

Apply activity-based costing to calculate product cost in small and medium enterprises

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Abstract: Traditional costing (TDC) has been used many decades and very popular with organizations because it is simple and inexpensive. In today's business environment, overhead cost has a significant proportion in total cost, using TDC for assigning overhead cost lead to inaccuracy of product cost. Activity-Based Costing (ABC), until now, is considered as a modern costing method that overcomes the limitations of TDC and it has been popular in developed countries. However, it is until new method in developing countries, so it needs to be more diffused in this countries. This paper conducted the project on ABC method in Van Chinh enterprise in Vietnam. We defined ten activities centers as shown in table 4. Then, we applied ABC method to calculate cost of products and compared with the results calculated by TDC method. This paper concluded that ABC method is practical and appropriate for such a Van Chinh enterprise and provides more accurate information for cost management and management decision-making.

Keywords: Activity-Based Costing (ABC), Traditional Costing (TDC), Vietnam, Van Chinh Enterprise, Cost Analysis, Small and Medium Enterprises

1. Introduction

Traditional costing systems lead to large distortions in reporting the cost of products, services, and customers. Based on its information, managers may make serious mistakes in decision-making. It is needed to find another costing method in order to cover the TDC limitations. In the mid 1980s, the other costing method with named Activity-Based Costing (ABC) was developed by Kaplan, and it has promptly applied very popular in developed countries with obvious advantages. Several surveys conducted in developed and developing countries showed that ABC systems brought many advantages and benefits for organizations (see Krumwiede 1998, Nassar et al (2011), Cohen et al (2005), Baird (2007), Khozein and Dankoob (2011), Zhang and Isa (2010), Chen at el (1993)). Today more and more developing countries such as china, Thailand, Malaysia, Morocco, etc have adopted and implemented it. The prior literature presented that ABC application in developing counties also brought many advantages over TDC (see Liu and Pan (2007), Zhang and Isa (2010), Chongruksut and Brooks (1993)). The core of

ABC method not only accurately calculates the cost of goods (products or services) but also helps the organizations definite value-added activities and non-value-added activities and support credible information for managers to make good decisions. In order to accomplish this mission, ABC must assign accurately indirect cost to products. By using multiple drivers to assign indirect cost, ABC has achieved its mission and it is perceived as a normal costing method by researchers, academics as well as the accounting practitioners. ABC was developed to provide more accurate ways of assigning the costs of indirect and support resources to activities, business process, products, services, and customers.

The main difference between ABC and TDC is assign indirect costs to products for calculating product cost. Indirect costs incurred in organization are caused by its activities and different type of indirect cost has a different relationship with products. How can ABC assign accurately indirect costs to products? In order to do this, it must assign indirect cost based on cause-and-effect relationship with products. This is the basic theory to construct the ABC method. Therefore, ABC must use multiple cost drivers to reflect and measure indirect costs. In contrast, TDC assigns

them by using only one cost driver such as direct-labor hours or machine hours so it leads to distort cost information. Kaplan (1998) presented the goal of ABC is not only to allocate common costs to products but its goal is also to measure and then price out all the resources used for activities that support the production and delivery of products and service to customers.

Although ABC has numerous advantages over TDC, but still has disadvantages that make it difficult to apply. From prior literatures we can summarize its disadvantages as following: the first in order to construct the ABC model, the companies must collect and analyze costs of many different activities, the second is that ABC needs more cost-drivers than TDC, the identification of cost drivers is often complex, the third ABC requires the personnel ability of employees and managers (Kaplan and Anderson (2004)). Other reason created obstacle for ABC adoption and implementation are satisfaction with the existing costing system, ABC implementation being associated with high costs, lack of time to undertake an assessment of ABC implementation, ABC's perceived inadequacy to provide more accurate cost information, lack of management support or interest and, the lack of local consultants and the high cost of consultants, finally, the requirement to follow the parent company's directives, including the selection of cost accounting systems (See Nassar et al (2011), Cohen et al (2005)).

2. The Need of Doing Research

From the review of prior literature, many researches on ABC method were done developed countries and very little research has been done in developing countries. A majority of ABC research related to large companies, and a very small proportion related to small and medium enterprise.

From the diffusion of ABC, ABC very popular in developed countries but it is a new method in developing countries, especially in Asian context. In Vietnam, ABC has not been applied in Vietnamese companies. According to Truong and Dinh (2009), ABC method to modern management has been widely applied in many businesses around the world, like UK, USA, Thailand, etc., but this method has not been applied in Vietnam enterprises. Huynh et al (2013) surveyed 339 Vietnamese companies, presented that there was no Vietnamese companies applied ABC method for calculating its product cost.

From academic perspective, ABC method has many advantages than TDC, thus it should be continued to study in order to innovate its limitations and foster its implementation. TDC lead to large distortions in reporting the cost of activities, processes, products, services, and customers. Consequently, managers may make serious mistakes in decisions made on basis of this information. ABC system is more detailed and more accurate than a functional-based cost management system. ABC is the core of ABM – the new cost management system might be more accurately referred to as an activity-and-strategic-based cost management system. ABC systems not only develop more accurate costs, they also aid control costs. Because

ABC systems also focus on activities, they are a very useful tool in cost management systems. Activity-based management (ABM) is using the output of an activity-based cost accounting system to aid strategic decision making and to improve operational control of an organization. In the broadest terms, ABM aims to improve the value received by customers and to improve profits by identifying opportunities for improvements in strategy and operations.

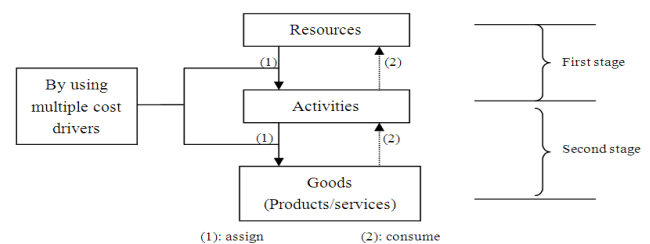
So, this research applied ABC method to calculate product cost in Van Chinh enterprise as an illustration for an application ABC in SMEs. The results of this research also contributed to literature about the differences between ABC and TDC. Finally, this research contributed to diffuse ABC in the developing countries; in this case it was conducted in Vietnam.

3. Research Methodology

The research process of this paper includes two phases. The first phase, we study ABC theory and its practice in organization. The methodology used is a type of theoretical mining and logical reasoning to explore the advantages and benefits of ABC method by comparing with TDC method. Analysis and synthesis is used to review the prior literature related to our research's aims, and then the authors discuss and select the papers that are most suitable for our research to refer. The second phase, we do action research by applying ABC method to calculate product cost in a SMEs as an illustration for advantages of ABC method. Then, we compare the cost and profit of each product with the results calculated by TDC method. Finally, the approval method is used to confirm with Van Chinh managers about the results of ABC implementation after our project team left this company.

4. Activity-Based Costing

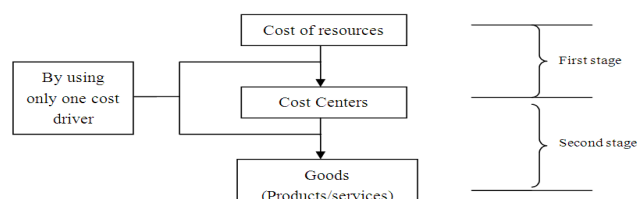
Under ABC method, organization operating was divided to activities, and the activities consume resources and products consume activities. Thus ABC model includes two stages: in the first stage, cost of resources is assigned to activities by direct tracing or using driver tracing, in the second stage, cost of activities is assigned to products. The basic model of ABC system is shown on the figure 1:



Source: Adapted from Kaplan and Atkinson, 1998

Figure 1. Basic Activity-Based Costing system

In contrast with ABC, TDC use single driver for assigning indirect cost. The TDC system is shown on the figure 2.



Source: Adapted from Kaplan and Atkinson, 1998

Figure 2. Traditional Costing system

We can summarize the core differences between ABC system and TDC system: ABC uses vary cost drivers for tracing indirect cost, it focus on indirect costs with cause-and-effect, and focus on the activities or processes rather than on the structure. These differences are also ABC advantages. ABC method increases the accuracy of product costs in order to increase management to a high level of confidence in cost-based decision. The comparison between ABC method and the TDC method was done prior researchers such as Kaplan (1998), Hansen (2003), Horngren (2007) to find the same and the difference between both systems. According to Kaplan (1988) traditional cost systems has simple two stages structure as shown in the figure 2. In the first stage, service department costs are assigned to production or operating departments. In addition, the costs directly arising in these production departments are directly traced to these departments. Thus, after the first stage, all organizational expenses are assigned, either directly or through assignment from service departments, to production departments. In the second stage, costs are assigned from production departments to products processed through those departments. Both TDC system and ABC system have the simple two stage structure as shown above. The first stage of an ABC system has the same structure as traditional cost system, through instead of assigning service department resource costs to production centers, ABC systems assign resource cost of both production and service department to the activities performed by those resources. In ABC system, every cost assignment to an activity, or a product, service, or customer, should be transparent and traceable, via cause – and – effect relationships, to the demand for resources by cost object (whether an activity, product, service, or customer) (Kaplan, 1998). Horngren et al (2007) addressed that one of the most important differences between TDC systems and ABC systems is the extent of allocation across the value chain. TDC generally allocate only indirect production costs to the products. These are the only costs that can be added to the inventory value of a product for financial reporting purposes, and TDC often focus on simply measuring such inventory values. They normally do not allocate the cost of other value-chain functions because these are not appropriate costs to include in inventory. ABC systems, in contrast, focus on the costs that are important to decision makers. They often expand allocation of costs beyond production to processes such as design, marketing, order processing, and customer service. As a result, ABC systems are more complex than TDC but promise more accurate and useful costs to aid decision making. Hasen and Mowen

(2003) in a functional-based costing system, unit-based activity drivers supposedly explain the consumption of overhead by products. Sophisticated unit-based costing systems allocate fixed overhead to individual products, using fixed overhead rates, and they assign variable overhead, using variable overhead rates. From the perspective of ABC, the variable overhead is appropriately traced to individual products because overhead consumption increases as units produced increases. However, assigning fixed overhead costs using unit-based drivers can be arbitrary and may not reflect the activities actually being consumed by the products. Many of the costs assigned in the traditional fixed overhead category are, in reality, batch-level, product-level, and facility-level costs that vary with drivers other than unit-based drivers. ABC systems improve product costing accuracy by recognizing that many of the so-called fixed overhead costs vary in proportion to changes other than production volume. By understanding what causes these costs to increase or decrease, they can be traced to individual products. This cause-and-effect relationship allows managers to improve product costing accuracy, which can significantly improve decision making. Additionally, this large pool of fixed overhead costs is no longer so mysterious. Knowing the underlying behavior of many these costs allows managers to exert more control over the activities that cause the costs. It also allows managers to identify which of the activities and value and which do not. Value analysis is the heart of ABM and is the basis for continuous improvement.

5. Apply ABC to Calculate Product Cost in Van Chinh Enterprise

Van Chinh, is a small and medium-sized enterprise, a furniture manufacturer that is located in Binh Duong province, Vietnam. It is invested and run by Korean. This enterprise produces many different wooden items; each kind has different technical characteristics and different resource consumption. This project was done by supporting of Van Chinh enterprise's manager and accountants under the agreement of director board. We had 6 months for this project is from April to September 2012. The team of this project analyzed the relationship of the resource, activities and products. Then, design the framework for an ABC system in this enterprise included 5 steps as follow:

Step 1: Identify, define, and classify activities and key attributes.

Step 2: Assign the cost of resources to activities.

Step 3: Identify cost objects and specify the amount of each activity consumed by specific cost object.

Step 4: Calculate primary activity rate.

Step 5: Assign activity cost to cost object.

The results calculated by the TDC and ABC in this case based on the data of accounting period in August 2012.

Van Chinh enterprise manufactures 21 products. The company works 27,539.50 direct labor-hours in August 2012. Costs for materials and labor for one unit of each product are given below:

Table 1. Products and related direct costs

	Product Code	Quantity in (Unit)	Direct labor hours per Unit	Total Direct labor hours	Direct labor per hour (VND)	Material cost per Unit (VND)	Direct labor cost per Unit (VND)
1	V-K	453	2.00	906.00	21,000	680,698	42,000
2	V-F	357	2.00	714.00	21,000	680,960	42,000
3	V-T	353	2.00	706.00	21,000	705,594	42,000
4	V-Q	123	2.00	246.00	21,000	588,929	42,000
5	V-200	156	2.50	390.00	21,000	689,221	52,500
6	V-200S	826	2.50	2,065.00	21,000	594,410	52,500
7	V-080	56	2.50	140.00	21,000	498,852	52,500
8	V-900	431	2.50	1,077.50	21,000	693,852	52,500
9	V-900Q	356	3.00	1,068.00	21,000	637,948	63,000
10	V-208Q	489	3.00	1,467.00	21,000	551,144	63,000
11	V-200Q	456	3.00	1,368.00	21,000	623,523	63,000
12	V-1010	145	3.00	435.00	21,000	389,043	63,000
13	KK	423	5.00	2,115.00	21,000	294,508	105,000
14	BTD-Q	256	4.50	1,152.00	21,000	420,934	94,500
15	BTD-K	463	4.00	1,852.00	21,000	439,917	84,000
16	BTD-S	553	4.00	2,212.00	21,000	445,739	84,000
17	BTD-F	556	4.00	2,224.00	21,000	468,119	84,000
18	TDG-Q	458	4.00	1,832.00	21,000	371,955	84,000
19	TNN	764	3.50	2,674.00	21,000	297,955	73,500
20	SF-L	156	4.00	624.00	21,000	260,251	84,000
21	SF-S	568	4.00	2,272.00	21,000	234,424	84,000
	Total	8,398		27,539.50			

Source: Data provided by Van Chinh Enterprise.

The company's manufacturing overhead costs VND984,858,209 in August 2012. Under TDC, the company has used direct labor-hours as a basis for assigning overhead cost to its products. Below we show allocations of the Van Chinh enterprise's overhead costs to the products, first using TDC based on direct labor-hours as a base, and then using ABC with activities as a base.

5.1. Traditional Costing Based on Direct Labor-Hours as a Base

The company's overhead rate will be VND35,761.66 per hour are used as a base for assigning overhead costs. This rate is computed as follows:

$$\frac{\text{Manufacturing overhead cost, VND984,858,209}}{\text{Direct labor-hours, 27,539.50}} = \text{VND35,761.66/Direct labor hour}$$

Total manufacturing cost assigned for each product as follow:

Table 2. Overhead cost assigned for products

	Product Code	Unit	Total
1	V-K	71,523	32,400,063
2	V-F	71,523	25,533,825
3	V-T	71,523	25,247,731
4	V-Q	71,523	8,797,368
5	V-200	89,404	13,947,047
6	V-200S	89,404	73,847,826
7	V-080	89,404	5,006,632
8	V-900	89,404	38,533,188
9	V-900Q	107,285	38,193,452
10	V-208Q	107,285	52,462,354
11	V-200Q	107,285	48,921,950
12	V-1010	107,285	15,556,322
13	KK	178,808	75,635,909
14	BTD-Q	160,927	41,197,431
15	BTD-K	143,047	66,230,593
16	BTD-S	143,047	79,104,790
17	BTD-F	143,047	79,533,930
18	TDG-Q	143,047	65,515,359
19	TNN	125,166	95,626,676
20	SF-L	143,047	22,315,275
21	SF-S	143,047	81,250,489
	Total		984,858,209

Source: Data provided by Van Chinh Enterprise.

Using this rate, the cost to one unit of each product is given below:

Table 3. Product costs calculated under TDC

	Product Code	Direct materials	Direct labor	Overhead	Total cost to per unit
1	V-K	680,698	42,000	71,523	794,221
2	V-F	680,960	42,000	71,523	794,483
3	V-T	705,594	42,000	71,523	819,117
4	V-Q	588,929	42,000	71,523	702,452
5	V-200	689,221	52,500	89,404	831,125
6	V-200S	594,410	52,500	89,404	736,314
7	V-080	498,852	52,500	89,404	640,756
8	V-900	693,852	52,500	89,404	835,756
9	V-900Q	637,948	63,000	107,285	808,233
10	V-208Q	551,144	63,000	107,285	721,429
11	V-200Q	623,523	63,000	107,285	793,808
12	V-1010	389,043	63,000	107,285	559,328
13	KK	294,508	105,000	178,808	578,316
14	BTD-Q	420,934	94,500	160,927	676,361
15	BTD-K	439,917	84,000	143,047	666,964
16	BTD-S	445,739	84,000	143,047	672,786
17	BTD-F	468,119	84,000	143,047	695,166
18	TDG-Q	371,955	84,000	143,047	599,002
19	TNN	297,955	73,500	125,166	496,621
20	SF-L	260,251	84,000	143,047	487,298
21	SF-S	234,424	84,000	143,047	461,471

Source: Data provided by Van Chinh Enterprise

The problem with this costing approach is that it looks only at labor time and does not consider the impact of other factors such as setups required, handle production, material receipt, inspections performed etc., on the overhead costs of the company. Therefore, since other factors are being ignored, and since the products require more labor time than other, it is assigned more amounts of overhead cost. This method is accurate only in those situations where other factors affecting overhead are not significant. In this case, these other factors are significant, as we shall see in following discussion.

Table 4. Activity and its cost driver

Activity	Cost Drivers
Labor related	Labor-hours (DLH)
Run machine	Machine-hours (MH)
Set up machines	Setups hours
Handle production runs	Production runs
Production orders	Number of orders
Purchasing materials	Number of orders
Material receipts	Receipts
Parts administration	Part types
Quality inspections	Inspections
General factory	Machine-hours

Source: Author's identification

5.2. Activity-Based Costing Based on Activities as a Base

Next, we analyzed the Van Chinh enterprise operations and identified ten activities along with their associated cost drivers. In the stage one, we classified ten activity cost

pools which fall into four broad categories: Unit level, Batch level, Product level, Facility level. In the stage two, we identified cost drivers for each activity cost pool. Then, we assigned the costs in each activity cost pool to products according to the proportion of each cost driver consumed by each product.

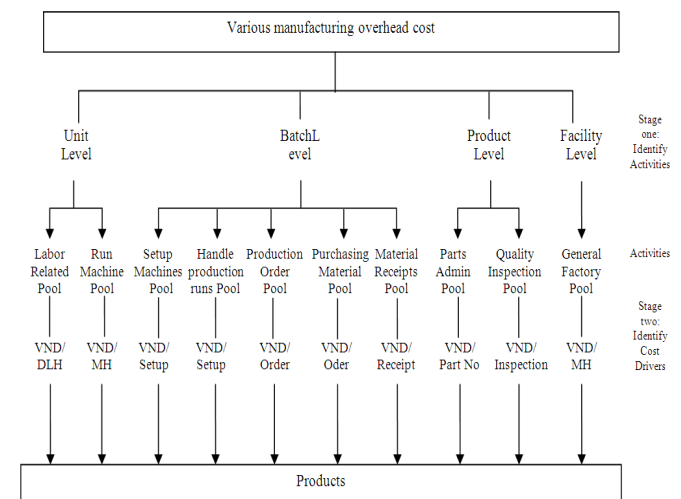


Figure 3. Activities were classified to four categories (Source: Author's identification)

The data relating to the activities are presented in Table 4.

Overhead cost was determined the amount and traced to each activity, along with the expected number of events or transactions for each center's cost driver. Data for activities are as shown in the table 5.

Using the appropriate cost drivers as a base, we computed a predetermined overhead rate for each activity.

These rates in turn have been used to assign the costs of the activity centers to the products. The results are shown on table 7

Table 5. Overhead cost and number of transactions

Activity center	Labor related	Run machine	Set up machines	Handle production runs	Production orders	Purchasing materials	Material receipts	Parts administration	Quality inspections	General factory	Total
Traceable Costs (VND)	194,961,646	162,468,038	110,478,266	75,255,196	93,776,551	29,829,131	31,583,786	50,300,105	94,166,475	142,039,015	984,858,209
Total Events or transactions	27,540	60,352	5,471	4,210	2,817	5,504	3,597	3,308	8,398	60,352	181,548
Transactions consumed by each product											
V-K	906	960	82	75	50	71	86	40	453	960	3,682
V-F	714	758	43	36	30	54	32	25	357	758	2,807
V-T	706	1,024	73	49	37	72	58	36	353	1,024	3,432
V-Q	246	418	33	31	20	39	28	15	123	418	1,371
V-200	390	858	71	142	95	213	105	165	156	858	3,053
V-200S	2,065	4,750	180	1,200	960	1,080	918	845	826	4,750	17,574
V-080	140	126	12	12	12	14	21	13	56	126	532
V-900	1,078	862	33	31	24	60	43	29	431	862	3,453
V-900Q	1,068	801	35	44	49	75	64	47	356	801	3,339
V-208Q	1,467	1,306	79	72	55	135	105	49	489	1,306	5,063
V-200Q	1,368	1,300	69	53	31	102	94	16	456	1,300	4,789
V-1010	435	370	15	11	8	24	19	9	145	370	1,405
KK	2,115	3,173	368	245	164	369	158	62	423	3,173	10,250
BTD-Q	1,152	2,995	298	199	132	297	152	130	256	2,995	8,606
BTD-K	1,852	4,445	358	199	110	297	158	97	463	4,445	12,424
BTD-S	2,212	6,194	627	392	245	588	356	176	553	6,194	17,537
BTD-F	2,224	6,005	563	331	195	498	359	132	556	6,005	16,868
TDG-Q	1,832	5,611	716	388	173	804	489	310	458	5,611	16,392
TNN	2,674	8,851	994	471	347	327	178	690	764	8,851	24,147
SF-L	624	1,934	139	35	25	71	22	210	156	1,934	5,150
SF-S	2,272	7,611	683	195	56	314	152	212	568	7,611	19,674
Total	27,540	60,352	5,471	4,210	2,817	5,504	3,597	3,308	8,398	60,352	181,548

Source: Author's calculation

Table 6. Overhead rates by activity

Activity Center	Traceable Costs	Total Events or Transactions	Rate per Event or Transaction (VND)
Labor related	194,961,646	27,540	7,079/DLH
Run machine	162,468,038	60,352	2,692/MH
Set up machines	110,478,266	5,471	20,193/setup
Handle production runs	75,255,196	4,210	17,877/Run
Production orders	93,776,551	2,817	33,285/order
Purchasing materials	29,829,131	5,504	5,420/order
Material receipts	31,583,786	3,597	8,781/receipt
Parts administration	50,300,105	3,308	15,206/part type
Quality inspections	94,166,475	8,398	11,213/inspection
General factory	142,039,015	60,352	2,354/MH
Total	984,858,209		

Source: Author's calculation

Table 7. Overhead cost per unit of product

	Labor related	Run machine	Set up machine	Handle production runs	Production orders	Purchasing materials	Material receipts	Parts administration	Quality inspections	General factory	Total overhead cost assigned	Number of units produced	Overhead cost per unit
Rate per Event or Transaction (VND)	7,079/DLH	2,692/MH	20,193/setup	17,877/Run	33,285/order	5,420/order	8,781/receipt	15,206/part type	11,213/inspection	2,354/MH			
V-K	6,413,887	2,584,327	1,655,861	1,332,642	1,654,147	384,787	755,183	608,224	5,079,473	2,259,369	22,727,901	453	50,172
V-F	5,054,653	2,040,542	868,318	640,589	993,917	292,655	280,998	380,140	4,003,028	1,783,960	16,338,800	357	45,767
V-T	4,998,018	2,756,616	1,474,121	870,009	1,246,041	390,207	509,310	547,401	3,958,176	2,409,994	19,159,893	353	54,277
V-Q	1,741,519	1,125,259	666,383	561,846	653,806	211,362	245,872	228,084	1,379,195	983,767	7,797,094	123	63,391
V-200	2,760,945	2,309,742	1,433,734	2,538,521	3,150,948	1,154,361	922,026	2,508,923	1,749,222	2,019,311	20,547,733	156	131,716
V-200S	14,618,849	12,787,036	3,634,818	21,452,287	31,953,271	5,853,100	8,061,143	12,848,727	9,261,909	11,179,171	131,650,310	826	159,383
V-080	991,108	339,193	242,321	214,523	399,416	75,874	184,405	197,673	627,926	296,542	3,568,981	56	63,732
V-900	7,627,995	2,320,510	666,383	556,545	811,143	325,172	377,592	440,962	4,832,788	2,028,725	19,987,816	431	46,375
V-900 Q	7,560,741	2,156,298	706,770	782,115	1,620,547	406,465	559,802	714,663	3,991,815	1,885,161	20,384,377	356	57,259
V-208 Q	10,385,400	3,515,762	1,595,281	1,283,887	1,840,284	731,637	922,026	745,074	5,483,140	3,073,684	29,576,175	489	60,483
V-200 Q	9,684,545	3,499,610	1,393,347	948,851	1,026,113	552,793	825,433	243,290	5,113,112	3,059,563	26,346,655	456	57,778
V-1010	3,079,515	996,043	302,901	191,538	254,730	130,069	166,843	136,850	1,625,880	870,799	7,755,168	145	53,484
KK	14,972,817	8,541,740	7,431,183	4,385,801	5,443,891	1,999,809	1,387,430	942,747	4,743,084	7,467,686	57,316,187	423	135,499
BTD-Q	8,155,406	8,062,563	6,017,643	3,551,545	4,408,368	1,609,602	1,334,743	1,976,727	2,870,519	7,048,761	45,035,878	256	175,921
BTD-K	13,110,949	11,965,973	7,229,249	3,555,518	3,677,749	1,609,602	1,387,430	1,474,943	5,191,603	10,461,350	59,664,366	463	128,865
BTD-S	15,659,513	16,674,295	12,661,282	7,005,513	8,152,141	3,186,688	3,126,108	2,676,185	6,200,769	14,577,639	89,920,131	553	162,604
BTD-F	15,744,465	16,165,505	11,368,902	5,920,411	6,484,174	2,698,929	3,152,451	2,007,138	6,234,408	14,132,826	83,909,210	556	150,916
TDG-Q	12,969,362	15,104,854	14,458,497	6,927,301	5,764,487	4,357,308	4,294,070	4,713,734	5,135,538	13,205,543	86,930,630	458	189,805
TNN	18,930,171	23,826,959	20,072,271	8,425,982	11,553,475	1,772,189	1,563,054	10,491,860	8,566,705	20,830,914	126,033,578	764	164,965
SF-L	4,417,512	5,206,343	2,806,887	621,222	832,116	384,787	193,186	3,193,175	1,749,222	4,551,688	23,956,139	156	153,565
SF-S	16,084,274	20,488,869	13,792,14	3,488,550	1,855,789	1,701,735	1,334,743	3,223,586	6,368,964	17,912,562	86,251,186	568	151,851

Source: Author's calculation

Then we calculate the cost of per unit under ABC method and comparison with TDC as follow:

Table 8. Product cost calculated by ABC and TDC

	ABC				TDC				ABC/TDC (%)
	Direct materials	Direct labor	Overhead	Total per unit	Direct materials	Direct labor	Overhead	Total per unit	
V-K	680,698	42,000	50,172	772,870	680,698	42,000	71,523	794,221	97.31
V-F	680,960	42,000	45,767	768,727	680,960	42,000	71,523	794,483	96.76
V-T	705,594	42,000	54,277	801,871	705,594	42,000	71,523	819,117	97.89
V-Q	588,929	42,000	63,391	694,320	588,929	42,000	71,523	702,452	98.84
V-200	689,221	52,500	131,716	873,437	689,221	52,500	89,404	831,125	105.09
V-200S	594,410	52,500	159,383	806,293	594,410	52,500	89,404	736,314	109.50

V-080	498,852	52,500	63,732	615,084	498,852	52,500	89,404	640,756	95.99
V-900	693,852	52,500	46,375	792,727	693,852	52,500	89,404	835,756	94.85
V-900Q	637,948	63,000	57,259	758,207	637,948	63,000	107,285	808,233	93.81
V-208Q	551,144	63,000	60,483	674,627	551,144	63,000	107,285	721,429	93.51
V-200Q	623,523	63,000	57,778	744,301	623,523	63,000	107,285	793,808	93.76
V-1010	389,043	63,000	53,484	505,527	389,043	63,000	107,285	559,328	90.38
KK	294,508	105,000	135,499	535,007	294,508	105,000	178,808	578,316	92.51
BTD-Q	420,934	94,500	175,921	691,355	420,934	94,500	160,927	676,361	102.22
BTD-K	439,917	84,000	128,865	652,782	439,917	84,000	143,047	666,964	97.87
BTD-S	445,739	84,000	162,604	692,343	445,739	84,000	143,047	672,786	102.91
BTD-F	468,119	84,000	150,916	703,035	468,119	84,000	143,047	695,166	101.13
TDG-Q	371,955	84,000	189,805	645,760	371,955	84,000	143,047	599,002	107.81
TNN	297,955	73,500	164,965	536,420	297,955	73,500	125,166	496,621	108.01
SF-L	260,251	84,000	153,565	497,816	260,251	84,000	143,047	487,298	102.16
SF-S	234,424	84,000	151,851	470,275	234,424	84,000	143,047	461,471	101.91

Source: Author's calculation

The table 7 presented the use of an activity approach has resulted in overhead cost being assigned to each unit of product. These amounts are used in the table above to determine the cost to a unit of each product under ABC method. The results from the ABC system were quite different from the results using the traditional cost system

shown in table 8. We can see the figure bellow presented the difference of product cost calculated by ABC method and traditional costing method.

The profits and loss of each product was shown in table 9 as follow:

Table 9. Profit calculated by ABC and TDC

	Quantity in August 2012 (Unit)	Selling Price	ABC		TDC	
			Total cost per unit	Profit per unit	Total cost per unit	Profit per unit
V-K	453	782,308	772,870	9,438	794,221	(11,913)
V-F	357	778,593	768,727	9,866	794,483	(15,890)
V-T	353	808,468	801,871	6,597	819,117	(10,649)
V-Q	123	681,378	694,320	(12,942)	702,452	(21,074)
V-200	156	856,059	873,437	(17,378)	831,125	24,934
V-200S	826	789,329	806,293	(16,964)	736,314	53,015
V-080	56	631,145	615,084	16,061	640,756	(9,611)
V-900	431	822,802	792,727	30,075	835,756	(12,954)
V-900Q	356	793,685	758,207	35,477	808,233	(14,548)
V-208Q	489	703,393	674,627	28,766	721,429	(18,036)
V-200Q	456	789,442	744,301	45,141	793,808	(4,366)
V-1010	145	552,336	505,527	46,809	559,328	(6,992)
KK	423	581,208	535,007	46,201	578,316	2,892
BTD-Q	256	700,034	691,355	8,679	676,361	23,673
BTD-K	463	677,635	652,782	24,853	666,964	10,671
BTD-S	553	688,260	692,343	(4,084)	672,786	15,474
BTD-F	556	719,497	703,035	16,462	695,166	24,331
TDG-Q	458	630,150	645,760	(15,610)	599,002	31,148
TNN	764	527,411	536,420	(9,010)	496,621	30,790
SF-L	156	499,480	497,816	1,664	487,298	12,182
SF-S	568	472,085	470,275	1,810	461,471	10,614

Source: Author's calculation

6. Discussion

The comparison of product cost calculated by ABC and TDC in figure 3 shows three significant areas: products under the cost of ABC, products which cost almost the same, and products over the cost of ABC.

1. The S-Curve lines below the value 100 of y-axis show products that cost lower than calculations by TDC. The products in this area have generated more profit that enterprise that were not visible when applying TDC. In contrast, in the area where the S-curve is located above the value 100 of y-axis, the real cost of the products will be greater than the cost calculated TDC, these products have made a loss but the business cannot see. This area is a hidden loss. By the

aid of ABC, managers realized the “hidden profit” or “hidden loss” area. With accurate costing information, the enterprise can redefine the output price of these products; examine pricing decisions, and can gain more competitive advantage.

2. The figure 3 shows that product cost calculated by ABC method is quite difference compared with TDC. This results lead to big difference in profit provided by ABC and TDC as shown on figure 4.
3. By applying the ABC system, the Van Chinh enterprise realizes the unreasonable allocation of resources. Instead of allocating resources to produce really profitable products such as V-080, V-900, V-900Q, V-208Q, V-200Q, V-1010, KK, BTD-Q, BTD-K, BTD-F, V-K, V-F, V-T, SF-L, and SF-S (Most

After applying the ABC system, managers in this enterprise have confirmed with us that, besides being able to calculate the accurate costs of products, ABC also helps the business discover many non-value-added activities that TDC does not indicate such as: the number of times saw blades were replaced, the numerous times the cutting mold had to be changed, the numerous times raw materials had to be tested and made outputs of production, the long wait it took for semi-finished goods to continue to the next step of the production process. Therefore the managers strongly believe to use information provided by ABC system to assist them in making appropriate decisions to improve production processes, improve efficiency, reduce costs, and pricing decisions.

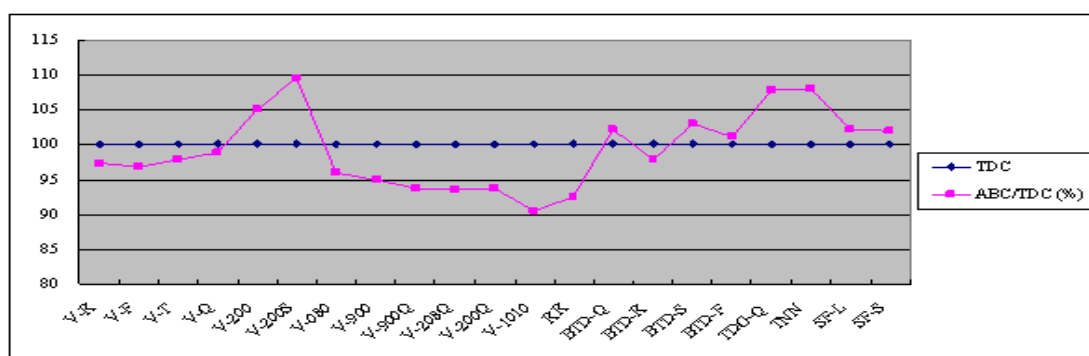


Figure 3. S-Curve (bias in percentage)

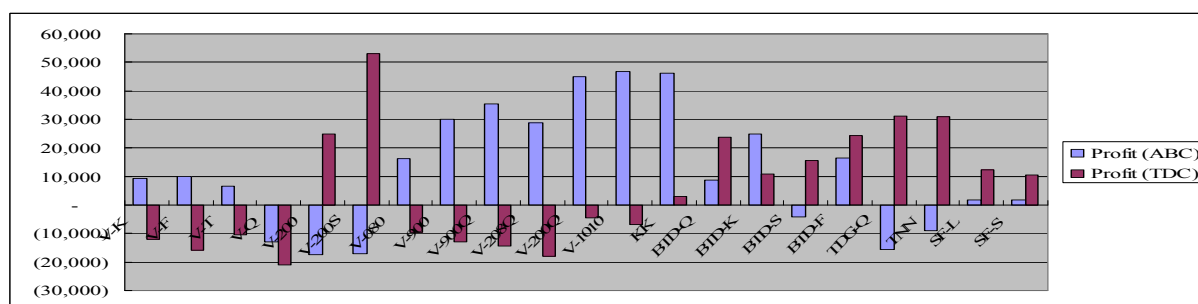


Figure 4. Comparison of profit calculated by ABC and TDC

This research attempts design and apply ABC in SMEs in Vietnam as an illustration for diffusion ABC method. Using the data provided by Van Chinh enterprise, this paper calculated unit cost of each product. Then compare it with the result of TDC. There was the big difference between product costs calculated by two methods. Before this project were conducted, this enterprise using TDC method with one cost driver (labor hour) to assign overhead cost. The distortion of information provided by TDC leads Van Chinh's managers met many mistake in decision-making. By using ten cost drivers to assign overhead cost, the product cost calculated by ABC method is more accurate. ABC method also indicates products generate profit and products make a loss for this enterprise. Under ABC method, information provided more detailed, more confident for managers to make decision.

Beside the advantages and profits that ABC method has brought for Van Chinh enterprise, the application of ABC method has met some difficulties such as: lack of human resource, high costs, identification of cost drivers is complex. In which lack of human resource is the most difficulties. This enterprise meets difficulties to find qualified accountants that understand and have skill in ABC method. This is also a note for universities more emphasize to focus on management accounting especially in ABC method when providing accounting courses in Vietnam.

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