Man In India, 95 (3) : 703-713

EVALUATION OF ENVIRONMENTAL AND SOCIO-CULTURAL DIMENSIONS OF SUSTAINABILITY ECO-AIRPORT INTERNATIONAL AIRPORT SULTAN HASANUDDIN

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The research aims to evaluate the environmental and socio-cultural dimensions of the sustainability index of the Eco-Airport at Sultan Hasanuddin International Airport. This research is a survey research and focus group discussion (FGD). The sample in this research were 21 experts airports. Data was collected using a questionnaire, and analyzed using the methods RAP-Sultan Hasanuddin International Airport, namely: 1) The RAP-ordination techniques BSHas through the method of "multidimensional scaling" (MDS) to determine the value of the index and the status of eco-sustainability aerodrome airport as well as identifying the attributes that affect the sustainability index sensitive to the environmental and socio-cultural dimension; 2) prospective analysis to determine the dominant attributes that affect the eco-airport Sultan Hasanuddin International Airport to the environmental and socio-cultural dimensions. The results showed that the value of eco-sustainability index Sultan Hasanuddin International Airport airport to the environmental dimension, namely 62.78% included in the category of modest sustainable while the social dimension of culture that is 31.82% included in the category of less sustainable. Leverage analysis results (dominant sensitive attributes that affect the sustainability index eco-airport BSHas) against the environmental and socio-cultural dimensions, namely: the dimensions of the environment is smoke in the arrival area/basement, while the socio-cultural dimension is the habit of throwing garbage in the arrival area/basement.

Introduction

Along with increase the public demand for air transport action services is increasing, traffic impact on the users of airport services, the traffic in also become so dense as well as moment before the flight (departure) and the time after the flight (arrival). This demands a serious need for airport management and adequate as air transportation terminals (Ljung Nathanael, 2012).

The airport is a terminal for takeoff, landing, and movement on the ground for aircraft, the airport also describe asthe mode of the air transport system. In different perspective, the role of airports community was more than, the airport could become a regional identity, a means of recreation, a means of education through the arrangement of open space. Adisasmita Sakti Adji (2013), state that technically/ physically airport was a dirt track that is flat and paved, which is used by the aircraft to takes off and landings the airport are usually equipped with a control tower, hangars, as well as the passenger terminal and cargo terminal. In addition

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Nasition (2003) states the aerodrome airport is a country gate which gives access to various aspects of political, socio-cultural, economic and tourist.

There is an increase of needs of community that airport to be managed in a sustainable manner, so that it takes the concept of planning, development and environmental monitoring. Application of the concept of environmentally sound aerodrome is far ratio of environmental pollution around airports. The concept of eco-airport is one of the airports that the concept of environmentally friendly design.

The concept of eco-design aerodrome airport is planned, developed, and operated with the aim of creating infrastructure and facilities that are environmentally friendly within the airport itself and in the surrounding area. The concept of eco-airport is applied first by Narita Airport of Japan, the airport has implemented a concept that become environmental friendfly and reduce the ratio of environmental pollution around airports that may affect the operations of the airport. this concept become more widely use in the world. Followed by other countries such as Singapore (Changi Airport) and Malaysia (Kuala Lumpur International Airport). The concept of eco-airport aerodrome is expected to perform pollution prevent pollution (Rachman, 2007).

To reach the airport environmentally friendly (eco-airport), sustainability index required the application of the concept of sustainable development (sutainibility development) that can provide problem-solving achievement aerodrome environmentally friendly (eco-airport). Development of sustainable infrastructure means must prioritize balance between physical aspects the integration of environmental, socio-cultural and economic. The concept of sustainability has evolved into a wide range of other issues in a comprehensive manner. In addition to environmental issues (waste gas emissions, climate change, biodiversity, habitat protection, aesthetics), other issues such as the economy (productivity, economic activation, employment) and social (equity, health, cultural values, public participation) (Kuncoro Dorodjatun, 2011).

Law No. 32 of 2009 on the Protection and Management of Environment confirms that sustainable development is a conscious and planned effort that combines aspects of environmental, social and economic development strategies to ensure the environmental integrity and safety, capability, welfare, and quality of life of the present generation and future generations. Another opinion is development that meets the needs of the present without compromising the ability to meet the needs of future generations. Sustainable development should pay attention to the use of the environment and the preservation of the environment so that environmental quality is maintained, so that the environmental capacity is not reduced or lost. The meaning of sustainable development is the social justice from generation to generation has been reached.

The approach used to assess sustainable development index, through six dimensions, namely; dimensions of ecology, economy, socio-cultural, institutional,

political, and security (Clayton and Bass, 2002). Concepts or other literature added dimension of technology into sustainable development criteria. The State Thailand, improve sustainable development approach in value in six dimensions, ie the ecological, economic, social, technological, social and ethical. So, approach the assessment of sustainable development vary in line with the system or object under study. (Rita Nurmalina, 2008)

In this study will be assessed two dimensions to assess the airport-based eco-airport at Sultan Hasanuddin International airport (BSHas) sustainable, ie dimensions of environmental and socio-cultural dimensions. These two dimensions are measured and analyzed to determine the achievement of eco-airport at Sultan Hasanuddin International airport sustained.

Purpose of this research, in general for evaluating the sustainability of the airport environment friendly (eco airport) at the Sultan Hasanuddin International airport (BSHas). Specifically aims to; 1) assess the sustainability index and status Sultan Hasanuddin International Airport; 2) assess the sustainability index dimensions and socio-cultural environment; 3) identify the attributes that affect sensitive Sultan Hasanuddin International Airport.

Research Method

The method used in this research is survey method with RAP-analysis techniques Sultan Hasanuddin International Airport. The study was conducted from March to May 2015. The analysis which include; 1) The RAP-ordination techniques Sultan Hasanuddin International Airport through the method of "multidimensional scaling" (MDS) to determine the value of the index and the sustainability status aerodrome environmentally friendly (eco-airport) at Sultan Hasanuddin International Airport sensitive and identify attributes that affect the sustainability index on the dimensions and socio-cultural environment through the leverage analysis. 2) prospective analysis to determine the dominant attributes that affect the eco-airport BSHas. MDS approach gives stable results compared to the double variable method such as factor analysis (Pither J.T dan Preikshot David, 2001).

Data were collected using a questionnaire given to 21 experts aerodrome at Sultan Hasanuddin International Airport, which is made up of 4 people Airport Readiness Department; 4 Department of Airport Operations; 5 Department OM SMS and CS; 2 Department of Finance and IT; and 6 people Shared Service. At an environmental standpoint obtained basic principles that refers to the arrangement of open space (open space), the ecological functions that reduce noise (based on the Decision of the Minister of Environment No. KEP-48/MENLH/11/1996), air pollution (guided the Minister Decree No.41/1999) and a terminal building with energy efficiency (electricity and water). On the socio-cultural viewpoint obtained basic principles referring to the public perception of the management Sultan Hasanuddin International Airport.Stages of research (Budiharsono, 2007), namely:

a. determining attributes. In this study, there are 22 attributes (indicators) which consists of 11 environmental indicators and 12 indicators of socio-cultural.
b. assessment of each attribute in the scale-ordination (scoring) based on sustainability criteria for each dimension.
c. ordinated analysis of RAP-Sultan Hasanuddin International Airport with MDS method.
d. assessing the sustainability index and status BSHas studied both multi-dimensional and in every dimension
e. sensitivity analysis (leverage analysis) to determine the attributes that are sensitive affects sustainability.

Scale sustainability index of the system under study have hose 0% - 100% (Rita Nurmalina, 2008) as shown in Table 1.

TABLE 1: CATEGORY INDEX AND THE SUSTAINABILITY STATUS

Index Value	*Category*
0,00 – 25,00	Bad: Not sustainable
25,01 – 50,00	Less: less sustainable
50,01 – 75,00	Enough: Enough sustainable
75,01 – 100,00	Good: Very sustainable

Result Research

Sustainability Analysis Sultan Hasanuddin International Airport

RAP-Sultan Hasanuddin International Airport analysis results multidimensional using techniques ordinated through the method of "multi-dimensional system" (MDS) produces a value of each dimension, as shown in the table below.

TABLE 2: RESULTS ANALYSIS SUSTAINABILITY INDEX SULTAN HASANUDDIN AIRPORT

No	*BSHas*	*Index*
	Dimension	Value
1	Environmental	62.78
2	Socio-Cultural	31.82
	Average	47.30

Table 2 shows the value of sustainability Sultan Hasanuddin International Airport every dimension, which is 62.78% Environmental included in the category modest sustainable, index value socio-cultural 31.82% less sustainable categories. On average both dimensions are 47.30%, which means less sustainable.

Status Determination Sultan Hasanuddin International Airport

For further analysis to determine the status of International airports are shown in the table below.

TABLE 3: STATUS DETERMINATION SULTAN HASANUDDIN INTERNATIONAL AIRPORT

BSHas	*RES*	*RES*	*RES*	*RES*	*Combined*	*Weighted*	*DimensionValue*	*Total*
Dimension	KE-1	KE-2	KE-3	KE-4	Weight		Bshas	Value
Environmental	1.1724	0.8991	1.8887	2.0089	1.4142	0.3209	62.78	20.15
Socio-Cultural	1.6552	0.7295	1.6312	1.4679	1.3040	0.2959	31.82	9.42
Total	2.8294	1.6286	3.5199	3.4768	2.7182	0.6168	94.60	29.57
						BSHas Status	**Less**	

In Table 3, shows the status of eco-sustainability BSHas airport, after an assessment of the merger of the two dimensions obtained 29.57% of the total value means the status of Sultan Hasanuddin International Airport less sustainable.

Evaluation of existing condition for the sustainability of Sultan Hasanuddin International Airport both dimensions that the dimensions of environmental and socio-cultural dimensions could be explained below.

1. Environmental dimension

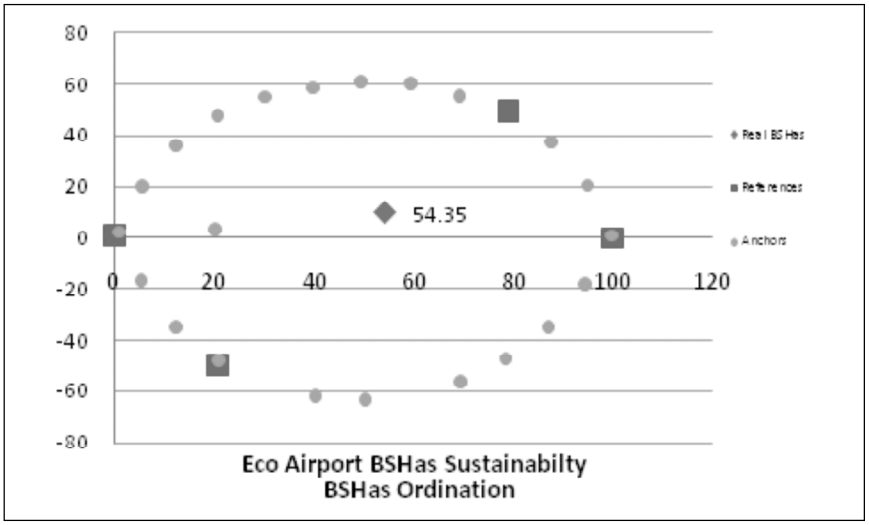

Figure 2: RAP-ordinated BSHas

RAP-ordinated analysis results BSHas sustainability index eco-airport Sultan Hasanuddin International Airport environmental dimension can be seen in Figure 2, are in the interval 50-60% or sustainable enough to have status. This is partly caused by the management of eco-airportsuch requirements are met such as airport terminal building material licensed environmentally friendly, the plant in an open space 80% of plant species which serves to absorb air pollution and reduce noise.

Results of analysis of the environmental dimension of sustainability leverage seen in figure 3, it is known that from the 12 attributes analyzed, five attributes that affect the eco-sensitive airports, namely: 1) smoke in the arrival area / basement; 2) smoke in the departure lounge; 3) a smoke in the room check-in area; 4) the efficiency of energy use of lights; and 5) the use of air conditioning energy efficiency. Three attributes that have the same problems that cigarette smoke, it takes a good handling, namely in the area of arrivals / basement needed a smoking room enough, in the departure lounge are required all the food stalls / kiosks provide a smoking room and in the area of the room check in as well The need smoking

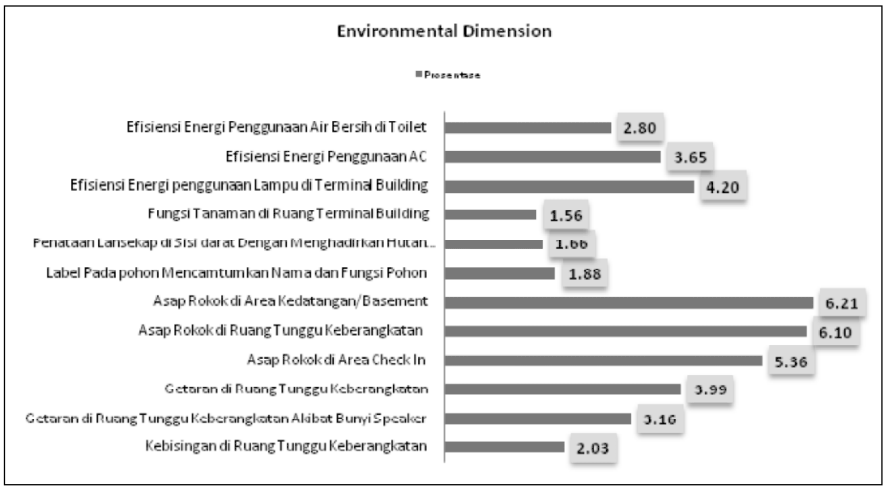

Figure 3: Analysis and Status Index Sustainability Eco-Airport BSHas. Sensitive factors that affect the sustainability of the environmental dimension

room. Besides, the rules that apply in airports have not been effectively implemented.

Two other attributes, namely the light use efficiency and the efficient use of Air Conditioner (AC) is done in the form of turning off the lights or air conditioning when not needed and low watt or wear material. If this attribute fifth attention and managed properly, then the value of this index increased sustainability dimension in the future.

2. Socio-cultural dimension

Results of the analysis of RAP-Sultan Hasanuddin International Airport ordinated eco-sustainability index BSHas airport socio-cultural dimension can be seen in Figure 4, are in the interval 25-30% less sustainable or have status. This is partly caused by the habit of littering the airport community is not in place, especially in the basement area, kebiassan not turn off the AC when not needed and officers in the apron did not use a mask and earplugs.

Results of the analysis of socio-cultural sustainability leverage seen in Figure 5, note that of the 12 attributes analyzed, five attributes that affect the eco-sensitive airports, namely 1) the custom of taking out the trash, 2) the habit of using AC, 3) officers at the airport apron is not wear a mask, 4) activities disturbing the airport, 5) labeling of trees in open spaces. Two attributes that have the same problems are not habit of throwing garbage in the space provided primarily in the area of departure, arrival area / basement and on the apron of the airport officers who do not wear a mask and earplugs. Strict enforcement of the regulations should be applied. Habits take advantage of air conditioning when needed and labeling of

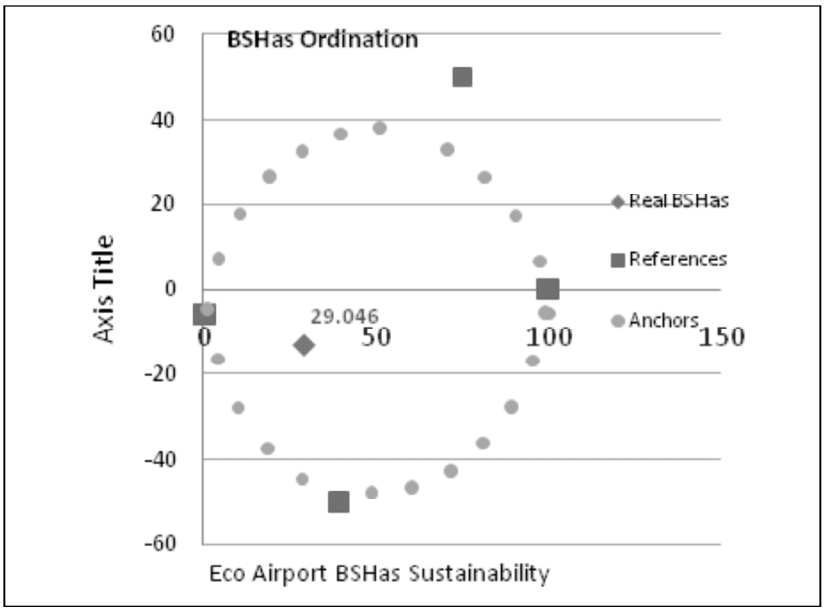

Figure 4: RAP-ordinated BSHas

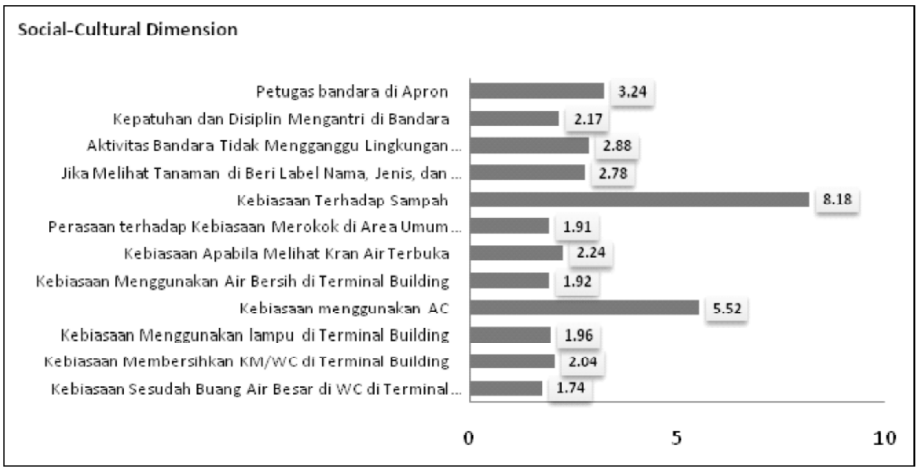

Figure 5: Analysis of the Status Index and Sustainability Eco-Airport BSHas. Sensitive factors that affect the sustainability of the Social-Cultural dimension

trees (tree species name and function) to familiarize the public to know the function of environmental education. To improve the sustainability index of this dimension needed management attention and well.

DISCUSSION

Results of the analysis of socio-cultural sustainability leverage seen in Figure 5, note that of the 12 attributes Analyzed, five attributes that Affect the eco-sensitive airports items, namely 1) the custom of taking out the trash, 2) the habit of using AC, 3) officers at the airport apron is not wear a mask, 4) activities disturbing the airport, 5) labeling of trees in open spaces. Two attributes that have the same problems are not habit of throwing garbage in the space Provided primarily in the area of departure, arrival area / basement and on the apron of the airport officers who do not wear a mask and earplugs. Strict enforcement of the regulations should be applied. Habits take advantage of air conditioning when needed and labeling of trees (tree species name and function) to familiarize the public to know the function of environmental education. To improve the sustainability index of this dimension needed management attention and well.

Results of the analysis of the two dimensions of sustainability index value in a row is the environmental dimension of 62.78%, which means quite sustainable, and socio-cultural dimensions of 31.82% which means less sustainable. For the determination of the status of sustainability Sultan Hasanuddin International Airport eco-airport based on average values obtained 29.57%, which means that the status of the airport less sustainable.

This situation proves that the Sultan Hasanuddin International Airport based eco-airport requires intervention for improvement, both from the government, the stekholder airport, and the community as users of this air transport services. If there is no improvement, then the International Airport as a hub of air transportation in the area of Makassar will continue to decline and thus achievement based International Airport Eco-airpot also suffered setbacks. In accordance with Regulation of the Director General of Civil Aviation No.SKEP/ 124/VI/2009 on Guidelines for Environmentally Friendly Airport (Eco Airport) in Article 2(c) states that the Eco-Airport Airport organized for the purpose of conducting airport that can support the achievement sustainable development.If the situation is left alone so to the achievement of sustainable development will not be easy to achieve.

A sensitivity analysis of the two dimensions of sustainability attributes airports Sultan Hasanuddin Makassar done using analysis Laverage. Changes to the value of this attribute will affect sensitivity to changes in the index and the sustainability status. Laverage analysis results showed that for the environmental dimension, of 12 attributes analyzed, five attributes that affect the eco-sensitive airports, namely: 1) smoke in the arrival area / basement; 2) smoke in the departure lounge; 3) a smoke in the room check-in area; 4) the efficiency of energy use of lights; and 5) the use of air conditioning energy efficiency. Meanwhile, the social dimension of culture, of the 12 attributes analyzed, five attributes that affect the eco-sensitive airports, namely 1) the custom of taking out the trash, 2) the habit of using AC, 3)

on the apron of the airport officers did not wear a mask, 4) activities disturbing the airport, 5) labeling of trees in open spaces.

In this research the socio-cultural dimension has the lowest value, because it is caused by people's habits airports in activities every day has not characterize environmentally friendly. Smoking, and littering is not in place, such as the arrival hall basement. This is caused by not tightening oversight of the discipline and the implementation of regulations in BSHas. Habit to use Air Conditioner (AC) in the room at the time is not required and customs officers in the apron who was not wearing a safety, namely masks and earplugs (The results in 2015). The results of previous research, especially in the court of the passenger terminal near the arrival gates, the terminal floor found cigarette butts and dust thick enough. Lack of awareness of some of the passengers, introduction and pickup in maintaining cleanliness, for example by arbitrarily throw trash and cigarette butts in any place around the area / court of departure and arrival terminals (Arief Muhammad, 2008).

In multidimensional, of 24 attributes analyzed there are 10 attributes that factor into sustainability levers Sultan Hasanuddin airport-based eco-airport. Factors that are not environmentally friendly pengahambat and need to get attention and good treatment, if left the aerodrome is based eco-airpot will not be sustainable in the future (Angkasa Pura, 2013).

Conclusion

The results showed existing condition index value eco-sustainability of the environmental dimension airport BSHas 62.78%; social and cultural dimensions of 31.82%. The value of sustainability index eco-airport Sultan Hasanuddin International Airport on average 47.30% and in determining the status of sustainability status values obtained 29.57% included in the category of less sustainable. Leverage analysis results to the two dimensions of the dominant attributes that affect the sustainability index sensitive eco-airport BSHas, the environmental dimension is smoke in the arrival area/basement and socio-cultural dimensions is the habit of throwing garbage in the arrivals area/basement.

Acknowledgement

Data obtained from experts of airport Makassar city associated with this research, the authors would like to thank him for the data and information as well as the facilities provided for the purposes of this study, in addition thanks jg given to the Study Program for Population and Environment Post Graduate Makassar State University.

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