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Application of activity-based costing to a land transportation company: A case study

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ABSTRACT

Although there are many studies in the literature that explain modern costing approaches including activity-based costing (ABC), the number of studies that present real life applications is very few. This is especially true for logistics and transportation applications. One of the main difficulties in land transportation companies is to determine and evaluate true cost of their operations and services. If used and implemented properly, ABC can be very helpful for transportation companies to determine cost of their operations with higher correctness. In this paper, an application of ABC to a land transportation company that is located in Turkey is presented in detail. In order to improve the effectiveness of the ABC an integrated approach that combines ABC with business process modeling and analytical hierarchy approach is proposed. It is figured out that the proposed approach is quite effective in costing services of the land transportation company compared to the existing traditional costing system which is in use.

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1. Introduction

Present age of rigorous international competition and rapidly improving technologies and improving information systems has forced companies to use new business management techniques (Baykasoğlu and Kaplanoğlu, 2006c). Market structures of products and services enforced companies to manage their costs according to business competition. Under severe competition, companies need to become leaner, responsive and agile, with ever-increasing efficiency and effectiveness (Agrawal and Mehra, 1998). In order to retain the competitive status, a company should be able to provide high-quality services/products in a short period of time with lowest possible cost. In order to be able to provide lower costs, accurate cost information is critical for every aspect of business, and it affects the pricing policies and performance reviews (Gupta and Galloway, 2003). This is not a critical issue for

only manufacturing companies, it is also vital for service sector companies including logistics and transportation companies. In a rigorous business environment, manufacturing and supply services have become very hard to maintain satisfactory returns or profits. Therefore, the role of cost estimation for products and services has become more critical. Before the modern business management times, accounting was being just used to record the costs of products and/or services. However, the important role of cost estimation and cost information appeared after the advent of modern business management techniques. This is because traditional cost accounting systems were not able to satisfy the needs of modern business management. This is especially because the traditional cost systems are known to distort the cost information by using traditional overhead allocation methods (Qian and Ben-Arieh, 2008). However, decision makers, assuming information is relevant, prefer more accurate product cost information to less (Charles and Hansen, 2008). As a result, a gap has emerged between the accounting information gathered and the modern business management.

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Many business management concepts have been developed since the global competition had become serious. Organizations have started to practice their improvement of competitiveness. In order to achieve this goal they have started to use modern and advanced process and cost management techniques such as activity-based costing, kaizen costing, total quality management, process improvement, etc. All these kinds of techniques are being used for the sake of process improvement and for increasing the competitiveness of the organizations. Competition for logistics and transportation companies is severe and they are under the pressure of demanding business conditions. Logistics are becoming more and more important because the cost of logistics has a considerable proportion in the total cost of products. Physical distribution cost estimates range from 7.93% to 30% of sales (Davis, 1991). This is generally because of increasing product and/or service differentiations. Therefore, the proportion of logistics costs attract interests of researchers because the improvement of logistics cost has a direct impact on the total cost of products.

Majority of costs occurred in logistics come from the indirect costs of the services provided (Baykasoğlu and Kaplanoğlu, 2006a–c). As the customer needs change drastically and delivery time of goods decrease, the complexity of the logistics processes increase and thereby the indirect cost proportion of the logistic operations increases, even for some organizations, the overheads amount may exceed the amount of direct costs. Therefore, overhead proportion of the total costs of logistics cannot be overlooked during the cost control. The studies performed by “Council of Logistics Management” and “Institute of Management Accountants” presented that firms had increasingly asked logistic managers to plan and manage complex operations and networks while reducing cost and enhancing service (Pohlen and La Londe, 1994). This is a natural consequence of the importance of logistic operations within an organization.

Among all the costs (resources used), the true cost of transportation services provided must be determined accurately. On the other hand, the true costs of the transportation services are not so easy to determine at a first glance because many logistics costs remain buried in overheads and logistics managers do not have adequate visibility or control over their costs (Pohlen and La Londe, 1994) and the cost estimation of the transportation services have not been carried out by using sophisticated costing methods. The cost data recorded has been generally assigned to transportation services directly. However, for an adequate decision support more is needed than just cost assignment. There is a need for an instrument that is capable of linking logistical process information to financial information (Van Damme and Van Der Zon, 1999).

In practice, there are some alternative means to find the cost of logistics services provided. Traditional cost accounting method is widely used in order to find the cost of the logistics services provided. Direct product profitability (DPP) and customer profitability analysis (CPA) are some other mentioned means of logistics costing. The DPP methodology attempts to identify all of the costs asso-

ciated with a product or an order as it moves through the distribution channel (Themido et al., 2000) and CPA tries to identify the true costs associated with servicing an individual customer (Christopher, 1992; Cooper and Kaplan, 1991). However, strict market conditions of logistics necessitate a different cost approach, which combines process conditions, the business costs and process performances. Although there are many studies in the literature which explain modern costing approaches including ABC, the number of studies which present actual case studies are very few. This is especially true for logistics and transportation services. If used and implemented properly ABC can be very helpful for transportation companies to determine true cost of their operations and services.

According to Nachtmann and Al-Rifai (2004), ABC helped many manufacturing and service organizations to improve their competitiveness by enabling them to make better decisions based on an improved understanding of their product cost behavior. There are many applications of ABC in manufacturing organizations and about their decision processes (Zhuang and Burns, 1992; Dhavale, 1993; Koltai et al., 2000; Özbayrak et al., 2004; Kirche et al., 2005; Satoglu et al., 2006) and some applications in logistics organizations and logistics related activities such as holding cost determination (Berling, 2008). Stapleton et al. (2004) discussed advantages, disadvantages and difficulties of ABC for logistics and marketing in general. Goldsby and Closs (2000) illustrated application of ABC to reverse logistics activities performed across supply chain organization without presenting details of implementation. Van Damme and Van Der Zon (1999) presented a logistics management accounting framework to support logistics management decisions without presenting an actual implementation. Liberatore and Miller (1998) proposed a framework for integrating ABC, analytical hierarchy process (AHP) and balanced scorecard for logistic strategy development and monitoring. Pohlen and La Londe (1994) carried out a survey of leading-edge firms within USA in order to present trends for implementing ABC. They concluded that there is a trend towards implementing ABC in logistics and most firms expect the ABC applications in logistics to produce results similar to those experienced in manufacturing. However, we did not find many applications and implementations of ABC in transportation companies, especially in Turkey we did not come across with any real application. The work of Themido et al. (2000) is one of most detailed study on the application of ABC to logistics. They presented application of ABC for costing the service provided by a third-part logistics operator in Portugal to one of its clients.

In this paper, an application of ABC-based costing model to a land transportation company is presented. In the case study most of the costs elements of the transportation company are evaluated through the ABC-based model. In the costing model, SIMPROCESS is used for process modeling and AHP methodology is employed to determine cost driver parameters similar to Schniederjans and Garvin (1997). The results obtained from the ABC-based model are compared with the results of

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