Comparative Study of Traditional and Activity-Based Costing in Forging Companies of Iran Tractor.

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Abstract:
The present study attempts to examine the impact/relationship between Activity Based Costing (ABC) adoption and implementation versus Traditional Cost Accounting (TC) in Iranian forging companies of Iran tractor manufacturing. Archival data were extracted from annual reports of 240 quoted companies in Iran for the year 2014. After conducting an interviews with engineers and industrial accounting experts, all the products were classified according to weight and by applying the sample method, only 10 kind of products were selected for the presented study. The results showed that, (A) - there is no significant difference between cost of every unit according to TC and ABC system and (B) - there is no significant difference between gross profit of every unit according to TC and ABC system. By applying the statistical methods with the help of Micro Soft Excel and SPSS software the results suggested that the main hypothesis is confirmed and the sub-hypothesis Ha and Hb are rejected.

Keywords: Traditional Costing (TC), Activity Based Costing (ABC), Tractor Manufacturing, Forging Companies, Management Accounting, Costing Systems.

Introduction
Activity Based Costing (ABC) adoption and implementation versus traditional cost-accounting have been widely researched in developed countries. However, in developing countries like I.R. of Iran, research regarding these issues in general, and within the Iranian manufacturing of forging company of Iran tractor in specific, is still sadly limited. During the research we noticed that at the end of 1960s and in early 1970s, some of accounting researchers studied on the relationship between activity and cost. But at the end of 1980s, pursuant studies noticed that some factors like profitability, competition at world level, increasing customers’ satisfaction, emphasis on products quality control and lowering costs were taken as main Internal. The fact that costing traditional systems not only cannot meet managers’ needs but also using of the information derived from these system in some cases causes misleading and leads to making improper decisions (Cooper and Slagmulder, 1997). By following this trend, the increase of competitive market that requires rational allocation of production costs, a new system was introduced under the title of activity based costing that was a 2-D system. Afterwards, it expressed costs allocation from resources to activities and then also from activities to cost objectives, that might lead to presentation of useful information in order to achieve corrected goals inside and outside the organization. As a result, this technique may be defined as follows (Szychta, 2010). Kaplan and Johnson in a book titled Losses in 1987 introduced activity-based costing as an alternative to traditional costing models. At that time, traditional accounting models had failed to provide information needed to calculate the cost price of products and performance evaluation in an environment with rapid technological changes, intense competition, and information processing revolution. Kaplan and Johnson's model was first proposed in manufacturing companies to reduce production costs. After the adoption of this model by manufacturing companies, service industries also took the model into account as an improved method for calculating costs. The implementation of the ABC and TC system has the following steps:
ACTIVITY BASED COSTING

<table>
<thead>
<tr>
<th>ACTIVITY BASED COSTING METHOD</th>
<th>TRADITIONAL BASED COSTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Identify &amp; Classify activities</td>
<td>1 Identification of indirect cost</td>
</tr>
<tr>
<td>2 Estimate cost for whole activity</td>
<td>2 Estimation of indirect cost</td>
</tr>
<tr>
<td>3 Compute a cost driver rate</td>
<td>3 Choose cost drivers</td>
</tr>
<tr>
<td>4 Apply activity costs using cost drivers</td>
<td>4 Estimation of value for cost drivers</td>
</tr>
<tr>
<td>5 Computation of overhead rate</td>
<td>6 Application of overhead rate</td>
</tr>
</tbody>
</table>


Activity based costing is based on actual performance, consumption and expense data taken out from the organization's existing information system and combined with the knowledge of those directly involved in the distribution of goods and services. Here the cost is designated to activities based on the resources they use for processing. The ABC also provides insights into the starting place of costs and also the probable outcome of different decisions by the process managers. Apart from providing the information required for this process, it also realizes performances breakthrough.

In Traditional costing, there is a certain amount of estimation in cost allocation. The cost systems do not focus on why or where cost occurred. Generally, there is little insight into the causes of variances. The reporting methodology is accounting–oriented, inaccurate, not flexible and often not timely. The operational managers often cannot understand since it is very analytical and does not relate to the cost of a product or services applied.

Advantages of Activity based costing and Traditional based costing.

Kingcott (1991) advised that if the costs of Activity-based costing (ABC) exceeded the benefits, company should not apply Activity-based costing (ABC) systems. If so, the capital expenditure on the activity based system and its subsequent running costs can be a road block for firms.

Johns, Evans and Ashworth (1995), indicated that the question that lingers in our minds is why those companies even now implement traditional costing instead of Activity-based Costing (ABC)? It is because the Activity-based Costing (ABC) has it pros and cons.

Gunasekaran, (1999) in Malaysia some organizations that have changed to the Activity-based Costing (ABC) system since as far back as 1980 as the system had proven its usability in the appropriate product mix decision and overheads management.

Gering (1999), mentioned that Activity-based costing (ABC) will work best with a minimum amount of detail and estimated cost figures. This means that companies in Malaysia wanting to change to Activity-based costing (ABC) needed to the appointment of a designer to come out with more precise measurement tools if more accurate costs are needed.

Stapleton et.al (2004), indicated that the costs of finding true costs overshadowed the benefits of finding true costs. These findings were later confirmed by Charles and Hansen (2008). Even though Activity-based costing (ABC) often provided better product cost than traditional volume-based systems, it still had some limitations (Evans and Ashworth, 1995). First and foremost, Activity-based costing (ABC) systems were found to be expensive to use. In Malaysia the increased cost of identifying multiple activities and applying large amounts of cost drivers deterred many organizations from using Activity-based costing (ABC).

According to Qian and Ben-Arieh (2008) is Activity-based costing (ABC) is more accurate cost-estimation method. They argued that Activity-based costing (ABC) helped managers to become aware of original parameters that created demands on indirect and keep up resources which can identify and remove non-value adding activities. Also illustrated that Activity-based costing (ABC) approach had demonstrated to be more accurate than the traditional cost estimation. Singer and Donoso (2008) conducted several test on the validity of Activity-based costing (ABC) cost estimation and they concluded that the accuracy of estimation of costs made by Activity-based costing (ABC) was valid. Activity-based costing (ABC) was a more accurate product-
costing system than traditional volume-based costing systems especially when organizations were facing higher product diversity.

Disadvantage of Activity Based costing and Traditional Costing method
The disadvantage of traditional costing systems is that they do not present nonfinancial information about Small and Medium Enterprises (SMEs). The traditional costing systems provided trivial information regarding the factors that was significant to the customers like quality and service. A traditional based costing system typically uses a single overhead pool that is a single collection of costs that are not directly peculiar as product part costs or as labor. This would comprise of supply and maintenance expenses, allotment of management salaries, Depreciation, etc.

However, Cooper and Kaplan, (1991) Activity-based costing (ABC) had emerged as a tremendously useful guide to management action that translated directly into higher profits. Another disadvantage mentioned by Noreen (1999) is that Activity based costing (ABC) implementation provided beneficial results only under specific conditions.

Datar and Gupta, (1994), indicated that the disadvantage of Activity-based costing (ABC) was that it increased the frequency of errors in product cost measurement through increasing in number of cost pools and improvement in specification of cost bases.

Evans and Ashworth (1995) claimed that although more overhead costs can be allocated straight to products via ABC’s multiple activity cost pools, but, some overhead cost remained to be dispensed with the help of some arbitrary volume based cost driver like machine or labor hours.

Carolfi (1996) claimed that Activity-based costing (ABC) allowed managers to get rid of costs related to non-value added activities and develop the efficiencies of present development since Activity-based costing (ABC) offered better visibility into business development and their cost drivers.

Another study conducted by McGowan and Klammer (1997) suggested that many Activity-based costing (ABC) adopters had abandoned their implementations and this raised concerns on the potential impact of Activity-based costing (ABC) on performance.

Furthermore, Gunasekaran, Marri and Grieve, (1999) traditional costing systems show that only financial information while non-financial information like defect rates and throughput rates in each activity was beyond the capacity of traditional costing systems. At first, managers viewed Activity-based costing (ABC) approach as a more accurate way of calculating product costs. According to Dickinson and Lere (2003), one of the most significant weaknesses of the traditional costing method is that the cost of a sales representative’s engaging in non-standard selling activities is frequently excluded from his/her. Also has mentioned that in order to comprehend the potential power of Activity-based costing (ABC) cost data in pricing, it is important to comprehend how Activity-based costing (ABC) cost data is different in contrast to the traditional method. The attribute of Activity-based costing (ABC) is that it does not vary with volume; however it may differ with some other measure of activity. Activity-based costing (ABC) recognizes that activities cause cost.

Review of Literature
There are many studies that demonstrate the benefits of ABC/TC implementation in different manufacturing/service industries. Keegan and Eiler, (1994) they stated that, the increased knowledge of cost drivers has prompted many companies to reengineer their business processes by monitoring each of their processes and then, eliminating (or improving) the processes which are non-value added.

Evans and Ashworth, (1995), there are many advantages and disadvantages of Activity-based costing (ABC) as pointed out in the literature review. The main disadvantages or limitations of Activity-based costing (ABC) is that it is expensive to use.

Andrade, Filho, Maia and Qassim (1997), found that Activity-based costing (ABC) is being extensively implemented as an alternative to traditional costing.

Gunasekaran and Sarhadi (1998) discussed different issues associated with the implementation of ABC in manufacturing. They explained that new productivity and quality improvement strategies could increase in the awareness of ABC in present day manufacturing organizations and an appropriate framework for the management of productivity and quality.

According to Ray H. Garrison and Eric W. Noreen, (1999) there are six basic steps required to implement an ABC system: (A). Identify and define activities and activity pools, (B). Directly trace costs to activities (to the extent feasible), (C). Assign costs to activity cost pools, (D).
Calculate activity rates, (E). Assign costs to cost objects using the activity rates and activity measures previously determined and (F). Prepare and distribute management reports.

Gupta and Galloway (2003) introduced ABC/TC as a supportive information system in operations decision making processes such as, product planning, product design, quality management, process design, process improvement, inventory management, and investment management.

Maliah, Nik Nazli and Norhayati, (2004), mentioned that the cost allocation in traditional costing was based on labour hours or machine hours which are hard to reveal the actual cause and effective relationship between indirect costs and individual products.

Tsai and Kuo, (2004) studies shows in order to address the problems of traditional cost systems, companies reengineer their accounting systems by incorporating their understanding of cost drivers and applying these drivers to the cost of products in proportion to the volume of activity that a product consumes.

Hassanzadeh and Seyednejad (2007), in a study entitled "A comparative analysis of traditional costing and activity-based costing in Iran Tractor Manufacturing Forging Company", explored two concepts of traditional costing and activity-based costing. The results of this study suggested that there is no significant difference between the cost prices calculated based on activity-based costing and traditional costing.

Zanjirdar and Partani (2008), in a research entitled "Analysis of the implementation of activity-based costing systems in small and medium enterprises" provided a background on activity-based costing in small and medium enterprises and introduced a framework in order to justify and implement activity-based costing in in small and medium enterprises.

Charles (2008) also pointed out that the approach of Activity-based costing (ABC) is trying to allocate overhead costs to cost objects more precise than traditional cost systems or traditional costing.

Rezaie et al. (2008) used ABC approach together with traditional costing (TC) for parts costing in flexible manufacturing systems (FMS) with the A(2) level of automation. They presented a new model for the implementation of ABC based on the product cost tree concept. In their work, they first recorded the required resources and activities for each part and then their expenses were measured based on some scales. The model was used in a forging industry. They reported that ABC outputs were more reliable than the TC outputs, and recommend using ABC approach.

Devinaga Rasiah, (2011) stated that, this is mainly because no matter what costing method, all of them do have their pros and cons. It’s important for the organizations in Malaysia to know clearly what they require prior to deciding on which costing method to use. Organizations need to study the pros and cons of each costing method to know which one was more appropriate for their organization. There is no such thing as the best costing method; there is only the most suitable costing method to use.


Batool Hasani and YOUNOS VAkilARoAAI (2013) presented an empirical investigation to estimate the cost of power station construction project located in city of Zanjan, Iran based on the implementation of both traditional as well as ABC method. The project consisted of six components namely the cost of purchasing equipment, buying transformers, engineering services, construction, laboratory services and purchase of land. The results indicated that ABC method was able to find better cost estimation compared with traditional method. ABC method is generally recommended when overhead costs are significant compared with total cost. Therefore, they recommend using ABC method only when the cost of computation is negligible compared with the results of ABC implementation.

The Problem of the Research
In Islamic Republic of Iran, many companies are still using the traditional based costing or using some other methods of costing.

Objective of the Study
The objectives of the research are as follows:
1. To compare the Activity-based costing (ABC) with traditional costing.
2. To find out why activity based costing is still lacking behind the traditional based costing in Iran.

Research Question
The research question addressed in the present study was as follows:
Does the implementation of activity-based costing system versus Traditional Cost Accounting (TC) in Iranian forging companies of Iran tractor
manufacturing improve the relevance and usefulness of cost information for the managing decision makers?

**Hypothesis of Study**

H. There are possibilities of using of ABC system in Iranian forging companies.

Ha- There is difference between cost on the base of activity-based costing system and traditional costing system.

Hb- There is difference between gross profit of every single unit on the base of activity-based costing system and traditional costing system.

**Methods of data collection**

This research method is an empirical research that uses multiple resources and evidence to investigate a phenomenon in a real context when the boundaries between phenomenon and context are not clear, therefor for collecting the required date bellow steps are taken.

1. Referral to the documents of the company, Archival data were extracted from annual reports of 240 quoted companies in Iranian forging companies of Iran tractor manufacturing for the year 2014.

2. Visiting the company physically, and conducting an interviews with production engineers, engineers, senior managers, supervisors of various units and industrial accounting experts, all the products were classified according to weight and by applying the sample method, only 10 kind of products were selected for the presented study.

**Statistical data analysis**

To test the hypotheses and to perform the data analysis, paired samples, t-test and Levene's test were applied to determine the relationship. The software’s of SPSS and Micro soft Excel were used. Addition to that four steps were taken to implement activity-based costing system versus traditional costing system as follows:

1. Activities that consume resources were identified and their cost price was determined.
2. For each activity, a stimulus/driver was determined for the cost price.
3. A cost rate was calculated for each cost stimulus.
4. The cost of a product was obtained by multiplying the cost stimulus by the unit volume of the cost stimulus used for each product.

To avoid the coast increase and decreases in general, items are divided into two groups based on the cost per unit and then they are compared. After the studying of ledger and detailed book of tractor forging company of Iran, the real cost of the selected activities are as the following: (Numbers & Amounts are in Million Riyals)

<table>
<thead>
<tr>
<th>Row</th>
<th>Activities</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Public operations</td>
<td>11161286071</td>
</tr>
<tr>
<td>2</td>
<td>Education and welfare</td>
<td>6696771643</td>
</tr>
<tr>
<td>3</td>
<td>Maintenance</td>
<td>15625800499</td>
</tr>
<tr>
<td>4</td>
<td>Material and products storage</td>
<td>4092471559</td>
</tr>
<tr>
<td>5</td>
<td>Computer center</td>
<td>744085438</td>
</tr>
<tr>
<td>6</td>
<td>Laboratories</td>
<td>1116128607</td>
</tr>
<tr>
<td>7</td>
<td>Planning</td>
<td>2976342952</td>
</tr>
<tr>
<td>8</td>
<td>Production designing and engineering</td>
<td>24554829356</td>
</tr>
<tr>
<td>9</td>
<td>Quality control</td>
<td>7440857381</td>
</tr>
</tbody>
</table>

The Cost of Activities of all Companies

Table: No. 1
Comparison of the Cost in Traditional and Activity Based Costing system

Table: No. 2

<table>
<thead>
<tr>
<th>Name and Code of Product</th>
<th>Cost in TC system</th>
<th>Single Unit Cost in TC system</th>
<th>Cost in ABC system</th>
<th>Single Unit Cost in ABC system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crankshaft (264 ZA)</td>
<td>15162.29</td>
<td>537651</td>
<td>15598.780</td>
<td>553129</td>
</tr>
<tr>
<td>Secondary shaft (727)</td>
<td>9667.68</td>
<td>46911</td>
<td>10038.290</td>
<td>48709</td>
</tr>
<tr>
<td>Kranoyl (944 VA)</td>
<td>6564.37</td>
<td>46234</td>
<td>6480.56</td>
<td>45644</td>
</tr>
<tr>
<td>Initial shaft (726)</td>
<td>6721.94</td>
<td>31408</td>
<td>6678.73</td>
<td>31206</td>
</tr>
<tr>
<td>Gear (263)</td>
<td>6166.94</td>
<td>169912</td>
<td>6066.10</td>
<td>167133</td>
</tr>
<tr>
<td>Wheel axis (6)</td>
<td>3270.75</td>
<td>138591</td>
<td>3437.11</td>
<td>145641</td>
</tr>
<tr>
<td>Kranoyl (262 ZA)</td>
<td>3926.26</td>
<td>242826</td>
<td>4041.65</td>
<td>249963</td>
</tr>
<tr>
<td>Arm-HDY. Lift (53)</td>
<td>2999.80</td>
<td>87935</td>
<td>3304</td>
<td>69852</td>
</tr>
<tr>
<td>Crankshaft (273)</td>
<td>3529.52</td>
<td>689629</td>
<td>3471.14</td>
<td>678222</td>
</tr>
<tr>
<td>Crankshaft (1010VA)</td>
<td>3651.49</td>
<td>632402</td>
<td>3919.98</td>
<td>678904</td>
</tr>
</tbody>
</table>

Gross profit of Each Unit in Traditional Costing System

Table: No. 3

<table>
<thead>
<tr>
<th>Product group</th>
<th>264</th>
<th>722</th>
<th>944</th>
<th>726</th>
<th>263</th>
<th>6</th>
<th>262</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>28201</td>
<td>204086</td>
<td>141981</td>
<td>213019</td>
<td>26295</td>
<td>22600</td>
<td>16169</td>
</tr>
<tr>
<td>Multiple: Selling price per unit</td>
<td>784427</td>
<td>49470</td>
<td>49581</td>
<td>33061</td>
<td>246600</td>
<td>253020</td>
<td>30640</td>
</tr>
<tr>
<td>Total sale cost</td>
<td>22121625827</td>
<td>10096134420</td>
<td>7039559961</td>
<td>7042621159</td>
<td>6484347000</td>
<td>5718252000</td>
<td>495418160</td>
</tr>
<tr>
<td>Minus: cost</td>
<td>15162297542</td>
<td>9667683900</td>
<td>6564376321</td>
<td>6731939391</td>
<td>6166940459</td>
<td>3270753329</td>
<td>3926361009</td>
</tr>
<tr>
<td>Gross profit</td>
<td>6959328285</td>
<td>428450520</td>
<td>475183640</td>
<td>310681768</td>
<td>317406541</td>
<td>2447498671</td>
<td>(3430942849)</td>
</tr>
<tr>
<td>Division on number: Gross profit per unit</td>
<td>246.78</td>
<td>2.56</td>
<td>3.35</td>
<td>1.65</td>
<td>76.69</td>
<td>114.43</td>
<td>63.21</td>
</tr>
</tbody>
</table>

Gross profit of Each Unit in Activity Based Costing system

Table: No. 4

<table>
<thead>
<tr>
<th>Product group</th>
<th>264</th>
<th>722</th>
<th>944</th>
<th>726</th>
<th>263</th>
<th>6</th>
<th>262</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>28201</td>
<td>204086</td>
<td>141981</td>
<td>213019</td>
<td>26295</td>
<td>22600</td>
<td>16169</td>
</tr>
<tr>
<td>Multiple Selling price per unit</td>
<td>784427</td>
<td>49470</td>
<td>49581</td>
<td>33061</td>
<td>246600</td>
<td>253020</td>
<td>30640</td>
</tr>
<tr>
<td>Total sale cost</td>
<td>22121625827</td>
<td>10096134420</td>
<td>7039559961</td>
<td>7042621159</td>
<td>6484347000</td>
<td>5718252000</td>
<td>495418160</td>
</tr>
<tr>
<td>Minus: cost</td>
<td>15598780944</td>
<td>10038290133</td>
<td>6480562644</td>
<td>667835453</td>
<td>6066105185</td>
<td>3437116146</td>
<td>4041651114</td>
</tr>
<tr>
<td>Gross profit</td>
<td>6532842861</td>
<td>156784282</td>
<td>558992312</td>
<td>396946202</td>
<td>288424185</td>
<td>2534155853</td>
<td>906700946</td>
</tr>
<tr>
<td>Division on number: Gross profit per unit</td>
<td>231298</td>
<td>761</td>
<td>3937</td>
<td>1855</td>
<td>79467</td>
<td>107379</td>
<td>56077</td>
</tr>
</tbody>
</table>

Results

To test of sub-hypothesis 1:

H1 = μTC ≠ μABC

TC is refer to the mean of cost of every unit of product in traditional costing system

ABC is refer to the mean of cost of every unit of product in Activity Based Costing system

H0: μTC = μABC
According to above table, the mean of cost in TC and ABC system are 6166.107 and 630.639 Riyals respectively.

The above table has provided the compare of mean of cost in TC and ABC system. According to table 6, the difference between cost mean in TC and ABC system on the base of T-test in significant level $\alpha=0.05$ is not significant. Such that sig=0.982>0.05.

**Test of sub-hypothesis 2:**

**Gross Profit of ABC and TC system of every unit**

The below table shows the mean, standard deviation and standard error of gross profit of every unit on the base of traditional and Activity Based Costing system.
Table 9 has provided the compare of gross profit mean for every unit in TC and ABC system using T-dependent test. The results indicates that, the differences between gross profit in every unit of TC and ABC system are not significant because the value (sig= 0.797>0.05) which has been obtained is bigger than the, α=0.05.

The results of sub-hypothesis Ha test: According to results, the P value is more than 5% (P>0.05), Null hypothesis in 95% confidence is accepted and the opposite hypothesis is rejected. It means that there is no significant difference between cost of every unit according to TC and ABC system.

The results of sub-hypothesis Hb test: According to results, the P value is more than 5% (P>0.05), the Null hypothesis in 95% confidence is accepted and the opposite hypothesis is rejected. It means that there is no significant difference between gross profit of every unit according to TC and ABC system.

Conclusions
The aim of the present study was to explore the possibility of implementing activity-based costing system and calculating the cost of each product in Iranian forging companies of Iran tractor manufacturing. According to Iranian forging companies the results of sub-hypothesis-1 and 2, showed the companies can use of ABC system. Therefore, the main hypotheses (H) is confirmed and sub hypotheses (Ha&Hb) are rejected. Therefor the results of the study indicated that the use of activity-based costing system may enables the Iranian forging companies to come up with a better understanding of the profitability of their products. Besides, this understanding we found that Activity Based Costing System, in companies that overhead cost consist the high percent of total production costs, ABC system must be applied, in particular, when operational staff and production managers do not trust on current system about costing the product. Finally this is important for the organizations in I.R. Iran to know clearly what they require prior to deciding on which costing method to use. Organizations need to study the pros and cons of each costing method to know which one was more appropriate for their organization. But there is no such thing as the best costing method; there is only the most suitable costing method to use.

References:


