The analysis of relatedness and interaction of impact on using house of quality for some cases as building, housing, and apartment in Indonesia

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Abstract. The essence of Environmental Impact Assessment (EIA) is on environmental impact management and monitoring to evaluate the effectiveness of environmental management. Meanwhile, environmental management and environmental monitoring describe a detailed direction of environmental management as a result of impact evaluation. In fact, impact evaluation is not fully reflected in the environmental management plan for some areas. This study aimed to identify the impact evaluation results recommended in the environmental management plan and environmental monitoring plan in some cases of EIA in Indonesia. Research method using house of quality. Sample in this research was EIA on some kinds of business plan which already had environmental permit, especially on building, housing, and apartment. The results showed that the impact interaction was not well analyzed, so that synergistic, cumulative, and/or diagnostic impacts were not entirely imposed on the proponent, but related to the cause of impact and authorized institution.

1. Introduction

The goals of assessing Environmental Impact Assessment (EIA) is on environmental management and monitoring, but in reality, in the EIA document which consists of the terms of reference, analysis, and management and monitoring, the discussion is more to the prediction of the impact than the monitoring plan itself. In another way, the evaluation gets a smaller portion of the implementation, interaction and direction of management which caused by the impact analyzed.

Instead of the evaluation and direction are weak[3], the magnitude of the impact is low, the impact is cumulative, and other impacts around it is ignored. As a result, environmental management is not optimal, the environmental assessment function is not as expected. Small impacts when interacting with other processes will become large and could be accumulated or synergistic. Large impacts when interacting with other processes that are antagonistic could become smaller. The weakness of EIA system and recommendation studied quantitatively overview a constraint problems in developing country [11].

This study aims to analyze the results of impact evaluation recommended in the environmental management plan and environmental monitoring plan in several cases of EIA documents in Indonesia, especially in building, housing, and apartment constructions. The research method is a case study on several environmental documents selected as samples. We used house of quality method to find the relatedness, technical requirements, and interaction matrix.

The results of the study indicate that the environmental management plan and environmental monitoring plan have not fully integrated with the environmental impacts that may arise from the business and/or activity plan.
2. Methods

The sample in this study was an environmental document, namely impact evaluation and management and monitoring, on several types of business plans and/or compulsory environmental impact analysis activities for building, housing, and apartment constructions. Specific scientific reasons in calculating the magnitude of the impact of business plans and/or multi sector activities in the type of building, housing, and apartment construction according to Ministry Regulations 5/2012 concerning EIA business plans and/or mandatory activities were a. Land acquisition. b. Land support capacity. c. The level of daily water needs. d. Waste generated. e. The effects of development on the surrounding environment (vibration, noise, air pollution, etc.). f. KDB (basic building coefficient) and KLB (building area coefficient) g. The number and type of trees that may be lost. h. Social conflict due to land acquisition (generally located near a city center that has a high density). i. High-rise and basement building structures cause dewatering problems and disturbance of piles to surrounding water source aquifers. j. The rise of movement (traffic) and the needs of settlements from a large workforce. k. Generate movement and visitor parking needs. l. Production of waste, domestic waste m. Local inundation/flood. Linkages between impacts in the EIA document are used in the flow or fishbone chart method, while the impact interaction with the matrix.

This study used house of quality analysis method, to get the best results in accordance with the wishes of consumers. Consumer desire in this case is assumed to meet the criteria for good documents in the legislation. House of quality or quality function deployment was defined as a relationships between customer’s desires and firm/product capabilities [1]. Many definitions about quality can be conclude that “quality is fitness for used” according to Deming’s Management Methods, and “quality is meet with standard”. Quality can be quantified, so if you can measure it, then you can manage it [2].

House of quality figured below, explain the relationships between customer’s desires and product capabilities.

![House of Quality](masterproject.com/house-of-quality)

Figure 1. House of Quality (masterproject.com/house-of-quality)

House of quality steps following six sigma as follows: (1) identifying what the customers want, (2) identifying how the product can satisfy the customer, (3) identifying between how’s related point number 2, (4) developing important ratings, (5) evaluate competing product, and (6) determining best attributes by comparing firms performance.

3. Results and Discussion

3.1 Regulation

The prevailing regulations/legal basis for determining hypothetical impacts are Ministry regulations No.16/2012 concerning Guidelines for Preparation of Environmental Documents, and Guidelines for Scoping in EIA (KMNLH, 2007), covering as follows.

1) Is the capacity of the environmental component under study sufficiently high?
2) Does the environmental component (which will be affected) mean an important role in the social and/or economic life of the local community?
3) Does the intended environmental component have specific ecological functions (ecosystem services)?
4) Does the local community express concern about the changes in the environmental component referred to?
5) Will there be regulations or policies that will be violated or exceeded by the existence of these impacts?
6) Has the proponent prepared a SOP to prevent, minimize and/or mitigate the environmental impacts that will arise?

While the environmental impact (Layman’s Imperia Project) in European Union describes using diagram below.

![Image](https://example.com/image.png)

Figure 2. Components of significant impact assessment in EIA

3.2 Relatedness and Interaction of Impact

The impact component that was assessed, resulted in an important hypothetical impact. The insignificant impact was managed and monitored, and the impact was not important. These impacts are evaluated holistically and become the basis of the environmental management plan and monitoring plan. In a holistic evaluation, the study of linkages and interaction impacts is carried out, to find out the effects that are antagonistic, synergistic, and cumulative.

3.3 Analysis House of Quality

The sample in this study was the EIA document type of building activities including hotels and apartments in Yogyakarta, and the area of commercial and integrated residential facilities in the City of Balikpapan. The results of the impact relationship analysis and interaction showed in the following figure.
Figure 3. Relatedness and interaction impact using House of Quality

Based on the picture above, it can be said that the highest relative weight value is lack of water, followed by land acquisition, social conflict, and labor. Based on the results of importance characteristics start with public concern, related regulation being violated, and the importance to social economic life. From the three cases studied above did not consider the relatedness and interaction, which can be synergistic impact, cumulative impact, or antagonism impact. While the results of the previous study overviewed the constraints of EIA system in developing countries [11].

4. Conclusion

The impact evaluation and management and monitoring, on several types of business plans for building, housing, and apartment constructions studied with House of Quality method. The analysis of relatedness and interaction impact found that lack of water, land acquisition, social conflict, and labor requirement were the most important things with public concern. The proponent must concern on their impact and always monitor and evaluate periodically according to the environmental permit. For further research the primary data of the related impact will strengthen results of the analysis.

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