SYSTEM DYNAMIC FOR ACCELERATION MODELING POLICY IN DISADVANTAGE AREAS DEVELOPMENT

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ABSTRACT
Regional Development acceleration in the disadvantage area in Indonesia assessed very slow, that's need big effort to accelerate regional development. Dynamic system is the methods those representing interaction inside structure that could be interpreted into math model by using computer simulation to get the historic behavior. This system gave information about the combination of variable that effect into the regional development.
Keywords: *Regional Development, Dynamic System*

1. INTRODUCTION

Development is an attempt to accelerate development, especially in areas that are still left behind. Seeing these objectives, the development of the region supports the activity for development acceleration in those areas for improving the welfare of local residents.

Development of disadvantage areas, should establish a pattern of interaction with the surrounding area that is more advanced. Such interactions include the physical and non-physical interaction with other parts of the region, either the potential or unpotential areas. The integration of the region can accelerate the growth of new integrated regional development. To support these efforts, it is necessary to formulate a model using System Dynamic for ntegration policy through a systems approach that includes the development of four subsystems, as follows : Economic Sub-system, Human Resources Sub-system, Infrastructure Sub-system, Production Sub-system. The policy model expected to provide the output of the policy scenarios for each sub-system.

Goals of the activities are : making a model policy, analyze the factors which influence for making the policy to accelerate the growth of a region, making a policy scenario, which can increase the acceleration of region development.

2. METHODOLOGY

The methodology used in this activity is a system approach. This approach was chosen, because the development of a region is influenced by many interrelated elements are dynamic (Marimin, 2004). Therefore, the system approach is the right choice, because this approach is able to solve a problem that has characteristics (Marimin, 2004) as follows :
a. Complexity, which is quite a complicated interaction between all the elements.
b. Dynamic, in the sense that there are factors that change every time and forecasting in the future.
c. Probabilistic, need for opportunities in the inference functions conclusions and recommendations.

One thing that stands out from the system approach is the searching of key factors in the assessment of the problem to obtain an appropriate settlement, with the use of quantitative models for assist in the rational decision-making process. System approach, can solve the problems of high complexity.

3. RESULT AND DISCUSSION

Region is made based on four sub-systems, as follows : economic sub-system,

human resources sub-system, infrastructure sub-system, production sub-system.

Each sub-system consists of several factors that influence into the development of each sub-system. Sub-systems can be studied and analyzed to produce the most optimal model of regional development.

System approach in policy model, performed using soft system and a hard system. Model Policy called Soft System, because the model is designed based on recent quantitative data, as well as data in the past time, such as Gross Domestic Product and Human Development Index. The model also entered into the category of soft systems, because after the simulation process, the results are used to make qualitative policy scenarios.

Conceptual approach to policy model is done through regional development approach by considering the potential and constraints of regional development. This approach is intended to be always adapted to the regional development regional carrying capacity of both physical and non-physical in order to reach the sustainable development. Regional typology performed by the most dominant business activity in the region.

In an effort to achieve the desired objectives of this activity, there are several approaches to implement, as follows :

1. Identification of potential human resource sub-system consisting of several factors such as: Education, Immigration, Emigration, Soft Skills, Hard Skills, Employment, Social, Cultural, and Human Development Index (HDI), which can be an indicator of the economy and provide added value to development area.
2. Identification of economic potential is a factor of local revenue and market opportunities, which is a reflection of the investment capabilities of a particular region, in addition to the factors analyzed overseas markets, local markets, budget, GDP, revenue, purchasing power, tax, employment, tax incentives, taxes and charges policy. The results of this analysis can be reflected the extent of the region can provide economic opportunity and improve the welfare of the citizen.
3. Identification of prime factors based on criterias that can describe the advantages of these factors, the sub-systems of production, as follows :
   - How far the factors can provide employment opportunities ?
   - How far the certain factors can attract investment, conducted by analyzing data of the investment license for the dominant sectors.
   - Analysis of the government's commitment to the investment of these factors.
   - Identification of information science and technology for the development of production activity
4. Analysis of linkages between sub-systems in development.
5. Policy Analysis of infrastructure, modes of transport, roads, public facilities, facilities, and social, which can describe the existence of infrastructure, so that it appears the advantages and disadvantages of the region.
6. Identify physical potential region, to analyze the potential and challenges of natural resource development, support and institutional factors.
7. Analysis of the relationship between four main sub-systems, carry out by using a system dynamic.

Correlation between each sub-system and the influence of the sub-systems to the development of the region, implemented as a policy option that needs to be tested in a system linkages. Results of these analyzes are formulated in the form of alternative development policies. The sequencing of policy priorities using multiple criteria set by the experts and all stakeholders associated with the development policy of regional integration. Visually, the conception of the study can be shown in Figure 1.

Figure 1. Conception Activity

4. IMPLEMENTATION OF SYSTEM DYNAMIC

Some changes in development paradigm has implications for all fields. In this context, systems dynamic approach has an excellent prospects, as a tool to answer a change of paradigm in the development of a region. Through this approach the expected prediction of the Implementation various policy scenarios regional development, both spatial and non-spatial, can be done (Muhammadi et al, 2001). In other words, this approach can serve as an early warning system of the implementation of a regional development policy, so can choose the most optimal policy scenarios, and if there are certain consequences as a result of the implementation of these policies, can be prepared measures to anticipate as soon as possible.

System Dynamic that will be done to make a model of regional integration policies, consists of several stages, as follows :

1. Mapping of the Real System
   Current system which components consist of various regions map, so it would appear the existence of such a system overview.
2. Formulate a mental model, so as to know the relationship between sub-systems, causal, and behavior between each sub-system, and the development of regional integration factor.
3. Making Causal Loop Diagrams
   This diagram will express about the causal relationship between subsystem models of regional integration policies and the factors within each sub-system, into the language of a particular image. This diagram is used to form the structure of the model policy which represent in the form of the circumference of a causal diagram.
4. Preparation of the model, which is done by building Soft Floor Diagram (SFD). Model of regional integration policy is the basis of the investigation eksperimantal relatively inexpensive and time saving than if you held a direct experiment on a real system. Modeling Process is done in making the policy model, as follows :

a. Identify the problem (determination of limit)
   At this stage will be selected on the policy model based on need, which is accelerating the growth of the region, and determine variables that affect the growth of the region. This stage will define the problems encountered in the growth of the region in the form of dynamic models.
b. Dynamic formulation hypothesis
   Done by sorting the initial hypothesis and mapping (limit diagram models, subsystem diagrams, causal diagram, mapping stock and flow, policy structure diagram).
c. Formulation of Simulation model
   The relationship between the sub-systems model of regional integration policies can be described in the form of the formulation, wherein the formulation will be used as input to the simulation models. The formulation can be obtained from:
   - The study of literature from sub-systems and factors used in the model of regional integration policy.
   - Justification of relevant experts
   - Trends of the data sub-systems and factors of the data in the past, in order to obtain a pattern that can be formulated to predict the development of the region today and in the future.

   At this stage also made estimates of parameters that affect the purposes of the study, and the relationship of behavior and the initial conditions of parameters.
d. Assessment
   Policy model which has been formed to be tested by comparing the results of model calculations with the real conditions which should be obtained through a real phenomenon, as well as references from relevant experts.
e. Input Data
   This activity is done by filling the data and defining all relations between the sub-systems with other subsystems, as well as the relationship between the factors with other factors, both of

which are in a sub-system, and which are beyond the sub-system.

f. Simulation
Simulation is a dynamic process behavior models done by Run models, so that the resulting graphs and data tables behavior models.

g. Verification
A test of consistency and behavior models, through testing and evaluation activities, if the result is not verified, then do the implementation of CLD, if the results are valid, then continue on the next process. Policy model will be tested through the simulation process and the results will be compared with the

conditions that should logically be obtained through a real phenomenon, as well as references from relevant experts. Verification of this activity is also carried out by a workshop, so the assessment of the workshop will appear on the simulation results, if the results are considered relevant, the process continues.

h. Sensitivity Test
This test is done to gain leverage point, so that the output is in the form of the dominant factors that influence the development of each sub-system model of regional integration policies.
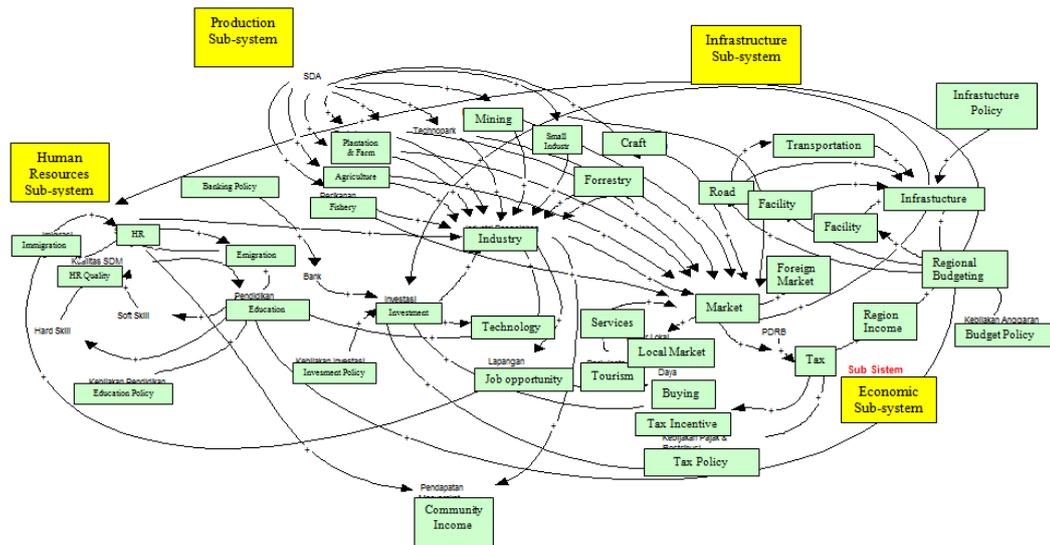
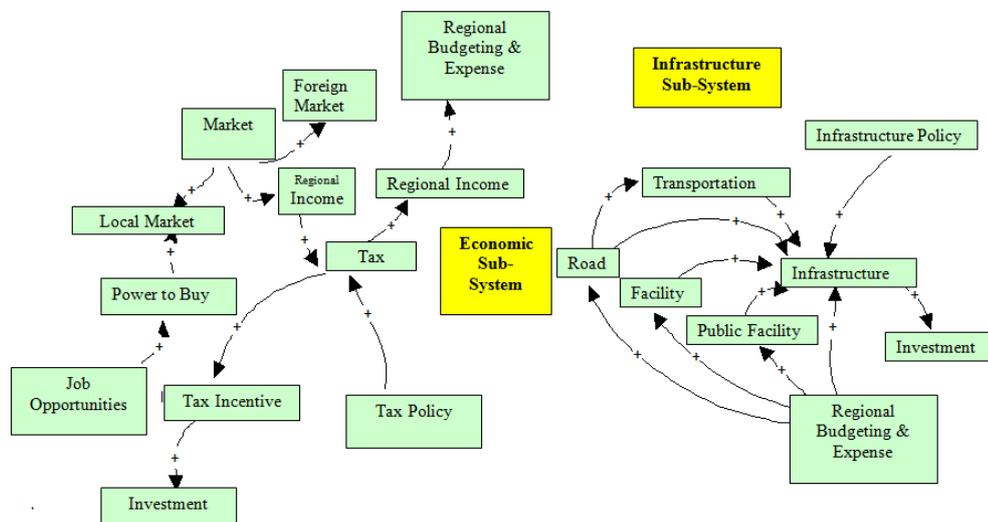

Figure 2. Causal Loop Model Policy

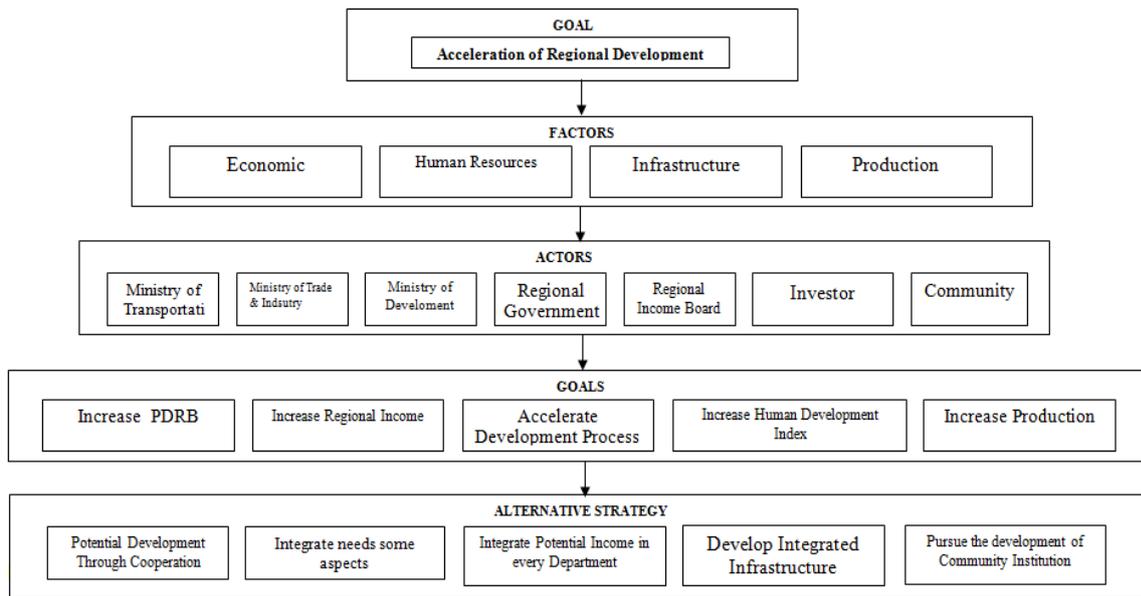Figure 3. Causal Loop Sub-System Economic Model Policy

Figure 4. Prime Hierarchy of Policy

5.   CONCLUSION

Acceleration model of Regional Development can be made based on four sub-systems, as follows :
a. Economic Sub-system
b. Human Resources Sub-system
c. Infrastructure Sub-system
d. Production Sub-system

The Strategy for increasing in acceleration of Regional Development as follows :
a. Potential Development through cooperation.
b. Integration of several importan aspect.
c. Integration of potentian income resources in all Departments.
d. Development of infrastructure.
e. Pursue the Development of community institution.

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