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The Impact of Activity Based Costing (ABC) Application on Product Quality

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ABSTRACT

Researchers identified the importance of ABC on product pricing, while this study is an attempt to highlight the role of ABC in enhancing the product quality. This study aimed to identify the relationships between ABC and Product Characteristics, Product Reliability, Product quality, Product standard matching, Product durability, Product service level, and Product beauty. This study used 93 questionnaires to achieve the objectives. The results showed that ABC has a positive relationship with (Product Characteristics, Product Reliability, Product quality, Product standard matching, and Product durability) but the results showed that there are no relationships between ABC and Product service level and Product beauty.

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INTRODUCTION

The worlds is experiencing a big shift in the business environment, such as the rapid growing in information technology, acceleration in the field of innovation of new products and provide excellent services, which extended the competition between companies to become at the global level. On this level, the companies are required to provide high quality products with best services. In doing so, companies have to adopt best accounting information systems and polices such as Activity Based Coasting (ABC) to keep up with developments in the modern business environment and in order to find appropriate ways to measure products' cost and to facilitate the marketing process while maintaining the quality of the products.

Many researchers highlighted the role of activity based accounting in enhancing the company's performance, for example, Cagwina and Bouwmanb (2002) investigated the relationship between applying ABC and financial performance and the conditions under which such improvement is achieved. They used confirmatory factor analysis and structural equation modelling to investigate the relationship between ABC and financial performance. They revealed that there is a positive relationship between ABC and improvement in ROI when ABC is used concurrently with other strategic initiatives, when implemented in complex and diverse firms, when used in environments where costs are relatively important, and when there are limited numbers of intra-company transactions. In addition, measures of success of ABC used in prior research appear to be predictors of improvement in financial performance.

Moreover, Tornberg, Jämsenand Paranko (2002) aimed to investigate the possibilities of activity-based costing and the modeling of design, purchasing and manufacturing processes in providing useful cost information for product designers. The hypothesis was that activity-based costing and process modeling might provide an effective tool for the evaluation of different design options .They concluded that activity-based costing and process modeling provide a good starting point in heading toward more cost-conscious design. This way the designers learn the relationships between the activities performed in the organization and their associated costs.

The competition among industrial companies urges the administrations to find the best methods to provide customers with high quality and best price products. Many researches such as (Rifai, (2014), Alshaiekh, (2011) Metwally (2009)) highlighted the importance of ABC in achieving the best pricing of products. This study came to shed light on the role of ABC in enhancing the quality of products. This study is trying to answer the following questions:

1. Does applying ABC affect the product's quality?
2. Does applying ABC affect the product's characteristics?
3. Does applying ABC affect the product's reliability?

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4. Does applying ABC affect the product standards matching?
5. Does applying ABC affect product durability?
6. Does applying ABC affect product service level?
7. Does applying ABC affect beauty product?

Objectives Of The Study:

This study aims to achieve the following objectives.

1. Exploring the relationship between applying ABC and the product's quality.
2. Exploring the relationship between applying ABC and the product's characteristics.
3. Exploring the relationship between applying ABC and the product's reliability.
4. Exploring the relationship between applying ABC and the product standards matching.
5. Exploring the relationship between applying ABC and product durability.
6. Exploring the relationship between applying ABC and product service level.
7. Exploring the relationship between applying ABC and beauty product

Activity based costing is a methodology that is helpful for companies or institutions to identify the activities and assign the cost for each activity; cost estimate is being done in this methodology. Tracing the consumption that is to be spent is the main concern of this costing methodology which has gained the interest of entrepreneurs. This is not just about saving money but utilizing the resources in the most productive way. (Occupy theory, 2014)

Occupy theory (2014) stated that the following are the advantages that can be enjoyed if ABC is to be used and implemented

1. Allows the company or the business institution to have the most accurate costing of the products/services. Since this method is primarily focused on the costing of the products or services this is best done with accuracy because the entire process is being monitored thereby allowing the company to have known the cost which is friendly to both the manufacturer and to the consumer.

2. Easier to be understood. This method or approach does not require a deeper way of understanding. It is never hard to be understood since this is focusing on the reality how the process is being undertaken.

3. The unit cost is properly utilized rather than its total cost.

4. Is helpful in the integration of continues improvement programs for the company.

5. Benchmarking is being facilitated.

6. Performance management and scorecards are being supported.

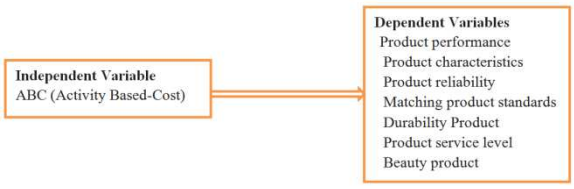
There are many researchers studied the ABC system (i.e. Rifai, (2014), Alshaiekh, (2011)) for example, Rifai (2014) studied the extent of the application of cost-based system on the basis of activity in the iron and steel industry in Jordan. He aimed to estimate the accrued revenues and growth as a result of the implementation of ABC system, in addition to check whether there are obstacles facing the implementation of ABC in the iron and steel industry in Jordan. The study revealed that ABC should be used in the steel companies to elevate systems. This study recommended to strengthening the system based activity-based costing within the top management of these companies; the system also includes a strategic side to the other available systems. Alsheikh (2011) aimed at defining the most important features and advantages of the system (ABC) and the extent of adoption of ABCin the Jordanian industrial companies in pricing process, and to identify products that should continue to produce them or stop them. The main findings that (ABC) helps to reduce costs by assessing the various activities, and that the traditional costing system does not concern the costs of products specifically in the industrial environment, helping system (ABC) in management decisions

Metwally (2009) aimed to explore customers satisfaction, to achieve this goal, hehighlighted that quality of ABC is the most important factor that affect the production. He added that the production with high quality is rapidly increasing its market share; success in these companies depends on the degrees of quality and knows how to reach quality standards.

***Hypotheses Of The Study*:**

1- There is no relationship between application of cost-based on activities and the product performance.
2- There is no relationship between applying ABC and the product’s characteristics.
3-There is no relationship between applying ABC and the product’s reliability.
4-There is no relationship between applying ABC and the product's quality.
5- There is no relationship between applying ABC and the product standards matching.
6- There is no relationship between applying ABC and product’s durability.
7-There is no relationship between applying ABC and product’s service level
8-There is no relationship between applying ABC and product’s beauty

The study model:



Population and Sample:

The questionnaire was distributed to 128 employees at 21 industrial Jordanian companies. Only 93 questionnaires were returned yielding 72.6%

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response rate. Table below exhibited demographic profile of the respondents.

Table 1.1: Demographic Profile of respondents.

	Frequency	Percentage (%)
Gender		
Male	89	95.7%
Female	4	4.3%`
Total	93	100%
Age		
Less 25	9	9.7%
25- 35	4	4.3%`
36- 45	62	66.6%
More than 45	18	19.4%
Total	93	100%
Education		
Diploma	0	0%
Bachelor degree	79	84.9%
Master degree	12	12.9%
PhD	2	2.2%
Total	93	100%
Specialization		
Accounting	86	92.4%
AIS	5	5.4%
MIS	1	1.1%
CS	1	1.1%
Total	93	100%
Years of Experience		
2 or less	9	9.7%
3 to 5	47	50.5%
6 to 10	16	17.2%
More than 10	21	22.6%
Total	93	100%

The above table showed that 95.7% of respondents were male, only 4.3% were females. Additionally, 66.6% of respondent aged between 36 to 45 years, 18 respondents was more than 45, 9 less 25 years and only 4 were between 25 and 35. Moreover Table 1.1 shows that 84.9 % of the sample held a Bachelor degree. Those with a master's degree were only 12.9 %, and the remaining had PhD 2.2%. Regarding the specialization, the majority of the respondents majored in Accounting92.4%, 5.4% in AIS, 1.1% majored in MIS, and similarly1.1% majored in computer science. In relation to experience, Table 1.1 shows that 50.5% of the sample had three to five years of work experience, and 17.2% had experience between six and ten years, and the others either had two years or less years of experience 9.7%, or more than 10 years of experience 22.6 %.

Goodness Of Data:

Before testing the research hypotheses, it is important that the data collected were checked for validity and reliability. The content validity of the instrument was ascertained by obtaining expert opinions from four lecturers in Jordanian universities. The construct validity of each variable, on the other hand, was ascertained by running factor analysis, which is elaborated below.

Factor Analysis Factor analysis is a type of data reduction technique used to reduce the variables to smaller number factors (Tabachnick & Fidell, 2007). Before performing the factor analysis, the assumptions of normality, homoscedasticity, and linearity were checked (Hair, Black, Babin, Anderson, & Latham, 2010). In line with that, this study used Kaiser Meyer Olkin (KMO) measure of sampling adequacy, which indicates the inter-correlation among the variables and the validity of the variables to enter factor analysis. Bartlett's test of sphericity is needed to test the intercorrelation among the items. For this test, the significance level of less than 0.05 is required to perform the factor analysis. Table 1.2 below shows the guide to interpret findings of factor analysis (Kaiser, 1970, 1974).

According to Hair *et al*. (2010), the suggested cut-off point for significance loading is 0.4 or above for a sample of 93 subjects. In addition, all components with eigenvalue more than 1.0 will be retained. KMO was used to test the questionnaire validity and to ensure the suitability of all variables entering the factor analysis test, as explained below. The suitability of all items for factor analysis test was assessed by three ways: (1) the correlation matrix includes many coefficients of 0.3 and above, (2) the Kaiser Meyer Olkin (KMO) for all items must exceed the recommended value of 0.6, and (3) the Bartlett's Test of Sphericity (BTS) is significant for all variables. The number of factors was defined by two steps: (1) the factors with eigenvalue greater than 1.0. (2) The factors have substantial amounts of common variance as displayed in the scree test. The variables with no significant loading on the factor were deleted, and then the factor was labeled based on the higher loading variables because they have

greater influence than the variables with low loading (Hair *et al*., 2010).

Table 1.2: KMO Test Guide.

KMO	Opportunity for factor analysis
.90 to 1.00	Marvelous
.80 to .89	Meritorious
.70 to .79	Middling
.60 to .69	Mediocre
.50 to .59	Miserable
Below .50	Should be excluded

Factor analysis was suitable to be performed on all factors because the KMO raged between .689 and 0.792 and the sphericity test was significant at ≤ .005. For example, the items that loaded into ABC factor explained 42.32 % of the total variance. The loading on this factor ranges from 0.762 to 0.453. This factor consists of seven items describing information about ABC. Moreover, the outputs in the component matrix were strongly loaded only on one component, and it shows a very clean result. Only one question was removed.

Reliability of Measurement After running factor analysis, it is necessary to rerun reliability test again to check for the reliability of the survey instrument. According to Hair *et al*. (2010), the perfect measure of a concept needs more than one item. Moreover, according to Nunnally (1978), to assess the reliability of the survey instrument, the inter-item analysis can be used to test the scale's internal consistency. Hence, Cronbach's alpha is considered an adequate indicator of the internal consistency and the reliability of the survey instrument (Sekaran & Bougie, 2010). The test shows that the Cronbach's alphas range from 0.922 to 0754, which exceed the minimum value of 0.7 to be acceptable. This means that the instruments used to measure the variable were acceptable and the data were later used for further analyses (Sekaran&Bougie, 2010).

To test collinearity, this study depends on the tolerance (TOL), and the variance inflation factor (VIF). The TOL indicates the effect of the other independent variables on the standard error of regression coefficient. The high VIF value indicates to a high degree of collinearity or multi-collinearity among the variables. Vice versa, the low TOL value indicates to a high degree of collinearity or multi-collinearity among the variables (Tabachnick&Fidell, 2007). According to Hair *et al*. (2010), the tolerance (TOL) should be above 0.10 and the variance inflation factor (VIF) should be less than 10 to indicate no collinearity or multi-collinearity among the independent variables. As shown in Table 1.3 there is no collinearity or multi-collinearity among the variables of this study. Table 1.3 shows that the values of VIF ranged from 1.780 to 1.988 and the values of TOL range from 0.584 to 0.683.

Linearity, Normality, And Homoscedasticity:

Linearity, normality, and homoscedasticity are other important assumptions that should be checked before regression test is performed. The need for normally distributed data is because the correlation represents a linear association between the variables while the nonlinear association is not represented. So the scatter plots should express the normal line for the independent and dependent variables. According to Hair *et al*. (2010), testing the normality of the data can be done by exploring skewness and kurtosis ratio. Normality is assumed when the skewness and the kurtosis are between ± 1.96 at alpha value .05 and ±2.58 at alpha .01, respectively. The test depict that the values of skewness and kurtosis and indicate that the data were normally distributed for the current study.

Results:

After the assumptions of multiple regression were met, this study proceeds to test the relationship between independent and dependent variables. The results came as shown below

Table 1.3: Simple regression test.

Variable	R	R^2	Adjusted R^2	Significant Level
Product Characteristics	.723	.750	.730	.031
Product Reliability	.688	.690	.685	.041
Product quality	.802	.793	.790	.000
Product standard matching	.755	.762	.760	.011
Product durability	.621	.633	.640	.049
Product service level	.105	.088	.091	.540
Product beauty	.350	.348	.349	.060

The above table shows that the ABC has a positive relationship with (Product Characteristics, Product Reliability,Product quality,Product standard matching,and Product durability) but the results showed that there are no relationships between ABC and Product service level and Product beauty. It is remarkable that the product beauty is significant at .10 level.

Conclusions:

The result of the current study came in line with past studies such as Rifai (2014), Alshaiekh (2011), and Metwally (2009), For example, Metwally (2009) highlighted that quality is the most important factor that affect the production. He added that the production with high quality is rapidly increasing its market share.

Alsheikh (2011) found that (ABC) helps to reduce costs by assessing the various activities, and helping system (ABC) in management decisions. Additionally, Rifai (2014) revealed that ABC should be used in the steel companies to elevate systems. He recommended to strengthening the system based activity-based costing within the top management of these companies; the system also includes a strategic side to the other available systems.

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