European Journal of Business and Management
ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online)
Vol.6, No.16, 2014

The Role of the Theory of Constraint (TOC) in Developing Systems for Managing Expenses to Develop and Enhance Production Operations and its Profits An Applied Study in Industrial Companies Whose Shares are Listed in Amman Stock Exchange Market

Dr. Suleiman Hussein Al-Beshtawi
Associate Professor, Accounting Dept.
Faculty of Administrative & Financial Sciences - AL-Israa University-Jordan
dr_sulieman@yahoo.com

Abstract
The Study is aimed at recognizing the needs and measures for applying the Theory of Constraint (TOC) in the Jordanian industrial companies and the role it plays in developing and enhancing the operations applied in production with the aim of increasing production and profit sought after. The population of this study included companies whose shares are listed in Amman Stock Exchange totaling (92) companies. The researcher applied random selection process from within the population of the study to chose sample companies that included (65) companies representing different sectors at an average of (65%) of the constituency.
The Study reached: A comprehensive group of clients and suppliers who have different, variable and volatile tastes and requirements that play an important role in the definition and design of the products and in the life cycle of the product and its management as well as defining the active input in its design and development. The application of the Theory of Constraint leads to the definition of the cost of the product and in turn affects the development and improvement of the cost management system and accrue due benefits.
The study recommended that due importance should given to allowing sufficient flexibility in the companies to meet the specifications that characterize the products and those that correspond to the wishes and requirements of users in order to maintain the cost of the targeted products, In addition to above, it is quite important to remove activities that do not add value to the product and bottlenecks during the production process with the aim of developing and improving costs management systems to increase profitability, sought after by the application of the Theory of Constraint in industrial companies.
Keywords: Theory of Constraint (TOC), Cost Management Systems , Development and Improvement of Production Processes , increase profitability .
JEL Classification: M11,M41,M49.

1. Introduction:

The vast developments in technology and the change in the accounting and administrative costs that took place in the current era led to the emergence of a range of systems , technologies, and ways that address many of the industrial administrative and cost issues or to provide products. One of the main goals of this group was developing methods that would reduce the cost of products while maintaining the quality and specifications in order to market them in an environment characterized by competition, as well as ensuring that they meet the company's goals related to profitability and maintaining the company's market share .
Currently, the need to study modern theories in the field of management, e.g. the Theory of Constraint (TOC), Cost Management Systems and of modern non- traditional management systems, that do not interact with the external environment surrounding companies on various types, due to the increased competition between companies and the desire to design products that achieves the required technology .
In order to maintain the market share of companies and satisfy their customers and achieve its competitive advantage and reduce costs, there are many modern administrative and cost management systems that concentrate on enhancing and development the production input operations to secure low cost products that would secure high profitability . (Wheelen and Hunger, 2010)
Many organizations are facing internal and external challenges that drive them to carry out changes in their various operations and activities that drove the acceleration in finding systems that deal with reducing the time allocated for production and removing activities used in production that do not add value to the product whilst consuming part of the cost of the product, thus determining the cost of the product before taking the decision to start production through researching a plan for the continued development and improvement of several generations of the product, as well as increasing its profitability.
Realizing the importance of studying and analyzing the dynamic pricing, complexity of the components of its performance and establishing reciprocal relationships with suppliers characterized by credibility and ability to

meet the requirements, management of different companies concentrated on looking for modern cost management systems that would study the internal organization of the life cycle of products, analyze its cost elements and its impact on each stage of the production cycle as well as the profitability of the product.

2. The problem of the study:

The vast developments in the field of technology in various states opened the way for companies, and, in particular, the industrial to search for modern methods in cost management focused on developing and enhancing production operations and at reducing the cost of products whilst maintaining the quality of their submission in order to increase profitability and to overcome competition, which dominates the market . Hence, this study focuses on answering the following questions :

1- Does the Theory of Constraint works towards developing cost management systems for developing production processes in industrial companies?
2- Does the Theory of Constraint works towards developing cost management systems to reduce the cost of products in order to increase the profitability of industrial companies?

3. Importance of the study :

The research undertakes a study of the Theory of Constraint and cost management systems as one of the tools of modern accounting management used to help managers develop and improve production processes and to reduce costs in industrial companies and increase their profitability.

The research looked into the Theory of Constraint and its role in the development of cost management systems to develop the production processes in industrial companies and to reduce the cost of production whilst maintaining the quality of their submission, as this sector has witnessed a very strong competitive market in recent years as well as a race between industrial companies in the provision of various products at competitive prices, that are decreasing continuously.

In addition to above, this research is quite important as it represents one of very few studies that look into the relationship between the variables .

4. Objectives of the study:

The research aims to study the Theory of Constraint and modern systems in the areas of management and costs in order to develop the costs management systems to develop and improve production processes in industrial companies and to reduce the cost of production whilst maintaining the quality in the provision of products.

Research concentrates on studying the relationship between them in order to increase the profitability of the company to ensure its survival and continuity in the business market and to offer products at lower cost and high degree of quality and technology .

5. Hypotheses of the study :

The research is based on the following two main hypotheses:

1- There is no statistically significant relationship between the Theory of Constraint and the development of cost management systems for the development of production processes in industrial companies.
2- There is no statistically significant relationship between the Theory of Constraint and the development of cost management systems to reduce the cost of products in order to increase the profitability of industrial companies.

6. The Theoretical Framework :

The Theory of Constraint (TOC) is regarded as the third of generations that focused on developing systems and concepts of cost management, where recently there has been a focus on developing cost management systems that concentrate on monitoring the cost of elements and reducing it. For example the production method in time Just in Time (JIT), Activity-Based Costing (ABC), Activity Based Management (ABM), Value Engineering (VE), Target costing (TC), Total Quality Management (TQM) as well as other systems. (Uderdown, 1997 & Gluatier) and (Coughlan & Darlington 2003, Pp :14-17) and (Chen, Et al, 1997).

In fact, these systems have contributed significantly to reducing the cost of the generated unit provided to users, improving its quality, inventing new manufacturing methods or presenting it to meet the desire of the clients. As these systems concentrated on continuous improvement through managing internal and external constraints. Corbett, (2000, Pp :2-3)

The qualitative characteristics required by the consumer and based on his taste must be designed in service prior to the submission operation in order to avoid high costs, which could be added to the service. This will make it possible to determine the prices of new products with the new specifications, as well as identifying the executive facilities needed to meet those prices.(Cooper & Chew, 1996) and (Fredendall and Lee, 2010, P p: 1535-1544)

Providing products at the lowest price and at a level that competes with competing productions available in

the market, matching the price that the consumer is willing to make as well as will enable the company to achieve its financial revenues, gives the targeted cost a strategic dimension represented by improving the operational efficiency through its dependence on (Value Engineering), that distinguishes between activities that add value for a service or product and others that do not add value to (Value and Non Value Added) in order to remove them because of their direct impact on raising the cost of products or products, and this is what the system is based primarily upon the ABC.

6.1 The objectives of the Theory of Constraint :

The aim of the Theory of Constraint is to overcome the problems arising from the incompatibility of production capacities between machines or stages which requires re-arranging the factory to generate compatibility , through the efficient management of the elements that affect this goal. These elements include the following: (AlRikabi and Hamoudi , 2010)

- Efficient management of records.
- Satisfying workers and enhancing their competence through training and motivation.
- Ensuring customer satisfaction through the control of critical success factors .

Thus, the Theory of Constraint regards the economic unity as a series of episodes of machinery, equipment and other resources and start identifying resources that represent the company's ability to obtain funds, and research the records of other production needs and so on until the continued improvement operations in the production processes are realized thus achieving the objectives of the company .

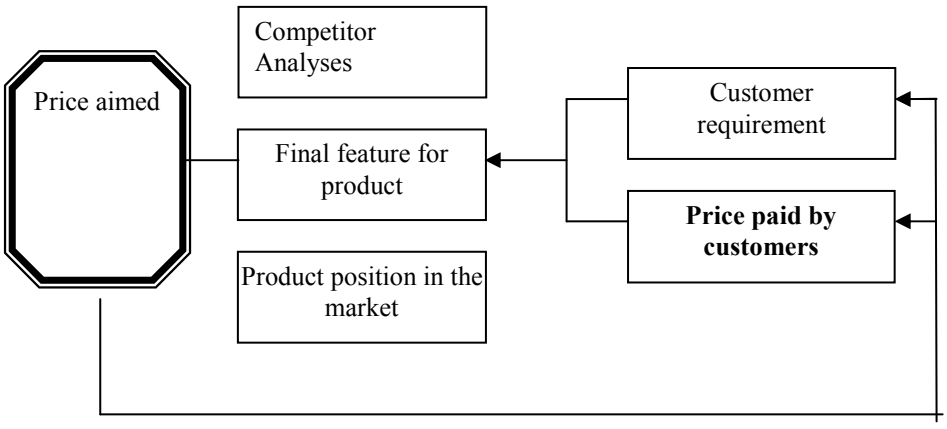
It was imperative for companies interested in developing and improving its cost systems with the aim of responding to the clients' wishes and needs at the lowest cost, to define and apply the concept of target cost, regarded as one of the modern cost systems concerned with defining the production cost based on the selling price of the product in the market. The ability of the market to pay the price a particular product is then determined and the profit target is set.

This enables the definition of the targeted cost – i.e. difference between the selling price and the target cost . The measurement of target cost was, therefore, based on the scale of grades, which includes the use and non in use, of target cost through :

- Applying target cost when providing products to customers (market study).
- Applying target cost when defining (founding) price offered to customers.
- Applying target cost when structuring the products offered to the customers (the formation of products).
- Applying target cost when implementation of the provision of products to customers is initiated.
- Applying target cost when analyzing and implementing the results (post-implementation).
- Applying target cost when using the implementation information for the Management's use (Implementation Benefits) .

After determining the target price, the target cost is defined. This can be expressed through the following equation: TC = SP - TP. (TC = target cost , SP = selling price target , TP = profit target (desired)) .

Accordingly, the elements are listed, first through defining the target price, followed by profit target , then target cost . This is illustrated in Figure (1) as follows:



Form (1) Defining Target Price

Source: (Ansari and CAM-I, 1997.p: 33):

To consider reducing the cost of the products to the lowest possible level through having it designed to meet the desires of users and achieve profits and financial returns to the company, the management of these companies

had to apply production techniques and systems design and to produce the products as a means to counter the competition , which dominates the production environment in the current era.To enable cost management systems to achieve its objectives, the management of these companies had to apply managerial systems, techniques and theories as well as enhanced costs to integrate their work with each other in order to achieve the whole objectives of the company represented in the ongoing improvement and development of their services , on the one hand, and to maximize their profits and to maintain their market share on the other .

The Theory of Constraint had a prominent role in the achievement of this development due to its importance in determining the optimal production plan in the light of the scarcity of resources and the multiplicity of the constraints in production processes. The Theory of Constraint offered the concept of directing rare elements used in the production processes, being a management tool concerned with continuous improvement of the concepts of cost management whereby scheduling and organizing production processes by selecting the activities used in the production of value-added and the zero- value-added products and in trying to focus on activities that add value to the production and lay off those that do not add value, thus reducing and addressing suffocation elements during production through identifying changes in the production systems and manage costs to activate its interior constraints and handle them in line with external constraints to produce and measure the impact of those changes in an attempt to optimize resources and re- design products with the lowest use of scarce resources. This will have a direct impact on reducing the cost of the product and increasing its profitability . (Al Fadl and Nour , 2002) and (Mores, et al, 2003)

6.2 The Integration of the Theory of Constraint with modern cost and management systems:

A new approach for the management of production and processes in companies, known now as Theory of Constraint (TOC), was developed by the researcher Goldratt in late 1970. This approach, a coherent theory for managing the company's operation, is based on two main components: the philosophy of continuous improvement and the general approach to investigate , analyze and find solutions to the problems of the so-called "Thinking Process" (TP). (Rahman, 1998, pp.336 355), Mabin and Balderstone, 2003, pp.568 - 595)) and (Goldratt and Cox, 1993).

The stated interest in running the target cost and the costs systems is based on activities as one of the systems management costs. This reflects, at the time being, its role in the integration with the Theory of Constraint that improve the profitability of the company as a whole by reducing the cost of products or products in the design phase or manufacturing, on the assumption that there is one or more activities in the company with limited resources and energy, that in turn represent restrictions or obstruction to the productive process, which, therefore, demands that activities with no bottlenecks should be exploited depending on the needs and resources of various activities . This was commonly used when the company depended in their design of production Just in time (JIT) as this system requires that a production environment responsive to rapid changes in design and implementation is provided. As such plans should be set for the implementation operation and operations process to define the flow of the execution operations and time that each operation needs to be completed to eliminate the reasons that hinders providing the products or products to its users. In addidtion to adding the energy to the constraints through the purchase of modern electronic equipment or increasing the number of operators to elinate the causes that hinder production and execution. (Darlingtonam Et al, 1992, pp :32-33 and 35-38) and (Blocher, Et al, 1999, p142) and ((Lukesh, 1999.

To enable the company's management to reach its objectives of reducing the cost of their products, it had to implement the Activity Based Costing (ABC) that represent one of the modern methods in cost management and which is considered as a quantitative measure that provides the company's management with data for cost centers that are related to the cost of products used in the application of target cost . (Cokins, 2002) and Kee and Schmidt, 2000, p :1-17)) and (Fritzsch, 1998)

The application of target cost with the ABC system in the company requires comprehensive and accurate description of the production activities that also indicates description of costs of each of the activities associated in the production process in order to reach the limits of target cost (Cooper and Slagmulder, 1999, Pp :23-33). The target cost method is also regarded as the mechanical application of the ABC system as each focuses on the functional analysis procedures for the production that enables the company's management to identify the size and quality of the elements of the costs associated with each function of the product. (Cokins, 2002) and (Horvath, 1993, p: 33)

In spite of the benefits and advantages offered by the target cost when applied in businesses and the direct impact on cutting the service, maintaining the company's market share and increasing its profits, which means survival in a market characterized by competition and open market, the application of target cost requires the definition of an effective organizational structure in the company, that demands job description for members of the target cost team, which includes staff from the various departments such as design, engineering , accounting, marketing .... etc. - as well as the characterization of the operational process, defining its accurate cost and defining the price of the target market in order to achieve financial returns that meet the overall objectives of the company (CMA, 2003) (Sakurai, 1989) (Yulee, 2002, Pp :23-28).

It was noted by (Kee, 1995) and ((Baxendal and Raju, 2004 and (Massi, 2002) that the use of the Theory of Constraint and integration with modern cost management systems lead to the strengthening of administrative decisions related to the production processes that achieve maximizing the profitability of the facility, and in particular those associated with resource allocation and choice of mix production optimization and reducing the initialization time , rotation and orientation .... etc. , which is reflected in the improved quality of production. The application of the Theory of Constraint requires management to focus on the limitations associated with production and production capacity as well as the ability of the management to continuous improvement along with cost – where the concepts of the theory focused, in particular, on aspects of planning on exploiting the productive resources, exerting control over the elements of production cost and taking decisions related to the choice of alternatives available manufacturing. (Loannou and Papadoyiannisab, 2007, Pp: 4927-4954).

The Theory of Constraint (TOC) and its integration with cost management systems, on the other hand , works on decreasing the total cost of products during their life cycle as they work on the division of the production into group activities. Each of these activities is dealt with through steps, with each step forming an activity that poses restrictions to the productive process and the other does not constitute any limitation. Through the application of the Theory of Constraint, activities that represent the real resources of the establishment that defines the cost and the selling price that the consumer can pay, are best exploited. (Freeman, 2007) and (Noreen, Et al, 1995) .

On this basis , the effectiveness of the cost management systems are concentrated during the planning and design of services and products so as to ensure oversight and control of costs. Consequently, the company's design team works relentlessly on developing a design that parallels the target cost, followed by moving on to the life cycle of the product or service which gives room for a more comprehensive product costs and profitability. (Kaplan and Atkinson, 1999, p.221) and (Donelan and Kaplan, 1998), through dependence on more than one system or method to manage costs prior to the execution operation (during the design phase) or after the operation (during the marketing and distribution phase), which in turn ensures good relations and interdependence between the company and the investors, users and others. The life cycle of the product and its integration with the Theory of Constraint in the development of cost management systems can be divided into three phases:

- Planning and interior design stage, that takes place prior to starting the process of implementation and operation.
- Production and operation, which begins with the actual implementation process and ends with the selling of the product to end users..
- Launching the product in the market.

This is what cost management systems differs from the Theory of Constraint whereby studies have shown that the first leads to reducing the cost at a rate of (20% to 40%) being focused on reducing the cost before starting production stages and during the design and planning phase . The second is concerned with the operational phase and thus reducing the cost is lesser than the proportion of the cost is ratio that can be reduced during the design phase (Golderatt and Cax, 1993) and (Smith et al, 2001. P145)

Therefore, the integration of the Theory of Constraint with modern cost management systems enables the company's management to adopt a counter-productive method in determining the cost of its products at the lowest possible cost , as well as determining the desired profit margin, which would later become the estimated figure for operation costs that cannot be exceeded at any time when designing or redesigning and developing the products . And managing costs through the application based on target cost works on enhancing the company's profitability as a whole.

7. Population and the study sample:

The research covered (92) industrial companies whose shares are listed are in the Amman Stock Exchange. These companies are divided into different industrial sectors (pharmaceutical, medical, chemical, paper and cardboard, printing and packaging , food and beverages , tobacco , cigarettes, mining and extraction, construction, engineering, electrical, garment, leather, textile, glass and ceramic industries) (Banks in Jordan Guide, 2013, www.cbj.gov.jo). The researcher used a random selection method from within the study population to select a sample of the study, where the study sample included (65) companies from various sectors representing (65%) of the study population. A questionnaire was designed and distributed to the members of the sample @ (5) forms for each company at a total of (325) forms. (250) forms were recovered out of which (220) forms were found suitable for analysis . The researcher used in the process of analysis and hypothesis testing the software (SPSS) - Statistical Package for the Social Sciences and the following statistical methods were used to analyze the test results and accept or reject the hypotheses of the study :

1- Percentages and duplicates.
2- Averages and standard deviations.
3- Testing (One Sample T Test) for one sample to examine the possibility to accept or reject hypotheses.
3- Testing Cronbach Alpha to verify the reliability of study tool.

8. Presenting the results of the study:

This aspect of the study included the presentation of the findings that the study came up with, through applying the statistical system SPSS and analyzing the data to achieve the objectives of the study. The following statistical methods have been used to analyze the practical side :

- **Descriptive statistics:** Through the use of the arithmetic mean and standard deviation to describe the views of the sample.
- **One Sample T-Test:** To test the hypotheses of the study and whether there is a statistically significant difference between the arithmetic mean of the hypotheses and the average measurement tool, and thus judge the sample opinion about assumptions .

8.1 First: Stability Test :

Stability Test was undertaken through the use of Cronbach Alpha test, which is used to measure the stability of the measurement tool where Alpha's value measured (0.918). This ratio, according to statistical standards, is regarded to be excellent being higher than the acceptance rate that reached a rate of (60%). Whilst the natural distribution test the extent to which the data follow the normal distribution indicated the SIG values for all axes of the study is higher than (0.05), which indicates the data follow a normal distribution .

The researcher used the Likert scale to convert the following answers to a formula amount.

Table (1) shows the weights given to the paragraphs of the questionnaire

Variables	Measure
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Table (2) shows criteria was also used to define the average degree rise for each account:

Low	2.49-0.0
Medium	3.492.5 -
High	3.003.5 -

8.2 Second: The demographic characteristics of the sample :

The study examined the following demographic characteristics of the sample, illustrated in Table (3)

Variables	Alternatives	Repetition	Percentage
Qualification	Diploma	25	11%
	Bachelor	140	64%
	Masters	50	23%
	Doctorate	5	2%
	Total	**220**	**100%**
Educational Specialization	Accounting	100	45%
	Business Administration	30	14%
	Engineering	70	32%
	Other	20	9%
	Total	**220**	**100%**
Years of experience	Less than 5 years	25	11%
	5 years – less than 10 years	90	41%
	10 years – less than 15 years	30	14%
	15 years – less than 20 years	45	20%
	Over 20 years	30	14%
	Total	**220**	**100%**
Position	Managing Director	25	11%
	Production Engineer	60	27%
	Financial Manager	35	16%
	Accountant	90	41%
	Other	10	5%
	Total	**220**	**100%**

As noted from the above table that the respondents qualified scientifically and practically where that was the highest percentage of qualified science was 64% for the first undergraduate degree, and that the highest

percentage of those who came to have practical experience between 5-10 years. With regard to scientific specialization, the 45% was allocated to accounting as well as 41% for those working in the field of accounting

8.3 The Study's Hypotheses Test:

8.3.1 The first hypothesis: there is no statistically significant relationship between the Theory of Constraint and the development of cost management systems concerned with developing the production processes in industrial companies.

Table (4) indicates the mean and standard deviations for the answers of respondents on the relationship between the Theory of Constraint and the cost management systems in developing the production processes in industrial companies.

Ser. No.	Paragraph	Mean	Standard Deviation
1	Applying the Theory of Constraint in production leads to the development of cost management systems in order to identify an effective regulatory structure in the company, as contained in the job description for the cost management team, which includes staff from the various departments such as design, engineering, accounting, marketing .... etc.	3.8727	1.13161
2	The company's management works towards securing an input from customers and with regard to the product design , development and implementation and applying the requirements of the Theory of Constraint in production.	3.5000	1.39307
3	Applying the Theory of Constraint in production for the development of cost management systems based on studying suppliers' objectives due to the study's important role in determining the elements of the design of products or activities involved in its design and development with a view to removing inconsistencies and conflicts between the elements that specify the cost for producing, designing and developing the unit.	3.8682	1.25908
4	The application of the Theory of Constraint in the study demands for studying the required needs for developing cost management systems upon starting the implementation of the production steps and submitting them to the customers .	4.4591	.88269
5	The company's management applies, in the long term, the Theory of Constraint in production in developing cost management systems and in designing the products through its dependence on value engineering (VE) which operates on a timetable that regulates all aspects and activities of research, development, product design, implementation processes, and others.	3.6182	1.12653
6	It should be taken into account the flexibility of the volatility in product specifications and individually with the volatility in the wishes and requirements of the customers, especially if they have a high level of knowledge of their requirements and desires for the future. This is what it takes to apply the Theory of Constraint in production after undertaking improvements to, and developing the cost management systems.	4.4864	.80228
7	The quality of the products and its low cost is one of the requirements of the consumer and, therefore, the desires of the customers determine the company's strategy in the implementation of their products.	4.1864	1.01891
8	Correlation between all relevant parties involved in executing the products, e.g. distributors, marketers, sales brokers, customers and others should be put in place, as required for the application of the Theory of Constraint in production after making improvements and developing cost management systems.	3.3227	1.27155
9	Among the methods that are appropriate for developing cost management systems, is applying managing costs associated with the life cycle of the product, i.e. buying and operating and maintenance costs , etc., that are considered amongst the conditions for the application of the Theory of Constraint in production.	4.4955	.68578
10	In applying the Theory of Constraint in production when presenting products to the customers, market studies should be undertaken. This will entail that the company's management develops its cost management systems, concerned with determining the cost of a product, throughout the stages of its life.	3.7727	1.23243
11	The price of providing products to customers is defined (established) when by conducting the necessary improvements and enhancements to production methods and which requires entails keeping abreast with the required developments and improvements to the cost management systems.	4.5227	.80207
12	The application of the Theory of Constraint in production is undertaken through the study of the interrelationship between cost management systems and adopting the formula of the products offered to consumers.	3.7818	1.11349
13	The implementation of cost management systems production steps are affected by the requirements of the application of the Theory of Constraint in production.	3.9455	.95885
14	Analysis and adoption of the results of implementation (post-implementation) of the basic requirements for the application of the Theory of Constraint in production. This requires the development of the cost management systems in order to determine the cost of the final product, including the costs of after-sale supporting elements.	3.7136	1.07898
	Total	3.9675	.56977

It is noted from the answers respondents to the paragraphs of the questionnaire relating to the first hypothesis first shown in table (4) above, that paragraphs (4) & (6) & (7) & (9) & (11) scored the highest results with ranging averages between (4.4955) & ((4.1864 and deviations ranging between (0.68578) & (1.01891). This demonstrates that the respondents are strongly in favor on the need to provide cost systems associated with the wishes and requirements of the customers and that determine the price of providing products to the customers and the product life cycle a in ways that commensurate with developments to cost management systems to enable the companies to apply the Theory of Constraint efficiently and effectively, thus ensuring the achievement of results.

Remaining responses emphasized the importance of the Theory of Constraint in developing cost management systems due to the important role it plays in defining the elements of product design or the activities involved in the production as well as the views of distributors, marketers, brokers, customers and others after making improvements and developing the cost management systems based on the Value Engineering (V.E.) concerned with providing a timetable that organizes all aspects and activities of research, development, product design, implementation processes and others. Average answers ranged between (3.3227) & (3.8727) and deviations standard ranged between (1.27155) & (1.13161). Paragraph (13) defined the measure bias in the answers to the statement of the importance and impact of the Theory of Constraint on the development of cost management systems, where answers of sample respondents with a mean of (3.9455) and a standard deviation of (0.95885) .

8.3.2 First Hypothesis Test :

To examine the possibility of accepting or rejecting the first hypothesis, Table (5) shows the results by applying the One Sample T Test, where the results showed the following:

T Calculated	T Tabulated	T significance	Hypothesis Result
25.187	1.96	0.000	Rejected

Through the answers of respondents in Tables (5) - and through the use of the ONE SAMPLE T-TEST to test the main hypothesis, it is noted that the value of (T Calculated) when the average default (3) equals (25.187). In statistical terms (0,000), which is higher than the value of (T Tabular) amounting to (1.96), a value statistically significant at the level of statistical significance (0,05). As such, we reject the nihilism hypothesis and accept the alternative hypothesis, which states: There is a statistically significant relationship between the theory of constraint and the development of cost management systems in order to develop production processes in industrial companies.

8.3.3 Second hypothesis: There is no statistically significant relationship between the Theory of Constraint and the development of cost management systems to reduce product
cost in order to increase the profitability of industrial companies.

Table (6) shows the averages and standard deviations for the answers of respondents on the relationship between the Theory of Constraint and cost management systems for the development of production processes in industrial companies.

In analyzing respondents ‘ answers to questions relating to the Second Hypothesis, shown in Table (6) above, it is noted that paragraphs (4), (5), (7) & (14) scored the highest results, with averages ranging between (4.5227) & ((4.1091) and standard deviations ranging between (0.79636) & (0.90504). This demonstrates that the respondents are, to a high degree, in favor of the role of the Theory of Constraint and the application of cost management systems to avoid any costs or additional burdens on the products provided which leads to lower maintenance costs and follow-up to execute productivity and reduce the costs of research and development, which would ensure maximum utilization of resources and energies available to get the biggest benefit from the resources and achieve the biggest profit possible.

On the other hand, responses confirmed achieving profitability of the companies of the sample study by applying the theory of constraint and the application of cost management systems and their impact in determining the price of the target market for products based on the ability and desires of customers in order to achieve financial returns that meet the all the goals of the company as answers to paragraphs (1) & (2) revealed, with an average calculation, (3.6909) & (3.5864) respectively and deviations of standard (0.95320) & (1.24849), respectively.

Answers to paragraphs (3), (9), (10), (11), (12) & (13) revealed procedures for development and improvement required for the application of the theory of constraint as far as engineering changes in product design, removal of activities (restrictions) that do not add value to the product to remove bottlenecks during production, defining the contribution of products to achieve profitability on the basis of identification cost elements and choosing the standard for linking cost guides with its cause in an accurate way, determine the contribution margin for each product and modify all the activities involved in the production process in order to achieve maximum effectiveness of productivity possible. Answers of the sample came with an average calculation of (3.9909) & (3.6182) and deviations of standard ranged between (.96036) (1.26044) .

Ser. No.	Paragraph	Mean	Standard Deviation
1	The application of the theory of constraint in production leads to the development of cost management systems for the characterization of the production process and determining its exact cost, thereafter determining the price of the target market in order to achieve financial returns that meet the overall objectives of the company.	3.6909	0.95320
2	The price of products should be defined based on the ability and desires of the customers, and as such the starting point in cost management approach is market-driven costing.	3.5864	1.24849
3	Engineering changes in product design must precede the implementation stage in order to avoid any additional costs that could be incurred in the future, whether to eliminate it or for the lack of its use for the product.	3.8091	0.97452
4	Working within one team and involving the workers in the manufacturing plan leads to the avoidance of any costs or additional burdens on the products offered and generates a spirit of responsibility amongst team member to work as a single unit on the implementation of the products in all of its stages motivates them to implement the plan efficiently.	4.1091	0.90504
5	The theory of constraint and the application of cost management systems works on reducing the costs of research and development	4.4955	0.68578
6	The theory of constraint and the application of cost management systems reduce the costs of designing the components of the product.	3.7636	1.22327
7	The theory of constraint and the application of cost management systems reduce maintenance costs and follow-up of the implementation of the production process costs.	4.5227	0.79636
8	The theory of determinants and the application of cost management systems work towards reducing the costs of product planning and design.	3.7455	1.11802
9	The theory of constraint and the application of cost management systems work towards reducing the costs on the basis of removal of activities (restrictions) that do not add value to the product .	3.9909	0.96036
10	The theory of constraint and the application of cost management systems determine the contribution of products in achieving profitability on the basis of contribution margin for each product and then converting this contribution to the contribution margin of the rare element and choosing the best combination to maximize the profitability of the facility as a whole .	3.7727	1.10341
11	The theory of constraint and the application of cost management systems work towards reducing costs on the basis of supporting and modifying all the activities involved in the production process in order to achieve maximum possible product effectiveness, leading to increased production capacity without increasing costs.	3.7227	0.97476
12	The theory of constraint and the application of cost management systems works towards reducing costs on the basis of defining expenditure guidelines and select criterion to link cost with its originator, in an accurate manner, without incurring additional costs that do not add value to the products .	3.6182	1.26044
13	The theory of constraint and the application of cost management systems to reduce costs on the basis of cost and revenue management when faced with bottlenecks during production , leading to decreasing the operating costs and increasing the contribution of achievement generating unit and then maximizing the profitability of the facility .	3.8500	0.99783
14	The theory of constraint and the application of cost management systems work towards reducing costs on the basis of balancing time between the speed performance of non- specific or restricted activities, which achieves maximum exploitation of available resources and energies to get the biggest benefit from the resources and achieve the greatest possible profit.	4.1591	0.91020
	Total	**3.9169**	**0.68936**

The answers to paragraphs (6) & (8) came with an average calculation (3.7636) & (3.7455) respectively and

deviations of standard (1.22327) & (1.11802), respectively, to demonstrate the role of the theory of constraint and costs management system in reducing the costs of planning and design of the components of the products.

8.3.4 Second Hypothesis Test :

To examine the possibility of accepting or rejecting the hypothesis, Table (7) shows the results of the second hypothesis Test run through using the One Sample T Test, where the results showed the following:

T Calculated	T Tabulated	T significance	Hypothesis Result
19.728	1.96	0.000	Rejected

Through the answers of the respondents in the tables (7) - and through the use of the One Sample T-Test to test the main hypothesis, it is noted that the value of (T calculated) when the average default (3) equals (19.728) and in statistical terms (0,000) which is higher than the value of (T Tabular) amounting to (1.96), a value statistically significant at the level of statistical significance (0,05). Accordingly, we reject the hypothesis nihilism and accept the hypothesis alternative, which states : There is a statistically significant relationship between the theory of constraint and the development of cost management systems to reduce the cost of products in order to increase the profitability of industrial companies.

8.3.5 Normal Distribution Test:

To accredit the data that was collected from the answers of respondents, to prove or deny the hypotheses of the study, the Kolmogorov – Smirnov Test was used to test the level by which the data follows the normal distribution, as the (Sig) value for the variables of the study was greater than the significance level 0.05, which indicates that the data follow the normal distribution. The following table shows (Sig) value for each hypothesis:

Table (8) Results of the Natural Distribution Test

Hypothesis	Sig
First	0.256
Second	0.359

9. Conclusions and Recommendations

9.1 Conclusions

1- The development of costs management systems calls for the application of target cost in the company in order to obtain input from customers and with regard to product design and development, that depends on Value Engineering (VE) and operates on the calendar that regulates all aspects and activities of research, development, product design, implementation processes , and others.
2- Suppliers play an important role in determining the elements of the design of products or activities involved in design, development, etc.
3- The users have different, volatile and changing tastes and requirements in respect to specifications and prices for the products, which affects constantly cost managements methods and its development and enhancement to achieve the accrued benefits.
4- Determining the price of products should be undertaken on the basis of the ability and willingness of the consumer. As such, the starting point in the target cost is the market, i.e. the so -called cost method in accordance with the market approach Market - driven Costing.
5- The quality of the service and its low cost are the requirements of the consumer. As such the desires of the customers are the force that defines the company's strategy in the design and implementation of its products.
6- Any changes in the geometric design of the products must be carried out prior to the start of implementation in order to avoid any additional costs that may be incurred in the future , through disposal or lack of need by the service.
7- Working within one team leads to the avoidance of any costs or additional burdens on the offered product as well as holding the team, as a single unit, with the responsibility for the implementation of the product in all its stages and involving the workers in the manufacturing plan, motivates them to implement the plan efficiently .

9.2 Recommendations

1- Sufficient flexibility should be made available in the companies to meet the specifications that characterize the products and those that correspond to the wishes and requirements of the users in order to maintain the cost of the targeted products especially where the customers enjoy a high level of knowledge of their requirements and desires for the future.
2- Increase interconnection between all relevant parties concerned with the implementation of the products , e.g. distributors, marketers, sales brokers, customers and others.
3- In applying the theory of constraint, it should be taken into consideration that the concept of target cost to develop and improve cost management systems should be applied in order to determine the costs associated with the life cycle of the product e.g. buying rate, operating, and other costs prior to starting production in order to avoid additional costs.
4- To achieve efficiency and effectiveness in the application of the theory of constraint in industrial companies,

there is a need to provide and manage a cost associated with specific systems for product life cycle and in line with the wishes and requirements of the customers.

5- The price of the offered products should be based on the ability of the customers to pay as well as the cost of development and improvement occurring on the cost and management systems in order to achieve the required profitability by the company's management.

6- Undertaking developmental and improvement procedures on the cost management systems and managing it, required for the application of the theory of constraint by eliminating activities that do not add value to the product and removing bottlenecks during the production process of the product.

7- Achieving the highest possible profit from the application of the theory of constraint and cost management on the products through maximum exploitation of available resources and energies to get the biggest benefit and reduce costs to the least possible.

10. References

Baxendale,S.J. And P.S. Raju.2004."Using ABC To Enhance Throughput Accounting ; A Strategic Perspective" , Journal Of Cost Management ,USA.

Blocher,Chen,And Cokins,Lin , 2005, " Cost Management 3e" , The McGraw-Hill Companies, Inc., Ch:10.

Central Bank Of Jordan , 2013, " Guide The Banking Sector And Sirefi In Jordan ", Www.Cbj.Gov.Jo.

Chen, Y.S Etal, 1997, "Examination Of U.S –Based Japanese Subsidiaries: Evidence Of The Transfer Of The Japanese Strategic Cost Management", International Journal Of Accounting, Vol. 32, No.4.

Cma, 2003, "Implementing Target Costing", Strategic Management Series , Management Accounting Guideline, Canada.

Cokins, G. , 2002, "Integration Target Costing And ABC", Journal Of Cost Management, Vol.16, No.4, July-August, Pp. 13-22.

Cooper, R. And Slagmulder, R., 1999, "Develop Profitable New Product With Target Costing", Sloan Management Review, Cambridge, Vol.40, No.4, Pp. 23-33.

Cooper, Robin And Chew, Bruce, 1996, "Control Tomorrow's, Cost Through Today's Designs" Harvard Business Review, Jan-Feb..

Corbett ,T . Throughput , 2000, " Accounting And ABC: The Driving Factors Behind Each Methodology" , Journal Of Cost Management ,Pp.2-3.

Coughlan, P. And Darlington, J. , 2003,"As Fast As The Slowest Operation: The Theory Of Constraints", Management Accounting, June, Pp 14-17

Darlington, J. Et Al , 1992," Throughput Accounting: The Garrett Automotive Experience", Management Accounting, April, Pp: 23-80.

Donelan, J. G. And E. A. Kaplan. 1998," Value Chain Analysis: A Strategic Approach To Cost Management", Journal Of Cost Management (March/April).

Freeman , John , 2007 ,"Theory Of Constraints And Throughput Accounting ",Topic Gateway Series And Technical Information Service , March No. 26.

G. Ioannou And C. Papadoyiannisab , 2007, "Theory Of Constraints-Based Methodology For Effective Erp Implementations" , The Clute Institute, Journal Of Applied Business Research, Article Views: 123, Pp: 4927-4954.

Gluatier, M. And Uderdown, B., 1997, "Accounting Theory And Practice", Pitman Publishing Inc, 6th Edition.

Goldratt, E.M. And Cax, J. ,1993," The Goal", 2nd Ed. London: Gower.

Kaplan Robert And Atkinson Anthony, 1999 , " Advanced Management Accounting" , Prentice Hall, 3rd Edition.

L. D. Fredendall & B.R. Lea, 2010 , " Improving The Product Mix Heuristic In The Theory Of Constraints", International Journal Of Production Research, Article Views: 81 , Vol. 48 , P: 1535-1544

Massi,, 2002 ,"The Integration Of Activity-Based Costing And The Theory Of Constraints", Journal Of Cost Management.

Moayyad , Mohammed Fadl And Noor , Abdul Nasser ,2002 , " Management Accounting " , Dar March Publishing , Printing And Distribution , Amman, Jordan .

Naji Chaib Stirrup And Janan Ali Hamoudi , 2010, "The Role Of The Theory Of Determinants In Improving The Productive Capacity Of The General Company For Leather Industries - Plant Baghdad " , Journal Of The Faculty Of Management And Economics , University Of Baghdad .

Noreen, E., Smith, D. And Mackey, J.T. ,1995," The Theory Of Constraints And Its Implications For Management Accounting. Great Barrington, M.A.: North River Press.

P. Horvarth, 1993,"Target Costing: State Of The Art Report, Arlington-Texas: Computer Aided Manufacturing-International", Cam-I, P: 33.

Ralph B. Fritzsch, 1998 , " Activity-Based Costing And The Theory Of Constraints: Using Time Horizons To Resolve Two Alternative Concepts Of Product Cost", The Clute Institute, Journal Of Applied Business Research, Vol. 14, No 1.

Richard J. Lukesh, 1999," Theory Of Constraints: Throughput Cost Accounting" , Tam International Headquarters , Jan 1.

Robert Kee, Charles Schmidt , 2000 ,"A Comparative Analysis Of Utilizing Activity-Based Costing And The Theory Of Constraints For Making Product-Mix Decisions" , International Journal Of Production Economics, Volume 63, Issue 1, 5 January 2000, Pages 1-17.

Robert Kee,1995, "Integration Of Activity-Based Costing With The Theory Of Constraints To Enhance Production-Related Decision-Making ",Journal Of Accounting Horizons,Vol.9 Issue4.

S.Ansari, Bell, J And Cam-I , 1997,"Target Cost Core Group, Target Costing: The Next Frontier In Strategic Cost Management ", Consortium For Advanced Manufacturing International, P:33.

Sakurai, M. ,1989," Target Costing And How To Use It", Journal Of Cost Management, Vol.3, No.2, (Sum):39-50.

Shams-Ur Rahman, 1998,"Theory Of Constraints: A Review Of The Philosophy And Its Applications", International Journal Of Operations & Production Management, Vol. 18 Issue 4, Pp.336 – 355.

Smith, H. And Et Al ,2001," Reading In Management Accounting", Prentice Hall, 3rd Edition.

Victoria J. Mabin, Steven J. Balderstone, ,2003, "The Performance Of The Theory Of Constraints Methodology: Analysis And Discussion Of Successful Toc Applications", International Journal Of Operations & Production Management, Vol. 23 Issue 6, Pp.568 – 595

Wayne Morse, James R.Daris & Al .Hartgrares 2003,"Managemnt Accounting Strategic Approach", 3.Ed, Thomson-South Western.

Wheelen Thomas L. And Hunger David J. ,2010, "Strategic Management And Business Management And Business Policy: Achieving Sustainability", 12th Ed., Pearson.

Yulee, R., 2002, "Target Costing, What You See Is Not What You Get", Journal Of Cost Management, July-August , Pp: 23-28.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Recent conferences: http://www.iiste.org/conference/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar