

## Planning of dairy farm and dairy plant based ecotourism

A S Sarnyoto<sup>1</sup>, I P Tama, and C F M Tantrika

Department of Industrial Engineering, Faculty of Engineering, Universitas Brawijaya,  
MT. Haryono Street 167, Malang 65141, Indonesia

amaliasharfina3@gmail.com

**Abstract.** One of a dairy production company producing pasteurized milk and yoghurt drink, whose brand has widely known in East Java, has a factory plant in Batu City, one of tourism destinations in Indonesia. Behind the factory plant, there is a vacant land with an estimated total area of 2.3 ha and a vacant cowshed which had not been used for cattle ranching. Because of that, the company planned to develop the vacant land as a dairy farm and plant based ecotourism. In addition, dairy farm and dairy plant based tourism attractions are still rarely found in Batu. Thus, the first aim of this study was to analyse the potencies of the company that related to future plans of ecotourism built. The second aim was to set up the strategies that can be done in order to actualize the ecotourism project. The next aim was to plan the ecotourism, especially the facilities planning and the facilities arrangement on the vacant land. Strategic management approach was used to analyse the potencies and to determine the strategies. To select the proper facilities, tourists were asked to give appraisal by using questionnaire. Appraisal result was mapped onto four quadrants spatial map to see advantages and shortcomings of each facility along with choosing the right facilities to be built. Those facilities and tourist activities were compared with ecotourism criteria to make sure that the facilities were appropriate to provide not only entertainment but also ecotourism function. To arrange the chosen facilities, the step in Systematic Layout Planning were conducted to generate a propose layout of facilities arrangement. Based on potencies analysis, in Internal-External matrix, the company current position was on quadrant 2 (grow and build), with the most appropriate strategy was intensive or integrative. The proposed strategies were to build the new infrastructure, to renovate cowshed, and to add new tourism facilities on the land. There were 11 selected facilities based on MDS. Moreover, based on SLP, a facility layout had been designed and been proposed to be built on the vacant land behind the factory as the new ecotourism destination.

### 1. Introduction

Tourism is a recreational activity outside the residence to get away from routine activities or to look for other atmosphere[1]. One kind of tourist attraction is natural resource that should always be preserved along with tourism attraction development. Travelers' awareness to preserve the nature is needed while traveling. Raising travelers' awareness can be done through provision of ecotourism. One of tourism destination in Indonesia is Batu City. There are some featured products from this city, including pasteurized milk. One of dairy production company had a vacant land behind the factory.

During this time, the company only ran production process of pasteurized milk and yoghurt. Production process cannot be seen by public. Whereas, production process can be a tourist attraction if managed properly and can be one promising ecotourism destination. However, the development of ecotourism was still constrained by a variety of things so that development cannot be run optimally.



In addition of the factors mentioned before, dairy farm and dairy plant based tourism attractions were still rarely found in Batu. Because of that, the company planned to develop the vacant land as a dairy farm and dairy plant based ecotourism destination. Therefore, the company needs to know its internal strength and weaknesses, along with its external opportunities and threat. This information can be used for analyzing the potencies and determining the applicable strategies in order to actualize the ecotourism project.

This paper aimed to evaluate internal strength and weakness along with its external opportunities and threats faced by the company in order to develop its factory to become an ecotourism destination. Based on the evaluation, strategies will be determined. Likewise, in order implement the strategies and to maximize the use of the land, additional tourism facilities will be determined. Furthermore, to increase tourists' interest, the facilities should be arranged as attractive as possible.

## 2. Methodology

Strategic management is the science concerning in formulation, implementation and evaluation of cross-functional decisions that enable the organization to achieve its objectives[2]. In this research, strategic management approach was used to identify strengths, weaknesses, opportunities, and threats faced by the company. It was also used to generate appropriate strategies based on the company's potencies. There are 3 main stages in determining strategies i.e. input stage, matching stage, and decision stage. But, only 2 stages were done during this research.

### 1. Input Stage

In this stage, the information about internal strengths and weaknesses, along with external opportunities and threats were obtained. Identifying information was presented in a matrix of External Factor Evaluation (EFE) and Internal Factor Evaluation (IFE).

### 2. Matching Stage

In matching stage, the internal and external factors were analyzed in quantitative models for formulating alternatives strategies. The analysis tool models were SWOT (Strength, Weakness, Opportunities, and Threats) matrix and IE (Internal-External) matrix.

- a. SWOT matrix is an important matching tool that helps researchers develop four types of strategies, namely SO strategies (strength-opportunity), WO strategies (weaknesses-opportunities), ST strategy (strength-threat), and WT strategies (weaknesses threats)[2].
- b. IE (Internal-External) matrix is used for positioning a business or company into a matrix consisting of 9 cells. IE consists of two axis i.e. total score of IFE on the X axis and the total score of EFE on the Y axis[2].

After determining the strategies, the next step was to make ecotourism facilities development plan. Travelers' requirement should be considered. To determine the type of ecotourism facilities, identifying and analyzing the needs of travelers are necessary to be done. The method used in this study was Multidimensional Scaling (MDS). MDS is a method of analysis related to the placement of objects on a multidimensional map which is determined based on the similarity obtained from the respondents' perception based on attributes [3]. Therefore, this method was used to determine the appropriate type of facility to be developed in milk processing plant as ecotourism based on traveler assessment.

In order to determine the appropriate facilities, preliminary research to other similar tourist attraction was conducted, called it as benchmarking. It aimed to compare the existing tourist attraction in order to find new ideas about the new attraction that will be built in Batu. The opinions of company's management were also noteworthy because they would operate the facilities. Hence, they were interviewed to know which facilities and what kind of tourist attraction they want to build.

The next step was to collect tourists' requirement about the facilities that should be added by distributing questionnaire. Facilities obtained from preliminary research were also included in questionnaire to provide some overview to tourists (as respondents) in filling it. Facilities obtained then reassessed based on some criteria in order to select the best and appropriate facilities to be built.

Facilities assessment was conducted by measuring tourists' perception based on some criteria through questionnaire. Perception data then was processed by Multidimensional Scaling (MDS). In

MDS, the criteria were applied as variables. If the assessment criteria are more than two, then the grouping variables are needed to be simplified into two groups [3]. Hence, the mapping and interpreting the mapping result would be easier. The MDS result was used to determine facilities needed to be built. The chosen facilities then organized by applying one of industrial engineering science that was facilities layout planning. Facility layout planning is a way to organize factory facilities to create the most economical, safest, and most comfortable working areas. Therefore, it can raise morale and performance of operators [4]. One method of designing facility layout is Systematic Layout Planning (SLP) [5]. SLP was used because of its systematic approach to design the layout. In designing facility layout, activities were used as input. It was also important to determine the equipment needed to do the activities and to determine the space requirement. Besides that, the closeness relationship among facilities would be determined and be considerate by using Activity Relationship Chart (ARC). ARC was more suitable to determine the facility layout because the objects processed in ecotourism facility was the people whose number is uncertain, unlike the production floor that uses the exact amount of material flow as consideration.

**Table 1.** Internal factors weighting.

No	Internal Factors Strength	Weight	Rating	Weighted Score
1	Pasteurized milk and yoghurt drink products dominate the East Java market.	0.11	4	0.44
2	Milk can be processed into other kinds of products such as ice cream and cheese. That process can be another attraction for tourists.	0.09	3	0.27
3	Milk that produced is healthier because containing high antioxidant, hence can be categorized as another attraction in educative and health way.	0.09	3	0.27
4	Some process might be exposed to the tourists, not only milk and yoghurt production process, but also waste treatment into compost or biogas.	0.09	3	0.27
5	A 2.3 ha vacant behind the plant as the space for eco-tourism development.	0.11	4	0.44
6	Plant strategic location, which is located in the main road of Batu.	0.11	4	0.44
7	Assured product quality because of hygienic production standard.	0.11	4	0.44
No	Weaknesses	Weight	Rating	Weighted Score
8	Production process has not allowed to be seen by tourists or public yet.	0.11	1	0.11
9	Need substantial capital financial.	0.11	1	0.11
10	Lack of adequate infrastructure.	0.06	2	0.12
Total		1		2.94

### 3. Results

#### 3.1. Formulating strategies

There were three stages in establish the strategies by using strategies management approach, such as: Input stage, Matching Stage, and Decision Stage. The information was obtained by conducting interview to manager of KUD "BATU" and observation around KUD "BATU". Internal and external factors that had identified further be weighted in the IFE and EFE matrix. IFE matrix can be seen on Table 1 and EFE matrix can be seen on Table 2.

As mentioned before, there would be some strategies that established based on consideration about each pair of internal and external factor. Based on strength and opportunity, there were four strategies that can be arranged i.e. (1) make ecotourism by rearrange facilities inside the plant so that all processes can be exposed to tourists, (2) add the outlets that sell the company's products in some tourism attraction located in Batu or other cities and promote the ecotourism in those outlets, (3) sell products and promote ecotourism in each outlet owned by the parties in cooperation with the company, and (4) maximize the use of vacant land for developing the ecotourism. There were also four strategies established based on weakness and opportunities i.e. (1) more intensive promotion, (2) make ecotourism by rearrange facilities inside the plant so that all processes can be exposed to tourists, (3) build the infrastructure that supports ecotourism with regard to the preservation of nature, and (4) sell products and promoting ecotourism in each outlet owned by the parties in cooperation with the company. The strategy based on strength and threat was held the ecotourism promotion that carries the brand of milk already known, so that the tourists would be more interested. Lastly, the strategy based on weakness and threat was improve infrastructure so that local ecotourism in Batu would be able to contend in tourism attractions in other countries, especially in South East Asia region.

Based on weighting score calculation of internal and external factors, 2.94 was obtained as a total weighted score for internal factors and 3.53 as a total weighted score for external factors. The value were mapped onto IE matrix and resulting the company's position. IE Matrix can be seen on Fig 1.

From the Fig 1, the company was laid on quadrant II, which means the company was on grow and build state. Thus, the most appropriate strategy type was intensive (market penetration, market development and product development) or integrated (forward integration, backward integration and horizontal integration).

Based on strategies that have been formulated, some strategy that fits with the type of appropriate strategies to be applied by the company were to open more outlet in famous tourism object, promote the ecotourism in the outlets, intensive promotion, participate in infrastructure improvement, make a detail about ecotourism development future plan, and renovate the cowsheds and vacant land by adding and arranging more tourism facilities.

**Table 2.** External factors weighting.

No	External Factors Opportunities	Weight	Rating	Weighted Score
1	Developing products is planned to be penetrate to entire region of Indonesia because of its well known in East Java. Hence, the name of the company will also be known by more people.	0.14	3	0.42
2	Cooperation with big franchise companies that has widely known all over Indonesia, thus the cooperation can be continued for ecotourism development.	0.18	4	0.72
3	Dairy farm and dairy plant tourism object is still rarely found in Batu.	0.18	4	0.72
4	Beautiful scenery of Batu.	0.18	4	0.72
No	Threats	Weight	Rating	Weighted Score
5	Many famous tourism object in Batu and Malang	0.09	2	0.18
6	Dairy products that quickly expired	0.05	1	0.05
7	ASEAN Economic Community allows the company to has competitors from othe countries in ASEAN	0.18	4	0.72
	Total	1		3.53

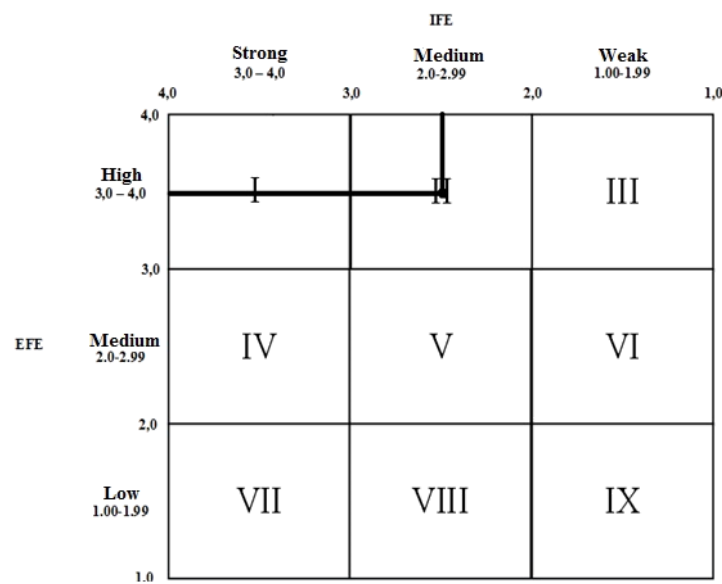


Figure 1. KUD "BATU" position on IE Matrix.

### 3.2. Determining the facilities

As the continuation in implementing the strategies, the determination of facilities was needed. To determine the facilities, firstly, some choices of facilities were identified by benchmarking to similar tourism attraction located in Batu and Bogor. The company's manager was also asked about which facilities they want to add. The known facilities in other similar tourism attractions are mini farm for cows and calves, biogas installation, simple milk processing station, catfish pond, rest area, cow museum, playground area, souvenir shop, restaurant, and milk ingredient foods store. Moreover, based on interview to company's manager, they intend to add cowshed or mini farm, biogas installation, compost pile, and milk processing station in form of mini factory.

The facilities obtained from benchmark and interview then included as choices in a questionnaire given to tourists. The facilities were included in questionnaire to provide overview to respondents thus their answer would not be too broad. But, the choices were still open if they want to add other facilities outside the facilities given. Respondents' answer was needed in order to determine kind of facilities they want along with the activities they want to do. Because when the facilities are already built, the tourist would be the main target to enjoy the attraction. Therefore, tourist's choices were essentials in determining facilities. These first questionnaires were distributed to 30 respondents.

Based on questionnaires, there were 15 activities that tourists want to do, such as making yoghurt, making ice cream, making cheese, milking, taking photos, viewing scenery, making pasteurized milk, playing games, outbound games, walking around the farm, feeding cows and calves, souvenir shopping, learning how to produce biogas, learning how to produce compost, and buying various milk ingredient products. As a means to perform the desired activities, there were 13 facilities which were wanted by respondents, such as cowshed, biogas installation, compost pile, outbound area, ice cream making station, yoghurt making station, cheese making station, milk processing station, viewing post, souvenir store, milk ingredient products store, biology museum, and playground for children.

**3.2.1. Criteria of assessment.** Facilities acquired from respondents' answers would be reassessed to determine which facilities meet the criteria as a tourist attraction, but still consider the elements of ecotourism. The tourist attractions criteria were taken based on Sundoro[7]. Those criteria are 'something to do', 'something to see', and 'something to buy'. Assessment based on 'something to do' criteria aimed to gain respondent's level of perception to enjoy a tourist attraction based on the activities that can be done. Assessment based on 'something to see' criteria aimed to understand respondent's

level of perception to enjoy a tourist attraction based on the things that can be seen. Assessment based on 'something to buy' criteria aimed to perceive respondent's level of perception to enjoy the attractions based on the availability of facilities for shopping. Besides the tourist attraction criteria, there were also ecotourism elements criteria which used to assess the facilities. The criteria were ecological preservation, education, and economic community [7][8]. Ecological preservation criteria were used to assess the perception of respondents' in enjoying the attractions by a desire that will arise from the travelers themselves to preserve the environment after enjoying the attractions. Education criteria were used to assess respondents' perception to enjoy the attractions based on education that can be obtained. Economic community is a principle that can be rated by respondents to see how much of ecotourism development will be intended for the public, which the facilities/attractions can involve the local community to work in running the operations so that it provides income for the communities around ecotourism objects.

**3.2.2. Facilities assessment.** The assessment of facilities was conducted by distributing questionnaire to respondents. The questionnaire contained several statements that represent the criteria that must be met by each facility. Assessment used a Likert scale in intervals of 1-5 which states of agreement or disagreement on the statements in assessing the facility. The assessment were later be processed by using Multidimensional Scaling. The number of samples should be taken for data to be processed by using multivariate analysis was minimal 10 times the number of variables. In this research, 6 criteria were used as variables. That means, the samples of 60 was needed for each facilities based on each criteria. Hence, there would be 4680 total data collected.

**3.2.3. Data mapping and facilities selection.** After validity and reliability test, average data of each facility based on each criterion were calculated. Those values were used as input to calculate Euclidean distance between each facility. Euclidean distance then used to determine each facilities coordinate on spatial maps. Average data can be seen on Table 3. Meanwhile, Multidimensional Scaling spatial map can be seen on Figure 2. SPSS 20 were also used in processing data for Multidimensional Scaling to map the facilities into four quadrants. Before interpret the result of Multidimensional Scaling, variable grouping by using Principal Component Analysis was needed because the spatial map only consist of 2 axes, whereas there were 6 variables. The result of variables grouping can be seen on Table 3. Based on Table 3, 'something to do', 'something to see', and 'something to buy' were grouped as one into Component 1 because the value of their Component 1 were greater than the value of their Component 2. Otherwise, education, ecological preservation, and economic community were grouped into Component 2 because their Component 2 were greater than the value of the Component 1. After grouping the variables, interpretation of MDS spatial map can be completed.

**Table 3.** Average data of respondents' perception.

Variables	Facility*												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Something to do	4.10	3.47	3.57	4.50	4.38	4.42	4.36	4.67	4.13	4.47	4.13	4.00	4.43
Something to see	4.05	3.98	4.20	3.42	4.51	4.47	4.50	4.56	3.67	3.45	3.80	4.05	3.65
Something to buy	3.88	3.43	3.55	3.60	4.16	4.31	3.88	4.31	3.60	3.90	4.02	3.83	3.77
Education	4.13	4.17	4.35	4.17	4.22	4.53	4.13	4.53	3.58	3.13	3.07	4.23	3.43
Ecological Preservation	4.03	4.18	4.03	4.18	3.60	3.69	3.62	3.69	3.92	3.28	3.32	3.80	3.60
Economic Community	4.18	4.10	4.18	4.10	4.02	4.16	4.18	4.16	3.97	4.33	4.32	3.47	3.68

\*1 = Cowshed; 2 = Biogas Installation; 3 = Compost Pile; 4 = Outbound Area; 5 = Ice Cream Making Station; 6 = Yoghurt Making Station; 7 = Cheese Making Station; 8 = Milk Processing Station; 9 = Viewing Post; 10 = Souvenir Shop; 11 = Milk Products Store; 12 = Biology Museum; 13 = Playground.



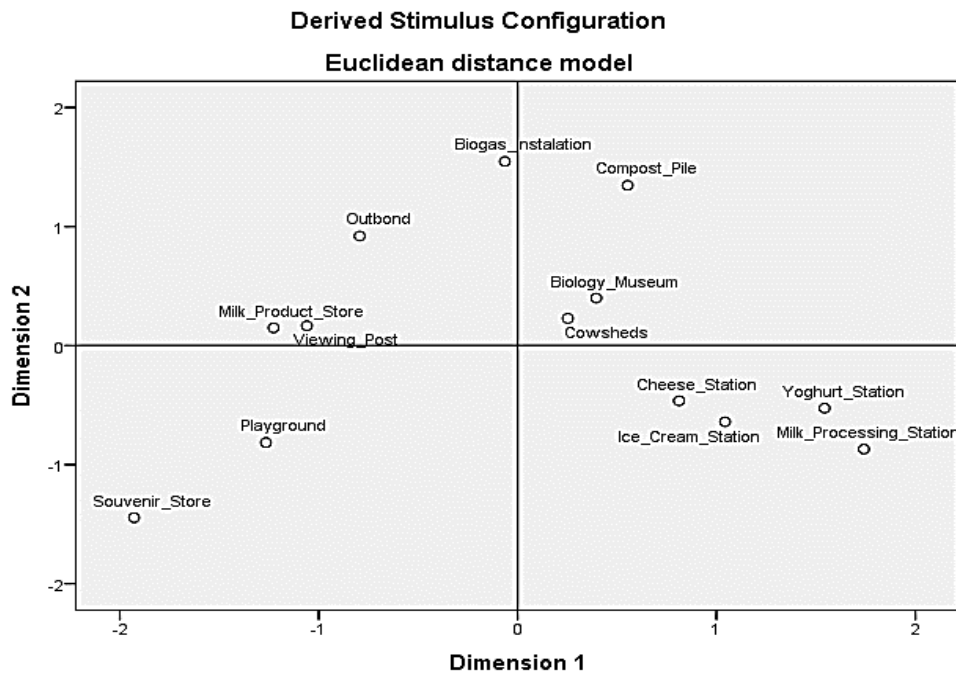


Figure 2. Coordinate of each object on MDS spatial map.

Table 4. Variables grouping result.

	Component Matrix <sup>a</sup>	
	1	2
Something_To_Do	,706	-,423
Something_To_See	,668	,657
Something_To_Buy	,918	-,033
Edukasi	,332	,884
Pelestarian_Ekologi	-,676	,625
Ekonomi_Masyarakat	,108	,181

Table 5. Description of facilities.

No	Facilities	Description
1	Cowshed	Facility to placed cow and cattle. The cowsheds will be design like an open field that the cows can freely move. Tourists can get information on how to care for cattle. Visitors can also perform the activity of cow bathing, feeding, and milking cows.
2	Biogas Installation	Facility where tourists can see the making process of biogas from waste of cattle. Tourists can also learn by direct practice in biogas production.
3	Compost Pile	Facility where tourists can see the making process of compost from waste of cattle and waste from biogas production. Tourists can also learn by direct practice in compost production.
4	Outbound Area	Facility where tourists can perform outbound activities such as playing games, flying fox, pole climbing, and swimming. The help of safety guard is needed in this facility to check the completeness of visitor safety equipment when playing games and ensuring visitor safety procedures already performing well
5	Ice Cream Making Station	Facility where tourist can make ice cream with a simple way without waiting the ice cream to be frozen in freezer.

No	Facilities	Description
6	Yoghurt Making Station	Tourist can learn about how to make yoghurt in simple way. Because of long time producing and short time expiring of yoghurt outside the chiller machine, company can only provide the information through video. But, the tourists will still be given yoghurt drink before exit the station.
7	Cheese Making Station	Facility where company run the production of cheese in low production capacity. Tourists can see the production process through glass wall bordering production room and tourist room. Tourist can also learn about how to make cheese in simple way that they can try at home. Same as yoghurt making station, information about making cheese with simple method is submitted to tourist through video
8	Milk Processing Station	Contains of mini factory and tourists room. In mini factory, production process of pasteurizing milk runs. Like cheese making station, tourists can see milk production through glass wall to keep maintaining hygiene of the milk. After that, they can learn about how to pasteurizing milk by using simple equipment which used daily, such as stove and pan. Tourists will also be given pasteurized milk that already packed in a bottle.
9	Viewing Post	Viewing post can be used to see the natural scenery around ecotourism. It can also be used for photography activities.
10	Milk Products Store	Milk product store will provide a wide range of products made from milk, such as pasteurized milk, that can be purchased by the tourists. Clerk and cashier are needed in this facility to run operational activities and help tourist in shopping.
11	Biology Museum	Facility that has biological objects and other objects related to the environment. Information related is devoted to animal agriculture and dairy cattle, such as how the cows can produce milk, the types of dairy cattle, bovine growth process and so on

From Figure 2, it is known that cowshed, biology museum, and compost pile were located on Quadrant I. It implied that those three facilities had advantages in all six variables. Meanwhile, biogas installation, milk product store, outbound, and viewing post were located on Quadrant II, which implied that those 4 facilities were had advantages in education, ecology preservation, and local community economy variable but having shortcomings in 'something to do', 'something to see', and 'something to buy' variable because the negative value of the Dimension 1. Facilities located in quadrant III had all shortcomings in all six variables. Hence, it is decided not to select facilities in quadrant III. In addition to the main facility as an attraction for the tourist, some supporting facilities were also needed to support tourists' activities and comfort when travelling. Referring to the Indonesian Government Regulation No. 50 Year 2011 concerning the National Tourism Development Master Plan Year 2010-2025 Article 25 Clause a, supporting facilities to be added were security post, ATM, deposit box, medical room, wheelchair and baby trolley rental, pedestrian, parking area, praying room, food court/restaurant, information center, information board or signpost that will be placed in some corner on pedestrian walkway, landscaping (scenery, flower garden, and orchard).

### 3.3. Designing Facilities

To design the facilities, activities in each facility should be determined first. Activities at each facility are determined by considering respondents' answer in the questionnaire, the existing activities in similar tourist attractions, and a company's desire about the development. In each facility, not only tourists who are going to do some activities but also tour guide and operators in running this ecotourism operational. Description of each facility can be seen in Table 5.

Based on activities determination, space requirement of all facilities can be calculated. To calculate the space requirement, some standards from literatures were used. Standard from Littlefield were used

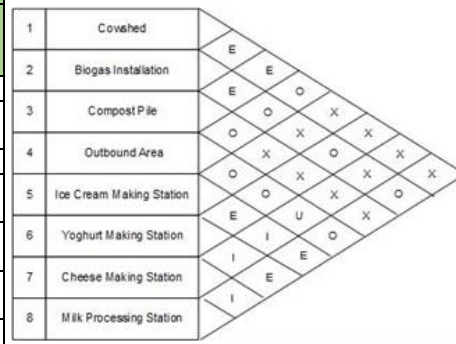


to calculate space requirement of all facilities and especially space allowance for tourists and table set for tourists and employees, and also aisle in each and cross-facilities[6]. Besides that, to calculate space requirement for ice cream, yoghurt, and cheese making station, also milk processing station, the size and capacity of existing machine were used. Machines needed were freezer, chiller, eco pasteurizer, press machine, sealing machine, container, homogenizer, and separator. To calculate space requirement for parking area, standard from Department of Transportation of Indonesian Republic to determine the aisle and space needed for each type of vehicle were used. The result of space requirements calculation can be seen on Figure 3(a).

After determining space requirement, the next step was to determine closeness relationship between each facility by using Activity Relationship Chart (ARC). Determining closeness relationship were based some reason obtained by management consideration. There are 6 levels of relationship, i.e. Absolutely Necessary (A), Very Important (E), Important (I), Ordinary (O), Unimportant (U), and Undesirable (X). Part of Activity Relationship Chart can be seen on Figure 3(b).

Main Facilities		Supporting Facilities	
Facilities	Space Requirement (m <sup>2</sup> )	Facilities	Space Requirement (m <sup>2</sup> )
Cowshed	781.09	Food court	427.64
Biogas Installation	85.12	Parking Area	2,313.63
Compost Pile	58.03	Safety Post	7.00
Outbound Area	3504.45	Information Centre	16.21
Ice Cream Making Station	141.87	Praying Room	102.71
Yoghurt Making Station	109.94	Toilet	53.48
Cheese Making Station	178.80	Medical Room	14.00
Milk Processing Station	164.35	Ticketing locket	164.74
Viewing Post	39.97	ATM	10.00
Milk Products Store	46.12	Orchard	2,140.00
Biology Museum	119.40	Generator set	8.00
<b>Total</b>	<b>5354.16</b>	<b>Total</b>	<b>5257.41</b>

(a)



(b)

**Figure 3.** (a) Space requirement; (b) Part of activity relationship chart.

ARC resulted in 3 “A” relationships, 8 “E” relationships, 32 “I” relationships, 48 “O” relationships, 71 “U” relationships, and 63 “X” relationships. To draw the layout design, some line and color symbols were used as supporting tools to visualize the position of each facility. “A” relationship is symbolized by red line, “E” by orange line, “I” by green line, “O” by blue line, “X” by brown line, and “U” without any line. Each facility was represented by space block according to space requirement when placed on layout design.

After drawing the relationship diagram, some modifications were considered in designing facility layout to adjust the design with actual condition. It is commonly called as modifying consideration [5]. Layout was designed by adjusting the shape of land. Among the facilities, it was also provided pedestrian lane with 3.6 m of width [6]. To add to the beauty of the scenery, in the rest of the land where facilities and pedestrian were not placed, flower garden was set.

There were also two limitations in designing the layout. On the land, the cowshed was already exist but had never been used before. Thus, the location of the cowshed was fixed and should not be changed. Moreover, the land was bordered by rice field in north, west, and east side. The only side which was bordered directly with main highway was in the south side. Therefore, the entrance and exit of vehicles should be located in south side of the land. The facility layout design can be seen on Figure 4.

Based on Figure 4, it can be seen that food court was directly accessible to travelers when passing the entrance, milk processing area that arranged circularly with the orchard as its center which made the

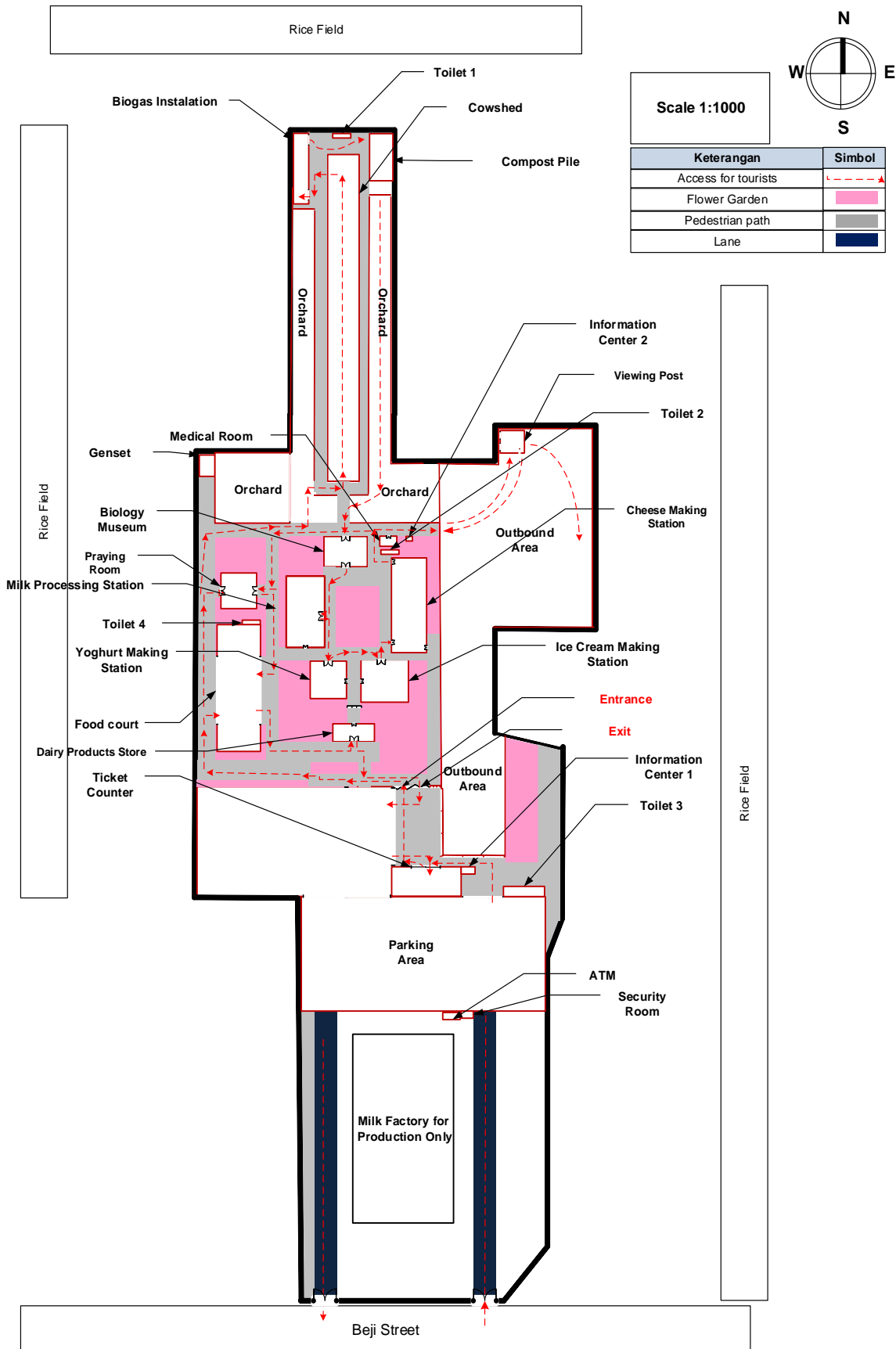
scenery look more beautiful and the tourists can also immediately see all areas of milk processing, and boundaries between types of vehicles in the parking area easy to determined. Beside the advantages, there are some shortcomings of this layout, which are not so many alternative route can be pass, the location of outbound area is on the edge and likely to be felt sealed because it is directly adjacent to the border wall, and the south edge of outbound area is close to the parking area, hence the activities may disturbed by the vehicle sounds and pollutions or activities outside of ecotourism because the outbound area better be directly connected with the pristine nature.

#### 4. Conclusions

The appropriate type of strategy based on the company's position on IE matrix was intensive or integrative strategy, such as make a detail about ecotourism development future plan and also renovate the cowsheds and vacant land by adding and arranging more tourism facilities. Based on MDS, the appropriate facilities that selected were cowshed, biogas installation, compost pile, outbound area, ice cream making station, yoghurt making station, cheese making station, milk processing station, viewing post, dairy products store, and biology museum. The arrangement of those facilities was designed into a layout. The advantages of the layout were food court that directly accessible to travelers when passing the entrance, milk processing area that arranged circularly with the orchard as its center which made the scenery look more beautiful, and boundaries between types of vehicles in the parking area easy to determined. The shortcomings of this layout were not so many alternative route could be pass, the location of outbound area was on the edge and likely to be felt sealed because it was directly adjacent to the border wall, and the south edge of outbound area was close to the parking area, hence the activities may disturbed by the vehicle sounds and pollutions from the outside of ecotourism.

#### References

- [1] Damanik J, Weber HF. *Perencanaan Ekowisata Dari Teori Ke Aplikasi*. Yogyakarta: Pusat Studi Pariwisata (PUSPAR) UGM dan ANDI; 2006.
- [2] David FR. *Strategic Management*. 13th ed. New Jersey: Prentice Hall; 2011.
- [3] Masuku TJ, Marline SP, Yohanes ARL. Persepsi Konsumen Terhadap Produk Sepatu Olahraga Di Sport Station Megamall Dengan Menggunakan Analisis Multidimensional Scaling. *Jurnal Ilmiah Sains* 2014; XIV (2): 68 – 72.
- [4] Wignjosoebroto S. *Tata Letak Pabrik dan Pemindahan Bahan*. Surabaya: Guna Widya; 2009.
- [5] Heragu SS. *Facilities Design*. 3rd ed. Florida: CRC Press; 2008.
- [6] Littlefield D. *Metric Handbook Planning and Design Data*. Oxford: Elsevier Ltd; 2008.
- [7] Sundoro DA. *Arahan Pengembangan Objek Wisata Alam Cagar Kota Batu Berbasis Konsep Ekowisata*. Unpublish Thesis. Malang: Department of Urban and Regional Planning, Universitas Brawijaya; 2011.
- [8] Departemen Kebudayaan dan Pariwisata dan WWF Indonesia. *Prinsip dan Kriteria Ekowisata Berbasis Masyarakat*. Jakarta: Departemen Kebudayaan dan Pariwisata dan WWF Indonesia; 2009.



Reproduced with permission of copyright owner. Further reproduction prohibited without permission.