prob analysis to determine the probabilities of various potential economic sector development scenarios. This is followed by MULTIPOL analysis to formulate the potential policy development path for East Timor's economic sectors. Data collection was carried out through Focus Group Discussions (FGD) involving experts from the government (ministries) and academia, where experts discussed input factors and values for the SMIC-Prob and MULTIPOL analyses.

SMIC-Prob Analysis

Uncertainty analysis with SMIC-Prob requires several stages to generate scenario combinations. In general, these stages are related to gathering information about the observed system or case, followed by data analysis and result interpretation. Figure 4.4 below presents the SMIC-Prob analysis framework, modified from Stratigea (2013).

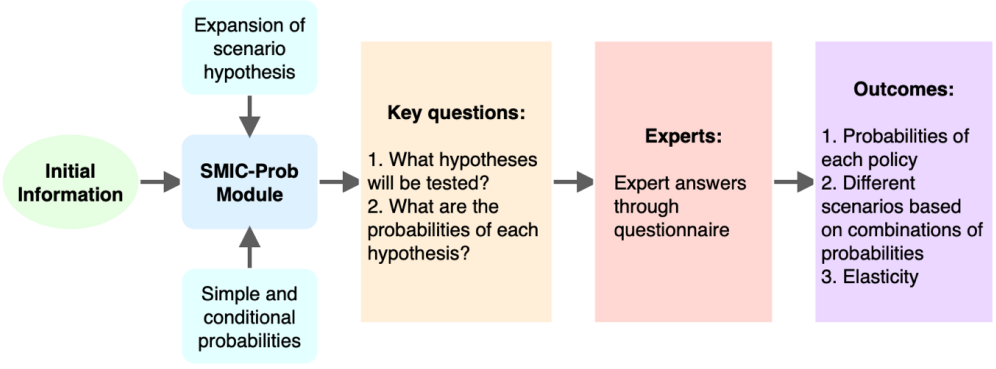

Fig 2. SMIC-Prob Analysis Framework
Source: Stratigea (2013)

As shown in Fig. 2, SMIC-Prob requires hypothesis exploration stages related to events or situations tested through various opportunities. Since SMIC-Prob relies on expert judgment, the determination of probabilities by experts becomes the most critical stage in generating the outcomes of the analysis. This is reflected in Fig. 3, where stages two and three are the core components of the SMIC-Prob analysis.

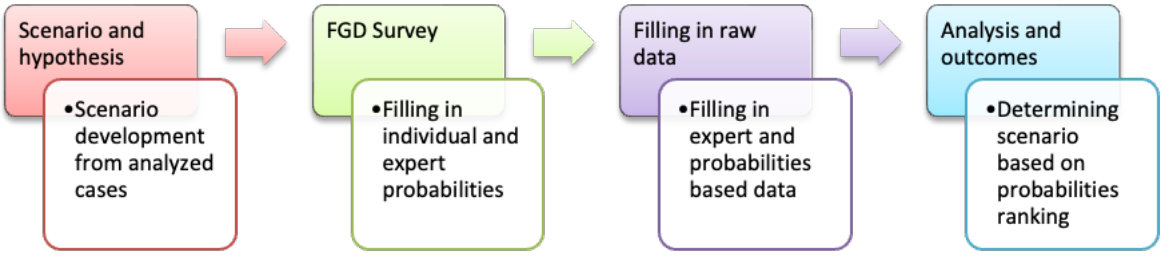

Fig 3. Stages of SMIC-Prob Analysis
Source: Fauzi (2019)

Assessment in SMIC-Prob of the likelihood of an observed case can be done in two ways. The first is to ask each expert to fill in the simple and conditional probabilities for each scenario. With this approach, the combination of outcomes produced is the result of each individual's analysis. This approach is certainly complex, especially when involving a relatively large number of experts. The second approach involves aggregating the experts' assessments by calculating the average probability from the experts, thus producing a comprehensive outcome. The second approach is more commonly used in various cases, such as in regional planning by Novkovic et al. (2010) and Medina et al. (2015).

MULTIPOL analysis

Policy analysis on the management and development of the agricultural and fisheries sectors, infrastructure development, and oil and mineral sector development is conducted using the MULTIPOL model. MULTIPOL is a multicriteria-based policy analysis tool that uses scores and weights. It integrates a participatory approach through the involvement of stakeholders in the multicriteria assessment (Rustini et al., 2023). MULTIPOL also evaluates action choices (or program alternatives) not only based on the criteria used, but also through the interaction of three components: action, policy, and scenarios, as shown in Fig. 4. The interaction of these three components results in two types of evaluations in MULTIPOL (Stratigea et al., 2013).

First, the Action to Policy-based evaluation (e.g., program to policy). This evaluation determines which program is appropriate for each policy, resulting in a hierarchy of the impact of the program (action) on the policy. Second, the Policies to Scenario evaluation. This evaluation determines which policy is appropriate for a particular scenario, resulting in a hierarchy of policies and their impacts on each scenario.

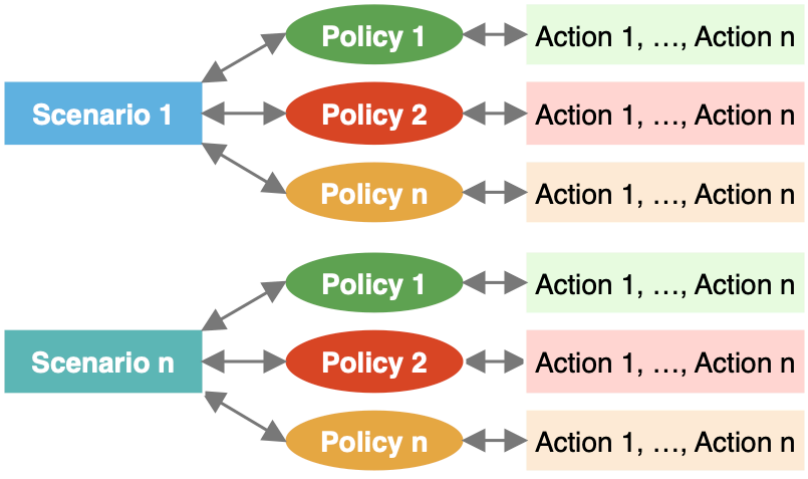

Fig 4. Interaction of Scenario, Policy, and Action
Source: Fauzi (2019)

The three main components of MULTIPOL are scenarios, policies, and actions. A scenario is a structured development that could be undertaken in the future where goals can be achieved. A policy is a strategy (also known as the strategic path) needed to support the scenario. This policy may relate to macro, micro, sectoral aspects, as well as social, economic, political, institutional, and other aspects. Action, also known as policy measures, refers to the ways to achieve the goals, which are potential interventions aimed at implementing the policy. In addition to these three main inputs, MULTIPOL requires input criteria that will be used when assessing scenarios, policies, and actions. In other words, this component will be filled through a matrix of the three inputs with predefined criteria. The criteria describe measurable aspects based on the judgment of stakeholders. MULTIPOL integrates a participatory approach into the principles of multicriteria, so the MULTIPOL framework is based on gathering information from stakeholders through reciprocal Focus Group Discussions (FGD). More clearly, the MULTIPOL framework is presented in Fig. 5.

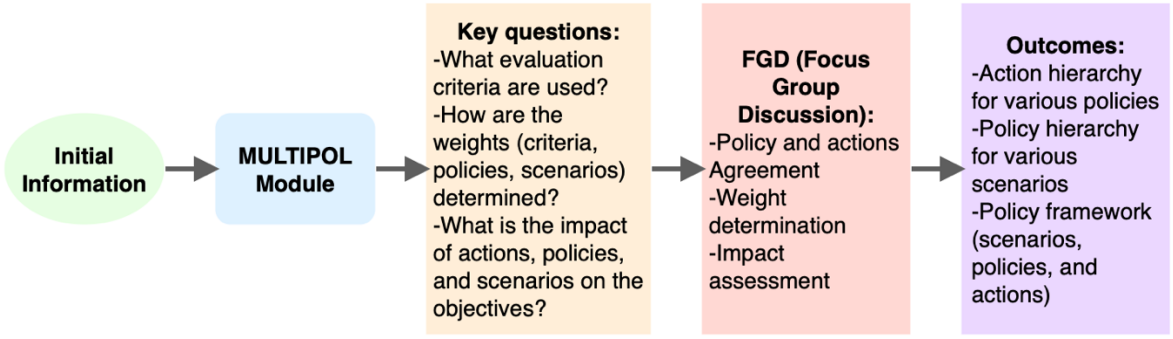

Fig 5. MULTIPOL Framework
Source: Stratigea (2013)

3. Results and Discussion

3.1 Probability of Potential Economic Sector Development in East Timor

The probability analysis is conducted using the SMIC-Prob prospective analysis technique, which begins by calibrating the raw data into net data. Table 1 below presents the changes in the probabilities of scenarios for the development of productive sectors in East Timor from raw data to net data.

Table 1
Raw Data and Net Data for Simple Probability of Alternative Scenarios for Productive Sector Development in East Timor

No	Scenario	Code of Scenario	Raw Data	Net Data
1.	Development of Oil and Gas Sector	MIGAS	0.65	0.635
2.	Development of Non-Oil and Gas Sector	NONMIGAS	0.7	0.588
3.	Development of Productive Sector As Usual	BAU	0.35	0.513

Table 1 shows that there is a change in values from raw data to net data, which also alters the ranking of the scenarios. The scenario with the highest probability for the development of the productive sector is the development of the oil and gas sector, followed by the development of the non-oil and gas sector, and lastly, the development of the productive sector as usual.
Next, the results of the SMIC-Prob analysis also present calculations for the net data on conditional probabilities of realization (Table 2) and non-realization (Table 3).

Table 2
Net Data for Conditional Probabilities of Realized Scenarios

Scenario	Development of Oil and Gas Sector	Development of Non-Oil and Gas Sector	Development of Productive Sector As Usual
Development of Oil and Gas Sector	0.635	0.617	0.446
Development of Non-Oil and Gas Sector	0.571	0.588	0.694
Development of Productive Sector As Usual	0.361	0.606	0.513

As shown in Table 2, if the development of the oil and gas sector is realized, both the oil and gas sector and the non-oil and gas sector will develop. However, if the non-oil and gas sector is developed, it will cause the probability of the “productive sector as usual” scenario to increase. On the other hand, if the “productive sector as usual” scenario is pursued, the non-oil and gas sector will also develop.

Table 3
Net Data for Conditional Probabilities of Unrealized Scenarios

Scenario	Development of Oil and Gas Sector	Development of Non-Oil and Gas Sector	Development of Productive Sector As Usual
Development of Oil and Gas Sector	0	0.661	0.834
Development of Non-Oil and Gas Sector	0.617	0	0.476
Development of Productive Sector As Usual	0.779	0.381	0

While Table 3 shows that if the oil and gas sector is not developed, the probability of the "productive sector as usual" scenario becomes higher. Meanwhile, if the non-oil and gas sector is not developed, the probability of developing the oil and gas sector becomes higher. Similarly, if the productive sector is not developed as usual, then the oil and gas sector will develop. It can be concluded that, at this point, the oil and gas sector is indeed the backbone of the productive sector. Therefore, if other sectors are not pursued, the oil and gas sector will still continue to develop. SMIC-Prob can also present the results of scenario combination probabilities, as shown in Fig. 6.

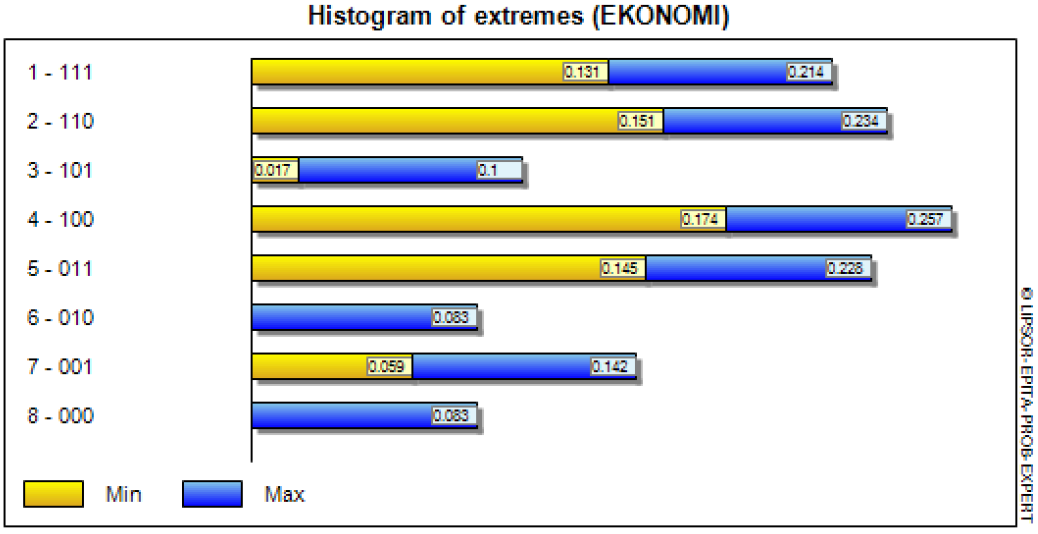

Fig. 6. Probability of Scenario Combinations

If we consider the maximum value of combinations when scenarios are implemented, the highest probability is the combination that involves the development of the oil and gas sector (code 100), followed by the combination of the oil and gas sector and the non-oil and gas sector (code 110).

Table 4
Sensitivity Analysis Matrix for Productive Sector Development Scenarios in East Timor

Scenario	Development of Oil and Gas Sector	Development of Non-Oil and Gas Sector	Development of Productive Sector As Usual	Absolute Value
Development of Oil and Gas Sector	1	-0.830	-1.380	2.210
Development of Non-Oil and Gas Sector	-0.541	1	-0.243	0.784
Development of Productive Sector As Usual	-0.773	-0.323	1	1.096
Absolute value	1.314	1.154	1.623	-

The final column in Table 4 shows the absolute values of elasticity for each scenario (horizontal summation), interpreted as the "prime mover" or main driver of the system being analyzed. The final column also represents the most influenced (conditioned) scenario. It can be seen that the oil and gas sector development scenario is currently the prime mover. This means that the development of the productive sector is highly influenced by the development of the oil and gas sector. On the other hand, the "productive sector as usual" scenario is the one most influenced by other factors.

3.2 Scenarios (Potential Path Policy) for the Development of the Productive Economic Sector

MULTIPOL is a prospective analysis technique, specifically for policy analysis using multicriteria principles with the use of scores and weights to determine hierarchies or the best choices. There are three components in the MULTIPOL analysis, namely scenario, policy, and action. These three components also require input criteria to assess them. Additionally, MULTIPOL integrates a participatory approach into the multicriteria principles, so the MULTIPOL framework is based on gathering information from stakeholders through reciprocal Focus Group Discussions (FGD).

The results of identifying the scenario components, criteria, policies, and actions that have been designed for the development of the productive sector in East Timor are presented in Table 5.

Table 5. Scenarios, Criteria, Policies, and Actions for Productive Sector Development in East Timor

A	*Scenario*	Code
1.	Business as usual	BAU
2.	Development of the oil and gas sector	Migas
3.	Development of the non-oil and gas sector	Non Migas
B	Criteria	Code
1.	Income growth	Income
2.	Increase in productivity (GDP)	PDB
3.	Environmental sustainability	Lestari
4.	Increase in foreign exchange	Devisa
5.	Employment absorption and job availability	Employ
6.	Economic transformation and development	Transform
C	Policy	Code
1.	Infrastructure development	infra
2.	Agricultural productivity	productani
3.	Local economic development	ekolok
4.	Strengthening human resources (HR)	SDM
5.	Tourism development	Tourism
6.	Export of natural resources	EksporSDA
7.	Strengthening labor force	kuat tk
8.	Environmental governance	tkling
D	Action	Code
1.	Cross-sector collaboration	Linsek
2.	Existence of a master plan	Masterplan
3.	Tourism sector development	Tourism
4.	Road infrastructure improvement	Infrajln
5.	Public infrastructure improvement	Infraumum
6.	Farmer assistance	Damping
7.	Improvement in education facilities	Sardik
8.	Enhancement of community skills	Skillmasy
9.	Processing of natural and agricultural products	Olahhasil
10.	Environmental conservation	Konserv
11.	Existence of travel agents	Trvlagent
12.	Social security	Jamsos
13.	Job placement	Tptkerja
14.	Ease of export	Mudahekspo
15.	Expansion of exports	luasekpor

As previously explained, data collection for MULTIPOL inputs was conducted through Focus Group Discussions (FGD). The FGD resulted in scores and weights, as presented in Table 6 through Table 8. Table 6 shows the scoring of actions or programs against the criteria that represent the goals of the productive sector development in East Timor. The matrix is filled with scores ranging from 0 to 20 (Fauzi, 2019).

Table 6
Action Scoring Matrix Against Criteria for Productive Sector Development in East Timor

Code of Action	Code of Criteria					
	income	PDB	lestari	devisa	employ	Transform
Linsek	16	15	10	15	18	10
Masterplan	17	20	18	5	10	15
Tourism	15	18	15	18	15	17
Infrajln	16	18	5	17	16	5
Infraumum	10	5	15	5	1	15
Damping	18	4	10	2	15	10
Sardik	5	5	10	4	1	10
Skillmasy	18	16	5	15	15	10
Olahhasisl	17	18	5	18	10	15
Konserv	5	5	18	4	15	15
Trvlagent	10	12	10	10	10	10
Jamsos	10	5	5	5	18	5
Tptkerja	15	10	4	15	17	15
Mudahekspo	5	15	3	18	5	15
Luasekspor	10	15	3	18	10	15

Meanwhile, Table 7 presents the weight assignment for policies against the criteria, with a total weight of 100. This weight assignment also applies to scoring scenarios against the criteria, where each scenario has a total weight of 100 (Fauzi, 2019).

Table 7
Policy Weight Assignment Matrix Against Criteria for Productive Sector Development in East Timor

Code of Policy	Sum	Code of Criteria					
		income	PDB	lestari	devisa	employ	Transform
infra	100	15	50	3	10	10	12
productani	100	40	20	15	10	10	5
ekolok	100	35	20	4.5	3	7.5	30
SDM	100	20	10	5	15	30	20
Tourism	100	30	20	10	20	10	10
Eksporsda	100	10	35	1	30	4	20
kuat tk	100	20	10	5	20	25	20
tkling	100	10	10	40	10	10	20

Next, Table 8 presents the matrix of scenarios against each criterion for the development of the productive sector in East Timor.

Table 8
Scenario Scoring Matrix Against Criteria for Productive Sector Development in East Timor

Scenario	Sum	Code of Criteria					
		income	PDB	lestari	devisa	employ	Transform
Business as Usual	100	20	20	5	40	10	5
Oil and Gas	100	20	30	5	30	5	10
Non Oil and Gas	100	15	10	20	5	10	40

Based on the results of the MULTIPOL analysis, Table 5.9 presents the scores for each policy, as well as the average scores and standard deviation. The average score represents the overall performance of each action against the policy (or program against policy). Meanwhile, the standard deviation value indicates the sensitivity of each action to the policy (Stratigea et al., 2013). Therefore, the highest average score and the lowest standard deviation represent the best performance. The combination of these two measurement indicators is reflected in the position of the action within the hierarchy.

Table 9
Evaluation Based on Actions and Policy for Productive Sector Development in East Timor

Code of Action	Code of Policy								Moy	Ec.Ty	Number
	Infra	productani	ekolok	SDM	Tourism	EksporSDA	Kuat tk	tkling			
Linsek	14.7	14.7	13.9	14.9	14.6	14.2	14.7	12.4	14.2	0.7	12
Masterplan	16.4	15.8	16.2	13.1	14.4	13.8	12.8	15.4	14.8	1.3	13
Tourism	17	16	16.3	16.1	16.4	17.4	16.3	16	16.5	0.5	15
Infrajln	15.4	14.3	12.6	13.6	14.4	14.7	13.6	9.7	13.6	1.6	10
Infraumum	6.8	8.6	9.9	7.3	8.1	7.4	7.5	11.1	8.3	1.4	3
Damping	7.9	11.7	11.7	11.3	10.1	6.5	10.6	9.9	9.9	1.8	5
Sardik	5.2	5.5	6.4	4.9	5.4	5.6	5.1	7.5	5.7	0.8	1
Skillmasy	15.1	14.6	14.3	14.2	14.6	14.6	14.2	10.4	14	1.4	11
Olahhasisl	16.3	14.7	15.6	14.1	15.3	16.9	14.6	11.3	14.9	1.6	14
Konserv	7.5	8.4	9.3	10.5	8.1	7.2	9.9	13.1	9.2	1.8	4
Trvlagent	11	10.4	10.4	10.2	10.4	10.7	10.2	10.2	10.5	0.3	6
Jamsos	7.1	8.3	7.7	9.9	7.8	6	9.2	6.8	7.8	1.2	2
Tptkerja	12.4	12.6	13.7	14.6	13.1	13.2	14.4	10.3	13	1.2	9
Mudahekspo	12.4	8.5	10.3	9.9	10.4	14.4	10.5	8.5	10.7	1.9	7
Luasekspor	13.7	11	12.4	12.4	12.4	15.1	12.8	9.5	12.5	1.6	8

Table 9 presents the evaluation results based on actions and policy. The combination of the highest average score and the lowest standard deviation, which indicates the best performance, is number 15, which is tourism sector development. This is followed by the program for processing natural and agricultural products at position 14, masterplan development at number 13, cross-sector development at number 12, and community skills development at number 11. The results of the MULTIPOL analysis also present a closeness map, which shows the proximity between the programs (actions) and policies. As shown in Fig. 7, it is evident that each policy is closely aligned with specific actions or programs. For example, the policy of natural resource exports is closely linked with the program of easing export procedures. Meanwhile, the infrastructure development policy is closely related to the expansion of exports, product processing, and road infrastructure. The tourism and local economic development policies are closely associated with the development of tourism facilities, the existence of travel agents, and the preparation of a master plan.

On the other hand, the policies related to strengthening the labor force, human resources (HR), and agricultural productivity are closely connected to programs such as cross-sector development synergy, community skills enhancement, job placement, social security, and farmer assistance. Lastly, the environmental governance policy is closely linked with environmental conservation, public infrastructure, and educational facilities. The MULTIPOL analysis also produces a profile map, which connects the scores for each program (action) with the policies (policy), as presented in Fig. 8.

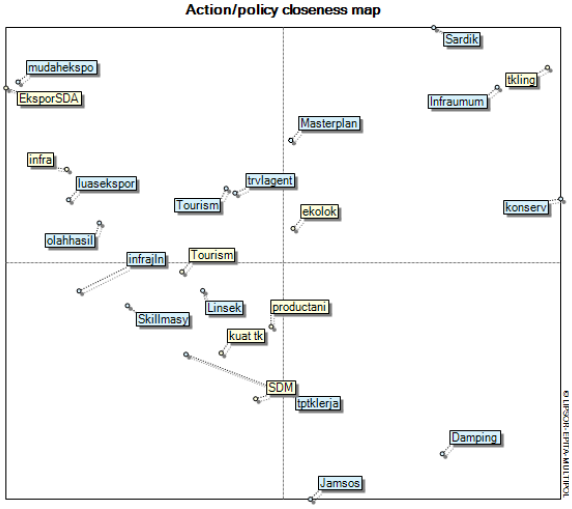

Fig. 7. Closeness of Policy and Action for Productive Sector Development in East Timor

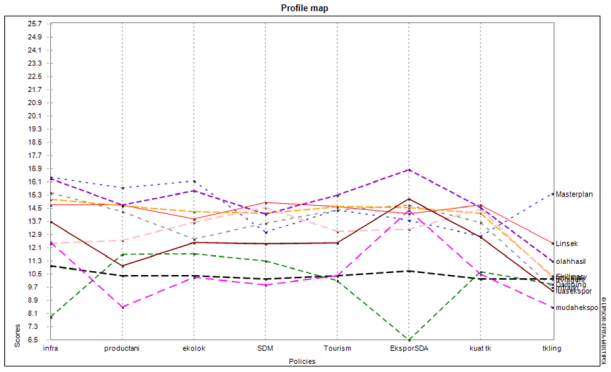

Fig. 8. Profile Map of Policy-Action in Productive Sector Development in East Timor

Fig. 8 shows that the activity of preparing a master plan is a priority in policies related to infrastructure development, agricultural product development, local economic development, and environmental governance. Meanwhile, for the policies on human resource (HR) development and environmental governance, cross-sectoral programs are important to be developed. For the policies on tourism development and the export of natural resources, the highlighted programs are natural resource and agricultural product processing. Next, Table 10 and Fig. 9 present the scores for each policy against the scenarios.

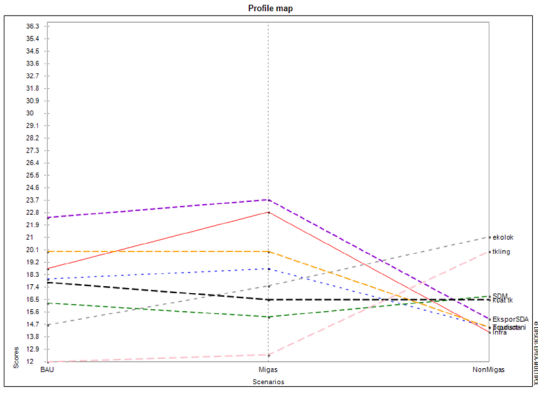

Fig 9. Profile Map of Scenario-Policy in Productive Sector Development in East Timor

Table 10
Policy Scores Against Scenarios for Productive Sector Development in East Timor

Code of Policy	Scenario			Moy	Ec.Ty	Number
	Business as usual	Oil and gas	Non oil and gas			
Linsek	18.8	22.9	14.1	18.6	3.5	7
Masterplan	18	18.8	14.5	17.1	1.9	4
Tourism	14.7	17.5	21	17.7	2.6	5
Infrajln	16.2	15.2	16.8	16.1	0.6	2
Infraumum	20	20	14.5	18.2	2.6	6
Damping	22.5	23.8	15.1	20.4	3.8	8
Sardik	17.8	16.5	16.5	16.9	0.6	3
Skillmasy	12	12.5	20	14.8	3.7	1

The results of the analysis, as shown in Table 10, indicate that in the "business as usual" scenario and the oil and gas sector development scenario, the primary policy is the export of natural resources (SDA). Meanwhile, in the non-oil and gas sector development scenario, the highlighted policy is the strengthening of the local economy. More clearly, the position of each policy in each scenario is presented in Fig. 9. The overall results of the MULTIPOL analysis can be presented in the form of potential policy paths that can be achieved with the appropriate programs for specific policies and scenarios. Thus, the results of the MULTIPOL analysis will provide a clearer picture for the Government of East Timor to implement scenarios, policies, and programs in the development of the productive sector in East Timor.

3.3 Discussion

The results of the SMIC-Prob analysis indicate that the probability of developing the productive sector in East Timor requires intervention and should not be “business as usual”. Therefore, the development of the oil and gas sector remains the primary sector, followed by the development of the non-oil and gas sector. The main characteristic of East Timor's economy is that it is a small open macroeconomy with oil wealth and full dollarization. This is marked by a high degree of economic openness and the use of foreign currency (U.S. Dollar = USD) as the legal tender for all domestic transactions. East Timor's long-term economic development vision is outlined in the 2010 Strategic Development Plan (SDP). The SDP states that by 2030, East Timor aims to join the group of upper-middle-income countries. This means that East Timor's per capita income by 2030 must fall between US$ 3,946 and US$ 12,195. The subsequent vision for development is to eradicate poverty and enhance the stability of economic development by diversifying the economy without oil (Timor-Leste SDP, 2011). This vision aligns with the findings from the probability analysis of developing the non-oil and gas sector. Furthermore, the structure of the economy in East Timor is starting to shift from the secondary sector to the tertiary sector.

Research by Waluyo (2012) shows that in nearly all economic structure indicators (share, growth, contribution), there has been a shift from the secondary sector to the tertiary sector. This indicates that between 2000-2003 and 2004-2010, there was a structural change in East Timor's economy, from the secondary sector (manufacturing/processing industry) to the tertiary sector (service industry). This structural change is likely driven by the growth of East Timor's economy, supported by increased government/private sector activity and international institutions that require various services to carry out their activities in the short term. This structural change is positive if balanced with import substitution policies, so that the role of imports decreases and the domestic economy can produce goods and services to meet domestic needs. However, it would be detrimental if accompanied by increased imports of goods and services, as it would increase the dependence of the domestic economy on foreign countries and trigger the “productivity escape” abroad.

Based on the MULTIPOL analysis, a potential path policy for developing East Timor's productive economic sector is outlined in Fig. 10.

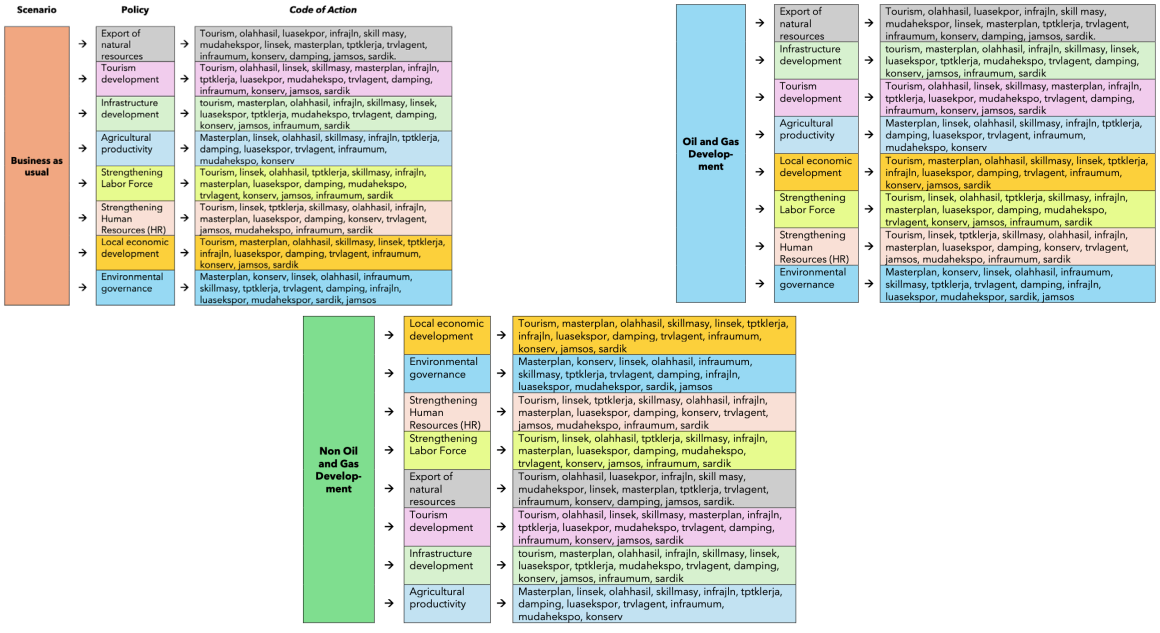

Fig. 10. Development of the Productive Economic Sectors in East Timor

The mining sector remains a key pillar of East Timor's economy, so in the "business as usual" scenario, this sector is, of course, the primary choice. Similarly, in the oil and gas sector development scenario, the export of natural resources (especially oil and gas) also becomes a prominent policy choice. If the Government of East Timor decides on the non-oil and gas sector development scenario, policies for the development of the local economy become the recommended policy, alongside environmental governance and strengthening human resources. For the strengthening of the local economy, the government needs to design programs for the development of the tourism sector as an alternative. Additionally, the preparation of a master plan also becomes crucial, so that the direction of the productive sector development policies in East Timor is clearly outlined.

4. Conclusions

As a newly established country, East Timor is a visionary nation by managing oil revenue funds through a clear and long-term oriented scheme. Therefore, oil revenue funds should be directed towards the development of potential economic sectors. The results of the SMIC-Prob analysis show that the potential economic sector with the highest probability is the mining sector (oil and gas), followed by the agricultural sector. In the formulation of the potential path policy, for both the business as usual scenario and the oil and gas sector development scenario, optimizing oil revenue becomes the main policy. Meanwhile, in the non-oil and gas sector development scenario, the recommended policy is the development of the local economy. Therefore, the government is advised to formulate a master plan for the long-term development of the agricultural sector as an alternative potential economic sector.

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