

Costing structure improvement using activity based costing in palm oil plantation of Malaysia

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ABSTRACT

Malaysia is one of the largest producers and exporters of palm oil in the world, accounting for 11% of the world's oils & fats production and 27% of the export trade of oils & fats. Oil palm tree will start bearing fruits after 30 months of field planting and will continue to be productive for the next 20 to 30 years. Thus, a proper costing method is very important in order to have a clear picture of its profit loss and gain for the next 20 to 30 years. The aim of this work is to apply the activity based costing (ABC) as a method of cost estimation for the palm oil plantation. The ABC has been applied to analyze the costing for every activity involved in the palm oil plantation. The actual cost information of each activity has been obtained through a process flowchart. Other than that, proper cost driver has been assigned in order to obtain the actual manufacturing cost of an oil palm plantation. The expected monthly manufacturing costs of xxx company has been calculated which is MYR 494303.04 and consequently the accurate profitability can be achieved. Accurate profitability is the most important factor for the management to identify the money that process in order to maintain rapid but sustainable growth. Therefore, ABC has assigned actual cost information and proper cost drivers for each of the activities being involved and it makes the company's profitability more accurate.

INTRODUCTION

The oil palm tree comes from West Africa. It grows in the wild and later was transformed as an agricultural product. In early 1870s, British had first prompted the African oil palm to Malaysia as an ornamental plant. In 1917, the first commercial oil palm planting was established at Tennamaran Estate, Selangor under the responsibility of a Frenchman, Henri Fauconnier. This began the development of oil palm plantation, and the oil palm industry in Malaysia (1). In early 1960s, Malaysian introduced agricultural diversification program which had boosted up the development of oil palm plantation, and the oil palm industry in Malaysia. This program was introduced to decrease the dependency of country's economy on tin and natural rubber. To eliminate poverty among the landless and smallholders, the government had introduced land settlement schemes for planting palm oil at the same decade. This land settlement schemes had elevated the development of oil palm plantations in Malaysia. Later in 1966, Malaysia became the world's leading exporter of crude palm oil (CPO) (2). In the 1970s, the palm oil industry expanded further and there was a large scale of palm oil plantation in Sabah and Sarawak. In order to response to the government's call for increased industrialization, Malaysia's enterprise in domestic refining and fractional activities has transformed CPO exporters into producer and exporter of refined products. Due to a large supply of palm oil and palm kernel oil, the oleochemical industry started to flourish in the 1980s. Since then, Malaysia has become a world leader in the oleochemical industry and produces about 20% of the

world's basic oleochemicals. At about that time, the Kuala Lumpur Commodity Exchange (KLCE) was also founded. The purpose of KLCE is to reduce market risk in palm oil trading by setting prices, hedging and publishing market information. The rationalization of refining and fractionation of palm oil products indicated the first Malaysian Industrial Master Plan (IMP) during the 1980s to 1990s. This is to increase efficiency and competitiveness of Malaysia's palm oil industry among the world market. Also, cost of economic growth can be improved by the use of efficient technologies and with the help of improvement of financial sectors which import environment-friendly technologies from developed countries (3). This made Malaysia a hub for downstream processing, as it was more cost-effective than processing refined products in Europe. Under the second IMP (1996-2005), Malaysian companies were encouraged to further develop and produce more value-added downstream products. This resulted in the expansion of oil palm planting areas in Sabah and Sarawak. There has been an increase in research and development activities to meet the demand for productivity gains and the development of value-added products along the value chain. A comprehensive strategy has been developed by Malaysian palm oil council for positioning Malaysia through promotional activities as an international market leader in oil and fat. During the third IMP (2006 - 2020), the industry focuses on oleochemicals, biodiesel, biomass and biogas and the development of new Malaysian palm oil market. As part of the economic transformation program (2011-2020), the palm oil sector has been selected as one of the 12 key national economic areas (4). Malaysia is currently the world's largest exporter of palm oil, though after neighboring Indonesia it is the second largest producer of oil. Malaysia's main consumers of palm oil are China, India and the EU. Two companies based in Malaysia; Sime Darby and FELDA are the biggest planting companies in the world (5). According to (6), assessment on the economics are very important to improve the profit margins, there may be an enhanced sustainability not only in the economic scale, but also in the social scale from better incomes.

Activity based costing (ABC) was widely known as one of the most important innovations costing methodologies. During 1970s and 1980s, under the supports of multiple theoretical and practical research, the concept of ABC was developed in the United States of America. At the same time, the Consortium for Advanced Management-International, an international consulting group also introduced a formative role to study and codify the principles. ABC aims to determine the causal and impact relationships in order to allocate costs objectively. Compared with traditional cost accounting (TCA), ABC is more accurate to determine the actual costs of production and related service of a product. The accurate costing information helps the management to have a better understanding about their economics and make better decision making. In 1989s, the supporters of balanced scorecard - Robert S. Kaplan and Robin Cooper had published some articles of about this concept in Harvard Business Review. From their articles, the problems of traditional cost management had been listed. The problems of traditional cost management are unable to identify the actual production costs of a product and of its' services cost. Therefore, the management usually were using the inaccurate data to do decision making. When there are multiple products, the situation become more worst. Therefore, Robert and Robin characterised ABC as one of the better to solve those problems (7).

To implement ABC, cost drivers been used in order to allocate the actual costs according to the involved activities. Factor that affect the cost of the activity would be the cost drivers. Besides, unit cost would be considered as an output of ABC for measurement. Generally, four simple steps were required to implement ABC. There are identify activities, allocate resource costs to activities, identify outputs and assign activity costs to outputs. For the first step, the organization needs to carry out a detail analysis about the operating processes for each of the working centre. There might consist one or more than one activity involved in each process in order to produce an output. Those activities should be clearly defined and recorded. Next, resource costs of all identified activities need to be allocated. By this step, the organization allowed to trace back the costs for each activity and determine why the cost occurred. The resource costs can be classified into three types. There are direct costs, indirect costs and general/administration costs. Direct costs are the costs that are relatively easy to trace directly to one output. Costs that cannot be assigned to an individual output are the indirect costs. Then, all the output needed to be clearly identified. The outputs are very simple. The outputs can be the products, services or customers. The last step is all the activity costs need to allocate to outputs based on the consumption for activities by using cost drivers. Through the four simple steps of ABC, accurate costs information will be obtained. The management would be making better decision making based on the accurate cost information (7).

ABC had been widely used due to its several advantages. It provided accurate, timely and reliable information to managers in order to make decisions (8), helped to determine the process cost of contemporary production processes (9), provided a more accurate product cost than TCA (10), helped to doing cost estimation during complex processes exist (11), achieved a proper cost estimation tool to set up budget of a complex project (12), allowed to estimate production costs and environmental cost accurately

(13), helped to estimates the product/service costs by assigning the cost to the activities involved in the creation process (14), provided actual cost information to support management to do decision making (15), provided detailed and accurate cost information often required in taking various managerial decisions (16), provided detailed information for planning and controlling which lead to reduce unnecessarily costs (17), provided actual cost information that make management easy to provide decision making (18), helped to understand how to allocate resources and funding for activities to each system through appropriate cost drivers (19), helped for effectively computing values of cost drivers as well as making accurate cost estimations (20), helped managers understand how to allocate resources for activities through appropriate cost drivers (21), provided more detailed information on costs accurately calculate the manufacturing cost of our choice (22), helped to calculate an increasingly accurate manufacturing cost amidst the situation in which the share of indirect manufacturing cost increases due to the production technology advancement (11), helped to identify profitable and non-profitable products and account for resource constraints (23), determined the relative profitability of each market segment (24), helped to provide production plan and achieve the optimal profitable product mix (13) and improved all the company's inefficient activities (25).

In real life, the concept and application of ABC had been proven far beyond the academic discussion. ABC had been widely applied in many different areas like environment, engineering, healthcare etc. For environment, concept of ABC has been used to develop an optimal decision-making model for Taiwan's hybrid green power strategy (26). The results were management able to make better decision making in order to get the maximum profits for green power planning. For engineering, a costing model for raw material handling section was developed based on concept of ABC in an Indian steel plant (16). The results obtained from this model were all the activities are clearly defined and operate under efficiency resources. The steel plant allowed to minimize the manufacturing costs with an efficient resource planning. For healthcare, an ABC approach was used to develop a cost estimation model to identify cost information for an assisted reproductive technology treatment in Italy (27). The results obtained from this model was the actual cost information of particular treatment has been clearly defined. Management also allowed to set up an efficient budget in order to maintenance the efficiency of particular treatment. Surprisingly, [27] developed a distinctive pattern of crankshaft and identify the critical and non-critical parameter of crankshaft based on the Mahalanobis Taguchi System, then applied ABC as a method of estimation for the remanufacturing cost of crankshaft.

The ABC has been proved its application through various research works. According to this work survey by reviewing 100 of open access article from year 2011 until 2018, the method widely applied in engineering field followed by financial and healthcare with 36%, 33% and 15% respectively. It also showed that ABC has rarely been applied in plantation field which is only 2% as shown in Figure 1.

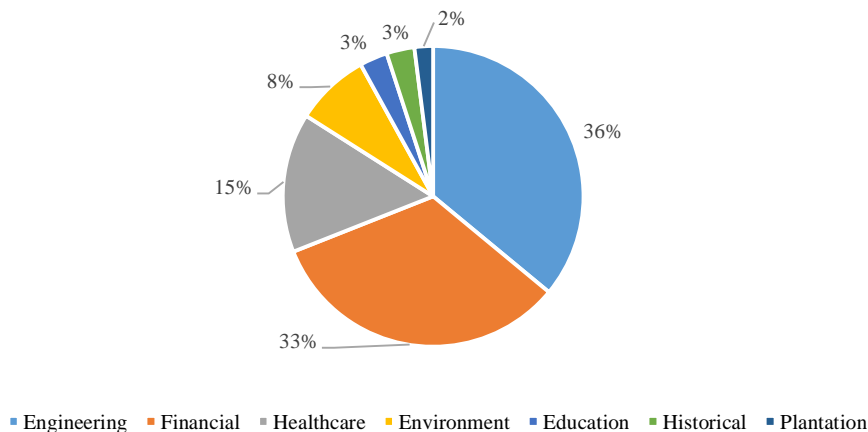


Figure 1 ABC with application area.

In addition, the most significant roles of ABC were to identify cost information (40.12%) followed by to calculate accurate profitability (16.67%) and to identify cost drivers (13.73%) as shown in the Figure 2. Therefore, the aim of this work is to apply ABC as a method of cost estimation for the palm oil plantation.

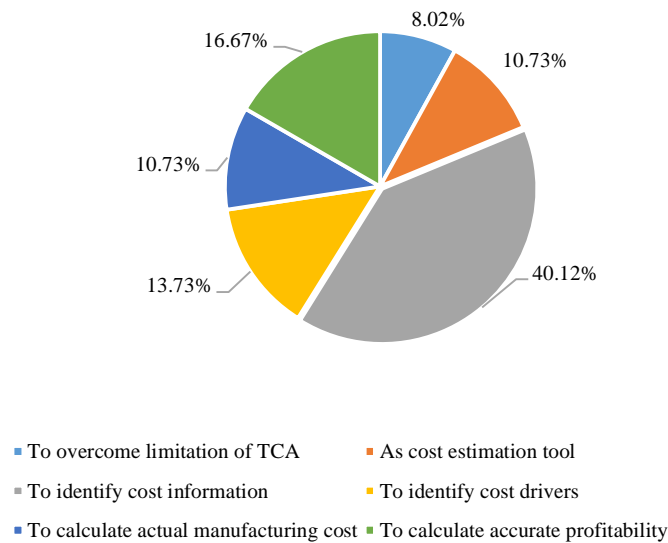


Figure 2 Significant roles of ABC usage.

METHODOLOGY

The xxx company has total of 10 palm oil estates in Malaysia. There are Cheekah Kemayan Estate, Darabif Estate, Juase Estate, Prosper Kemayan Estate, PSK Estate, Rompin Palm Oil Mill, Semai Sempurna Estate, SG Enggang Estate, SG Sisek Estate and Simpai Estate. One of their goal is to fulfill cultivation of oil palm. Therefore, accurate profitability is very important to support the company grow sustain and rapid in order to achieve their goal. The targeted estate in this work is Simpai Estate. The total size of it is 2642.9 acre. It included 2 areas which are matured area and immature area which consist 1559.00 acre and 1081.90 acre respectively. For matured area, it been divided into 2 areas. There are P90A and P91 D which consists of 8 blocks and 5 blocks respectively. For immature area, it also divided into 2 areas. There are PR15 A and PR16 A which of 4 blocks and 5 blocks respectively. The detail about the size of each block is shown in the Table 1.

Table 1 Size of Simpai Estate.

Matured Area										
	Block								Total (acre)	
P90 A	A1	A2	A3	A4	A5	A6	A7	A8		
	96.40	100.80	103.50	89.70	107.00	103.00	91.20	119.30	900.70	
P91 D	D1	D2	D3	D4	D5					
	126.80	151.90	168.30	106.50	104.90				658.30	
									1559.00	
Immature Area										
	Block								Total (acre)	
PR15A	A1	A2	A3	A4						
	173.70	117.90	110.20	124.30						528.10
PR16B	B1	B2	B3	B4	B5					
	138.40	137.90	79.10	138.90	61.50					555.80
									1083.90	

Therefore, this work has selected the matured plant oil area and immature palm oil area for further analysis. In actual practice, there are 6 type of activities involved such as harvesting, manuring, weeding, transport, pruning and oryctes spraying. Subsequently, the processes involved in actual practice has been identified. The wages per day in each process has been identified and recorded in the Table 2.

Table 2 Wages for process involved.

Process	Wages (MYR/day)
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Harvesting	50
Manuring	55
Weeding	50
Transport	50
Pruning	45
Oryctes Spraying	45

Besides, the production of palm oil is very important to the palm oil estate. This is because it will directly influence the income of the company. The production of palm oil per month in year 2017 has been identified and recorded in the Table 3.

Table 3 Production on palm oil per month in 2017.

2017	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Matured (Tones)	1224	1224	1088	1088	952	816	1224	1360	1224	1088	1088	1224
Immature (Tones)	55	68	77	88	88	99	99	99	99	110	110	110
Total (Tones)	14702											

Analysis of the data was done by using ABC method. It is used to overcome the limitation of TCA method. It is moving the costing method from volume based to activity based. Generally, the ABC assign the indirect costs to centres and costs from the centres and also the costs from activities to cost objects. Step one is to define activities that involved in the production process. Different companies will have different types of products. So, there will have different number of activities centre. The manufacturing cost is more accurate when there is larger the number of activities centre. However, there might consists some activities that may or may not be directly relevance in the production process. In order to reduce the complexity of ABC method, the critical activities been selected under junior assistant manager in xxx industry. Identify proper cost drivers for each activity would be the second step. After identifying the activities involved in the production, the proper cost drivers of each activity should be identified. Cost driver is the rootcause that effect the expense of a production operation. Management would allow to determine the real causes to perform an activity. Third step is allocating resources cost to each activity. Firstly, the resources cost used to operate each activity has to be measure. A unit of work done within the organization are the activities that done within the organization. Next, the amount of overhead cost required by those activities has to be forecast and allocated in percentage. In fact, the resources costs are already recorded in the existing accounting system like the salaries, supplies and utilities. Overhead cost apportioned into different activities. Besides, overhead cost would be apportioned based on percentage for categories such as consumables, salaries, materials cost and other costs. The cost information obtained is more accurate when the larger the number of categories. Estimating the cost per unit of activity driver would be the fourth step. The purpose of an activity driver is as a cost drive to estimate the required cost of an activity. The activity cost or the cost consumed by the cost object should be proportional to the activity driver. For example, the direct labor cost will drive the cost of activity labor cost. The more employees required, the more the direct labor cost. A process or product that required two employees to work will be allocated twice as much in direct labor cost. The list of the activities performed in the business and total activity cost would be the outcome. The cost obtained is more accurate when the larger the number of activity driver of activity cost. However, there is only one or two activity drivers be considering in order to reduce the complexity of the costing. The last step is preparing a list of activities for each of the product. Any product for which the management wants a separate cost measure is a cost object. Total yearly expenses would be obtained after annual quantity if cost driver consumed multiply with the cost per unit of activity driver. The outcome is a total expense for each product, which includes a list of activities and costs of the product. Therefore, the accurate profitability will be obtained. As a result, actual cost information and proper cost drivers will be obtained using this ABC method. Therefore, accurate profitability will be calculated and it's moving the production from moving based to activity based.

RESULT AND DISCUSSION

In actual practice, the estate practiced 6 type of main activities which are harvesting, manuring, weeding, transport, pruning and oryctes spraying. The main function of each activity as shown in Table 4.

Table 4 Function of activities involved.

No	Activity	Function
1	Harvesting	To harvest the ripen palm oil fruits.
2	Manuring	To supply nutrient to plant and improve growth and productiveness of plants.
3	Weeding	To removed unwanted plant that around the palm oil tree.
4	Transport	To collect and send the harvested palm oil fruits to factory.
5	Pruning	To remove the excess branches of palm oil and observe whether the palm oil fruits ripened or not.
6	Oryctes Spaying	To kill the insert that would damage the palm oil.

By using ABC method, it allowed scrutiny of the complete map of activities and the relationships that connect them in Figure 3.

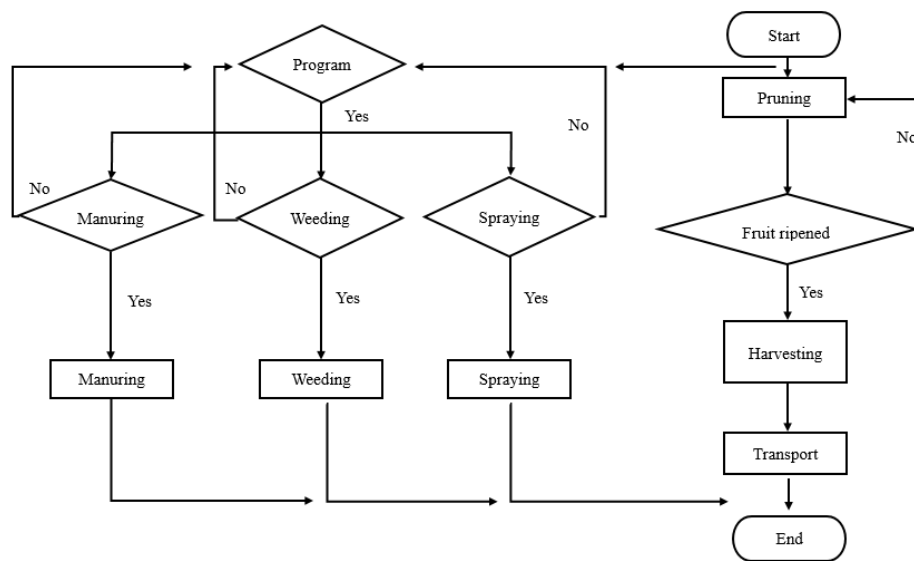


Figure 3 Process flowchart.

First, it starts with activity pruning. The workers use a chisel to remove the branches of immature palm oil trees but for matured palm oil trees they use sickle with a long adjustable aluminum rod. Sharpening stone might be used for sharpening the edge of the tools again. Through pruning, the worker able to define whether the palm oil fruits ripened or not. Next, it continues with activity harvesting. The purpose of this activity is to harvest and collect ripen palm oil fruits. For the palm oil trees that under 5 years old will go for immature harvesting and the palm oil trees that over 5 years old will go for matured harvesting. Same with pruning, the worker uses a chisel for immature palm oil trees and sickle with a long adjustable aluminum rod for matured palm oil trees. To sharpen the edge of tools, a sharpening stone might be used. A hook and wheelbarrow are used to collect the fruits that been harvested. Besides that, a loose fruit collector would be used to collect the loose fruits that drop on the ground. After that, those fruits will be gathered on the side of the road and waiting for transport to a palm oil factory. Then, the worker will send the collected fruits to a palm oil factory by truck for palm fruit oil extraction. A hook and loose fruit collector are used to collect the fruits into the truck. The quality and quantity of the oil will be affected if the transportation of palm oil fruited been delayed. Therefore, the worker must always send the collected fruits to a palm oil factory on times to prevent loss. In order to control the production of palm oil fruits, some programs will be carried out. The programs are manuring, weeding and oryctes spraying. Improper planning of those programs will affect the quality and the quantity of palm oil fruits. Therefore, those programs normally are organized by the plant-based dietitian. Manuring is one of the programs, the purpose of this program is to supply nutrient to plant and improve growth and productiveness of plants. The worker will pack the fertilizers into some plastic bags by a container. Then, the worker will carry them to the plantation by using a bucket. After the worker put the fertilizer to the plant, the plastic bag will hang on the branches of the plant as a remark. So, the worker able to trace back which sector of palm oil trees been fertilized. Weeding is another program. The goal is this activity is to remove the unwanted plants

around the palm oil trees. By this activity, worker able to collect and spot the loose fruits on the ground easily. Other than that, harvesting and application of fertilizers can be more efficiency. Weeding can be divided into manual weeding and chemical weeding. Manual weeding is carried out by using chisel, spade and rake. Weeding that using chemical and knapsack sprayer would be the chemical spraying. Glyphosate is one of the examples of the chemical. Generally, chemical weeding is more efficient than manual weeding. However, some unwanted plant is not easily removed by using chemical weeding and the chemical may cause some damages to the palm oil trees. Therefore, proper planning of this program is high indeed. The last main activity is oryctes spraying. As we all know, pests may cause damage to our plants where palm oil trees can't be an exception as well. For palm oil plantation, there are few pests existing, such as scales, mealybugs, leaf webworm, psychid, slug caterpillar and rhinoceros beetle. Therefore, oryctes spraying is one of the effective ways of facing pests. The worker usually spraying the chemical such as hexa cyper and bulldoze by using a knapsack sprayer. Same as weeding, the chemical used in oryctes spraying may cause some damages to the palm oil trees. So, it is very important to have proper planning for this program.

ABC helps management to has a better understanding of each of these activities. They were also able to assign the costs and resources more precisely through the details of each of these activities. Through the analysis by using ABC method, the cost information of each activity involved in palm oil plantation will be declared in this section. The accuracy of data is based on some reviews, reports of the company that carried out this study and the current market price. Based on the review of labor productivity in the Malaysian oil palm plantation sector, a manpower able to take care of 10 hectares of lands (Azman, 2015). Besides, another review states that a hectare of land usually consisting of 135 trees of palm oil trees (Ramli, 2011). Other than that, a hectare of land normally able to produce 4 to 5 tons of palm oil fruits (Mahat, 2012). Therefore, there are some assumptions for the following data analysis:

1. This study is considered as the monthly expenses of a palm oil plantation.
2. There is 30 working day monthly.
3. Only one manpower is considered, and its monthly wage is RM 1500.
4. The land size that covered in this study is 10 hectares.
5. The number of palm oil trees is 1350 trees.
6. There are 45 tons of palm oil fruits to be collected.
7. The costs are based on the reports and the current market price.
8. All activity is carried out smoothly and without any delay.

The detail cost information of activity pruning is shown in Table 5. It included the labor cost, transportation cost and cost for the tools used in this activity.

Table 5 Cost information of activity pruning.

No	Type	Unit	Cost / Unit	Cost (MYR)
1	Labor	3 days	50.00	150.00
2	Transport	3 days	10.00	30.00
3	Chisel	2 units	30.00	60.00
4	Sickle	2 units	40.00	80.00
5	Aluminum rods	1 unit	100.00	100.00
6	Sharpening Stone	1 unit	30.00	30.00
Total				450.00

By using ABC method, it helps to break down the costs information in order to lead management to have better decision making. From Table 5, it shows that the worker usually spends 3 days per month for pruning and the labor cost is the highest cost among others. The relationship as shown in Figure 4.

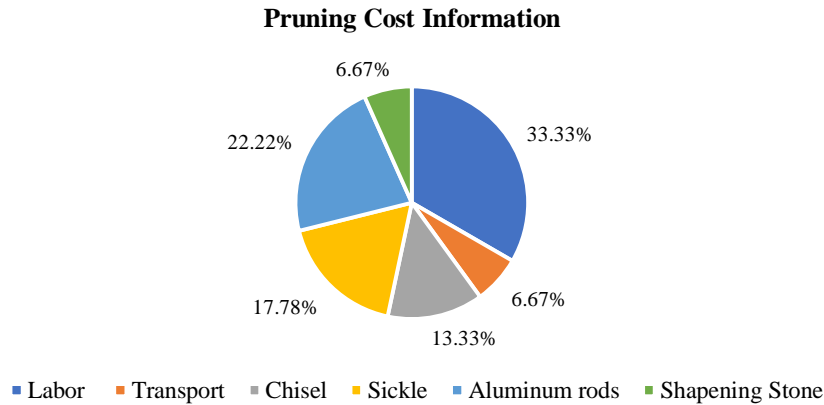


Figure 4 Cost information of activity pruning.

From Figure 4, it figures out that there is 33.33% of costs spent on the labor cost, while 6.67% of costs spend on transportation of the labor, and there is 13.33%, 17.78%, 22.22% and 6.67% of costs spent on the chisel, sickle, aluminum rods and sharpening stone respectively. In other words, there is 60.00% of total expenses been used for the equipment of this activity, 33.33% for labor cost and 6.67% for transportation fees. Those details information would lead management to have better decision making in assigning the costs and resources. For example, management might be assigning more costs and resources in tools and equipment in order to carry out this activity smoothly.

The detail cost information of activity harvesting is shown in Table 6. The immature harvesting and matured harvesting are mostly the same. The only different is immature harvesting using a chisel and matured harvesting using sickle with a long adjustable aluminum rod. Therefore, they are combined and considered as one activity in this calculation. It included the labor cost, transportation cost and cost for the tools used in this activity.

Table 6 Cost information of activity harvesting.

No	Type	Unit	Cost / Unit	Cost (MYR)
1	Labor	12 days	50.00	600.00
2	Transport	12 days	10.00	120.00
3	Wheelbarrow	1 unit	450.00	450.00
4	Chisel	3 units	30.00	90.00
5	Sickle	3 units	40.00	120.00
6	Aluminum rods	3 units	100.00	300.00
7	Loose Fruit Collector	2 units	5.00	10.00
8	Hook	2 units	10.00	20.00
9	Sharpening Stone	1 unit	30.00	30.00
Total				1,740.00

The costs information of a complicated process or activity able to be analysis the complicated manufacturing processes easily by using ABC methods. From Table 6, it shows that the worker usually spends 12 days per month for harvesting and the labor cost is the highest cost among others. The relationship as shown in Figure 5.

Harvesting Cost Information

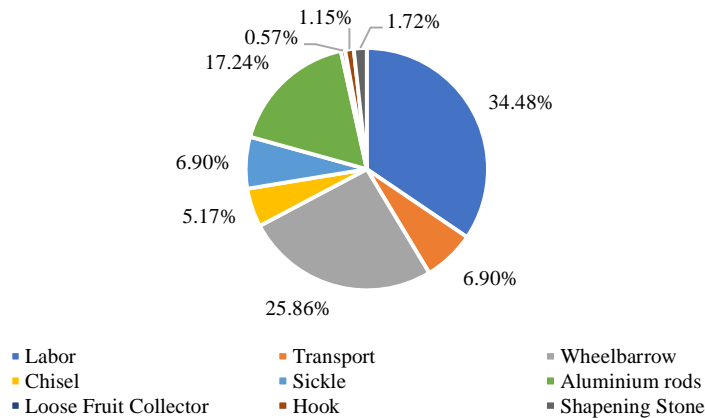


Figure 5 Cost information of activity harvesting.

From Figure 5, it figures out that there is 34.48% of costs spent on the labor cost, while 6.90% of costs spend on transportation of the labor, and there is 25.86%, 5.17%, 6.90%, 17.24%, 0.57%, 1.15% and 1.72% of costs spent on the wheelbarrow, chisel, sickle, aluminum rods, loose fruit collector, hook and sharpening stone respectively. In other word, there is 58.62% of total expenses been used for the equipment of this activity, 34.48% for labor cost and 6.90% for transportation fees. This complicated costs information able to be declared and analysis easily through ABC method. The management is able to understand how the cash flow in this activity. The detail cost information of activity transport is shown in Table 7. It included the labor cost, transportation cost and cost for the tools used in this activity.

Table 7 Cost information of activity Transport.

No	Type	Unit	Cost / Unit	Cost (MYR)
1	Labor	6 days	50.00	300.00
2	Transport	6 days	10.00	60.00
3	Hook	1 unit	10.00	10.00
4	Loose Fruit Collector	1 unit	5.00	5.00
5	Diesel & Maintenances	-	-	500.00
Total				875.00

Through ABC method, the most cost-consuming activities and resources will be highlighted. It would help management to support cost containment process. From Table 7, it shows that the worker usually spends 6 days per month to transport the fruits to a palm oil factory and the diesel and maintenances cost is the highest cost among others. The relationship as shown in Figure 6.

Transport Cost Information

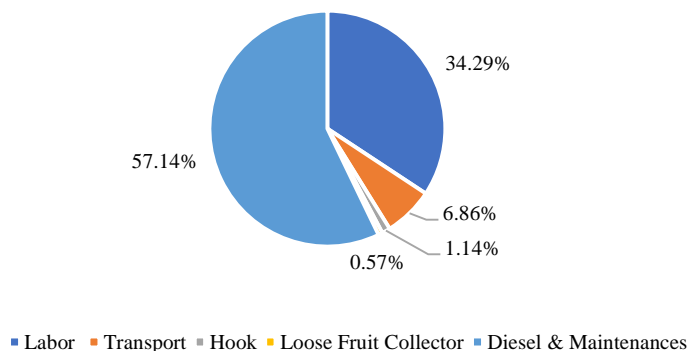


Figure 6 Cost information of activity transport.

From Figure 6, it figures out that there is 57.14% of costs spent on diesel and maintenances, 34.29% of costs spent on the labor cost, while 6.86% of costs spend on transportation of the labor, and there are 1.14% and 0.57% of costs spent on the hook and loose fruit collector respectively. In other words, there is 57.14% of total expenses been used for diesel and maintenances of this activity, 34.29% for labor cost, 6.86% for transportation fees and 1.71% for the equipment of this activity. By highlighting the cost-consuming activities and resources, the management able to control and allocate the costs more precisely and easily. Therefore, this activity able to operate more efficiently and smoothly. The detail cost information of activity manuring is shown in Table 8. It included the labor cost, transportation cost and cost for the tools and fertilizers used in this activity.

Table 8 Cost information of activity manuring.

No	Type	Unit	Cost / Unit	Cost (MYR)
1	Labor	5 days	50.00	250.00
2	Transport	5 days	10.00	50.00
3	Fertilizer	25 bags	15.00	375.00
4	Container	2 units	2.00	4.00
5	Buckets	2 units	5.00	10.00
6	Plastic bag	1350	0.05	67.50
units				
Total				756.50

Furthermore, ABC able to help management to control costs and enhance the processes. From Table 8, it shows that the worker usually spends 5 days per month for manuring and the fertilizer cost is the highest cost among others. The relationship between them is shown in Figure 7.

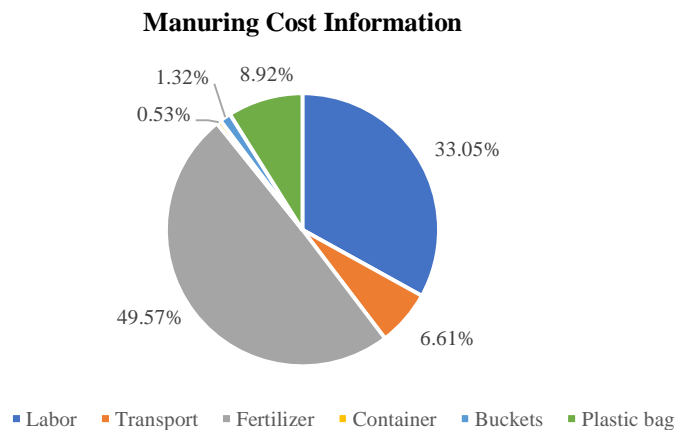


Figure 7 Cost information of activity manuring.

From Figure 7, it figures out that there is 49.57% of costs spent on the fertilizers, 33.05% of costs spent on the labor cost, while 6.61% of costs spend on transportation of the labor, and there is 0.53%, 1.32% and 8.92% of costs spent on the containers, buckets and plastic bags respectively. In other words, there is 49.57% of total expenses been used for the fertilizers, 33.05% for labor cost, 10.77% total expenses been used for the equipment of this activity and 6.61% for transportation fees. Therefore, management able to control costs and enhance this activity under this detail costs information. Management is able to control the manufacturing costs in order to reduce overhead costs and maximize profit. The detail cost information of activity weeding is shown in Table 9. It included the labor cost, transportation cost and cost for the tools and chemicals used in this activity.

Table 9 Cost information of activity weeding.

No	Type	Unit	Cost / Unit	Cost (MYR)
1	Labor	4 days	50.00	200.00
2	Transport	4 days	10.00	40.00
3	Knapsack sprayer	1 unit	130.00	130.00
4	Chisel	2 units	30.00	60.00

5	Spade	1 unit	25.00	25.00
6	Rake	1 unit	8.00	8.00
7	Sharpening Stone	1 unit	30.00	30.00
8	Chemical	-		80.00
Total				573.00

ABC method would help the administration to approach correct and reliable product cost data of a manufacturing process. From Table 9, it shows that the worker usually spends 4 days per month for weeding and the labor cost is the highest cost among others. The relationship between them is shown in Figure 8.

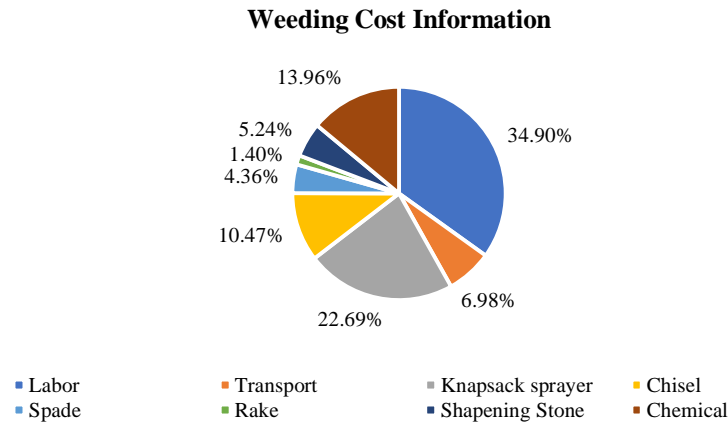


Figure 8 Cost information of activity weeding.

From Figure 8, it figures out that there is 34.90% of costs spent on the labor cost, 13.96% of costs spend on chemical, while 6.98% of costs spend on transportation of the labor, and there is 22.69%, 10.47%, 4.36%, 1.40% and 5.24% of costs spent on the knapsack sprayer, chisel, spade, rake and sharpening stone respectively. In other words, there is 44.15% of total expenses been used for the equipment of this activity, 34.90% for labor cost, 13.96% for chemicals and 6.98% for transportation fees. Through the cost information above, the management able to calculate their expenses on this activity and obtain the accurate product cost easily. This would help management to maximize the profit and as the motivation for business to grow over time. The detail cost information of activity orcytes spraying is shown in Table 10. It included the labor cost, transportation cost and cost for the tools and chemicals used in this activity.

Table 10 Cost information of activity orcytes spraying.

No	Type	Unit	Cost / Unit	Cost (MYR)
1	Labor	2 days	50.00	100.00
2	Transport	2. days	10.00	20.00
3	Knapsack sprayer	1 unit	130.00	130.00
4	Chemical	-		40.00
Total				290.00

ABC also helps management to trackback the costs to the products within an activity. From Table 10, it shows that the worker usually spends 2 days per month for orcytes spraying and the equipment cost which the knapsack sprayer is the highest cost among others. The relationship between them is shown in Figure 9.

Oryctes Spraying Cost Information

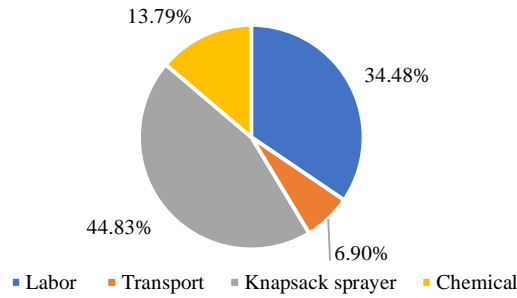


Figure 9 Cost information of activity oryctes spraying.

From Figure 9, it figures out that there is 44.83% of costs spent on knapsack sprayer, 34.48% of costs spent on the labor cost, while 13.79% of costs spend on chemicals, and there is 6.90% of costs for the transportation fees. Through this detail cost information, all the expenses able to be trackback easily. Therefore, management able to always have a true picture of expenses and resources that been consumed. The detail cost information for each activity involved in palm oil plantation is shown in Table 11. It included the cost driver, overhead cost, time spent, cost driver quantity and cost driver rate for each of the activity.

Table 11 Overview cost information.

No	Activity	Cost Driver (activity)	Overhead Cost (MYR)	Time Spent (%)	Cost Driver Quantity	Cost Driver Rate (MYR)
1	Harvesting	Number of palm tree	1740.00	37.14	1350 trees	1.29 per tree
2	Manuring	Bags of fertilizer	756.50	16.15	1350 bags	0.56 per bag
3	Weeding	Number of pumps	573.00	12.23	50 pumps	11.46 per pump
4	Transportation	Mass of palm oil fruit	875.00	18.68	45 tones	19.44 per ton
5	Pruning	Number of palm tree	450.00	9.61	1350 trees	0.33 per tree
6	Oryctes Spraying	Number of pumps	290.00	6.19	30 pumps	9.67 per pump
Total			4684.50	100.00		

From Table 11, the proper cost driver for each activity has been listed. Proper cost driver of each activity is very important in ABC method because the cost driver represented the causes of overhead costs of each activity. The cost driver of activity harvesting, and pruning be defined in this study is the number of the palm tree. The more the number of the palm tree, the higher the overhead cost. For manuring, the bag of fertilizer should be the most suitable cost driver for this activity. Next, the number of pumps is the cost driver for activity weeding and oryctes spraying. Lastly, the mass of palm oil fruits would be the cost driver of activity transport. By using those cost drivers, the total overhead cost would be calculated correctly. Besides, ABC also empowers the transparency of how assets are devoured and the expense or cost of a decent or administration. Table 11 revealed that the total overhead cost for 10 hectares palm oil plantation per month is MYR 4684.50. The activity harvesting consists of the highest overhead cost which equals to MYR 1740.00 (37.14%). It followed by activity transport, manuring, weeding, pruning and oryctes spraying which consists overhead cost of MYR 875 (18.68%), MYR 756.50 (16.15%), MYR 573.00 (12.23%), MYR 450.00 (9.61%) and MYR 290.00 (6.19%) respectively. The relationship between each activity has been shown clearly in Figure 10.

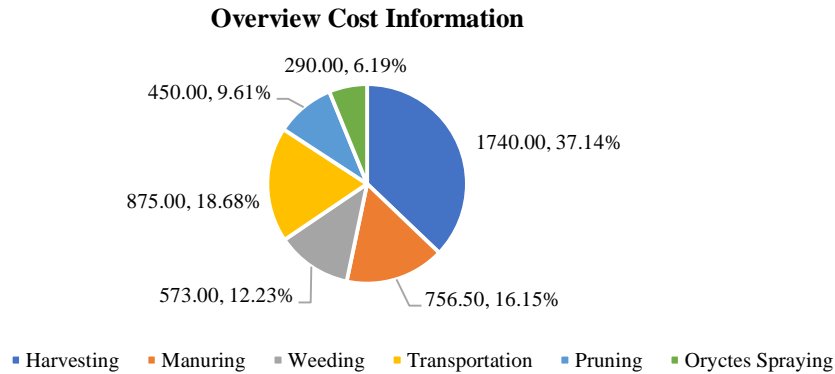


Figure 10 Overview cost information.

ABC method also provide management a cost estimation tool to estimate manufacturing costs by using the cost driver rate of each activity that listed in Table 11. The cost driver rate for activity harvesting is MYR 1.29 per tree, MYR 0.56 per bag for manuring, MYR 11.46 per pump for weeding, MYR 19.44 per ton for transport, MYR 0.33 per tree for pruning and MYR 9.67 per pump for oryctes spraying. The expected monthly manufacturing costs of Simpai Estate of xxx company is calculated and listed on Table 12.

Table 12 Expected monthly manufacturing cost.

No	Activity	Cost Driver (activity)	Overhead Cost (RM)	Time Spent (%)	Cost Driver Quantity	Cost Driver Rate (RM)
1	Harvesting	Number of palm tree	183902.40	37.14	142560 trees	1.29 per tree
2	Manuring	Bags of fertilizer	79833.60	16.15	142560 bags	0.56 per bag
3	Weeding	Number of pumps	60508.80	12.23	5280 pumps	11.46 per pump
4	Transportation	Mass of palm oil fruit	92378.88	18.68	4752 tones	19.44 per ton
5	Pruning	Number of palm tree	47044.80	9.61	142560 trees	0.33 per tree
6	Oryctes Spraying	Number of pumps	30634.56	6.19	3168 pumps	9.67 per pump
Total			494303.04	100.00		

The total area of Simpai Estate of xxx company was around 2640.90 acres or 1056.36 hectares. Therefore, the cost driver quantity for harvesting would be 142560 trees, 142560 bags for manuring, 5280 pumps for weeding, 4752 tones for transportation, 142560 trees for pruning and 3168 pumps for oryctes spraying. Therefore, the overhead cost for activity harvesting is MYR 183902.40 (37.14%) and MYR 79833.60 (16.15%), MYR 60508.80 (12.23%), MYR 92378.88 (18.68%), MYR 47044.80 (9.61%) and MYR 30634.56 (6.19%) for activity manuring, weeding, transportation, pruning and oryctes spraying respectively. As a result, the expected monthly manufacturing cost of Simpai Estate of xxx company from Table 12 was MYR 494,303.04. The actual profitability of the company is able to be identified easily by using the actual manufacturing cost that been found in this study. Through this study, it is strong proven that ABC method is one of the best methods to allocate costs and resources in certain products or processes. It even shows a good result in a palm oil plantation sector. The complete overview cost information that provided by Table 12 would support administration to allocate costs and resources more precisely. Firstly, ABC method would help to obtain a true picture of a products or processes. This is because ABC is based on the activities and every single activity would be studied and analyzed. It would increase the cost transparency of a products or processes. By the help of Table 11, the cost information of each activity has been listed and recorded. Every expenses of each activity could be highlighting easily. Therefore, management able to has a better understanding of a products or processes and make a better decision making. Next, ABC method helps management to obtain the proper cost drivers of each activity. Cost driver is the cause to has a cost. A proper cost driver would help management has a better idea about the true

cause that makes overhead costs to products or processes. For example, the cost driver of activity harvesting is the number of trees but not the size of an area. This is because there might be the different number of trees in an area. So, the number of trees should be the proper cost driver of activity harvesting. The greater number of trees, the higher the cost. Based on the cost drivers, management able to allocate the costs and resources more accurately and reduce wastes of each activity. Therefore, management would fully understand how the cash flow in and out of a products or processes. Furthermore, ABC would help management to has a better cost estimation tool. The cost driver rate of each activity has been listed in Table 11. Those cost driver rates would help management to do forecasting and estimate the expected expenses in the future. For example, the cost driver rate of activity harvesting is MYR 1.29 per tree and the targeted trees to be harvest is 3000. The expected expenses can be easily calculated by multiplying 3000 with MYR 1.29 with equal to MYR 3870. In short, management able to has better cost estimation for the future under the support of Table 11. The last but not least, ABC also help management to declare the actual manufacturing costs of a product or process. From Table 12, the expected monthly expenses of Simpai Estate of xxx company has been calculated with is MYR 494303.04. So, the management able to obtains the actual profitability of it easily by deduction of the profit and the manufacturing costs that been calculated. In short, ABC would help the management to identify how the actual money that flows in and out in order to grow sustain and rapid. However, there is some limitation of the ABC method. Firstly, it is a costly method. It consumes a lot of times and resources in order to obtain actual cost information. Wrong cost information would lead the products or processes work inefficiency and lead to wastes. Besides, improper cost drivers of an activity would lead the management to make a wrong decision because there are wrong costs and resources been allocated. Lastly, inaccurate profitability would cause the company hard to further expand their business.

CONCLUSIONS

This work successfully identified actual cost information has been achieved because all the activities involved in the palm oil plantation have been identified in Figure 3 (Process flowchart). It has shown all the activities involved and how they work. Besides, we able to identify how the cash flow in and out for each activity and actual cost information is obtained from Table 5 (Cost information of activity pruning) to Table 10 (Cost information of activity oryctes spraying). This work also identified cost drivers which support management assign costs and resources correctly and work more efficiency. The proper cost drivers for each activity has been declared and listed in Table 11 (Overview cost information). Finally, this work obtained the expected monthly expenses of Simpai Estate of xxx company was MYR 494303.04. Therefore, the management may able to identify how the actual money that flow in and out in order to grow sustain and rapid.

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