A preliminary dynamic model of success to successfull archetype in government budget competition allocation by using balanced score card-like framework

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Abstract. The budget allocation of Industry and Cooperative Office (Disperindagkop) is the main technical service agency for the leverage of the development of two Superior Industries (IU) of DIY Province, namely Wood Processing Industry (IKA) and Leather Processing Industry (IKU). Dynamic simulation is an alternative method to predict the growth of IKA and IKU performance and an archetype Success to Successfull (S2S) will be conducted to evaluated the effectiveness of government budget competition allocation. Balanced Score Card (BSC) is used as a framework for developing the dynamic hypothesis of the model. After Causal Loops Diagram (CLD) had been developed, both in existing and improvement stage, the next steps to build preliminary dynamic a simulated running model are transforming CLD into Stock and Flow Diagrams (SFD) until tested to proof validity of the model to represent the real condition and fisible be used as growth prediction of IKA and IKU for the next 16 years ahead. If model had been prooved valid, the scenario model (policy formulation) will be imposed (as shown in Appendices) to check whether the simulation model will impact on objective of the research.

Keywords: Balanced Score Card (BSC) framework; dynamic simulation/system dynamic; Succes to Succesfull (StoS) Archetype;

1. Introduction

Referring to the concept of Building National Industry 2025 (Bangun Industri Nasional 2025), there are two approaches to the implementation of strengthening the industrial structure, namely: (1) top down approach, and (2) bottom up approach. The top down approach involves the development of 35 selected priority industry clusters based on the national ability to compete in the domestic and international markets, while the bottom up approach is the empowerment of regional leading industrial products known as KIID, the Indonesian language abbreviation of Core Industry Competencies. The KIID results at the city / district level will then be aggregated into two or more Superior Industries (hereinafter abbreviated IU) at the Provincial level. IU of Yogjakarta province (DIY), that is Wood Processing Industry (IKA) and Leather Processing Industry (IKU).

In IU that allows for symbiotic relationships, such as IU DIY, the researcher suggest that their total performance is more feasible to be improved by applying innovation in the form of budget allocation

policy. This budget allocation policy will be useful to increase the opportunities for SMEs to obtain fiscal and non-fiscal incentives given priority industries based on KIID/IU is one type of industry that obtains government facilities as Article 18 and 21 of Law no. 25/2007 on investment (1).

Innovation to the budget allocation policy in question is how to do a bigger budget allocation to IU which is considered to have better growth potential, so it will be able to improve the total growth performance of SME business system for both IU in DIY. Periodically, budget reallocations are made if total growth performance is considered unsatisfactory.

This paper aims to build a preliminary dynamic simulation model of budget allocation competition between IKA and IKU. The simulation model begins by constructing a dynamic hypothesis based on reference modes that occur in the SME business system of IKA and IKU groups. The development / improvement model in the form of policy innovation allocation of government budget proportion will be applied in the form of proposed scenarios, so that the correct combination of budget proportion will be obtained in increasing the total performance of IKA and IKU growth.

2. Prediction Model Of Business Growth

Business growth prediction model has been developed, from analytical model to simulation. In the analytical model, Dimotikalis (2) developed the first business growth prediction model based on the Lotka-Volterra differential equation (LV) for multi entities. In dynamic business growth prediction, Sterman (3) then developed a diffusion competition model compiled by Bass in terms of dynamic simulation methods.

Although simulation models have been developed, they still focus on competition between new and old technologies in one product species, not competition among product species.Determining appropriate methods for predicting growth potential within the KIID / IU concept framework becomes a strategic thing for governments to implement budget allocation policies. In other words, the way in which the government is able to see growth potential among the existing IUs, the IKA and IKU, in the coming period will be the basis of budget allocation decisions. One way that can be used is to project growth performance. Projection can be done using conventional methods such as regression, or by using more advanced methods, dynamic simulation or System Dynamics (SD).

By using dynamic simulation method, the weakness can be eliminated. Future performance can be estimated not only by extrapolating the current system behavior, but also by considering market changes (market trends, new markets, etc.) as well as policy innovations from governments as SME regulators and accelerators, including alignment of programs / policies among SKPD in supporting performance of SME business systems.

2.1. Model Framework for Existing Stage

By using BSC-like framework, the weakness of business functions that exist in SME business system in IKA / IKU group ranging from marketing function, R & D, production management, and human resources (HR) will be minimized.

BSC-like framework will consist of four levels of perspective, namely: Objective, Business, Technical SKPD, and SKPD alignment. The technical SKPD in question is Disperindagkop which is the main responsible agency for IU coaching. Non-technical SKPD is an agency that does not directly handle IU programs, but will be closely linked to the success of improving the performance of IU programs such as the Forest Service, which is responsible for planting wood raw materials to support IKA's raw material supply.

In the existing stage model, there are three perspectives that will be developed in the model, ie objective, Business, and Technical SKPD. The perspective of the objective is the goal to be achieved from the model examined according to the key variable that is defined, that is long term competitiveness.

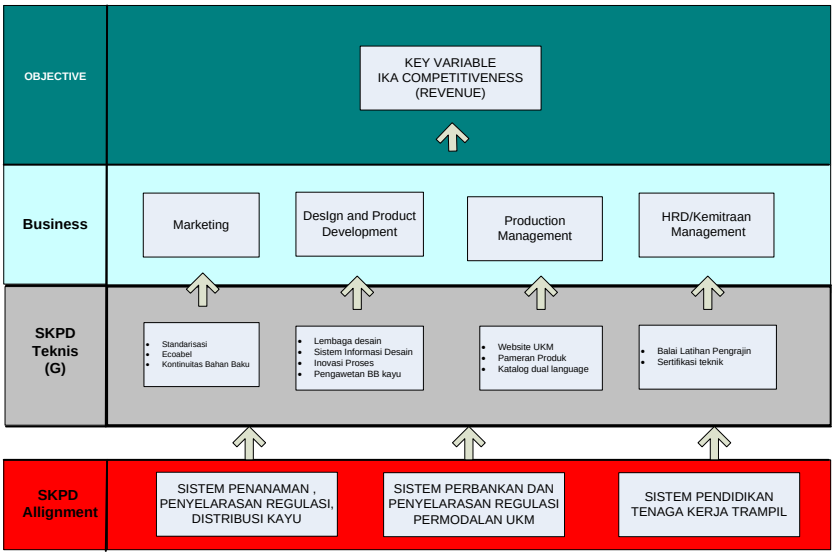


Figure 1. Illustration of BSC-like Framework IKA.

2.2. Model Framework for the Improvement Stage

In the improvement phase model, the three previous perspectives will be aligned with the fourth perspective, namely the main advanced programs of SKPD Non Technical Service which is expected to increase the IU performance of DIY in the field of IKA and IKU. Connectivity and alignment of Technical SKPD with Non Technical SKPD will be called SKPD alignment. As an illustration of BSC-Like framework, the relationship between perspectives on IKA cases can be mapped as Figure 1. Thus, BSC-like framework will implement alignment, either horizontally or vertically.

3. Problem Articulation

A research question in this paper is stated as: "how to develop dynamic model on government budget allocation scenario on the total performance improvement of the IU DIY export turnover, that is, IKA and IKU". As an illustration, if IKA's performance potential is better than IKU, IKA will increase its growth performance potential through larger government budget allocation policy than IKU. With the policy of bigger budget allocation to IKA, it is expected that the total performance of IKA and IKU will be better than without doing allocation competition.

Innovation in the form of budget allocation policy by DIY provincial government applied to KIID / IU problem is important to be prioritized because it is one of the strategic objectives of bottom up approach of strengthening of industrial structure, through the strengthening of SMEs. The implications of this budget allocation policy will have an impact over the long term, so it is appropriate that the IU budget allocation policy in DIY adopts the concept of research-based policy making as the spirit of Permendagri No.20/2011. The essence of Permendagri No.20 / 2011 emphasizes the paradigm shift . The success of an agency is no longer at how much the budget is spent/ absorbed through the program/ output, but on outcomes with measurable impacts.

3.1. Key Variables

There are three criteria used by DIY to determine superior product/commodity, that is (1) labor absorption more than 70% (labor intensive), (2) domestic raw material usage is more than 70%, (3) marketing ability shown by Volume of exports (revenue) with indicators: (a) export market more than 90%, (b) the domestic market is less than 10%, (c) export value greater than USD 1 million, (d) the export destination country of more than 3 countries, and (e) export growth of more than 5% over four years (4).

Since the SME-IU production value is proportional to the export turnover (revenue), the researcher assumes that the empirical data proves a positive correlation between the increase in local employment

and local raw materials as intended by the first and second criteria of IU determination with the export turnover.

Table 1. Proportion of Absorbtion Labor and Raw Material IKA.

			2011	2012	2013	2011	2012	2013	2011	2012	2013
IKA	**Kab/ Kota**	**KLBI**	**Nilai Produksi (Rp,000)**			**Tenaga Kerja (orang)**			**Nilai BB/BP (Rp,000)**		
Mebel Kayu	Sleman	36101	15.713.286	15.959.286	15.959.928	2.055	2.061	2.061	1.908.268	2.004.038	2.004.038
	Bantul	36101	135.617.313	135.768.562	144.325.600	14.949	15.048	15.248	74.334.333	74.396.03	73.450.750
Kerajinan Kayu	Sleman	20299	16.932	N/A	18.256	301	N/A	301	1.715	N/A	2.156
	Bantul	20293	15.729.268	15.747.194	15.847.195	2.61	2.623	2.623	4.799.501	4.780.128	4.780.128

Table 2. Proportion of Absorbtion Labor and Raw Material IKU.

			2011	2012	2013	2011	2012	2013	2011	2012	2013
IKA	**Kab/Kota**	**KLBI**	**Nilai Produksi (Rp,000)**			**Tenaga Kerja (orang)**			**Nilai BB/BP (Rp,000)**		
STK	Sleman	19121	117.603.616	117.970.275	118.990.289	2.433	2.447	2.463	73.611.544	73.800.486	74.800.486
Kerajinan Kulit	DIY	19121	N/A	4.210.300	4.248.300	N/A	325	350	N/A	2.522.493	2.522.493
	Bantul	20293	11.679.965	11.696.381	11.696.381	845	873	873	3.221.582	3.239.750	3.239.750

From the regulator side, SKPD Disperindagkop DIY unit of Foreign Trade (PLN) data shows that total of export turnover is used as indicator of IU performance from year to year. Based on theoretical, empirical and regulatory approaches, the researcher believes that the export turnover (hereinafter referred to as revenue) is valid enough to represent the dynamics of the growth of the historical performance (reference mode) of the observed object, the IKA and IKU.

So there are two key variables in this research, namely key variable representing IKA / IKU revenue sub-model and key variable representing sub fund allocation model as the objective of allocation competition model following success to successful rules (S2S). In the improvement phase model, the three previous perspectives will be aligned with the fourth perspective, namely the main advanced programs of SKPD Non Technical Service which is expected to increase the IU performance of DIY in the field of IKA and IKU.

3.2. Key Variables in the Fund Allocation Sub Model

The key variables in the sub-model of fund allocation will be related to the budget allocation which is the responsibility of both the technical service office (perindagkop) and non-technical office in improving the performance of IKA and IKU SMEs. The budget allocation for SKPD in the technical office is the exhibition budget and quality training budget. The allocation of the improvement budget from non technical SKPD in supporting IU is as follows: (1) development of SVLK program and sustainability of timber supply through timber planting program (for IKA by SKPD The Forestry Service), (2) development of stabilization program of raw material supply (Leather) and certifificate of manufacturing (hereinafter abbreviated as CoM) for SMEs (for IKU by SKPD The Agriculture Service).

3.3. Time Horizon

The dynamic model of this allocation competition will be tested and re-allocated periodically every four years. A four-year horizon choice is to consider: (1). The longest delay in the context of aligning the IKA and IKU is in the minimal timber planting pattern estimated at four years, so that the two-year

period is considered as a minimal progress that can be used to predict the success of the planting program, (2) fiscal and non-fiscal incentives for Priority industries based on KIID / IU as referred to in articles 18 and 21 of Law no. 25/2007 on investment will be reviewed at most every two years (5), so that the selection of the four-year review period is included in the context of the multiplication period of the incentive rule.

3.4. Reference Modes

Two things will be examined in this study as reference modes, namely: (1) behavior of empirical system behind IKA / IKU data and (2) behavior of government empirical budget allocation for IKA / IKU. The behavior of the empirical system behind the IKU / IKU data will be related to the revenue sub-model, while the empirical government's budget allocation behavior will be related to the sub-model of fund allocation.

3.5. Reference Modes on Revenue Sub-Model

Historical data during the 22-year time horizon to be used to observe the dynamic behavior of IKA and IKU problems in DIY consists of secondary data obtained from Statistical Bereau (BPS) and DIY Perindagkop Office. Historical data will be observed dynamically based on export performance value criteria in USD.

IKA's historical revenue data plot shows that the reference mode of IKA dynamic behavior during the 22-year time horizon, 1992 - 2013 shows the trend of S-shaped growth with overshoot (Figure 2). The historical data plot of IKU revenue with the same time period shows the tendency of exponential growth (Figure 2).

Figure 2. References Mode Revenue IKA and IKU from year 1992 to 2013.

3.6. Reference Modes to the Fund Allocation Sub Model

The sub-model of the Fund Allocation also uses the time horizon 22 years as in the revenue sub-model because it is assumed that the government budget allocation is already involved and affects IKA/ IKU's export revenues, as is the reference modes graph pattern in the revenue sub-model.

Using the 2013 budget database index, on average it can be estimated that the government budget always tends to increase from year to year, divided into two periods: (1) during the period 1992 to 2009 (before IU policy) there is a budget increase of about 6% From the previous year, (2) during the period 2010 to 2013 (after IU policy stipulation) there is a budget increase of about 10%.

Historical data also shows that the proportion of the budget made by the technical department (disperindagkop) on the existing program (ie for exhibition and quality improvement) is not very different, showing the proportion of IKA = 0.5118, and IKU = 0.4881. The budget estimation plot shows that reference modes of the dynamic behavior of the budget, both IKA and IKU during the 22-year time horizon show the trend of the dynamic pattern of exponential growth.

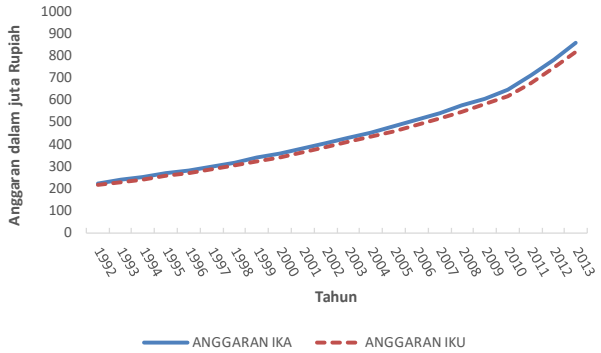
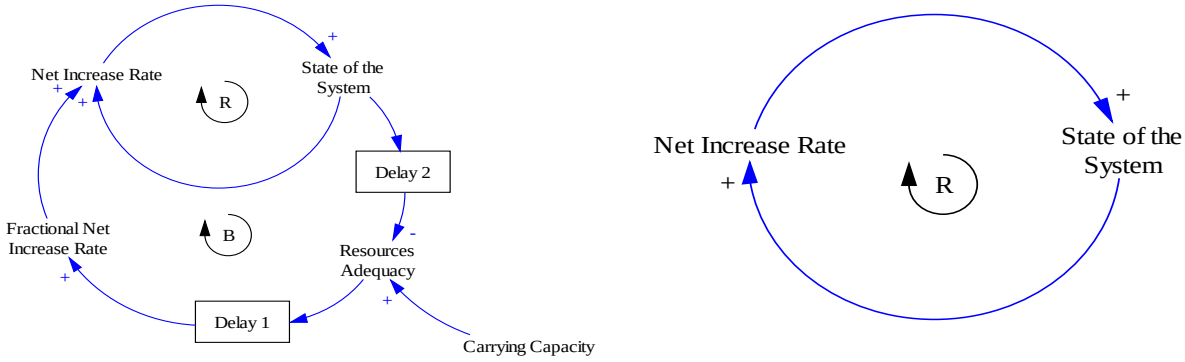


Figure 3. Reference Modes Budget IKA and IKU during 22 years.

4. Problem Articulation

4.1. Development of Initial Hypothesis

The initial hypothesis is used to predict the basic CLD model to be built. The behavior shown by the IKA reference mode shows dynamic behavioral model of growth with overshoots, while the IKU model shows the dynamic behavioral model of exponential growth. The dynamic hypothesis of the growth with overshoots and exponential growth models follows the CLD basic model as shown in Figure 4 below (3).



(a) *growth with overshoots* (b) *exponential growth*

Figure 4.Initial Dynamic Hipothesis IKA and IKU.

4.2. Endogeneous Focus

Boundary diagram model (MBD) of the potential growth dynamics of IKA craft industry business system performance is planned as in Table 3, where all the variables controlled by IKA and IKU industry level business systems will be included as endogenous variables. Meanwhile, the exogenous variables, both in MBD IKA and IKU, are demand, price, and carrying capacity.

Table 3.Model Boundary Diagram (MBD) IKA and IKU.

Endogen	Eksogen	Excluded
Fungsi Marketing: - Sales - Market Share **Fungsi R and D** - Product feature **Fungsi Manajemen Produksi** - Order rate - Production capacity **Fungsi SDM/Kemitraan** - Number of Crafter **Fungsi Anggaran Pemerintah Eksisting** - N/A **Fungsi Anggaran Pemerintah Improvement** - N/A	**Fungsi marketing** - Demand - Price **Fungsi R and D** - N/A **Fungsi Manajemen Produksi** - Carrying capacity **Fungsi SDM/Kemitraan** - N/A **Fungsi Anggaran Pemerintah Eksisting** - Exhibition Budget - Quality Training Budget **Fungsi Anggaran Pemerintah Improvement** - SVLK Budget - Efektivitas Pola Tanam Budget	- Disaster - Monetary crisis - Negative decision of Parliement

(a) MBD - IKA

Endogen	Eksogen	Excluded
Fungsi Marketing: - Sales - Market Share **Fungsi Manajemen Produksi** - Order rate - Production capacity **Fungsi SDM/Kemitraan** - Number of Crafter **Fungsi Anggaran Pemerintah Eksisting** - N/A **Fungsi Anggaran Pemerintah Improvement** - N/A	**Fungsi marketing** - Demand - Price **Fungsi Manajemen Produksi** - Carrying Capacity **Fungsi SDM/Kemitraan** - N/A **Fungsi Anggaran Pemerintah Eksisting** - Exhibition Budget - Quality Training Budget **Fungsi Anggaran Pemerintah Improvement** - Certificate of Manufacturing Budget - Leather Supply Stabilization Budget	- Disaster - Monetary crisis - Negative decision of Parliement - Production for Domestic Market

(b) MBD - IKU

4.3. Preparation of CLD

CLD is arranged in two stages, namely existing and improvement. In each IKA and IKU model, CLDs developed under the BSC-like framework are expected to be in accordance with their respective basic systems as in the plot of historical data from reference modes.

4.4. Existing Stage

The existing stage covers the mechanisms and issues of importance in SMEs and IKU SME industry business systems that include business marketing functions, design and R & D, production management, raw material supply chain, and HR management. The mechanism is developed into the form of linkage diagrams that make up reinforcing loops (R) and balancing loops (B). Two budget allocation programs for SME empowerment carried out by technical agencies in the existing phase, both for IKA and IKU, are budget exhibitions and SME quality improvement budgets. In the existing stage, the growth of SMEs is limited by its ability, it requires the government's policies, both SKPD technical department (Disperindagkop) and non-technical department (Dinas Kehutanan), appropriately.

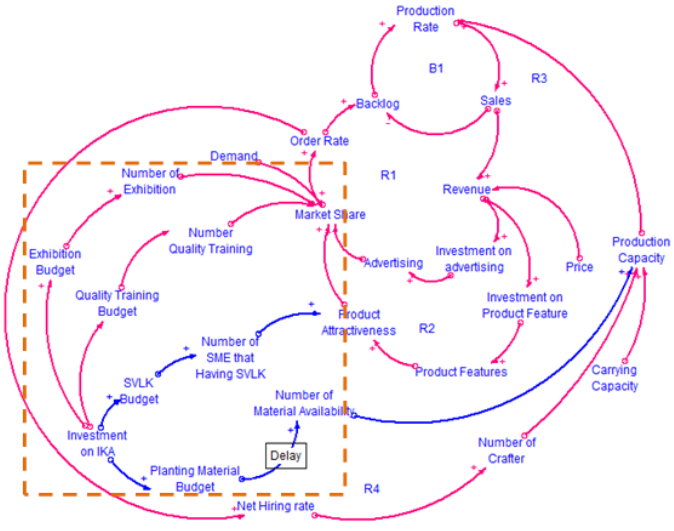


Figure 5. CLD Performance-Based (Improvement stage) IKA.

4.5. Improvement Stage

The improvement stage involves innovation of budgets related to the proportion of government budget allocations considered appropriate for developing IU in DIY, IKA / IKU. This innovation will involve budget alignment within the same thematic framework of SKPD Disperindagkop and non-technical departments (SKPD besides Disperindagkop). The relationship between empirical activities at the level of IKA and IKU SME business systems ranging from the existing to improvement stages is shown by CLD as in Figures 5 and 6.

In the CLD model for IKA Improvement, there are two delay, namely: (1) time-related delay between successful timber planting patterns in support of continuity of wood raw material availability, and (2) delay of decision to recruit HR / partner SME partners to increase capacity Production in executing production orders. The increase in production capacity will be limited by exogenous variables of carrying capacity. Both of these delays result in overshoot patterned growth (Sterman, 2008). Therefore, CLD Improvement IKA model is considered by researchers to represent the basic model of IKA reference modes, namely S-Shaped Growth with overshoot.

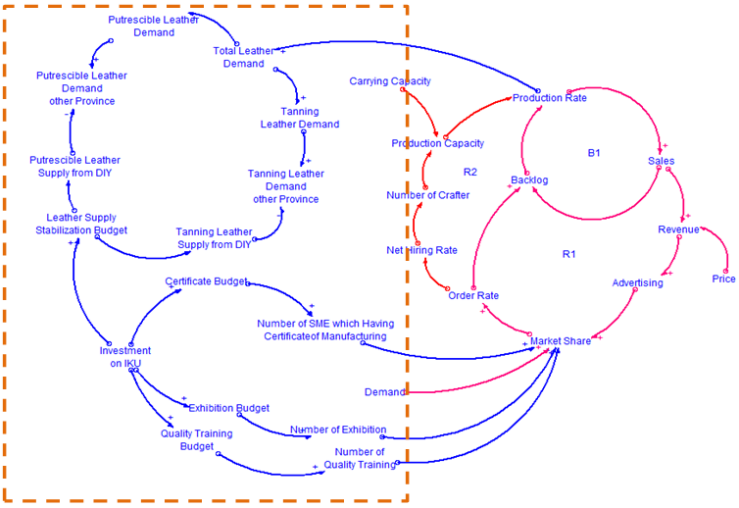


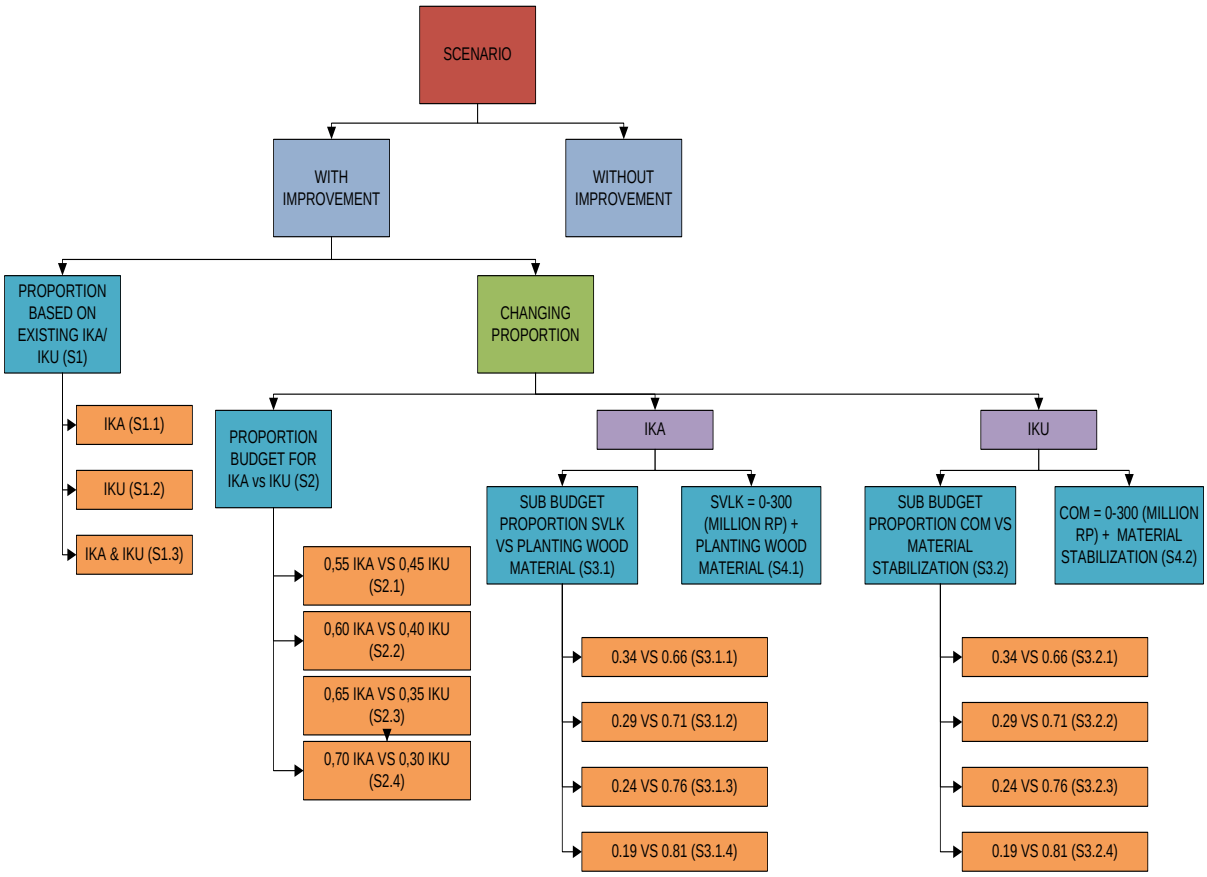
Figure 6. CLD Performance-Based (Improvement stage) IKU.

In CLD IKU Improvement model, there are two reinforce loops and one balancing loop. Considering that IKU model is dominated by reinforcing loops, CLD IKU Improvement model is considered to represent the hypothesis of IKU reference modes basic model, that is exponential growth.

5. Conclusion

To perform a simulated running model, the next steps from this preliminary dynamic simulation model are: (1) CLD will be developed into Stock and Flow Diagrams (SFD). (2) Reference modes that have been previously identified will be the reference when dynamic hypothesis (SFD) is run. If the graph of the run shows the pattern close to the reference modes, then the simulation model can be said to be representative enough to describe the real condition. After that, model must be tested to proof whether model valid on represented the real condition (based on testing of boundary adequacy, structural model assesment, parameter assessment, and extreme condition) and fisible be used as growth prediction of IKA and IKU for the next 16 years ahead. If model had been prooved valid, the scenario model (policy formulation) will be imposed (as shown in Appendices) to check whether the simulation model will impact on objective of the research.

6. Appendices



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