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Application of Activity Based Costing for Palm Oil Plantation

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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 about its profit loss and gain for the next 20 to 30 years. Subsequently, Traditional Cost Accounting (TCA) which the manufacturing overhead are driven by the production volume are being applied. The inaccurate cost estimation will lead the management hard to do decisions making. 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 analyse the costing of every activities involved in the palm oil plantation. Under the support of actual cost information and proper cost drivers, accurate profitability will able to be calculated. Accurate profitability is the most important factor for the management to identify on the money that process in order to maintain rapid but sustainable growth. Therefore, ABC system will provide actual cost information and proper cost drivers for each of the activities being involved. Thus, it makes the company's profitability more accurate.

INTRODUCTION

The oil palm tree come 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. 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 government 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]. The rationalization of refining and fractionation of palm oil products indicated by the first Malaysian Industrial Master Plan (IMP) during 1986s to 1995s. This is to increase efficiency and competitiveness of Malaysia's palm oil industry among the world market. This made Malaysia a hub for downstream processing, as it was more cost- effective than processing refined products in Europe [1]. 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 (MPOC) for positioning Malaysia through promotional activities as an international market leader in oil and fat [1]. Malaysia is currently the world's largest exporter of palm oil, though after neighbouring 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 [2].

At the same time, the Consortium for Advanced Management-International (CAM-I), an international consulting group also introduced a formative role to study and codify the principles. Then more formally known as Activity Based Costing (ABC). Activity Based Costing (ABC) aim to determine the casual and impact relationships in order to allocate costs objectively. Compared with conventional cost accounting method, Activity Based Costing (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 [3].

To implementing Activity Based Costing (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 Activity Based Costing (ABC) for measurement. Generally, four simple steps were required to implementing Activity Based Costing (ABC). There are identify activities, allocate resource costs to activities, identify outputs and assign activity costs to outputs. The concept of Activity Based Costing (ABC) method is shown as the Figure 1 below.

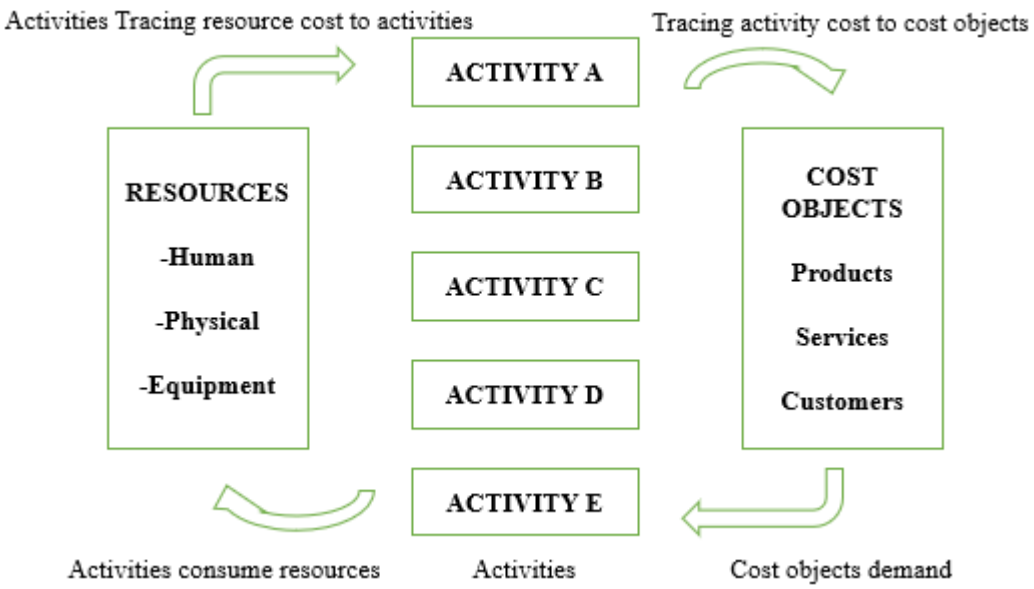

Figure 1 Concept of Activity Based Costing (ABC) method

Activity Based Costing (ABC) had been widely used due to its several advantages. Activity Based Costing (ABC) allow the company to obtain an accurate costing information about a product or services. Activity Based Costing (ABC) helped to understand how to allocate resource and finding for activities to each process [4]. The company will have a clear picture about their cost drivers and relative profitability for their profitable activities. This analysis information will assist the management in doing decision making to maximize their profits. Activity Based Costing (ABC) helps to improve the business processes. This is because all the activity involved to produce a product or service will be clearly defined by Activity Based Costing. From that, we can determine which process or activity are doing well and which ones required to be improved. Activity Based Costing (ABC) provided a means for analysing non-value-added activity workbooks that neglect resource constraints in activity [5]. So, we allow to reduce the operating costs by eliminating non-value-added activity. In addition, Activity Based Costing (ABC) also helps to identify the wastes of a product or service. Activity Based Costing (ABC) will allocate all the resource costs needed for a product or service. Those costs information will allow the us to determine which activities are heading the overhead costs. So, the decision makers allow to decide whether improve or eliminate all the

company's inefficient activities under the support of Activity Based Costing (ABC) [6]. It will help the company to reduce the costs by eliminating the wastes of a product or service.

In real life, the concept and application of Activity Based Costing (ABC) had been proven far beyond the academic discussion. Activity Based Costing (ABC) had been widely applied in many different areas like environment, engineering, healthcare etc. For environment, concept of Activity Based Costing (ABC) has been used to develop an optimal decision-making model for Taiwan's hybrid green power strategy [4]. From this research, the main problem in this research is there was unstable electricity supply for economic development and residential life in Taiwan. Therefore, green electric power system is very important for Taiwan as a new electricity source. A comprehensive model which developed based on Activity Based Costing (ABC) helped the management to have a clear picture about the actual cost information and understand all the activities involved in each of the process of green electric power system. 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 Activity Based Costing (ABC) in an Indian steel plant [7]. The main problem was the steel plant lack of accurate cost information to support their managerial decisions. This situation has led the steel plant to operate through inefficiency activities and resources. 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 resources planning. For healthcare, an Activity Based Costing (ABC) approach was used to develop a cost estimation model to identify cost information for an Assisted reproductive technology (ART) treatment in Italy [8]. The most critical issue in this research was lack of proper costing tool to estimate the costs required of an Assisted reproductive technology (ART) treatment in Italy. 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. The particulate treatment even been improved by eliminate inefficiency activities and resources. Figure2 shows the illustration of pie chart that show the percentage of distribution of seven categories. Based on the pie chart, the information of percentage can be stated as the highest percentage that applied ABC in area of engineering, 37% followed in area financial, 33% healthcare,15%, environment, 8%, education, 3%, historical 3%, and agriculture, 1% found in paper review. Based on the percentage, it is clearly stated that the lowest percentage that applied method of ABC in agriculture environment.

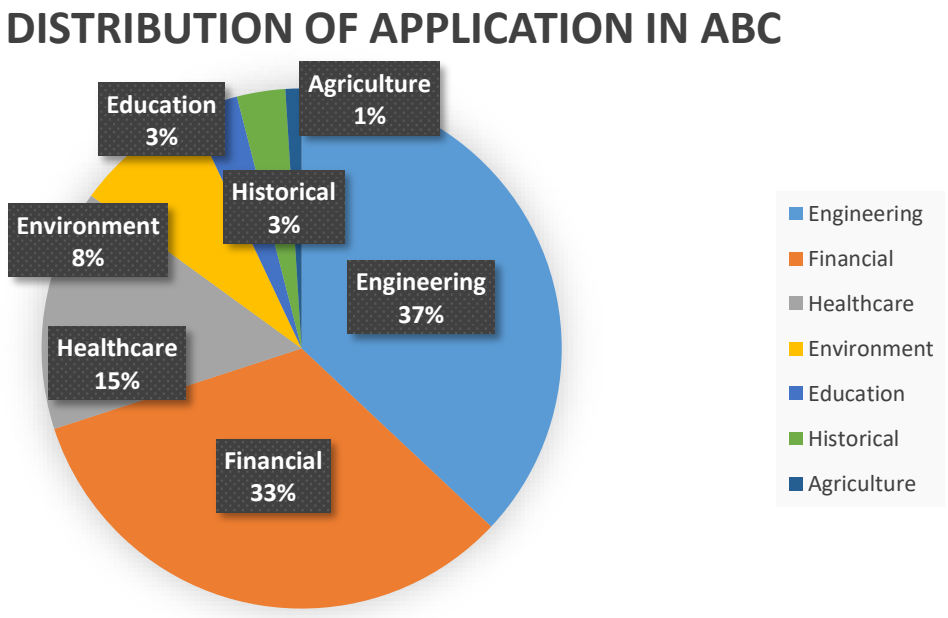

Figure 2 Pie chart of distribution of ABC

METHODOLOGY

In this section, ABC consider 100 papers which published from 2011-2018 to analyse based on types of different journals publications. Table 1 shows classification of ABC papers based on journals publications.

Table 1 Classification MTS papers based on journal publication

Journal publication	Quantity of papers
International Journal of Advances in Economic Research	1
International Journal of Business and Management	1
International Journal of Contemporary Hospitality Management	2
International Journal of Contemporary Hospitality Management	1
International Journal of Economics and Finance	1
International Journal of Production Economics	1
International Journal of Production Research	4
International Journal of Quality & Reliability Management	3
International Journal of Urogynecology Journal	1
International Journal on Digital Libraries	1
IOP Conference Series: Materials Science and Engineering	2
Journal of Accounting & Organizational Change	1
Journal of Accounting, Auditing & Accountability Journal	1
Journal of Advances in Accounting	2
Journal of Air Transport Management	1
Journal of Applied Accounting Research	4
Journal of Arch Orthop Trauma Surg	1
Journal of Asian Review of Accounting	1
Journal of Benchmarking: An International Journal	1
Journal of Business Process Management	5
Journal of Campus-Wide Information Systems	1
Journal of Cleaner Production	4
Journal of Clinical Apheresis	1
Journal of Clinical Lymphoma, Myeloma & Leukemia	1
Journal of Clinico Economics and Outcomes Research	1
Journal of Collection Building	1
Journal of Computers & Operations Research	1
Journal of Construction Innovation	1
Journal of Cost Analysis and Parametrics	1
Journal of Cost Effectiveness and Resource Allocation	1
Journal of Decision Support Systems	1
Journal of Digital Policy, Regulation and Governance	1
Journal of Economics and Finance	3
Journal of Energy Research	4
Journal of Environmental Sciences	1
Journal of Estudios Gerenciales	1
Journal of Global Mobility	1
Journal of Health Care Management Science	3
Journal of Health Economy Review	1
Journal of Health Organization and Management	3
Journal of Health Policy and Technology	1
Journal of Health Services Resources	1
Journal of Industrial Management & Data Systems	3
Journal of Intangible Capital	1
Journal of Library Management	2
Journal of Management Control	1
Journal of Management Science Letters	1
Journal of Manufacturing Technology Management	1
Journal of Mining Technology	1
Journal of Modelling in Management	1
Journal of Nuclear Engineering and Technology	1
Journal of Operational Research	1
Journal of Pathology	1
Journal of Procedia Engineering	2
Journal of Procedia Technology	7
Journal of PSU Research Review	1
Journal of Qualitative Research in Accounting & Management	1

Journal of Quality in Maintenance Engineering	1
Journal of Science of the Total Environment	1
Journal of Sustainability	5
Journal of The Bottom Line	2
Journal of The British Accounting Review	1
Journal of The Electronic Library	1
Journal of The Engineering Economist	1
Journal of Worldwide Hospitality and Tourism Themes	1

After classified ABC papers based on journals publication, research gap can be done in details in results and discussion. In research gap, ABC classified into six significant roles which related to objective.

RESULT AND DISCUSSION

Figure 3 illustrates the pie chart of percentages of significant roles of ABC among research gap that only focus on identify cost information, 40% identify cost drivers 16% and calculate accurate profitability, 14%.

Figure 3 Percentages of significant roles of ABC among research gap

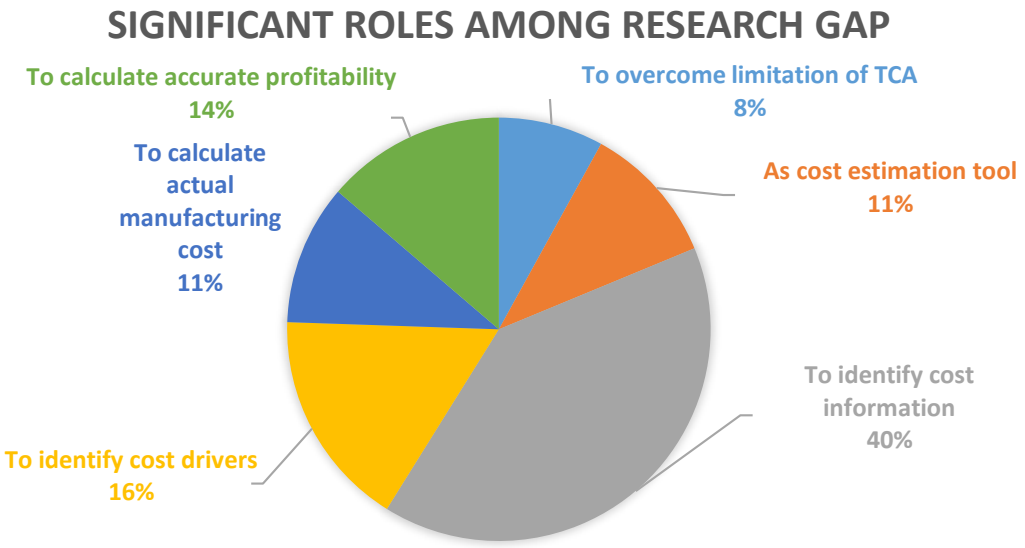

Table 2 shows the significant roles of ABC that shows 40 papers out of 100 papers that shows ABC as to identify cost information, 16 papers out of 100 papers that shows ABC as to identify cost drivers and 14 papers out of 100 papers that shows ABC as to calculate accurate profitability.

Table 2 Significant Roles of ABC

Roles / Author	Overcome limitation of TCA	As Estimation Tool	Actual Cost Information	Identify Cost Drivers	Actual Manufacturing Cost	Actual Profitability
Yang (2018) [4]						
Phan et al. (2018) [9]						
Sembiring et al. (2018) [10]						
McBain et al., (2018) [11]						

Forge and Srivastava (2018) [12]						
Fito et al. (2018) [3]						
Allain and Laurin (2018) [13]						
Tsai and Lu (2018) [14]						
Tsai and Lai (2018) [15]						
Tsai and Jhong (2018) [16]						
Tsai (2018) [5]						
Marinho et al. (2018) [6]						
Beauge et al. (2018) [17]						
Abu et al. (2018) [18]						
Ussahawanitchakit (2017) [19]						
Sorros et al. (2017) [20]						
Martino et al. (2017) [21]						
Chouhan et al. (2017) [22]						
Quinn et al. (2017) [23]						
Lu et al. (2017) [24]						
Lim et al. (2017) [25]						
Crocker et al. (2017) [26]						
Bent et al. (2017) [27]						
Azar et al. (2017) [28]						
Yang et al. (2016) [29]						
Orji et al. (2016) [30]						
Nowak and Linder (2016) [31]						
Linassi et al. (2016) [32]						
Lau et al. (2016) [33]						
Cassettari et al. (2016) [8]						
Parker (2016) [34]						
Lee et al (2016) [35]						
Dwivedi et al. (2016) [7]						
Shigaev (2015) [36]						
Marjanović, et al. (2015) [37]						
Kont (2015) [38]						
Haroun (2015) [39]						
Feng and Ho (2015) [40]						
Esmalifalak et al. (2015) [41]						
Cannavacciuolo et al. (2015) [42]						

Adane et al. (2015) [43]						
Kont (2015) [44]						
Kim et al. (2015) [45]						
Tsai et al. (2014) [46]						
Tsai et al. (2014) [47]						
Ríos-Manríquez et al. (2014) [48]						
Maiga et al. (2014) [49]						
Maiga (2014) [50]						
Laonapaporn et al. (2014) [51]						
Kuo and Yang (2014) [52]						
Intakhan (2014) [53]						
Ibrahim et al. (2014) [54]						
Alsmadi et al. (2014) [55]						
Sonnenberg et al. (2014) [56]						
Mercier and Naro (2014) [57]						
Kolosowski and Chwastyk (2014) [58]						
Tsai et al. (2013) [59]						
Tibesku et al. (2013) [60]						
Sarokolaei et al. (2013) [61]						
Ruiz et al. (2013) [62]						
Nassar et al. (2013) [63]						
Khataie and Bulgak (2013) [64]						
Gregorio and Soares (2013) [65]						
Dessureault and Benito (2013) [66]						
Cugini et al. (2013) [67]						
Carli and Canavari (2013) [68]						
Oh and Hildreth (2013) [69]						
Narita (2013) [70]						
Mirdamadi et al. (2013) [71]						
Gottmann et al. (2013) [72]						
Zhang et al. (2012) [73]						
Wu and Chen (2012) [74]						
Vij and Sanjeev (2012) [75]						
Tsai et al., (2012) [76]						
Tsai et al. (2012) [77]						
Schulze et al. (2012) [78]						

Qingge (2012) [79]						
Palaiologk et al. (2012) [80]						
Lin (2012) [81]						
Cannavacciuolo et al. (2012) [82]						
Burnett et al. (2012) [83]						
Bejar Ghadhab et al. (2012) [84]						
Sacchi et al. (2012) [85]						
Chiarini and Bates (2012) [86]						
Tsai et al. (2011) [87]						
Suthummanon et al. (2011) [88]						
Schoute et al. (2011) [89]						
Novak et al. (2011) [90]						
Nassar et al. (2011) [91]						
Muto et al. (2011) [92]						
Kostakis et al. (2011) [93]						
Jing and Songqing (2011) [94]						
Perego et al. (2011) [95]						
Azizi Ismail (2011) [96]						
Kont (2011) [97]						
Khataie et al. (2011) [98]						
Fang and Ng (2011) [99]						
Levant et al. (2011) [100]						

In addition, six significant roles of Activity Based Costing (ABC) has been identified from the research. Those significant roles are shown as below.

i. To overcome limitation of Traditional Cost Accounting (TCA) method

Activity Based Costing (ABC) providing accurate, timely and reliable information to managers in order to make decisions mention by Alsmadi (2014) [55]. Besides, Activity Based Costing (ABC) helped to determine the process cost of contemporary production processes mention by Kolosowski and Chwastyk (2014) [58]. ABC provided a more accurate product cost than traditional cost methods mention by Kont (2011) [97].

ii. As cost estimation tool

Activity Based Costing (ABC) helped to doing cost estimation during complex processes exist mention by Kim (2015) [45]. Activity Based Costing (ABC) is a proper cost estimation tool to set up budget of a complex project mention by Gregorio and Soares (2013) [65]. Activity Based Costing (ABC) allowed to

estimate production costs and environmental cost accurately mention by Tsai and Jhong (2018) [16]. ABC helped to estimates the product/service costs by assigning the cost to the activities involved in the creation process mention by Khataie and Bulgak (2013) [64].

iii. To identify actual cost information

Activity Based Costing (ABC) provided actual cost information to support management to do decision making mention by Gottmann (2013) [72]. Activity Based Costing (ABC) providing detailed and accurate cost information often required in taking various managerial decisions mention by Dwivedi and Chakraborty (2016) [7]. Activity Based Costing (ABC) provided detailed information for planning and controlling which lead to reducing unnecessarily costs mention by Fang and Ng (2011) [99]. Activity Based Costing (ABC) provided actual cost information that make management easy to provide decision making mention by Parker (2016) [34].

iv. To identify cost drives

Activity Based Costing (ABC) helped to understand how to allocate resources and funding for activities to each system through appropriate cost drivers mention by Tsai (2014) [47]. Activity Based Costing (ABC) helped for effectively computing values of cost drivers as well as making accurate cost estimations mention by Kostakis (2011) [93]. Activity Based Costing (ABC) helped managers understand how to allocate resources for activities through appropriate cost drivers mention by Orji and Wei (2016) [30].

v. To calculate actual manufacturing costs

Activity Based Costing (ABC) provided more detailed information on costs accurately calculate the manufacturing cost of our choice mention by Jing and Songqing (2011) [94]. Activity Based Costing (ABC) 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 mention by Kim (2015) [45].

vi. To calculate accurate profitability

Activity Based Costing (ABC) helped to identify profitable and non-profitable products and account for resource constraints mention by Tsai (2013) [59]. Activity Based Costing (ABC) determined the relative profitability of each market segment mention by Lau (2016) [33]. Activity Based Costing (ABC) helped to provide production plan and achieve the optimal profitable product mix mention by Tsai and Lai (2018) [15].

CONCLUSIONS

In this study, ABC system able to apply in an agriculture environment in order to get actual cost information and proper cost activities for each activity involved in palm oil plantation. Therefore, the more accurate profitability will be calculated. This paper will be including all the methodology to get more accurate result.

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