Analytical hierarchy model of institutional structures for development planning of local government in Bali

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Abstract. An institutional reflection plays an important role for development planning in accordance with institutional dynamics. The structure of institutional relationships is analysed for planning the local government development by Interpretive Structural Modelling (ISM). Data was taken from applicable laws and regulations with a juridical-normative method. Resulting hierarchical model of institutional structures, including eight (8) institutional elements, of which one (1) element is excluded beyond the seven (7) elements are classified as unstable impact variables. These seven variables seem to be carefully examined, because they have independent impacts on each other, and their feedback influence can expand beyond impact limitations of the ISM. Therefore, the study represents an example of the recent implementation of the ISM method, called Analytical Hierarchy Model of Institutional Structures (AHMIS) for development planning of local government in Bali.

1 Introduction

Planning is a process for determining the right future action through a sequence of options, taking into account the available resources. Development is an effort performed by all components to achieve the goal. Development Planning System is a unity of planning procedures to produce long-term, medium-term, and annual development implemented by organizational and community elements at the Central and Regional level. The institution is an organization and a set of rules of the game. The Organization as the institutional, economic concept is a unit of decision maker in which is governed by the institutional system or the rule of behaviors. The rules of the game cover a wide range of constitutional forms within a country for the agreement of two individual parties, sharing costs and benefits to be borne by each party to achieve a particular goal. Institutional is not static, but dynamic following the economic interactions between interests. Also, the dynamic nature of the institutions is also due to the changing values and culture of society as the time changes.

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Institutional changes have two dimensions. First, changes in configuration between economic actors will lead to institutional changes. Second, the institutional change is seen as the impacts to change in the interests of economic actors. On the other hand, institutional changes are deliberately designed to affect economic activity. In this position, institutions are placed actively as instruments to regulate economic activity (including actors involved in the institutional). The continuums of two, it can be believed that the institutional change is as important as the institutional design itself [1]. The process of institutional change can be described as a relative value change that encourages one or both parties to organize the political and economic exchange, to enable they work better with renewed contracts [2, 3].

2 Literature review

2.1 Institutional concept

The institutional economy includes two streams of relationships, the approach between economic and institutional. This approach addresses the institutional impact on the economy and vice versa institutional development to respond to economic experiences. The institutional economics does not focus on what some economists would call: economic motives” - concentration to earn income, the profit motive, or maximize something that has material value [4]. During which the non-economic motive is viewed as a factor not included in the operation of economic law, but is recognized as an essential part of the total situation which must be considered in taking the correct explanation of the economic and legal aspects regulate these non-economic aspects [1].

The institutional as the rule of the game in a society that the rules of the game include regulations that enable people to interact [5]. Institutions can also reduce the inherent uncertainty in human interaction through the creation of behavioral patterns [6]. The institutional expert approach moves from general ideas about human behavior and then The institutional and development of the economic process toward specific concepts and theories related to specific economic institutions. On the other hand, institutional are definitions as a rule system when executed with regularity and can be realized through the process of habituation. Habits reflect socio-economic and cultural life of the community. Furthermore, institutions through habituation and custom can be agents to own or change their intentions and actions. This refers to the institutionalism that can cause structural change, i.e., habit is a liaison mechanism [7].

The institution is the most important type of structures in social life [7]. On the other hand, the mind is understood as an emerging trait of organized matter. The human intention is regarded as a trait arising from materialist interactions in the human nervous system [8]. Commitment to the principle of certainty rejects the ‘cause-to-cause’ idea, while, the commitment to materialism encourages the intention of evolving and the nature of materialist interactions in the human nervous system. Thus, “intention can cause, but the intention is always caused”.

The habit does not deny choice, different sets of habits can lead to competing preferences [8]. On the other hand, individuals learn to adapt to circumstances, and through repetitive acts acquire certain cultural habits of thought and behavior. Habits and institutions have evolved. One of the common functions is to contradict some “hyper deliberation” in which agents are assumed to be involved in the process of deliberation over everything in their daily orbits. Hyper deliberations will only produce a social and mental paralysis in which no one will be able to act [8].
2.2 Institutional change

Institutional is not static, but always dynamic following the interaction of economic interactions between interests. The dynamic nature of the institution is also due to the changing values and culture of society as the times change. Institutional changes have two dimensions. First, changes in configuration between economic actors will lead to institutional change. In this approach, institutional change is perceived as the impact of a change of interest (configuration) of economic actors. Second, institutional change is deliberately designed to affect (regulate) economic activity. In this position, institutions are placed actively as instruments for regulating economic activity (including actors involved). Of the two spectra, it can be believed that institutional change is as important as the institutional design itself [1]. The process of institutional change can be described as follows: Relative price changes encourage both parties to organize political or economic exchanges, to show one or both parties can work better with renewed agreements or contracts [2].

The institutional change in society means changes in regulatory and organizational principles, as well as behavior and patterns of interaction. The direction of such change usually leads to an increased need for integration within a complex social system [9]. The difference may also mean expanding the chain of interdependence that demands integration. In this position, differences, and integration are complementary processes. Illustrates the basic characteristic of institutional change, namely: institutional/organizational interactions that occur continuously in the economic settings of scarcity, and then reinforced by competition. These two main factors are ways to understand the dynamics of institutional change [3].

3 Research methods

![Conceptual development methods for Analytical Hierarchy Model of Institutional Structures (AHMIS).](image)

Research is a tool to unfold behind the existing problems, to reveal the true truth. Also, research is essentially an attempt to find the correct and logical answer to a problem. The data in this research is obtained by “normative juridical” approach. The normative juridical
approach is a way of examining the theories, concepts, legal principles as well as the laws and regulations relating to research problems. Normative juridical data is processed and analyzed by Interpretive Structural Modelling (ISM) method, to produce new Analytical Hierarchy Model of Institutional Structure (AHMIS) for development planning of local government in Bali. The preparation of the procedure for developing AHMIS was described in Fig. 1.

## 4 Results and discussion

Table 1 shows the institutional elements with their abbreviations.

| No | Institutional Element                        | Abbreviation |
|----|---------------------------------------------|--------------|
| 1  | National Spatial Planing                    | NSP          |
| 2  | Provincial Spatial Planing                  | PSP          |
| 3  | Long-Term Development Plan                  | LTDP         |
| 4  | Midle-Term Development Plan                 | MTDP         |
| 5  | Head Visi Mission                            | HVM          |
| 6  | Regional Work Plan                          | RWP          |
| 7  | The Strategic Plan Device Organisation      | SPDO         |
| 8  | The Work Plan Device Organosation           | WPDO         |

| No. | Element to (i) | Element to (j) | Dependent power (x) |
|-----|----------------|----------------|---------------------|
| 1   | NSP            | X v o o o o o o|                     |
| 2   | PSP            | x v x x x x x|                     |
| 3   | LTDP           | x v x x x x x|                     |
| 4   | MTDP           | x v x x x x x|                     |
| 5   | HVM            | x v x x x x x|                     |
| 6   | RWP            | x v X         |                     |
| 7   | SPDO           | x v           |                     |
| 8   | WPDO           | X             |                     |

Dependent Power (x)
Referring to the Table 2, it can be seen that:
X: the existence of the established contextual relationship between element i (Ei) and element j (Ej), reciprocally (Eij = 1 and Eji = 1)
V: there is an established contextual relationship between elements i (Ei) and element j (Ej), but not vice versa (Eij = 1 and Eji = 0)
A: is the established contextual relationship between elements i (Ei) and element j (Ej), but not vice versa (Eij = 0 and Eji = 1)
O: the absence of a contextual relationship between elements i (Ei) and element j (Ej), reciprocally (Eij = 0 and Eji = 0)

| No. | Element to (i) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----|----------------|---|---|---|---|---|---|---|---|
| 1   | NSP            | 1 | 1 | 9 | 9 | 9 | 0 | 0 | 0 |
| 2   | PSP            | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 7 |
| 3   | LTDP           | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 6 |
| 4   | MTDP           | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 6 |
| 5   | HVM            | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 6 |
| 6   | RWP            | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 6 |
| 7   | SPDO           | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 6 |
| 8   | WPDO           | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |

Tabel 3. Structural Self-Interaction Matrix (SSIM).

Fig. 2 shows a diagram of dependence-driver power. Interpretation of Fig. 2 could be seen in Table 4.

Fig. 2. Diagram of dependence-driver power [10].
Table 4. Explanation of Fig. 2.

| Sector | Explanation | Number and Institutional Element |
|--------|-------------|----------------------------------|
| Sector 1 | Weak Driver - Weak Dependent Variable (Autonomous) <br>This modifiers in this sector are generally unrelated to the system and have little connection, although they may be strongly linked | 1 NSP |
| Sector 2 | Weak Driver – Strongly Dependent Variable (Dependent) <br>Generally the relationship in this sector is not independent variable (dependent variable) | 2 PSP<br>3 LTDP<br>4 MTDP<br>5 HVM<br>6 RWP<br>7 SPDO<br>8 WPDO |
| Sector 3 | Strongly Driver – Strongly Dependence variable (Linkage) <br>The variable in this sector should be studied carefully because the relationship among the variable are unstable. Any action on the variable affects others and the feedback effects can magnify the impact | |
| Sector 4 | Strongly Driver – Weak Dependent Variable (Independent) <br>This sector variable is part of the rest and is called independent variables | |

Table 5. Element of partition matrix.

| No. | Element | Reachability | Antecedent | Intersection |
|-----|---------|--------------|------------|--------------|
| 1   | NSP     | 1, 2         | 1, 2, 3, 4, 5, 6, 7, 8 | 1, 2 |
| 2   | PSP     | 2, 1, 3      | 1, 2, 3, 4, 5, 6, 7, 8 | 1, 2, 3 |
| 3   | LTDP    | 3, 2, 4, 5   | 1, 2, 3, 4, 5, 6, 7, 8 | 2, 3, 4, 5 |
| 4   | MTDP    | 4, 2, 3, 5   | 1, 2, 3, 4, 5, 6, 7, 8 | 2, 3, 4, 5 |
| 5   | HVM     | 5, 2, 3, 4   | 1, 2, 3, 4, 5, 6, 7, 8 | 2, 3, 4, 5 |
| 6   | RWP     | 6, 2, 3, 4, 5| 1, 2, 3, 4, 5, 6, 7, 8| 2, 3, 4, 5, 6 |
| 7   | SPDO    | 7, 2, 3, 4, 5, 6| 1, 2, 3, 4, 5, 6, 7, 8| 2, 3, 4, 5, 6, 7 |
| 8   | WPDO    | 8, 2, 3, 4, 5, 6, 7| 1, 2, 3, 4, 5, 6, 7, 8| 2, 3, 4, 5, 6, 7, 8 |

Development Planning is a process for determining the right future action, through a sequence of options, taking into account the available resources. Development is an effort performed by all components to achieve the goal (Fig. 3).
The Analytical Hierarchy Model of Institutional Structures (AHMIS) discussed earlier may be interpreted as follows:

1. LTDP, MTDP, and HVM are located in the same sector, namely sector III (Linkage). The publication of this sector should be studied carefully because the relationship between variables is unstable. Any action on the variable affects others, and the feedback effects can magnify the impact. This is following Law No. 25 of 2004 on the National Development Planning System which principally explains that:
   a. Local LTDP contains the vision, mission, and direction of local development
   b. Local MTDP is an elaboration of the vision, mission, and program of the Head of Region whose preparation is guided by Local LTDP

| No | Element | Reachability | Antecedent | Intersection | Level |
|----|---------|--------------|------------|--------------|------|
| 1  | NSP     | 1,2          | 1, 2, 3, 4, 5, 6, 7, 8 | 1,2       | I    |
| 2  | PSP     | 1,2,3        | 1, 2, 3, 4, 5, 6, 7, 8 | 1,2,3     | II   |
| 3  | LTDP    | 2,3,4,5      | 1, 2, 3, 4, 5, 6, 7, 8 | 2,3,4,5   | III  |
| 4  | MTDP    | 2,3,4,5      | 1, 2, 3, 4, 5, 6, 7, 8 | 2,3,4,5   | III  |
| 5  | HVM     | 2,3,4,5      | 1, 2, 3, 4, 5, 6, 7, 8 | 2,3,4,5   | III  |
| 6  | RWP     | 2,3,4,5,6    | 1, 2, 3, 4, 5, 6, 7, 8 | 2,3,4,5,6 | IV   |
| 7  | SPDO    | 2,3,4,5,6,7  | 1, 2, 3, 4, 5, 6, 7, 8 | 2,3,4,5,6,7 | V    |
| 8  | WPDO    | 2,3,4,5,6,7,8| 1, 2, 3, 4, 5, 6, 7, 8 | 2,3,4,5,6,7,8 | VI   |

Table 6. Element of partition matrix.

![Diagram](https://doi.org/10.1051/matecconf/201927602011)

Fig. 3. The Analytical Hierarchy Model of Institutional Structures (AHMIS).

2. NSP and PSP are respectively located at levels I and II defined by PSP as the translation of NSP as well as a reference of MTDP and Regional Development. This is following
Regional Regulation No. 16 of 2009 on Spatial Plan of Bali Province, the year 2009-2029. In Article 5 of the above, the law makes it clear that:

a. PSP is domiciled as a translation of the National Spatial Plan and becomes the space dimension of the Regional Long-Term Development Plan.
b. PSP is domiciled as a reference in the preparation of the Regional Medium Term Development Plan and the Regional Annual Development Program.

5 Conclusions

The result of institutional identification, there are eight elements of institutional that can influence development planning. Based on the interpretation of the Hierarchical Structures and Dependence-Drivers Power Diagram resulting: seven of the eight institutional elements are located in sector III (Linkage). Every variable in this sector should be carefully examined because the relationships among the variables are unstable. Any action on the variable will affect others, and the feedback effects can magnify the impact. Therefore, the Analytical Hierarchy Model of Institutional Structures (AHMIS) could be implemented on the development planning of local government in Bali.

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