

A model to integrate of the ABC and the BSC in the Egyptian companies: Aligning strategic efficiency and performance improvement (Field study)

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Abstract: Companies are now operating in intensive competitive environment to make significant process improvements in areas such as quality, productivity, and innovation because the customer expects more product choices, at lower prices, with higher quality and faster delivery. It is also evident that companies nowadays need more accurate, timely, and reliable operational and financial information to permit the managers to make effective strategic and tactical decisions about pricing, product line development, process improvements, product mix, investment decisions, etc. This study introduces the integration of the activity-based costing system (ABC) with the balanced scorecard approach. In an attempt to make the required information available to the organization, a proposed model called activity-based scorecard model (ABS) with an emphasis on the interaction of the two concerned management tools. Research questions tries to reveal the ambiguity concerning whether the organization which applies ABC with the BSC exhibits better performance and higher business efficiency than non adopting firms or firms which apply only a single management system but not the two. Information will be collected through questionnaire responses from a random sample of manufacturing companies and service business units. The proposed integration framework is expected to benefit the organization across its various business stages, e.g. (purchasing, distribution, customer service, etc.) and functions (planning, controlling, analysis, etc.). The framework is expected also to provide information which is helpful to the organization in decision making, analysis, and managing its strategy. Finally, it is suggested that the Activity- Based Scorecard is a powerful tool that supports a company with its process improvement efforts, leading to higher performance. This work in part depended upon a work done by the authors in a large scale, and some ideas were borrowed to support the current work.

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Key words: activity-based costing, balanced scorecard, process improvement, financial information, non-financial information.

1. Introduction

By looking at the business environment nowadays, it is noticed that companies struggle with numerous challenges including determining best strategies and objectives, coping with limited resources, determining how best to economically obtain additional resources, how to optimally allocate these scarce resources, and ultimately how to measure success. Moreover, companies need to consider the relationship between various inputs, objectives, and the associated improvement outcomes in their business process. **Maiga and Jacobs (2003), Elgibaly (2006)** stated that innovative techniques such as balanced scorecard (BSC) and activity-based costing (ABC) are being implemented by management in response to the new global competitive environment. CIMA magazine in 2001 reported that organizations have begun to look at activity-based management (ABM) for a variety of reasons. Among the commonly cited are top-down pressure to reduce costs, competitive pressure/market conditions; organization-wide program, the introduction of benchmarking, regulatory issues, and

seeking world-class status, competitive advantages through process management.

There is no doubt also that accurate information required by organizations in the different business stages to conduct its various functions effectively and to enable it to take the right decisions in stead of basing its decisions upon misleading or inaccurate information that weakens the organization and undermines its performance in the long run. That indicates to the importance of the management initiatives which help in providing such information. To avoid this shortcoming and solve such problem, the study proposes a framework for the integration of two process improvement methodologies: ABC and BSC though making different types of information as well as information in different business areas available to the organization which is expected to provide rich and helpful information to the organization, guide, and facilitate decision making in this organization. That is expected to help companies manage and continuously improve their business processes which help it survive today and flourish in the future, **Johnson (2008)**.

Further more, the follower of the Egyptian business environment nowadays will notice that new management accounting systems are not yet widely adopted, completely adopted, or even properly adopted. This study is expected to encourage companies in such countries adopt the stated techniques through spreading the results of adopting them.

1.2. research objectives and question:

The main research objective is to develop an operational model (Activity-based scorecard model) in an attempt to improve the operational performance of the Egyptian companies and help them pursue their strategies, and then support the claim of the continuous improvement. The sub objectives of the study are filling the gap of the information required by the organization, guiding Egyptian organizations in achieving process improvement, enhancing the Egyptian organizational performance and support their strategies, attempting to provide an integrative management and measurement system, finding a way to improve company performance, and finally, giving more attention to the tools which may affect strategy of the firm in an attempt to improve the firm's strategy and as a result improving future performance.

The study works to answer the following question:

Do the ABC system and the BSC approach have a significant effect upon improving both performance of the organization and business efficiency?

1.3. Research Methodology:

The researchers used the survey method to describe and analyze the impact of applying the two mentioned management accounting approaches upon the performance of the organization and business efficiency. The population of the study is the banks and the food industrial companies located in Egypt. The researcher carried out pilot study with (N=38) including both food industrial companies and banks. Random sample size calculated was 138. The researcher used the questionnaire instrument in addition to the test- retest approach to confirm the correctness of views collected. The number of questionnaire instruments sent to banks was 69 and the number of the received questionnaires was 47 with a response rate of 68%. The number of the questionnaire instruments sent to food industrial companies was 69 and the number of the received questionnaires was 51 with a response rate of 74%. The questions used were multiple choice questions, questions which are answered with yes or no, and the five likert scale questions. Respondents were contacted by telephone calls before delivering the

questionnaire instrument to them. Sometimes, a controllable experiment was implemented. Also, they were contacted by the telephone after delivering the questionnaire instrument to make sure that they completed it correctly.

Information was collected through questionnaire responses (five likert scale questions) from a random sample of manufacturing business units located in Egypt as well as the service sector. Food industries were selected as a representative of the manufacturing sector and banks were selected as a representative of the service sector. The questionnaire instrument was delivered to the financial, cost, or management accounting department of each targeted entity. The respondents were the managers or the directors of these departments, their assistants, and some distinctive employees who understand the tested management accounting initiatives. An interview was held with managers and directors of these departments asking for their participation in the study and explaining to them the nature and the objective of the study. In the interview the importance of understanding why firms may choose to implement BSC and ABC was described. As an inducement to reply, respondents were promised to receive summarized results of the study.

2. The possibly of the integration between ABC and BSC:

It is a questioning of the plausibility and possibility of integrating ABC and BSC systems. First of all, **Sunhilde (2009)** considered how, Activity Based Management (ABM) and other tools like Total Quality Management, Customer Value Analysis, EVA and Budgets approaches may complement a balanced scorecard effort. Similarly, **Shinder and McDowell (1999)** stated that ABC, the Balanced Scorecard and EVA are useful tools that can help a company achieve greater success in the current dynamic and competitive business environment and they also stated that these tools are quite complementary. ABC can help managers understand the cost and capital impact of their decisions. **Szychta (2010)** stated that ABC is a cost accounting system which can be effectively used together with other advanced management accounting tools (e.g. Balanced Scorecard). In addition, **Yilmaz (2008)** reported that the first link between BSC and ABC is operational connection. ABC provides cost and other business intelligence about key business factors including resources, activities, products, services and customers. They enable managers to make decisions that improve cost and profit performance.

Maiga and Jacobs (2003) suggested that successful implementation of new manufacturing techniques requires complementary management accounting systems. **Turney (2005)** stated also that Activity-based costing (ABC), activity-based management (ABM) and the balanced scorecard (BSC) are established management methods and they are building blocks of performance management systems. It was also stated that ABC and the BSC are often viewed as independent methods each with its own purpose. However, they are complementary and offer greater value when linked together. **Newing (1995)** suggested that the balanced scorecard works well in conjunction with ABC and activity-based management (ABM) because they are integral parts of the balanced scorecard, giving quantified visibility of what is really driving cost from outside the business, as well as within.

A need for the integration may be the reported deficiencies of the ABC system or difficulties in adopting it when it is applied alone as a single system, e.g. **Johnson (2008)** stated that ABC lacks the strategic and non-financial elements that are captured in the BSC. **Kaplan and Cooper (1998)** stated that changes in business since the mid-1970s, triggered by global competition and technological innovations, have led to striking innovations in the use of financial and non-financial information in organizations. **Maiga and Jacobs (2003)** also reported that Innovative techniques such as balanced scorecard (BSC) and activity-based costing (ABC) are being implemented by management in response to the new global competitive environment. **Sunhilde (2009)** found that ABC is used by many organizations that implement the BSC because ABC enables businesses to more accurately define and measure their metrics. While firms will likely benefit from ABC, the system is mainly an accounting and cost-based method of viewing and analyzing an organization and its activities. ABC also lacks the strategic and non-financial elements that are captured in the BSC. The BSC benefits from the inclusion of ABC performance measures.

2.1. ABC and BSC Perspectives:

There are interactions between ABC and the different perspectives of the BSC. The ABC system plays a role in such various perspectives, as follows:

2.1.1. ABC and the financial perspective:

Mansuy (2000) stated that a company that uses a bidding process to sell its products and services can increase profits by predicting overhead costs more accurately. Activity-based costing (ABC) permits more accurate estimates by showing the relationship between specific products and the cost of

producing them. By taking that relationship into account, a company can bid on a mix of products that will fit its overhead projections, thereby ensuring that overhead costs are covered and profits are increased.

Stout and Bedenis (2007) presented a case study of a company experiencing difficulties in cash flows and unprofitable growth. The company responded by redesigning its cost system and implementing a simple ABC system which eventually provided the owners with strategies for pursuing profitable growth. Therefore, it was concluded that activity-based costing allows a manufacturer to make business process changes that helped improve cash flow, product and channel profitability, and the company's competitive position.

2.1.2. ABC and the customer perspective:

With regard to relationship between the ABC system and the customer perspective as the second perspective in the scorecard system and the role the ABC system plays in that matter. A second linkage occurs when an ABC model is used to measure the profitability of individual customers (**Kaplan and Cooper, 1998**). **Kaplan (2001)** stated that the measurement of customer profitability is the second link between ABC and BSC. In the customer perspective, in addition to measures of the value proposition, there are the typical outcome measures; acquisition, satisfaction, retention, account share, and market share. But it is also important to measure whether our loyal, satisfied customers are, in fact, profitable customers. The organizations don't want to have loyal, satisfied customers- those that receive lots of service and features- incurring large losses. Instead we can combine our ABC and BSC insights. The BSC defines targeted vs. untargeted customers; the ABC gives managers insights about where opportunities exist to transform attractive, but money-losing into long-term, profitable relationships.

In addition, **Searcy (2004)** as well as **Cai and Yang (2008)** used ABC to conduct profitability analysis and analyze their customers or to assess the profitability picture in order to better understand which customers were profitable and which were subsidized. **Smith and Dikolli (1995)** suggested that activity-based costing may facilitate the success of CPA implementation. **Kaplan and Norton (1996)** stated that ABC systems permit companies to measure individual and aggregate customer profitability. All this refers us to the important role of the ABC system in customer accounting.

2.1.3. ABC and the internal business process perspective:

With regard to the relationship between ABC and the internal business process perspective of BSC, **Yilmaz (2008)** stated that the link between BSC and ABC arises in the operational excellence component of the scorecards internal perspective, which implies that the internal business process perspective represents a significant component in the integration between ABC and BSC or it is a main link in the ABC and the BSC chain. **Smith and Finger (2002)** stated that ABC system, as well as other management theories, has emphasized the significance of the business process and its management.

In addition, **Kaplan (2008)** stated that "We describe how to use ABC for operational planning by having it forecast the levels of resource capacity-employees, equipment, space, technology-you need to supply in order to deliver on the revenue targets in your strategic plan. This is a powerful analytic tool that eliminates almost all of the guesswork, subjectivity and negotiations normally associated with the resource planning or budgeting process. Furthermore, **Johnson (2008)** stated that most successful firms use ABC to manage costs and gain insight into their internal competitive advantages. Therefore, ABC is particularly valuable initially as a management accounting and reporting tool, but has also proved valuable as providing metrics for use in the BSC's internal process perspective.

2.1.4. ABC and the learning and growth perspective:

In this side, **Lim (2001)** stated that the learning and growth perspective usually has the least input from the ABC/M model. It is quite often limited to the rare situations where costing measures appear in this perspective. It is worth also mentioning that human capital is the most critical element of the learning and growth perspective of BSC. **Lin and Zhi-lin (2009)** stated that there was not an effective way to calculate the cost of human capital, as an important part of the learning and innovation perspective, accurately. In recent years, has been well developed and is an advanced method of cost calculation and may provide us a useful tool to measure human capital. Finally, Final, ABC input can be used to perform statistical forecasting to accurately determine the number of people required to support targeted products, channels, markets, customers, etc. (**Turney, 2008**)

3. The value of ABC/M with Scorecarding and the proposed integration:

First of all, ABC system outputs can be used as an inputs to the BSC system, **Sunhilde (2009)** stated that the cost of activities and activity outputs which are used in the internal business process dimension of

the BSC of the organizations. This activity information covers support services as well as primary business processes. **Cokins (2004)** stated that the information the ABM calculation engine reports should always be the input for something else, such as for performance measurement scorecard systems and thus the output of ABM can be an important input of performance measurements in a scorecard system, and the presence of ABM data can stimulate greater numbers of actions. **Maiga and Jacobs (2003)** stated also that ABC is an innovation aimed toward an increase in the accuracy of cost measures and also is often viewed as a supportive measurement system for successful implementation of the balanced scorecard. **Bula (2004)** stated that the simultaneous input and output nature of ABC in today's global environment sustains and enhances the relevance and reliability in performance measurement.

Therefore, ABC has a critical role and great impact on the measures of BSC. **Gold (1999)** reported that the use of activity-based costing (ABC) measures in the BSC initiative is essential to maintaining a focus on meaningful and actionable indicators and measures. In 2006, **Gary Cokins** stated also that the ABC/M applies its data for operational cost management-with a subset of ABC/M's measures serving as key performance indicators (KPIs) used in the BSC. **Tarokh and Shoostari (2005)** reported that the performance on a scorecard is being measured and optimized with ABC model to achieve more customer profitability. **Sunhilde (2009)** stated also that ABC is used by many organizations that implement the BSC because ABC enables businesses to more accurately define and measure their metrics.

In addition, ABC can represent as supported and powerful source of information related to the short and long run, therefore, ABC can be used as enabler or facilitator to BSC adoption and implementation. **Johnson (2008)** stated that ABC is used by many organizations that implement the BSC because ABC enables businesses to more accurately define and measure their metrics or, measures. **Cokins (2004)** in explaining the ABC role as a facilitator or enabler to the BSC implementation as well as the significant benefits that the ABM system provides, stated that whether the ABM data measure the work activity costs, the processes that the activities belong to, or the outputs, ABM makes scorecards easier to populate. This is because ABM already has accurate numbers in place, and in a format designed for decision support.

Maiga and Jacobs (2003) stated that ABC is a system that attempts to accurately link the consumption of resources to designated outputs.

Because of this, ABC is likely to facilitate the measurements within all four of the BSC sectors as well as assisting in analyzing the trade-off implicit in the four sectors. Furthermore, they stated also that ABC can be viewed as an "enabler" to support the development of cost-effective product designs and manufacturing processes. For example, with accountants providing important inputs into product design and development decisions, ABC attempts to mirror the manufacturing process, so that engineers and production managers easily can see how design changes will affect costs. Therefore, it is noticed that the ABC system is very important to the scorecard implementation success and hence to the organization and its performance.

4. The strategic Benefits of integrating ABC and BSC in the management accounting literature:

It is noticed that those who supported the integration did that for several reasons. There are numerous benefits anticipated from integrating the two management methods as well as the mutual benefits each system provides to the other.

In considering the benefits of integrating ABC/M to the balanced scorecard, **Melese et al. (2004)** stated that integrating management initiatives such as ABC, BSC, and TQM help the organization face the same basic set of management challenges: a) to improve effectiveness-emphasizing outputs over inputs; b) to improve efficiency-managing costs; and c) to improve accountability-tying budgets to performance. Further, it was stated that such integration leads to improving decision-making by providing information on the relative effectiveness and efficiency of program spending, improving [the] internal management of the organization, improving service quality, customer satisfaction, and the confidence of the people by holding agencies accountable for results.

Similarly, **Turney (2005)** stated that: "Linking ABC to the scorecard helps keep the spotlight on results and if people are responsible for performance measures of cost and profitability, they will pay very close attention to cost and profitability. It was also stated that the benefits of linkage include additional performance measures—measures for which ABC is the only reliable source—and more comprehensive decision support. Using a performance management (PM) approach to these various management methods can create a complete management planning and control cycle.

In addition, **Kelly (2005)** stated that integration of ABC and BSC and other management programs would enhance the organization in different ways; enhance organizational learning and energizing the entire business, ABC gets every one involved in

mapping and decomposing the organization's systems to the activity level. The BSC helps every one understand top level strategy and people are empowered and encouraged to learn. Also the integration helps the organization members focus on those customers and markets that are contributing the most to profitability and establish which products, processes and activities are providing value to the customer.

Eventually, integrating ABC and BSC can positively affect the company strategy. **Lim (2001)** reported that the balanced scorecard provides a top down model of business strategy, ABC/M provides a bottom-up view of business processes and linking the two together opens new opportunities for strategic insight and action. It was also reported that as a source of strategically relevant information about customer and product profitability, ABC/M makes an invaluable contribution to enabling the balanced scorecard strategic management process. **Venkatramanan (2006)** reported also that by overlaying ABC and BSC principles, a combined model provides cost information, identifies the amount of resources particular activities consume, and links activities and resource consumption to the achievement of strategic objectives. These are (i) to evaluate strategy implementation, by providing information about the impact of decisions already taken, and (ii) to monitor the premises on which strategy is based, and provide information that could affect future strategic decisions. To sum up, it is concluded that linking ABC and BSC enhances the value of the two stated management systems and they can benefit the organization when applied together.

5. Research variables and the field study

The study involves two main dependent variables; strategic efficiency of business and performance improvement of the organization. It involves two main independent variables; the ABC system and the BSC system.

The research function is:

$$Y = F(X)$$

Where $X = f(x_1, x_2)$

Y = strategic efficiency of business and performance improvement (the dependent variables)

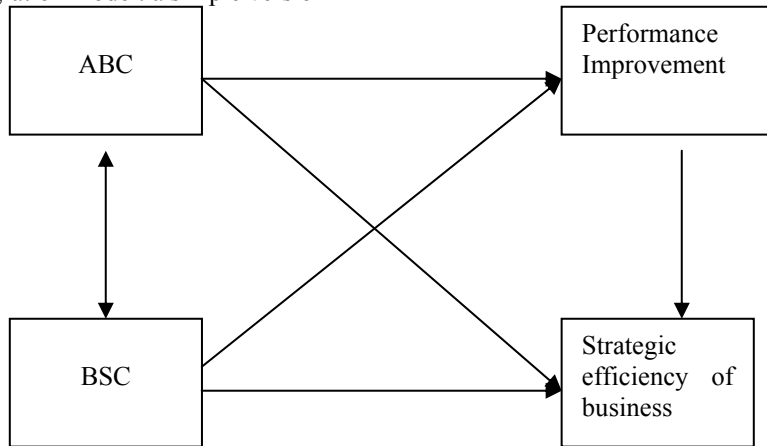
X = ABC and BSC

$x_1 = ABC$

$x_2 = BSC$

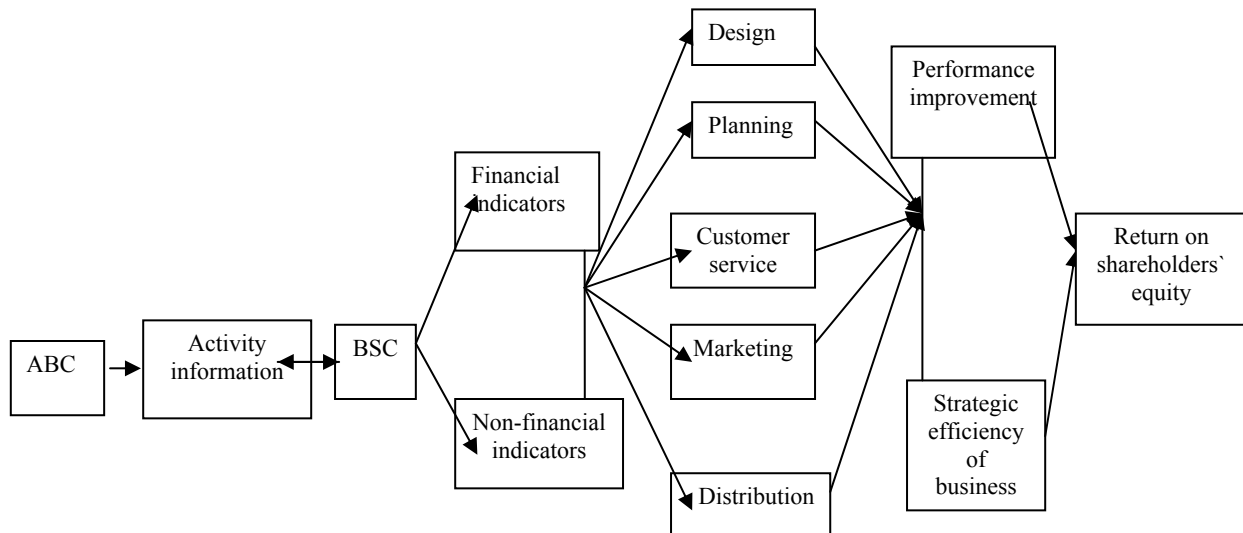
The research title can be depicted in the following figure. After putting the title in a function form, it becomes easy to draw the following simple research model:

Figure (1): the integration model: a simple version



This model can also be expanded by using more indicators as well as more expected contributions from such integration. This will help in attaining better and more understandable picture of the integration as the following flowchart shows:

Figure (2): the integration model: a more detailed one



From the above figure, the objectives of the integration model are apparent. It is noticed that the ultimate objective of the model is to achieve the organization's financial objectives through maximizing shareholders' returns or increasing the profitability of the share. There are also two main objectives the model tries to achieve, specifically, enhancing the strategic efficiency of business and improving the performance of the organization. It is also expected that model has much more benefits in terms of the provision of the help in different business applications or fields, e.g., planning, controlling, design and marketing as well as providing the organization with different types of

information which will help the organization at many respects.

5.1. sample size:

According to central limit theorem (CLT), If the population distribution is normal, then the sampling distribution of the mean will be normal for any sample size N (even N=1). If a population distribution is not normal, but it has a bump in the middle and no extreme scores and no strong skew, then a sample of even modest size (e.g., N=30) will have a sampling distribution of the mean that is very close to normal. However, if the population distribution is far from normal (e.g., extreme outliers or strong skew), then to produce a sampling

distribution of the mean that is close to normal it may be necessary to draw a very large sample (e.g., N=500 or more). Therefore, the researcher carried out pilot study with (N=38) including both food industrial companies and banks.

It can be shown that the total sample size is determined by the following formula:

$$n = \left(\frac{z_{\alpha/2} S}{d_i} \right)^2$$

Where:

n	Total Sample size
$z_{\alpha/2}$	Standardized value leaving an area of $\alpha/2$ to right

S	The estimated standard deviation from pilot study
d_i	$(\frac{s}{\sqrt{n}} z_{\alpha/2})$ The maximum error term

Table (1): Descriptive statistics for dimensions according to pilot study

STRATUM	Mean	SD	SE
BANK	3.7857	0.60241	0.13146
Industrial Companies	3.8431	0.71193	0.17267
TOTAL	3.8114	0.64511	0.10465

$$n = \left[\frac{1.96 \times 0.60}{0.10} \right]^2 = 138$$

Table (2): The sample Size respondents for both industrial companies and bank

STRATUM	No. of sent questioners	No. of received questioners	% respondents	%non-respondents
BANK	69	47	68	32
Industrial Companies	69	51	74	26

5.2. Descriptive statistics:

The researchers has carried out descriptive statistics including; frequencies, percentages, means, standard deviation, and coefficient of variation for all characteristics of the sample, independent and dependent variables. These descriptive statistics are based on ordinal likert scale and are used in this research as following:

Interval	Direction
1.00-1.79	Tends to Strongly disagree
1.80-2.59	Tends to disagree
2.60-3.39	Tends to neutral
3.40-4.19	Tends to agree
4.20-5.00	Tends to Strongly agree

5.2.1. Descriptive statistics for demographic variables:

Table (3): Sampling distribution Members according to the sector:

No	Sector	Freq.	%	Rank
1	Banks	47	48	2
2	Manufacturing	51	52	1
Total		98	100	

According to Table (3), it can be concluded that banks represent (48%), while the manufacturing companies represent (52%)

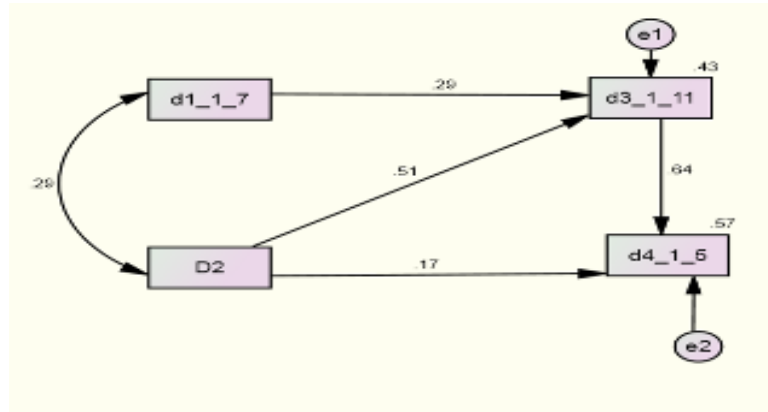
5.2.2. Structural equation modeling (SEM):

Research question:

“Do the ABC system and the BSC approach have a significant effect upon improving both performance of the organization and business efficiency?”

In figure three, it will be shown the effect of the integration upon the performance and efficiency, followed by table (4) which will present the results of the regression.

Figure (3): Estimated structural equation model of the impact of the integration upon performance and efficiency



Where:

D1= ABC

D2 = BSC

D3 =performance improvement

D4 = business efficiency.

Table (4): Regression weights according to Maximum Likelihood Estimates

Path	Estimate	S.E.	C.R.	P
Performance improvement <--- ABC	.275	0.077	3.551	***
Performance improvement <--- BSC	.585	0.092	6.357	***
Business efficiency <--- Performance improvement	.677	0.087	7.802	***
Business efficiency <--- BSC	.202	0.099	2.034	.042

*** Significant at level less than (0.001).

From table (4), it was appeared the following:

1- There is significant positive linear relationship between the ABC and the performance improvement at significant level less than (0.001). This validates the research question with regression model:

2- There is significant positive linear relationship between the BSC and the performance improvement at significant level less than (0.001). This validates the research question with regression model:

$$\text{Performance improvement} = .275 \text{ABC} + .585 \text{BSC}$$

3-There is significant positive linear relationship between the performance improvement and business efficiency at significant level less than (0.001). This validates the sixth research question with regression model:

4-There is significant positive linear relationship between the BSC and business efficiency at significant level less than (0.042). This validates the seventh research question with regression model:

$$\text{Business efficiency} = .677 \text{performance improvement} + .202 \text{BSC}$$

From table (5), it was noticed the following:

5.2.3. Measuring the Goodness of Fit of the (SEM) model:

Table (5): The Goodness of Fit Indices in the SEM

Chi-Square	1.118
Degree of Freedom	1
Level of Significance	0.290
Parasimony goodness of fit index (PGFI)	0.099
Root Mean Square Residual (RMR)	0.013
Goodness of Fit Index (GFI)	0.994
Adjusted Goodness of Fit Index (AGFI)	0.943
Normed Fit Index (NFI)	0.992
Relative Fit Index (RFI)	0.954
Incremental Fit Index (IFI)	0.999
Tucker Lewis Index (TLI)	0.995
Comparative Fit Index (CFI)	0.999
Root Mean Square Residual Approximation (RMSEA)	0.053
r ² : performance improvement=0.427 business efficiency=0.572	

- All the goodness of fit tests of the model showed significant result, i.e., probability level > .05, which concludes that the observed level equal the theoretical level. Also, the majority of indicators are at acceptable limits, especially GFI, NFI, RFI, IFI,TLI, and CFI which all are with in considerable range close to one. The fit measures indicate the goodness of fit of the final structural model and its ability to measure the impact of adopting ABC and BSC upon the performance of the organization and the business efficiency.

- The exogenous variables were accepted. ABC and BSC explain about 42.7% from total variation of dependent variable; performance improvement and the rest percent is due to either the random error in the regression model or other independent Variables excluded from regression model.

- The exogenous variables were accepted. ABC and BSC explain 57.2% from total variation of dependent variable; business efficiency and the rest percent is due to either the random error in the regression model or other Independent Variables excluded from regression model.

Table (6): Standardized Total Effects

Constructs	BSC	ABC	Performance improvement
Performance improvement	.511	.285	.000
Business efficiency	.497	.184	.644

From table (6), it was noticed the following:

- The most important exogenous observed variable totally affecting performance improvement is BSC.

The most important exogenous observed variables totally affecting business efficiency is performance improvement.

Table (7): Standardized direct Effects

constructs	BSC	ABC	Performance improvement
Performance improvement	.585	.275	.000
Business efficiency	.202	.000	.644

From table (7), it was noticed the following:

- The most important exogenous observed variable directly affecting performance improvement is BSC.

- The most important exogenous observed variable directly affecting on business efficiency is performance improvement.

- It is noticed that ABC has no direct effect on business efficiency.

Table (8): Standardized indirect Effects

Constructs	BSC	ABC	Performance improvement
Performance improvement	.000	.000	.000
Business efficiency	.329	.184	.000

From table (8), it was noticed the following:

- None of the exogenous variables has an indirect effect on performance improvement.

- The most important exogenous observed variables indirectly affecting business efficiency is BSC.

5.2.4. Testing the differences between the banks and the food industrial firms:

Independent samples test:

Table (9): Indicates to the t-test to measure the significant differences between banks and food industrial firms in terms of their adoption to ABC and BSC systems

No	Dimension	t-test for equality of means	
		T	Sig.(2-tailed)
1	Activity-based costing	-2.398	.018
2	Financial perspective of BSC	1.122	.265
3	Customer perspective of BSC	.547	.585
4	Internal business processes perspective of BSC	-1.143	.256
5	Learning and growth perspective of BSC	.064	.949
6	Business efficiency	-.288	.774
7	Performance of the organization	-1.419	.159
8	the impact of applying the ABC system upon the performance of the organization	-1.300	.197
9	the impact of applying BSC upon the performance and the strategy of the organization	-.778	.439
10	Integration between ABC and BSC	-1.375	.172
11	ABC and financial performance of the organization	-.972	.334
12	ABC and customer perspective	-.406	.686
13	ABC and internal business processes perspective	-2.361	.022
14	ABC and learning and growth perspective	-2.033	.046

Table (10): Group Statistics

No	Dimension	sector	N	Mean	Std. Deviation	Std. Error Mean
1	Activity-based costing	banks	47	3.6991	.72000	.10502
		Indust. Foods	51	4.0756	.82529	.11556
2	Financial perspective of BSC	Banks	47	4.1986	.83307	.12152
		Indust. Foods	51	4.0327	.62274	.08720
3	Customer perspective of BSC	Banks	47	3.5035	.81907	.11947
		Indust. Foods	51	3.3987	1.05202	.14731
4	Internal business processes perspective of BSC	Banks	47	3.4896	1.13965	.16623
		Indust. Foods	51	3.7190	.83632	.11711
5	Learning and growth perspective of BSC	Banks	47	3.8936	.99542	.14520
		Indust. Foods	51	3.8824	.73582	.10304
6	Business efficiency	Banks	47	3.7466	.69827	.10185
		Indust. Foods	51	3.7914	.83127	.11640
7	Performance of the organization	Banks	47	3.8170	.70134	.10230
		Indust. Foods	51	4.0471	.88416	.12381
8	the impact of applying the ABC system upon the performance of the organization	Banks	46	3.9203	.60117	.08864
		Indust. Foods	51	4.0817	.61858	.08662
9	the impact of applying BSC upon the performance and the strategy of the organization	Banks	47	3.9106	.64445	.09400
		Indust. Foods	51	4.0118	.64176	.08989
10	Integration between ABC and BSC	Banks	47	3.7163	.75013	.10942
		Indust. Foods	51	3.9052	.60760	.08508
11	ABC and financial performance of the organization	Banks	47	3.7943	.75037	.10945
		Indust. Foods	51	3.9412	.74448	.10425
12	ABC and customer perspective	Banks	47	3.5585	.68804	.10036
		Indust. Foods	51	3.6176	.74892	.10487
13	ABC and internal business processes perspective	Banks	26	3.4753	.84538	.16579
		Indust. Foods	36	3.8730	.47353	.07892
14	ABC and learning and growth perspective	Banks	29	3.3856	.85199	.15821
		Indust. Foods	37	3.7469	.58999	.09699

According to t-test in Table (9), it can be concluded that:

There are significant differences between banks and food industrial firms in relation to the following variables:

1. Activity-based costing.
2. ABC and the internal business processes perspective approach.
3. ABC and the learning and growth perspective of the BSC approach, at significant level less than

(0.05). Other variables may indicate to a non-significant differences.

6. Research findings and conclusions:

With regard to the relationship between the research independent and dependent variables, it was found that there is significant positive linear relationship between the ABC and the performance improvement and there is significant positive linear relationship between the BSC and the performance

improvement. It was found also that there is significant positive linear relationship between the performance improvement and business efficiency, and finally there is significant positive linear relationship between the BSC and business efficiency.

With regard to the direction of the relationship between the research variables, it was found that most important exogenous observed variable totally affecting performance improvement is BSC, the most important exogenous observed variables totally affecting business efficiency is performance improvement. Also, the most important exogenous observed variable directly affecting performance improvement is BSC, and finally the most important exogenous observed variable directly affecting business efficiency is performance improvement. It is noticed also that ABC has no direct effect on business efficiency, none of the exogenous variables has an indirect effect on performance improvement, and finally the most important exogenous observed variables indirectly affecting business efficiency is BSC. But, one should not accept all these results without some caution due to some problems related to the system of questionnaires, or may be to some common effective variables, which were missed in the current study.

Finally, with regard to the differences between banks and industrial food firms in terms of their adoption of ABC and BSC systems, it was found that there are significant differences in relation to the following variables:

- Activity-based costing for the direction of food industrial firms.
- ABC and the internal business processes perspective approach for the direction of industrial food companies.
- ABC and the learning and growth perspective of the BSC approach for the direction of food industrial firms, at significant level less than (0.05).

Finally, it is concluded that ABC and BSC improve performance of the organization and enhance business efficiency, it is found that both ABC and BSC lead to improving organizational performance and BSC was found to enhance business efficiency, but ABC was found to have no direct impact upon business efficiency.

With regard to the difference between the banks and the food industries companies in terms of adopting ABC and BSC, it is found that there is little difference between them. The only three noticed differences were concerning the ABC, the impact of ABC upon the internal business processes perspective of BSC, and the impact of ABC upon the

learning and growth perspectives of BSC for the favor of food industries companies.

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