

The Effect of Activity-Based Costing on Companies Financial Performance: A Study among Jordanian Industrial Shareholding Companies

Yusuf Ali Khalaf Al-Hroot^{1*} Ali Ahmad Diab Mssadeh² Mohammad Saadat Lutfi Amireh³
1, 2, 3. Assistant Professor, Department of Accounting, Faculty of Administrative & Financial Sciences,
Philadelphia University, Jordan. PO Box: 19392 – Amman – Jordan

Abstract

The costs play important role in the growth of corporations' especially industrial sector. In the low-income country like Jordan, the article aims to analyze the effect of adopting Activity Based Costing (ABC) on the financial performance of Jordanian industrial shareholding companies. The population of this study consists of (13) public shareholding industrial companies in Jordan out of (70) from the period of 2000-2014. Four years average before and after applying ABC system is taken for all variables and significance is tested with the help of paired sample t-test statistics. Dependent variable in this study is the implementing of ABC system, and independent variables are gross profit margin (GPM), margin before interest and tax ratio (MBIT), net profit margin ratio (ROS), return on assets (ROA), return on equity (ROE) and return on investment ratio (ROI) have been computed. The results show that 78 Performance variables shows that the direction for the improved ratios after implementing ABC system is 37 Performance variables (37/78, 47%), and remaining 41 (41/78, 53%) Performance variables direction shows deterioration in the after implementing ABC system period. Out of 37 improved ratios 4 Performance variables are statistically significant. In the other hand out of 41 deteriorated ratios 7 Performance variables are statistically significant.

Keywords: Activity Based Costing (ABC), financial performance, industrial companies, Jordan.

1. Introduction

The conventional or traditional costing systems (TCS) use a single, volume-based cost driver to assign manufacturing overhead to units produced. This is the first reason behind deforms the cost of products. For this reason TCs oftentimes report inexact product costs, the second reason is traditional costing systems fails to allocate non-manufacturing costs that also are associated with the production of an item, such as administrative expenses (Marx, 2009).

The modern company's products are produced by a combination of workforce and technology. The TCs employs a volume-based driver, such as machine hours or direct labor hours to assign manufacturing overhead to units produced. The conventional costing systems provide a value for the cost of goods sold.

An advantage of using TCs is compliant with GAAP, Easy implementation for companies that provide one product. However, TCs is widely accepted because those manufacturing companies now use computers and machines for much of their production. Machines and computers make the system out-of-date because it often uses direct labor hours to calculate cost. One of the most disadvantages of using TCs that it can lead to bad management decisions because it excludes certain non-manufacturing costs.

Activity-based costing (ABC) was first introduced by Cooper and Kaplan (1987). ABC is an approach for more accurately allocating overhead to those items that actually use it. The terminology of ABC describes tracing resource consumption and final costing outputs (Rahimniya, et al. (2014). Resources are assigned to activities and activities to cost objects. ABC works best in complex environments (Kaplan and Anderson 2005), where ABC likely to provide certain types of benefits, such as:

1. More accurate costing method of product and service.
2. Accurate pricing decisions.
3. Provides more information to understand cost drivers and product overheads by managers.

ABC is a managerial accounting system that estimates the cost of products and services by assigning overhead costs to direct costs. This costing method assigns the cost of each activity in an organization to all products and services according to the actual consumption of the activity resource by the product or service (Kaplan and Anderson 2005).

The process of ABC requires the following steps:

1. Analysis of activities
2. Gathering Cost data
3. Tracing of costs to activities
4. Establishment of output metrics
5. Cost analysis.

The process of converting a business costing methods or systems from traditional costing systems to ABC systems depends on several *key success factors*:

- Change management.
- Continuous education and training Communication.
- Cultural acceptance, and
- Executive management support.

The three primary disadvantages of ABC is that

1. The method of implementation is complex, costly, and time consuming.
2. The process of data collection and entry requires more resources than traditional method.
3. costly to maintain (after implementation).

The objectives of the study is to assess the changes in the financial performance of public shareholding industrial companies in Jordan pre and post applying ABC system using financial ratios. The second objective is to test whether there is significant difference in the financial ratios pre and post implementing ABC system.

2. Literature Review

In literature, the concept of Activity-based costing (ABC) was first introduced by Cooper and Kaplan in 1987. ABC is an approach for more accurately allocating overhead to those items that actually use it. Cagwin and Bouwman (2002) this study aims to find if there is an improvement in financial performance that is associated with the use of ABC, and the conditions under which such improvement is achieved. The results show that there indeed is a positive association between ABC and improvement in ROI when ABC is used concurrently with *four conditions* (1) other strategic initiatives. (2) When implemented in complex and diverse firms. (3) When used in environments where costs are relatively important. (4) And when there are limited numbers of intra-company transactions. According to Pizzini (2006) this study examines the association between cost-system functionality, managers' beliefs about the relevance and usefulness of cost data, and actual financial performance using a sample of 277 US hospitals. The results of this study indicate that systems can provide greater cost detail, better classify costs according to behavior, and report cost information more frequently. While Banker et al. (2008) studied the impact of ABC on adoption of world-class manufacturing (WCM) practices and plant performance. They find that WCM practices completely mediate the positive impact of ABC on plant performance, and thus advanced manufacturing capabilities represent a critical missing link in understanding the overall impact of ABC. The study suggests that ABC adoption by itself does not improve plant performance.

And according to the study of Zaman (2009) the purpose of this study are to develop a scale that best capture the perception of the practitioners related to ABC, The Cronbach's alpha shows apparent superiority of the scale. The factor analysis finds four dimensions, namely, overall performance, strategic cost allocation method, increased efficiency and effectiveness. This study suggest that the developed scale can have significant implications to capture the perception of ABC and that the perception of ABC in terms of strategic cost allocation method, increased efficiency and effectiveness has significant effect on firms' performance.

Another study for Al-Khadash and Mahmoud (2010) studied the improvement in financial performance associated with the use of ABC. Data were obtained through a mail survey of financial managers who furnished information regarding company financial performance; Data were obtained from the Jordanian shareholding companies as of the end of 2009. Regression analysis is used to test the association between the awareness level of using ABC and the level of adopting ABC. It is also used to identify the improvement in ROA as a mean of financial performance which associated with ABC initiatives. Results show that the awareness level of using ABC is high among the financial managers, but ABC implementation is not high; also it is found that there is a positive association between ABC and improvement in ROA. And according to the study of Jänkälä and Silvola (2012) this paper examines the effects of the use of ABC on small firms' performance. Moreover, they examine if the small firms' past financial performance drives the adoption of ABC and explore whether the extent of ABC

use leads, a survey was used in this paper, the results indicate that small firms with adequate financial resources as well as firms experiencing declining growth tend to use ABC and such use facilitates their subsequent growth and profitability. Small firms seem to benefit from using ABC. Final study for Knápková, et al. (2014) the article aims to analyze the use of ABC concept in Czech enterprises and the effect of its use on the financial performance of companies. An extensive questionnaire survey used, a total of 350 enterprises in the Czech Republic revealed that the ABC is used by approximately 19% of enterprises, which is less in comparison with similar studies conducted in developed countries. The use of the chi-square did not confirm the impact of company's size, company's specialization and company's age on the implementation of ABC. It was also tested whether the utilization of ABC in corporate practice improves the financial performance of companies. As financial performance indicators were selected return on equity and return on assets. The testing was carried out by using student's t-test. The differences in the achieved performance cannot be due to the results considered significant. The results indicate that the implementation of ABC neither has any effect on the financial performance of companies.

Despite the flourishing research works listed above, we can conclude that questionnaires are the most used data collection methods in earlier studies, to examine the effects of ABC on firms' performance. This study will use the financial ratios as variables. Comparison of the financial ratios before and after implementing ABC system to assess improve of firms, and by using student's t-test to test the significance difference between pre and post implementing ABC system.

3. Hypothesis

To fulfill the main objective of the study, following hypothesis has been formulated.

H₁: GPM of the Jordanian industrial companies improves after implementing ABC system.

H₂: MBIT of the Jordanian industrial companies improves after implementing ABC system.

H₃: ROS of the Jordanian industrial companies improves after implementing ABC system.

H₄: ROA of the Jordanian industrial companies improves after implementing ABC system.

H₅: ROE of the Jordanian industrial companies improves after implementing ABC system.

H₆: ROI of the Jordanian industrial companies improves after implementing ABC system.

H₇: There is significance difference between the pre and post implementing ABC system in terms of GPM, MBIT, ROS, ROA, ROE and ROI.

4. Research Methodology

4.1 Variables of study

This is a comparative study, so that's why it broadly based on independent variables. Dependent variable here is the implementing of ABC system, and independent variables are the six financial performance indicators. Independent variables are gross profit margin (GPM), margin before interest and tax ratio (MBIT), net profit margin ratios (ROS), return on assets (ROA), return on equity (ROE) and return on investment ratio (ROI) have been computed.

4.2 Population of study

The population of this study consists of (13) public shareholding industrial companies in Jordan out of (70); the financial performance can be measured for the public shareholding industrial companies via financial ratios shown in table 4. The accounting and financial data of selected public shareholding industrial companies is used from the period of 2000-2014. Four years average before and after applying ABC system is taken for all variables and significance is tested with the help of paired sample t-test statistics.

Table 4: The indicators to measure the financial performance of industrial companies

Performance Variables (Financial ratio)	Financial ratio formulas
Gross Profit Margin (GPM)	= (Net sales -Cost of goods sold) / Net sales
Margin Before Interest and Tax ratio(MBIT)	= Income Before Interest& Tax / Net sales
Net profit margin (ROS)	= Net income / Net sales
Return on Assets (ROA)	= Net profit after tax / Total Assets
Return on Equity (ROE)	= Net profit after tax / Total equity
Return on investment ratio (ROI)	= (Gain from Investment- cost of the investment) / cost of the investment

5. Results and discussion

The averages of ratios are shown in Table 5.1. To analyze the financial performance, the comparison of financial ratios pre and post applying ABC system is conducted for different financial ratios.

Table 5.1: the comparison of financial ratios Pre and post applying ABC system

Company name	Before/ After	Gross Profit Margin (GPM)	Margin Before Interest and Tax	Net Profit Margin (ROS)	Return on Assets (ROA)	Return on Equity ROE)	Return on Investments (ROI)
General Mining	Before	0.644	0.278	0.241	0.102	0.118	0.116
	After	0.657	0.309	0.229	0.093	0.108	0.108
The Industrial Commercial & Agricultural	Before	0.181	-0.002	-0.096	-0.062	-0.220	-0.156
	After	-0.162	-0.119	-0.192	-0.058	-0.176	-0.175
Dar Al Dawa Development & Investment	Before	0.532	0.255	0.240	0.136	0.158	0.158
	After	0.488	0.188	0.169	0.092	0.109	0.108
Arab Center For Pharmaceuticals & Chemicals Industries	Before	0.381	0.175	0.158	0.083	0.092	0.092
	After	0.150	0.072	0.066	0.011	0.012	0.012
National Cable & Wire Manufacturing	Before	0.088	-0.007	-0.008	-0.001	0.002	0.001
	After	0.086	0.029	0.022	0.024	0.033	0.031
Arab Engineering Industries	Before	-0.335	-0.786	-0.997	-0.079	-0.192	-0.136
	After	-0.176	-0.348	-0.705	-0.036	-0.528	-0.525
Elzay Ready Wear Manufacturing	Before	0.202	0.068	-0.033	-0.021	-0.049	-0.041
	After	0.142	-0.011	-0.057	-0.010	-0.078	-0.078
Jordan Steel	Before	0.176	0.165	0.136	0.127	0.172	0.172
	After	0.036	0.041	0.024	0.040	0.024	0.040
Arab Electrical Industries	Before	0.153	0.034	-0.015	0.009	0.012	0.013
	After	0.141	0.085	0.058	0.055	0.054	0.051
Union Tobacco&cigarette Industries	Before	0.148	0.113	0.098	0.165	0.270	0.259
	After	0.145	0.123	0.104	0.086	0.121	0.121
Comprehensive Multiple Projects	Before	0.121	-0.193	-0.227	-0.111	-0.118	-0.107
	After	0.126	0.078	0.039	0.053	0.050	0.051
Nutridar	Before	0.283	-0.086	-0.179	-0.038	-7.532	-0.058
	After	0.305	0.048	0.026	0.033	0.033	0.033
Middle East Complex For Engineering, Electronics & Heavy Industries	Before	0.181	0.120	0.048	0.025	0.057	0.053
	After	0.176	0.194	0.123	0.064	0.122	0.111

Table 5.2: The summary of financial performance analysis

Financial Ratios	GMP	MBIT	ROS	ROA	ROE	ROI	Number of increased ratios for each company	Number of decreased ratios for each company
General Mining	↑	↑	↓	↓	↓	↓	2	4
The Industrial Commercial & Agricultural	↓	↓	↓	↓	↑	↓	1	5
Dar Al Dawa Development & Investment	↓	↓	↓	↓	↓	↓	0	6
Arab Center For Pharmaceuticals & Chemicals Industries	↓	↓	↓	↓	↓	↓	0	6
National Cable & Wire Manufacturing	↓	↑	↑	↑	↑	↑	5	1
Arab Engineering Industries	↑	↑	↑	↑	↓	↓	4	2
Elzay Ready Wear Manufacturing	↓	↓	↓	↑	↓	↓	1	5
Jordan Steel	↓	↓	↓	↓	↓	↓	0	6
Arab Electrical Industries	↓	↑	↑	↑	↑	↑	5	1
Union Tobacco&cigarette Industries	↓	↑	↑	↓	↓	↓	2	4
Comprehensive Multiple Projects	↑	↑	↑	↑	↑	↑	6	0
Nutridar	↑	↑	↑	↑	↑	↑	6	0
Middle East Complex For Engineering, Electronics & Heavy Industries	↓	↑	↑	↑	↑	↑	5	1
total of increased ratios	4	8	7	7	6	5	37	-
total of decreased ratios	9	5	6	6	7	8	-	41
percentage total of increased ratios	31%	62%	54%	54%	46%	38%	47%	53%

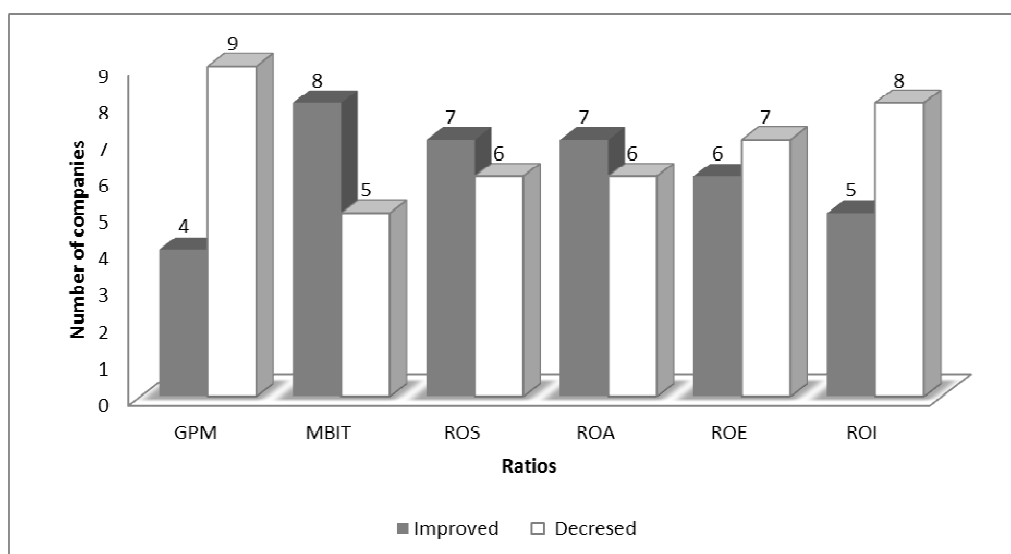


Figure.5: Companies Analysis of Ratios after Implementing ABC System

Figure 5 and table 5.2 shows most of the companies after implementing ABC system there is increase in MBIT, ROS and ROA, the increase in MBIT for (62%) of companies. While the increase in both ratios ROS and ROA the same for (54%) of companies. Increasing in ROA means that the companies did try using their assets more efficiently to earn more profit. The results of increasing in ROA are associated with the findings of Al-Khadash and Mahmoud (2010). They found that there is a positive association between ABC and improvement in ROA. The companies show that increase in MBIT, ROS and ROA have increased after implementing ABC system. National Cable & Wire Manufacturing and Arab Electrical Industries improved its ratios with (4381%) after implementing ABC system, which is highest percentage among companies. Hypothesis H2, H3 and H4 is accepted because improvements in the performance variables, MBIT, ROS and ROA (62%, 54% and 54% respectively) are more than deteriorated companies.

There is decrease in GPM in most of the company's (9 companies out of 13) 69.23% after implementing ABC system. As presented in figure 5 only four companies show that GPM has increased after implementing ABC system. General Mining, Arab Engineering Industries, Comprehensive Multiple Projects and Nutridar showed that GPM has been improved after implementing ABC system. Arab Engineering Industries improved its GPM with 47% after implementing ABC system, which is highest percentage. So hypothesis H1 is rejected because deteriorated in the performance variables are more than improvements companies.

There is decrease also in ROE and ROI, in most of the companies after implementing ABC system Table 5.1. Only six companies show that ROE has increased after implementing ABC system. The Industrial Commercial & Agricultural, National Cable & Wire Manufacturing, Arab Electrical Industries, Comprehensive Multiple Projects, Nutridar and Middle East Complex For Engineering, Electronics & Heavy Industries showed that ROE has been improved after implementing ABC system. National Cable & Wire Manufacturing improved its ROE with (1911%) after implementing ABC system, which is highest percentage among companies. It means these six companies did utilize the portion of shareholder equity efficiently to earn profit and other reason is that they did control on their operational and other costs which have enhanced profit after implementing ABC system. On the other hand ROI in most of the companies after implementing ABC system decreased, only five companies show that ROI has increased after implementing ABC system. National Cable & Wire Manufacturing improved its ROI with (4381%) after implementing ABC system, which is highest percentage among companies. So hypothesis H5, H6 is rejected because deteriorated in the performance variables are more than improvements companies.

Table 5.2 shows the summary of the performance indicators before and after implementing ABC system. 78 Performance variables shows that the direction for the improved ratios after implementing ABC system is 37 Performance variables (37/78, 47 %), and remaining 41 (41/78, 53%) Performance variables direction shows deterioration in the after implementing ABC system period. Out of 37 improved ratios 4 Performance variables are statistically significant. In the other hand out of 41 deteriorated ratios 7 Performance variables are statistically significant.

6. Paired Sample t-statistics

To test whether there is significant difference in the financial ratios pre and post implementing ABC system; paired t-test is applied using SPSS. The summary of the analysis presented in table 6 GPM for three companies decreased significantly the p-value is greater than 5 percent, it can be concluded that this ratios deteriorated significantly after implementing ABC with a total percentage of 23.08%. At the same time MBIT and ROS for Jordan Steel Company decreased significantly, Union Tobacco & cigarette Industries also have two ratios decreased significantly, ROE and ROI. Furthermore, Nutridar Company shows 4 ratios increased significantly, MBIT, ROS, ROA and ROI. So hypothesis H7 is rejected because the percentage of ratios deteriorated significantly after implementing ABC is 8.97% while the percentage of ratios improvement significantly after implementing ABC is 5.12%.

Table 6: Paired Sample t-statistics of companies applied ABC system

Company name	GPM	MBIT	ROS	ROA	ROE	ROI
General Mining	0.76	0.80	0.89	0.82	0.88	0.88
The Industrial Commercial & Agricultural	0.03*	0.39	0.48	0.95	0.80	0.88
Dar Al Dawa Development & Investment	0.08	0.19	0.19	0.12	0.15	0.15
Arab Center For Pharmaceuticals & Chemicals Industries	0.00*	0.62	0.66	0.18	0.16	0.16
National Cable & Wire Manufacturing	0.74	0.59	0.68	0.64	0.73	0.76
Arab Engineering Industries	0.29	0.58	0.56	0.10	0.25	0.24
Elzay Ready Wear Manufacturing	0.49	0.62	0.96	0.75	0.94	0.87
Jordan Steel	0.02*	0.02*	0.03*	0.11	0.11	0.08
Arab Electrical Industries	0.66	0.51	0.44	0.22	0.49	0.56
Union Tobacco & cigarette Industries	0.72	0.43	0.50	0.08	0.04*	0.04*
Comprehensive Multiple Projects	0.75	0.31	0.32	0.25	0.45	0.46
Nutridar	0.76	0.00*	0.03*	0.00*	0.10	0.00*
Middle East Complex For Engineering, Electronics & Heavy Industries	0.53	0.14	0.16	0.09	0.48	0.45
The number of companies that increased significantly	0	1	1	1	0	1
The number of companies that decreased significantly	3	1	1	0	1	1
The percentage of companies that increased significantly	0%	8%	8%	8%	0%	8%
The percentage of companies that decreased significantly	23.08%	8%	8%	0%	0%	8%

* Significant at the 5%.

Finally it argued that overall industrial sector of Jordan performance after implementing ABC system showing some sort of mixed results and has an insignificant negative impact. After implementing ABC system MBIT, ROS and ROA improved (insignificant), furthermore, GPM, ROE and ROI deteriorated (insignificant).

7. Conclusion

ABC systems need a change in organizational culture, willingness to learn, knowledge and adequate resources (Roberts and Silvester, 1995). The primary reasons for failure of any major project are lack of communication at any level, poor planning or inadequate process and lack of managerial commitment (Charaf and Rahmouni, 2014). The article aims to analyze the effect of Activity Based Costing (ABC) on the financial performance of Jordanian industrial shareholding companies. Dependent variable in this study is the implementing of ABC system, and independent variables are the six financial performance indicators. Independent variables are GPM, MBIT, ROS, ROA, ROE and ROI have been computed. The population of this study consists of (13) public shareholding industrial companies in Jordan out of (70); the financial performance measured for the public shareholding industrial companies via financial ratios. The financial data of selected public companies is used from the period of 2000-2014. Four years average before and after applying ABC system is taken for all variables and significance is tested by paired sample t-test statistics. The results indicate that 78 Performance variables shows that the direction for the improved ratios after implementing ABC system is 37 Performance variables (37/78, 47 %), and remaining 41 (41/78, 53%) Performance variables direction shows deterioration in the after implementing ABC system period. Out of 37 improved ratios 4 Performance variables are statistically significant. In the other hand out of 41 deteriorated ratios 7 Performance variables are statistically significant.

8. Limitations

There are certain limitations or weaknesses of this research study:

The main limitation of this research study is that it only talks about the effect of implementing ABC on financial performance in the industrial sector; it totally ignores the other corporate sectors of the economy, and the impact of possible differences in accounting methods adopted by the industrial sector companies is not investigated. Although this study used only six ratios but it did not cover the other ratios.

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