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## STRATEGIES FOR IMPLEMENTING ACTIVITY-BASED COSTING IN THE UK MANUFACTURING INDUSTRY

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### ABSTRACT

The purpose of this paper is to report the findings with a case study on why *activity based costing* lacks impact in the UK manufacturing industry. *Activity based costing* was performed on selected MT range subsystems of an electrical power generator to compare with the current UNN UK's conventional costing system. The results have found that the current costing system works well for the MT products and thus change of costing system is not necessary for these products. The *activity based costing* system can be partially implemented in UNN UK for areas requiring detailed costing information such as new renewable products. Based on the result of the case study, this paper also highlights the strategies need to be considered in order to adopt *activity based costing* within a typical manufacturing environment.

**Keywords:** Activity Based Costing; Conventional Costing Method; Strategies of implementing ABC in the manufacturing industry

### 1 INTRODUCTION

Managers in many organisations have found that traditional costing methods are no longer able to cope with the change in information required by company management. Many companies found that traditional accounting methods were “too late, too aggregated and too distorted” to support decision making in costing (Spedding and Sun, 1999). Although the potential benefits of Activity Based Costing (ABC) systems were widely discussed (Bharara and Lee, 1996; Rezaiea et al, 2008), interestingly, the overall adoption rate of ABC system in UK is relatively low (Askarany and Yazdifar, 2012). This issue led researchers into investigation for the reasons of low adoption rate. One possible cause could be the contingency factors where the organisation characteristics might affect the adoption decision of ABC. This alone is not sufficient to explain the low adoption rate of the ABC system. Implementation issues such as technical and non-technical factors could also affect the decision for implementing the ABC system. Therefore, the focus of this paper is to demonstrate and discusses the differences between the ABC and Standard Costing methods using a case study approach.

## **2 FACTORS AFFECTING ABC IMPLEMENTATION IN MANUFACTURING INDUSTRY**

The common factors affecting the adoption of an ABC system can be categorised into (i) contingency factors and (ii) technical factors (Chenhall, 2003; Fei and Isa, 2010a).

### **2.1 Contingency factors**

There are a small percentage of organisations have adopted ABC in the UK. A possible explanation for this can be related to the contingency theory. According to (Chenhall, 2003), in this theory, an organisational design depends on contingency factors such as environmental uncertainty and organisational size. The theory has been widely applied in managing costing system design (Chenhall, 2003; Fei and Isa, 2010b). Chenhall (2003) claimed that top management was unlikely to adopt costing systems that did not help to improve performance. Looking from the perspective of contingency theory, adoption of ABC in organisations depends on particular factors or variable of the organisation, and these can be categorised as contingency factors and technical factors. In general, the contingency factors consist of (i) organisation size, (ii) type of competition, (iii) product complexity and diversity, (iv) organisation strategy, (v) organisation structure, (vi) organisation culture and (vii) national culture while the implementation issues include (a) technical factors, (b) top management support, (c) organisation internal politics and (d) economic rationale.

### **2.2 Technical factors**

During the early research on success factors of ABC implementation, researchers believed that the barriers and difficulties for ABC implementation were primarily due to the technical factors (Anderson, 1995). According to authors Cohen et al, (2005), Sartorius et al, (2007) and Fei and Isa (2010a, 2010b), these technical difficulties include:

- (i) defining the scope of the model
- (ii) identifying the main activities
- (iii) cost drivers selection
- (iv) problems in gathering cost data

In addition, there are strong evidences suggested that failure in ABC implementation could be related to lack of support from top management (Anderson et al, 2002). Brown et al, (2004) explained that support from top management could reduce the level of uncertainty of the project as access to resources would become available and management of barriers across organisational boundaries would also increase, making the adoption of ABC easier.

## **3 IMPLEMENTING THE CASE STUDY**

Top management usually considers implementing ABC for the following reasons: (i) increase competition in the market place, (ii) the need to reduce production cost, increase overhead activities and overhead costs, (iii) changes in the nature of product cost and structure of overhead cost. Nevertheless, the contingency factors alone are insufficient for explaining all factors that affect the adoption of ABC. The implementation issues should also be taken into consideration. These include technical difficulties, lack of top management support, organisational internal politics and economical rationale.

### **3.1 The Case study**

MT Range products in power generator (MT11 and MT18) were selected for ABC calculation and synthetic data were used in the case study to protect confidentiality. In this case study, ABC calculation was computed for comparison against the conventional costing method used by UNN UK. The most common product within the ranges of MT11 and MT18 was determined to represent the MT11 and MT18 products. They were MT114E1 and MT184E1. According to Innes et al (2000), there are four major steps in the application of ABC.

- **Identify the main activities**

Kaplan and Anderson (2004) suggested the major approach for identifying main activities is to prepare a standard activity dictionary which would capture and list all activities performed within an organisation.

- **Cost the activities**

After the process of identifying activities, costing the activities is the next task. For activities requiring machining, they were usually monitored by the number of machine use per hour. If these could not be monitored, an estimate from a well knowledgeable employee would be used. For activities sharing a common resource, the cost would be apportioned according to the extent of use. As UNN UK produces a wide range of products, some of the activities in the MT range share the same resources with other products. Among all the activities identified, resources for MT Rotor, MT Stator and MT Assembly were not shared. However, other activities were sharing the same resources and expenses with other products. Thus, estimated percentages from the overall overhead costs were used for assigning costs to the activities in those departments.

- **Select cost drivers**

Lee and Kao (2001) defined cost drivers as factors that drove the cost of operational activities. Cost driver could also be defined as a variable which is a denominator in the rates when applying activity cost to products .

- **Apply cost driver rates to products**

Finally, the cost driver rate for each activity is multiplied to the volume of cost driver units consumed by each activity. The total overhead cost for both MT 11 and MT 18 products are shown in Table 1.

Table 1: Total overhead cost

Activities (MT)	Cost Drivers (MT)	Cost Driver Rate	Annual Driver Volume		Total overhead costs	
			MT11	MT18	MT11	MT18
Contract preparation	Number of product orders	1.50	3,000	5,000	4,500	7,500
Material handling	Number of work hours	1.80	2,000	3,000	3,600	5,400
Storage	Storage size (square meter)	3.29	1,500	2,000	4,929	6,571
Engineering process (MT Rotor)	Number of machine hours	9.98	5,000	10,000	49,897	99,794
Engineering process (MT Stator)	Number of machine hours	8.12	5,000	12,000	40,598	97,434
Engineering process (MT Assembly)	Number of machine hours	15.92	5,000	10,000	79,577	159,155
Quality Assurance	Number of inspection and test				102,557	158,964
Logistic	Number of product orders	25.45	2,000	3,500	50,909	89,091
Maintenance	Number of maintenance work orders				242,851	376,420
Warehousing	Space size	11.20	1,000	2,000	11,200	22,400
Training	Number of training				2,580	3,998
Total					593,197	1,026,727

The overhead cost for both MT 11 and MT 18 was calculated as shown in Table 2 (a). The total production cost for both products are shown in Table 2 (b). The formula for calculating the unit production overhead is shown as follow:

$$\text{Unit Production Overhead} = \frac{\text{Annual Overhead Cost}}{\text{Annual Production of Mach}} \quad (1)$$

Table 2: (a) Unit production overhead; (b) Unit production cost

	Annual Production of Machines	Annual Overhead Cost (£)	Unit Production Overhead (£)
MT11	3,000	593,197	197.73
MT18	5,000	1,026,727	205.35

	MT11 (£)	MT18 (£)
Direct Material	500	850
Direct Labour	100	150
Production Overhead	197.73	205.35
<b>Total unit cost</b>	<b>797.73</b>	<b>1205.35</b>

### 3.2 Comparison of ABC and Standard Costing methods

Table 3 compares the overhead and production costs between the ABC and Standard Costing systems. The overhead costs for MT 11 and MT18 are calculated by ABC which are 6.41% higher and 2.5% lower compared to those calculated on the standard costing system.

Table 3: Unit overhead and production costs

	MT11 Overhead Cost (£)	MT18 Overhead Cost (£)	MT11 Unit production cost (£)	MT18 Unit production cost (£)
Standard Costing System	185.1	210.6	784.20	1211.40
Activity Based Costing	197.73	205.35	797.73	1205.35

The differences in unit production cost between the two costing methods for MT11 and MT18 are 1.7% higher and 0.5% lower respectively. The results from both costing methods are generally very similar and there is no significant difference in the unit production costs between both costing methods. Figure 1 shows the annual production cost for both MT11 and MT18. The ABC system has demonstrated an ‘under-costing’ of £ 40,590 for MT11 and an ‘over-costing’ of £ 30,250 for MT18.

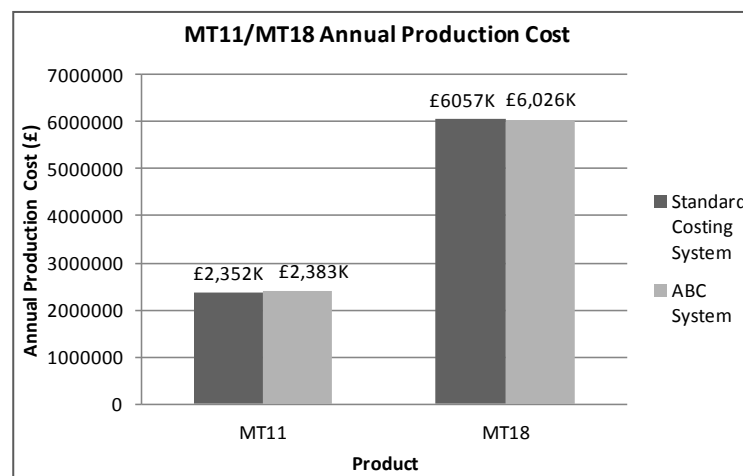


Figure 1: Annual production costs

### **3.3 Case Study Findings**

- The application of the ABC system has reassured the appropriateness of using the Standard Costing system in UNN UK.
- ABC system provides a better visibility and insight which allows the UNN UK top management to monitor the company's process and activity costs.
- The information acquired from the ABC calculation also helps the top management to identify potential cost reduction opportunities to improve decision making.

## **4 RECOMMENDED STRATEGIES FOR IMPLEMENTING ABC**

- (i) Changes will have an impact on most employees. Strong and valid rationale is required to convince all employees to accept the change. This can be related to the national culture of low power-distance and individualism in the UK.
- (ii) Communication to all levels of employees is very important and their opinions have to be taken into account. This increases the difficulties for implementing a change. Ineffective communication among all levels of employees may lead to organisation internal politics. Employees may resist changing when they are in doubts of the intention of the change.
- (iii) Major technical issues for adopting ABC include:
  - Compatibility with the current manufacturing system and IT infrastructures.
  - The complexity of ABC system
  - Difficulties in identifying the main activities, cost drivers and challenges for costing the activities accurately.In addition, ABC system consumes more time in data collection and interpretation and this may delay the decision making. Compared to ABC system, Standard Costing system is a simpler method that provides valuable information in a shorter time.
- (iv) High level of commitments from all levels of employees is necessary to successfully implement the ABC system. The affordability for all resources to implement ABC is also an issue itself. UNN's organisation culture of "attention to detail" in preference to "innovation" implies the less likelihood for ABC Implementation.

Overall, the results from ABC calculation have confirmed that the Standard Costing system in UNN works well for MT11 and MT18 products. This relieves the doubt about the accuracy of overhead cost for these two products. ABC system can be partly implemented to complement the Standard Costing system particularly in the areas requiring detailed information such as new products development for gaining better appreciation and more benefits to the business.

## **5 CONCLUSIONS AND FURTHER WORK**

One of the main reasons that ABC system has not been adopted in UNN is the lack of interest for the ABC system by the top management. The Standard Costing system works well for the size of this company because most products are manufactured in similar ways. The current system is capable of providing valuable information for competing in quality and services because the main costs are material costs (copper and steel).

Recommendations for further work, for example:

- Perform ABC calculation for all ranges of products, especially new emerging products to better understand the cost structure.
- Manually identify the cost drivers which are not available from the current costing system
- Increase the sample size of the questionnaires to include more departmental managers as well as lower level employees within the company.

Both the contingency factors and implementation issues are under investigation involves collaboration with a global leading power generator manufacturer, UNN UK. The study attempts to explore in depth the factors that affect the decision for implementing the ABC system against the conventional cost-

ing system (Standard Costing) through conducting questionnaires and semi-structure interviews with six key stakeholders within UNN.

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