

The effect of Business Intelligence Tools on Raising the Efficiency of Modern Management Accounting

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Abstract

This research study aims to update existing, traditional management accounting inquiry and decisions system, in a holistic sense, so management accounting can reclaim its leading role in decision-making. The main role of management accounting is to use available information in the best possible way to make the best possible decisions. Handling information to highest possible use in order to increase the efficiency of management accounting information system can be achieved through the adoption of Business Intelligence tools (BI). Business intelligence tools such as ETL (Extract, Transform, and Load), OLAP (Online Analytical Process), DWH (Data Warehouse) have been addressed. For achieving this purpose, number of 40 questionnaires has been designed, circulated by hand to a randomly selected sample of information technology department and board of directors at the Jordanian Industrial Companies listed at Amman Stock Exchange, SPSS package applied for the purpose of statistical analysis; arithmetic means, standard deviations, percentages and Simple Regression. Finally, the study concluded that, the use of business intelligence tools has a significant positive effect on modern management accounting, the decision process can be more effective, and Management can save time and money through the use of BI tools.

Key Words: *Management accounting, Business intelligence, OLAP, ETL, DWH.*

Introduction

All the economist observers in our world agreed that, the current management accounting information system is neglected. This negligence is due to the current systems, which are producing insufficient and unreliable information. Because of lack of suitable alternative, today's managers are still using such systems. Generally, most firms still face lack of regular, consistent information, necessary to accomplish the basic daily operating functions.

Business Intelligence tools can be used as an effective tool to handle such information technology to make management accounting or decision making more effective. Business intelligence can be defined as a specific, integrated information technology of the company, which is based on a global approach, which will be used to support decision-making. (Bars& Kemper, 2006). The application of Business Intelligence in management accounting can be done through its tools such as (ETL), (OLAP), (DWH). Business

intelligence applications are one of the three Information Technology systems components; business transaction application, and collaborative applications (Colin White, 2005). Business intelligence applications analyze business operations and produce information to help business users understand, improve and optimize business operations. Recently, there have been significant impacts in the use of business intelligence applications especially in the field of the costing control systems and management performance measures. The business intelligence impact is reaching everywhere and its influence is felt in all the aspects of business. The non-technical users and end users, business analysts, Information technology departments and external users are greatly influenced by BI (Nadeem & Jaffri, 2003).

Management information system is one of the most important components of management accounting in any firm, it provides financial and economic information, and takes over other management functions such as, collection of information for planning, control and decision-making. The information produced by the management accounting system must be subject to periodic technical assessment, so their effectiveness can be measured at the point when targets are achieved.

In the eighties of this century, some writers called to bring about a revolution in management accounting, in order to cope with the revolution of modern manufacturing firms, (Johnson and Kaplan, 1991), in their book titled "Relevance Lost: The Rise and Fall of Management Accounting," The authors drew several criticisms of management accounting, the most important of these criticisms said that, the traditional management accounting methods do not correspond to modern changes, especially in the competitive industrial environment. There has been a wide controversy about whether the concepts and teachings of management accounting (the theoretical academic), conforms to and supports, the practice of management accounting, (the practical side), (Scapens, 1984). The gap between the theoretical and practical (gap between theory and practice), and there has been a tendency to change management accounting research, focusing on the interpretation and explanation of practice more than a trend to develop complex models. Also it works on the adoption of research field that is related to reality, and teaching innovative modern accounting techniques which are applied in successful companies. The use of BI tools by managerial accounting can place the end users directly with the data they need. It moves data from sources systems to make better decisions, and it enables users to become responsible for the specification, creation and regeneration of the reports and analysis (Inmon & William 2002). In this research, we will try to test the effect of BI application and spread of these tools, and standing on the most important factors affecting its application and analysis. Also trying to prove that management accounting and through the use business intelligence tools will bring about tremendous changes to the decision making process, which means; less time, less efforts, less cost, and finally effective decisions.

Study Problem

The current system of decision making followed in the Jordanian industries is the typical form, which depends on the flow of financial information from the accounting department, not from a data warehouse, or data mining process. The current process of decision-making needs more advanced technological methods. Business intelligence tools, and its usefulness in the field of management accounting can help management of the Jordanian industries to make more efficient decision. The traditional technique of management accounting adopted by these industries needs such tools of business intelligence in order to improve its current decision system. This research study

Study Importance

The importance of this study can be embodied by the necessity of narrowing the gap between modern management accounting development and its application in reality. In a changing business environment, we are witnessing rapid development changes in technology, production and distribution. These rapid technological developments have increased competition and led to the emergence of the modern administrative techniques, which made companies to search for creating value for their customers, and

coordinating all their activities in order to satisfy customers' need and finally to achieve the firm's main objectives.

Study Objectives

This research study aims to achieve the following objectives:

4.1 To acknowledge the real practice and effect of business intelligence tools on management accounting techniques in the Jordanian industrial companies.

4.2 To know the effect of using of business intelligence tools on modern management accounting techniques by the Jordanian industrial companies.

Study Hypothesis

H0: There is no effect of Business Intelligence tools on raising the efficiency of modern management accounting

H1: There is an effect of Business Intelligence tools on raising the efficiency of modern management accounting.

Previous Studies

Moorthy, Voon, Samsuri, Goplan, Tak yew (2012)

The study talked about the application of information technology in management accounting decision making. The authors used the information technology tools in order to analyze management accounting decision making. The study also tried to apply and connect information technology tools in management accounting in order to control cost and to improve the efficiency of management accounting. The study concluded that using information technology in management accounting will result in better financial reports which will finally lead to better decision making.

Dolinsek, Strukelj (2012)

The study discussed the effects of technology and wealth on modern management accounting. The study tried to explain the need for companies to modern technologies in managing their business, and the challenges of applying modern management technology. The study concluded that, the technology is changing very fast, and we should follow these changes in order to keep up with a fixed level of management efficiency.

Yasmin&Hossan (2011)

The study discussed the significance of management accounting techniques in decision making. Budgetary control, variance analysis, cost volume profit analysis, fund flow analysis, activity based costing, and opportunity costing, are an examples of the management accounting techniques used in the study. The study concluded that, companies should put more efforts in improving the use of the management accounting techniques in order to improve their performance.

Galani, Gravas, Stavropoulos (2010)

The study discussed the impact of ERP systems on accounting process. The study introduced the Enterprise Resource Planning (ERP), to be used in modern management accounting. Using such system will make on reducing costs, and make better decision making. The study concluded that, using ERP will lead to better relation between the company and its suppliers and customers.

Brandas (2010)

The study discussed the effects of decision support system model based on rules and OLAP for costs management. The paper disclosed a decision making model (DSS), for costs management through the use of business intelligence tools such as OLAP. The study concluded that, using business intelligence tools as OLAP, will lead to effective control of business activities, which will lead to achieve the goals of the enterprise.

Strumickas & Valanciene (2010)

The study discussed the development of modern management accounting system. The study also discussed the practical and the theoretical parts, in the development of management accounting system within the environment of the enterprise. The study concluded that, management accounting system is affected by the internal, external environment and objectives of the enterprise.

Literature Review

Management accounting is the process of identification, measuring, accumulation, analysis, interpretation, and communicating financial information to internal parties in order to make decisions capable of achieving organization's goals. (Charles T. Horngren, 2010). In other words management accounting depends on the accuracy of the financial accounting communicated to management, on a timely basis, this known by "Information Quality". An effective financial information system needs to be able to integrate information of different types and from different sources (Romney & Steinbart, 2012).

Business intelligence was defined earlier as a specific, integrated information technology of the company, which is based on a global approach, which will be used to support decision-making (Bars & Kemper, 2006). In other words BI refers to the use of information technology in order to improve business effectiveness. An effective BI system will provide end users easy access to required information, which will produce effective decisions to their jobs. BI is considered a precious tool in the hand of management accounting which can provide a wide variety of relevant financial information for planning, control, pricing, and other functions. Common functions of business intelligence technologies are reporting, online analytical processing, analytics, data mining, process mining, complex event processing, business performance management, benchmarking, text mining, predictive analytics and prescriptive analytics (Wikipedia, 2013). To perform the functions of business intelligence technologies we should have a data warehouse DWH. A data warehouse is a data used for reporting and data analysis. It is a central repository of data which is created by integrating data from one or more disparate sources (Bars & Kemper, 2006). Data warehouse store current as well as historical data, and it is used for creating trending reports for senior management reporting, such as annual and quarterly comparisons. The data stored in the warehouse are uploaded from the operational system. The data may pass through an operational data store for additional operations before they are used in the DWH for reporting. Online analytical processing OLAP is another BI tool that encompasses relational reporting and data mining (Pareek, 2007). OLAP applications include all types of business reporting, budgeting, and forecasting financial reporting. OLAP components are consolidation, drill-down, and slicing and dicing (Brein & Marakas, 2011). Consolidation involves the aggregation of data that can be accumulated and computed in one or more dimensions, allowing for complex analytical and ad-hoc queries with a rapid execution time. The drill-down is a technique that allows users to navigate through the details. Slicing and dicing is a feature whereby users can take out a specific set of data of the cube and view the slices from different viewpoints. ETL, refers to a process in database usage, and especially in data warehousing that extract data from outside sources and transfer it to fit operational needs, which can include quality levels, and finally loads it into the end target operational. Business intelligence BI Applications include several techniques, which can be divided into three main groups:

Data Generation

Both data generation and the magnitude data volume, that belong to a source systems make it impossible to have direct access to the operating systems to achieve the objectives of analysis. So the first step of operations process is to use a system that extracts data from various sources and then downloaded in the areas required. ETL: Extract, Transform, Load. It is compatible with the function (Scorekeeping) in the management accounting information system.

Data Delivering & Processing

Prior the use of data by the right users, data should be transformed in order to be downloaded into the data stores (Data warehouse). The transferring process includes all activities necessary for the transfer of data, in order to make these data interpreted in terms of business and the economy; it's a composite of multiple sub-processes, such as, filtering, harmonization, aggregation and enrichment. The later process is considered the first step of drawing attention to the problem.

Data Analysis & Presentation

This stage is composed of many stages. The first stage is the analysis of data and then converted to a legible manner either online analytical processing (OLAP) Online Analytical Process, or Data Mining. Both of the two methods provide the possibility of comparing the goals and the actual performance. OLAP is simply an entrance to answer quick queries analytical multidimensional (MDA: Multidimensional Analysis), and OLAP is part of the broader group of Business Intelligence, which contains reports related to the exploration of the Data Mining.

Management accounting has its own objectives which is parallel to BI functions, these objectives can be summarized by the following levels:

Scorekeeping

It is the process of gathering and accumulating information. This process serves both, the internal and external parties, and enables them to evaluate organizational performance and position. General journals, and general ledger, are examples of scorekeeping process.

Attention-Directing

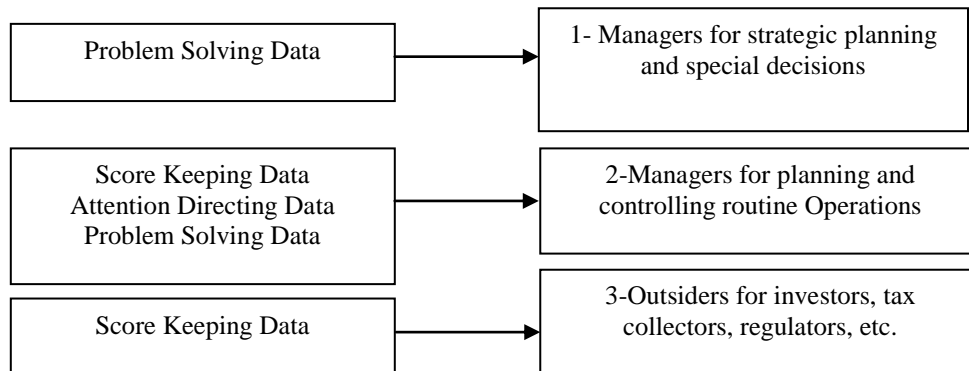
It is the process of analysis, reporting and interpretation of financial information in order to help management in solving the problem, discovering imperfections, inefficiencies, and opportunities. Attention-direction is commonly associated with current planning and control and with the analysis and investigation of recruiting routine internal-accounting process.

Problem-solving

It is the process of making the decision and solving the problem. Problem solving is commonly associated with nonrecurring decisions, situations that require special accounting analysis of reports.

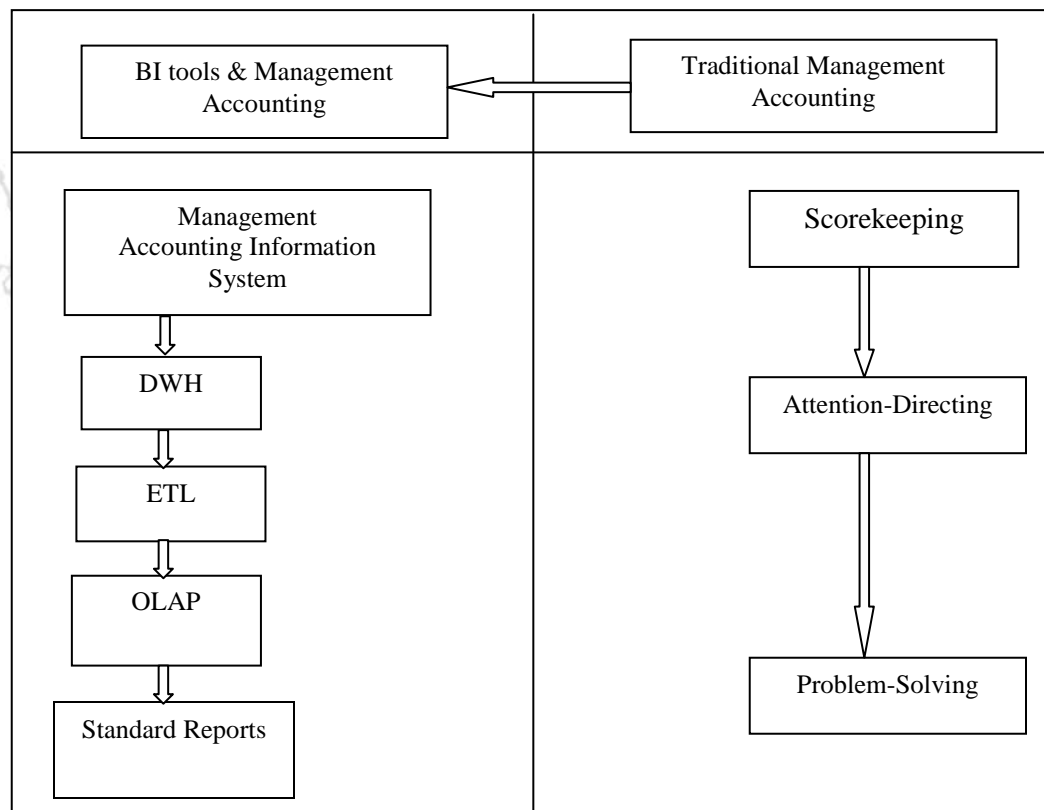
The above distinctions sometimes overlap or merge. Consequently, it is often difficult to pinpoint a particular accounting task as being scorekeeping, attention-directing, or problem-solving. The following Figure-1 explains the relationships just described. Above all, accounting systems are the means, and better decisions are the ends.

Figure-1



Source: Charels T.Horngren

Research Design



From the above previous studies and literature review, the authors are proposing an integrated framework that combines management accounting into business intelligence and its tools as a complete combination. Other research papers mentioned in previous studies have taken one tool only, as it in Galani, Gravas, and Stavropoulos study. The late researchers focused on ERP system only. The Brandas Study focused on the use of OLAP only. The Strumickas and Valanciene study discussed the development of modern management accounting system discussing the practical and the theoretical parts, in the development of

management accounting system within the environment dimension only. Our study is focusing on most of business intelligence tools, and thereby provides a structure for BI infrastructure that enables a reliable decision support system to the management of the industrial companies in Jordan

Study Community

The study community is formed out of Forty (40) different industrial companies listed in the Jordanian stock exchange market. A questionnaire has been developed and distributed among different management levels. Total of Forty (40) questionnaires was distributed, Thirty two (32), were recovered, which means that, Eighty percent (80%) of it was valid for analysis. Table (1) shows these results.

Table (1).

Items	No.	Percentages
Questionnaires Distributed	40	100%
Questionnaires recovered	32	80%

Table(2). illustrates the demographic characteristics distribution of the study community

Variable	Group	Frequencies	%
Sex	Male	21	66%
	Female	11	34%
Total		32	100%
Age	Less than 25 years	3	9%
	From 26 years—35 years	11	34%
	More than 36 years—45 years	12	38%
	More than 46 years	6	19%
Total		32	100%
Professional Certificate	Bachelor Degree	20	62%
	Master Degree	6	19%
	CPA/MBA Degree	6	19%
Total		32	100%
Experiences	Less than 5 years	5	16%
	From 6 years – 10 years	9	28%
	More than 11 years – 15 years	8	25%
	More than 16 years	10	31%
Total		32	100%

Statistical Analysis

Table (3). shows that the questionnaire used the Likert scale. The scale has five options as follows:

Table(3):	Highly Agreed	Agree	Moderately Agree	Not Agree	Highly Not Agreed
	1	2	3	4	5

Table(4) illustrates the statistical Median of Likert scale as follows:

Table(4):	Low	Moderate	High
	1-2.49	2.5-3.49	Above 3.5

For the purposes of description and analysis of the study data, generally many statistical measures is used to analyze the questionnaires, such as, Central tendency, Arithmetic mean, standard deviation, frequencies, t test, percentages, and Cronbach Alpha: The latest measure is used to test the reliability, and the credibility

of the study. As (Sekaran, 2003), explained, Internal reliability coefficient between answers that statistically acceptable, if the value for this measure is (60%) or more. The results showed that, the reliability coefficient equal 80%. which indicates that, the questionnaire is reliable.

Data Analysis of the Study Fields

The study takes the deductive form, as it depends on the outcomes of the data analysis derived from the questionnaire.

Table (5). illustrates these results

Q.No.	Questionnaire	A. Means	S. Deviation	Rank	Median Likert Scale
16	BI will increase the competitive advantage of the organization.	4.192	0.849	1	High
6	BI will expand the scope and relevance of management accounting by providing information about assets, outputs, quality and services.	4.115	0.766	2	High
3	Bi will provide a single integrated source of relevant cost information.	4.077	0.796	3	High
15	BI will improve knowledge sharing	4.077	0.891	4	High
5	BI will enable the use of multiple cost measurement taxonomies, each customized to provide relevant costs for specific decisions and uses.	4.038	0.871	5	High
9	BI will ensure that an enterprise resources planning (ERP) systems is the single source of all operational reporting and analysis, which will provide reliable and accurate financial reports.	4.000	0.938	6	High
2	BI will improve specific key business processes that impact costs, and revenues.	3.923	1.055	7	High
8	BI applications will leverage the structure of the chart of accounts	3.885	1.107	8	High
1	BI will improve management functions such as planning, controlling, and budgeting.	3.769	0.992	9	High
11	BI can be used as a monitoring tool	3.769	0.815	10	High
13	BI will improve operational and strategic decisions from better and timely information.	3.654	1.093	11	High
17	BI will make on reducing risk and minimizing losses	3.500	1.273	12	High
10	BI can provide senior managers a clear view of its history, and can identify trends and opportunities for growth.	3.462	1.208	13	Moderate
4	BI will eliminate time consuming in the searching process.	3.423	1.270	14	Moderate
7	BI will reduce reliance on financial accounting information.	3.423	1.172	15	Moderate
12	BI can cure the diseased areas and find the best possible solutions.	3.346	1.093	16	Moderate
14	BI will improve employee communications and job satisfaction resulting from a greater sense of empowerment.	3.077	0.977	17	Moderate
Total		3.748	1.009		High

In order to examine the effect of business intelligence tools in raising the efficiency of modern management accounting, the researchers had calculated the arithmetic means, and the standard deviation, of the questionnaire.

It's obvious from table (5), that, the arithmetic means are mostly high, except questions (4,7,12,and 14) it shows moderate results. The standard deviation also shows relatively close outcomes, which indicates that, the study community is homogenous, and the study reliability is high.

Results and Testing Hypotheses

The study hypothesis stated that there is no effect of business intelligence tools on raising the efficiency of modern management accounting. Regression test has been made in order to figure out whether there is an effect of business intelligence tools in raising the efficiency of modern management accounting in the Jordanian Industrial companies.

Table (6). illustrates the Regressiontest results

Sig	R2	R	Calculated F	Tabulated F	Result
0.019	0.209	0.457	6.338	2.450	Reject

Table (6) refers that there is significance effect where the adjusted R2 equals (0.209) at the significant level ($\alpha \leq 0.05$). As the calculated F value equals (6.338) which is higher than tabulated value (2.450), and as the level of statistical significance amounted to (0.019) which is less than the specified value 0.05, and therefore we accept the alternative hypothesis and reject the null hypothesis. This means that there is no statistical significant effect at the level of significance ($\alpha \leq 0.05$). Which means that, business intelligence tools has significant effect on modern management accounting, and it will increase the efficiency of these companies.

Conclusions

As per the above data analysis, and hypothesis testing, the study had concluded the following:

- 1- The use of business intelligence tools has significant effect on modern management accounting, and it will increase the efficiency of these companies, and it will improve employee communications and job satisfaction resulting from a greater sense of empowerment.
- 2- The use of management accounting in harmony with the accounting information system technology and Business Intelligence BI techniques will help management accounting to retreat its leading role, and it can participate in achieving the enterprise's goals.
- 3- With the availability of Business Intelligence tools BI programs can absorb enormous amounts and variety of relevant management accounting information, to be used in the planning and controlling, and other administrative functions.

Recommendations

According to the study conclusions the researchers recommend the following:

- 1- Companies should update its information technology to cope up with recent changes.
- 2- Companies should introduce the latest technological devices to adapt the changes in information systems technology.

- 3- Human resource department should hold continuous training sessions to its employees, in order to adapt with the changes occurred in information technology, and business intelligence tools.
- 4- More research to be carried on the same field using other intelligence tools, such as, accounting intelligence tools.

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