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# Integration of Green Target Costing and Activity-Based Budgeting

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**Abstract:** This study aims to integrate green target costing and activity-based budgeting as modern cost management techniques in a men's clothing factory in Najaf, affiliated with the General Company for Textile Industries in Babil Governorate. This approach is based on an integrated approach to achieve a competitive advantage.

Accordingly, the study's problem revolves around traditional methods, approaches, and systems in cost accounting and management, which have become incapable of providing useful information that helps these economic entities in general, and those in control in particular, meet modern requirements that enable them to survive in this environment and achieve a competitive advantage.

**Keywords:** Target Costing, Activity-Based Budgeting, Environmental Sustainability, Cost Reduction.

**Introduction:** Globalizing of competition and rapid changes have made businesses need to be much stronger to avoid costs. This has led the businesses to concentrate on cost management to the detriment of price management. Even though prices have been dropped to increase market share, this was less successful than the results expected. The cost management redistribution of a product has been started in the whole life cycle of it by considering a new generation cost calculation and decreasing costs.

The life cycle costs concept has the same importance as the target cost concept of a product in the target costing method. The target cost is determined as the design phase specific cost objective for a product in the target costing method. It is aimed to design the product in accord with the target cost by developing operations in the company. The most significant feature of this cost management technique is that it starts at the product design phase and, like the costing approach, it is obliged to foresee customer needs.

The project development requires that particular

projects should be done and useful data should be obtained. The costs incurred in the development process of a project can be listed within this scope. Preparation of specs for the product at the first stage of design studies. Preparation of a model or drawings for the product after the completion of the product specifications. Execution of the prototype production after the completion of the model and/or drawing works and the tests of the product. Evaluation of the field tests of the product as a result of the completion of the testing studies. Making the final decisions for mass production and providing the necessary resources. Taking secure measures against the legal issues of the project at all stages of the project and briefing the costs of these processes on the product.

**Understanding Green Target Costing**

Target Costing is one of the strategic cost management techniques developed in recent years, which has been widely used in the product design and development process in many organizations. There are a lot of researches about Target Costing and academic studies and in practice since it is implemented by big companies, particularly with the entry into force of trade agreements. On the other hand, as the number of studies conducted on green manufacturing increase, it will be possible to see the target costing studies of these organizations based on green manufacturing. Companies are expected to take their business activities into consideration in terms of the environment, to minimize the use of natural and energy resources, to create less waste for disposal. From this point of view, the necessity of reviewing the costs with a green perspective to build eco-friendly products is sure. The aim of the study is to reveal new structure that can answer the target costing based on green production needs of organizations with the help of the Activity-Based Budgeting method, and the integration of Green Target Costing with this structure relates to this method, either through a case (Abdel-Rahman, etc., 2003).

In recent years, one of the business strategies of enterprises is the strive to establish green supply chain management system that minimizes environmental pollution and is in harmony with the nature. Ecological compensation, recycling of waste products, producing using recyclable materials are in this context. One of the conditions for being able to implement this is to act on the principles of Green Manufacturing. The main strategy of Green Manufacturing is to produce products with the environment in mind by minimizing the waste from resources, energy and hazardous substances, resulting in the production process. In this project, not only resource and energy costs, but also costs arising from environmental damages caused by the production and operation of a product are determined. With the method proposed in the project, cost management of green products and / or production systems are considered with environmental costs in a holistic approach.

**Definition and Principles**

As competition increased, the need to reduce product costs has come to the forefront, and with the increase in globalization of the world, manufacturers, especially in sectors such as white goods, automobile, semiconductors and textiles, started to produce high-quality products with low costs to the world. In Turkey, especially starting from the 1980s, liberalization in the economy was the main issue in this respect, and with the effect of this, the area of validity of the August 1989 Research Technology Policy was greatly expanded. (Al-Mahmoud, 2007) Many regulations have been enacted to renew the sector and competitive structure of companies operating in the defense industry, which were opened to intense competition. The most important regulation here is the Defense Industry Implementation Regulation, which entered into force on 30.12.1993. Target Costing (GC), which is mentioned in this implementation regulation as one of the methods to be taken into consideration in cost management, has begun to be studied and applied in the defense industry. The development of target costing has not passed unnoticed in the Turkish Defense Industry. The presidency of the Defense Industry has been carried out by TUSAS, which was established in 1973 to design and produce airplanes for the defense industry, including the defense industry, research and studies on the subject Consumption allows for the idea of taking care (Yuksel Pazarceviren & Celayir, 2014). As a result of these studies during the period from 1997 to today (1997-1998) The first, second and third phases of the introduction of GC were initiated in a total of three stages. In the study, the experiences and applications of one of these contractors during the third phase were tried to be described in a comprehensive way.

While traditional cost management methods are passed, modern methods are more research that can provide more detailed, more accurate and healthier product costs. Accordingly, this study Alternative Cost Management Methods; In parallel with the change and development in the world, the discussions on the traditional methods based on it, as well as effective methods GC based on Activity-based Cost Management, whole life cycle costs, which is a developing approach based on ABC; It is aimed to evaluate in terms of their advantages and disadvantages. With the recent developments in the world due to the recent developments, the companies are faced with the globalization phenomenon, and the entire competition

environment is reformed. While the national market has the potential to lose its share, it also has the capacity to compete in world markets for consumers. (Al-Masoudi, etc.,2010) In order to continue to be successful in this environment, all kinds of costs must be reduced while increasing quality and product diversity. The concept of Total Cost Management is considered very critical at this point (Yuksel Pazarceviren & Dede, 2015). This concept; It includes all kinds of savings from the beginning of the production up to the consumption of the product. It not only deals with product costs but puts the spotlight on cost reduction at all stages of the product, from R & D to consumption, and is described as Cost Management involving all units and units of the company. Delivery of the product to the consumer with the costs specified by the planned level of profits in the selected competitive environment is called Product Cost Management.

In this approach, the following are based on the basic assumptions; At the outset, this cycle takes the form of market research where product features and sales prices are determined. After R & D tasks are assigned, he takes on the design of the product with the determined features. After the prototype is produced, its functions are determined by testing. These activities are followed by the processes of tool production design, series production design, raw material procurement, production and testing, assembly and packaging. Then, the product is placed on the market and it is ready for consumption. From this point on, the product is served until it is disposed of. All these activities are made under the control of finance until the sale price is determined. (Al-Rubaie, 2015) The whole activity has been a total of 13 processes. Since the activities need resources, they need suppliers. Relationships with both suppliers and other departments are included within these activities. In the light of these views, Cost Management divided the life cycle of the product into these activities and processes, in this way, and focused on reducing the events in which they took part. With the direct application of this approach, Activity-Based Management and Costing Method are complementary novel cost management strategies that complete the GC method in the determination of target costs.

**Historical Development**

Activity-based budgeting (ABB) is a relatively new technique in budgeting, which is used by organizations for systematic planning and controlling of activities whose resources are based on the activity-based costing (ABC) method as a resource consumption model. ABB attracts attention on growth when it is combined with the target costing method used by organizations to increase competitive advantage by evaluating the product development process and costs associated with the product before the production operations begin. (Bierer, etc., 2013)The relation between target costing and ABB is examined with a model proposed by the research, and the way businesses can use the model is illustrated (Yuksel Pazarceviren & Celayir, 2014). Now, target costing, green target costing, and activity-based budgeting will be introduced briefly.

Product costing change substantially because of the recent developments and increasing world competition and international trade. It arises that traditional volume based systems cannot cope with the modern manufacturing systems any more. In order to overcome these difficulties, activity-based costing (ABC) has been devised by academics in the late 1980's and the number of companies using it has been increasing rapidly since early 1990s. This alternative method defines overhead costs on the basis of the main activities (manufacturing and non-manufacturing), then classifies these costs to the cost object directly. Hence, management can reach an accurate product cost. Thereafter, companies can apply efficient strategies such as target costing.

**Importance in Sustainable Practices**

One of the goals of companies is the continuous reducing of its costs in the industrial environment, getting more with less. For achieving this goal, the companies must monitor the way they use their sources. There are two types of sources: Human sources and the capital sources. Since these sources directly affect the operation costs, they must be interpreted carefully. Besides, the companies have to control what they are produced. In other words, the companies have to focus on producing the products that are the most economical to produce. This decision can be made by following the changes of the unit costs of the services and the products that the companies serve. (Hilton, 2019) This requirement has created budgeting applications that reveal parameter costs and easy control of useful sources.

Overhead costs refer to a series of activities that are carried out for the production of goods or services other than the main factors of production labor, material and energy. Cost reduction studies do not only consider the cost of goods produced, but all activity costs included in the plus cost industry. In cost studies, it is necessary to know the unit costs of activities, products, and services, including the costs of these services and goods. Alternative tool applications are needed to control utility costs of cost components. Simultaneous use of Target Cost and Activity-Based Budgeting methods by decision-makers increases the competition power of the

companies by decreasing the cost of the products to be produced at the design stage. For an institution, activity costs depend on the cost components. With the Activity-Based Budgeting method, many components that make up the cost increase have been calculated. Besides the cost of components, materials and personnel costs are also observed. Thus, it is possible to determine the most economical order size.

**Activity-Based Budgeting Explained**

Activity-Based Budgeting (ABB) is the budgeting of cost and resources required for activities from which output is expected to achieve planned outputs for the next operating cycle. ABB is a method of budgeting to design an organization's future objectives and strategies on activities spent in past periods, and it does not prioritize activities that the business may need to achieve its medium and long-term goals. It is a method based on activity management instead of resource management. (Garrison, 2018) This is a budgeting method to evaluate activities about their demands, whether more useful activities can be performed toward the needs, performance and costs of activities, and it enables the organization to focus on activities in terms of their activational effectiveness. It also focuses on the consumption of resources for activities and is a good basis for managing organizational resources. The activity management also makes it possible to focus on the physical values, performance levels, and cycle times of the activities carried out (Yuksel Pazarceviren & Celayir, 2014). Besides, ABB measures the relationship between the completion level of certain activities and planned objectives after converting these desires/expectations into physical values, targets, or indicators. It is a budgeting model with continuous development, is based on continuous development, and aims to establish a dynamic relationship between final outputs and activities, which is achieved through the use rate between the activities and resources necessary to achieve these activities (Yuksel Pazarceviren et al., 2015). In the ABB system, the activities required to obtain the final product or service are determined by analyzing the physical needs of these products/services, and the resources required for these activities are budgeted by performing a software on economic consumption standards. It is a planning and control process of the estimated activities in the organization, focusing on the activities and relating the cost, time, and quality of the outputs targeted by these investments, and it is not an operational level that can be directed against the competition. The ABB model is a process of combining environmental (competition, economic, technological, legislatively) and behavioral data to make strategic inferences of economic resources necessary for ensuring fulfillment of planned objectives for a certain future time period.

**Concept and Framework**

In this study, activity-based budgeting as a budgeting method based on activity management is create adhered to the application framework of green target costing model, adapted from the target costing based on the activity-based costing method and a model proposal. The formation of the competitive environment urges cost management for businesses. The activity-based budgeting (ABB) as a budgeting method for activities is started by determining cost and amount of the resources required for the activities to achieve planned output. This method can identify the cost of each activity and business can follow these costs carefully. (El-Shamy, 1999) Green target costing-based ABB can adapt this budgeting method with environmental concerns (Yuksel Pazarceviren & Celayir, 2014). There are various definitions of green target costing. The target costing is more comprehensive that product cost management approach encompasses a large variety of planning, controlling, and finally decision-making tools. At its underlying principle is feature planning procedure which product lifecycle costs are considered backwards. All those cost consideration are revealed through comparison of planned or desired price; Target costing fits in well with some other cost management practices, particularly with Below-the-line quality or Cost-of-quality project evaluation (Yuksel Pazarceviren & Dede, 2015). Activity-based costing (ABC) is a costs accumulation and attribution method, highlights the activities occurred during the process of the absorption of main resources. A common way to describe it is simplifying cost accumulation method that can produce more accurate and exact cost expenses, thereby, more meritorious cost analysis and decisions choosing. However, the ABC has certain onus. (Drury, 2018) The method requires huge quantities of data and its interpretation. A product in the manufacturing sector could every single component be defined as a cost object, many supporting processes necessary for couple of main activities, meaning that the number of activities could extraordinarily increase; it could be infeasible to undertake action on cost and processed data.

**Benefits Over Traditional Budgeting**

This study aims to generate low cost, less environment harm in product design phase concepts, while the production strategy is establishing, especially at developing countries. General purpose of this activity-based synthetical approach is to establish considering importance of efficiency and the opportunity of expenses at the same time, by means involving financial

point of views with a productivity point of view. Today's expanding competitive environment necessitates production of the goods with the lowest cost, while demanding to be sensitive on environment. Besides, each budget item happens as a research field needs to assess and to monitor costs of activities and resources. Activity based budgeting is a synthetical approach which eliminates to consider financial outputs as a separate from productivity in designing phase by means incorporating activity data with financial data. (Jabbar, 2021) When assessing to budget limits at considering are identified product or material and budget analysis for yearly progression is the development of the expenses. Because established budget item costs necessitate to be using conservatively. Because, the main goal of the business is to keep expenses below estimated expenses. Because, "environmentally friendly" production sales increasing yearly dictate to eliminate environment pollution and reducing production time and increasing production efficiency.

Abbreviations are defined as ATB (Traditional target-based Target Costing), GTC (Green Target Costing), and OC (Overall Cost). There is also a definition section in the previous of the study. The current literature has been searched and it has been realized that a study joining ABB (activity-based budgeting) and TC (target costing) methodologies does not exist in benchmarked fields. More than 25 references in these fields don't give applicable information. Therefore, the references which are up to date and descriptive are chosen in order to give an applicable view of the mentioned methodologies commonly used by public companies. At last, company has been asked to try another project proposal. ABB-TC tool which can be used by organization has been developed. Company has planned to replicate this tool for every project proposal, and then to evaluate the timing of the timing realization of project expenses (Yuksel Pazarceviren & Celayir, 2014). In developing countries, in new established companies, and in the time of establishing new strategies. ABB (Activity Based Budgeting) is a budgeting approach which becomes prominent on activity levels. In this frame, it's possible to get explanatory values for unambiguous activities. By using those values, the costs of those activities can be obviously estimated, and can be calculated. In the time of getting a marketoriented production strategy in developing countries, especially public companies, in order to achieve low cost strategies, choosing suppliers and/or internal production units, TC (Target Costing) methodology is used respectively.

**Implementation Challenges**

The case study aimed to prepare an application in company facilities in a ready-to-wear textile enterprise in Istanbul. The application includes the determination of the activities attributable to the phases of the target cost analysis of a product developed based on the Green Target Costing method and the determination of the cost index for the detailed planning of the activity cost budget of the product. The cost index for the basic data of the Green Target Costing method was calculated by setting up the Activity-Based Budgeting based cost accounting system. Thus, the calculation of the green target cost, as well as the development of a product in line with the green target cost, was supported by the accurate calculation of the cost index. (Al-Ati, 2019) The activity cost budget of the product developed was realized by determining the activity amounts and the cost targets to be achieved in them. The case study on the enterprise produced intermediate and final products in small, medium and large series as a contracted enterprise in Istanbul, that better comprehends market changes. Marketing and concept design are performed in the factory and the product is manufactured in the production-enterprise.

Implementation of the Green Target Costing and Activity-Based Budgeting in company facilities are considered a benchmarking study for ready-to-wear textile enterprises. It is thought to be the most accurate approach in terms of the cost accounting systems to reveal the resource consumption and performance levels in activity groups. Although detailed information is requested from outsourced contractors, it has been difficult to obtain detailed data since all organizations have their own strategies. (Al-Dafii, etc.,2019) The aim is to provide new perspectives for the operation of small-size enterprises in such working establishments. In Istanbul, it was observed that the transfer of brand companies from manufacturing to marketing has become one of the most widely applied strategies, and that the production of many goods has turned to contracted subcontracting. On the other hand, they take into the contracted production and diversification of products in a difficult market. There are many small businesses needed to further increase production speed and efficiency.

**Synergy Between Green Target Costing and Activity-Based Budgeting**

Probably the most important change in cost accounting has been in the minds of its users. Traditional cost accounting emphasized the fulfilment of the requirements of external financial reports, with the result that cost accounting has been used for inventory valuation purposes for a long time. But the imprecision of the commonly used costing systems also began to be realized for decision-making and strategic planning. This has led to a considerable increase in the number of

alternative approaches during the last decade (Yuksel Pazarceviren & Celayir, 2014). One of the new paradigms in this context is activity-based costing (ABC). ABC aims to reflect the new cost realities, which are nonproduction costs and costs consumed by activities. In making a costing determination, ABC utilizes cause-and-effect relationships to link overhead costs to the products, customers, and facilities that create the need for these overhead resources. After the introduction of ABC, activity-based management (ABM) applications started to grow. (Al-Mahmoud, etc.,2018) A natural extension of ABC is found to be in budgeting. By extending ABC to a broad-based operational costing system with a forecasting horizon, a logical basis is established for budget decisions and plans, thus making possible the establishment of a broad-based management system that leads to a variety of follow-up analyses, starting with the setting of annual cost containment goals.

A starting point in the budgeting regarding the ABC is generally the classification of activities that consume a broad spectrum of particular resources over a long run. Hence, the nature of this decision makes the company undertake or release some resources, or at least to reduce the amount of some resources. (Burns, etc., 2013) A nother useful output is the performance measure of the activities, since it is assumed that it is enough to monitor their total costs. One of the most important decision processes of companies is the introduction of a new product to the market. ABC with its strategic approach can make a great contribution at this point. By linking a target costing with the ABC model, companies can determine the target cost of a product to be launched in the future, using the actual performance attributes, and also assesses the implications of the target cost in terms of the existing cost structure of the company. On a separate note, today's environmental concerns have a big impact on cost issues, especially in companies using many natural resources in the production input. Therefore, the need for a new approach has arisen for the survival of the companies in competitive market conditions, and this new approach is believed to be green target costing (GTC). (Berk, 2010) Green target costing applications supported by ABC systems are likely to produce valuable results for companies.

**Complementary Nature of Both Approaches**

Activity-Based Budgeting is the other approach of the new conception budget. Together, the Green Target Costing and Activity-Based Budgeting are the new comprehensive approach. This new approach constitutes a new perspective to the existing literature, which offers a more strategic cost management approach and considers analysis of environmental activities in firms in a more holistic way (Yuksel Pazarceviren & Celayir, 2014). This research explores the complementary nature of both approaches and aims to suggest this balanced approach in an integrated way to increase efficiency in environmental cost.

Since the issues about the environment are more impacting on the competitive environment of the firms, the firms have more realized that they have to control their environmental costs. The internal characteristics of the firm have a determining factor on why or why not firms engage in environmental activities and also to what extent. With respect to this consideration, more strategic cost management approach for environmental activities is essential in firms. (Datar; 2018) Although ex post control systems are generally used to control the environmental costs occurring in the firms, the effective control of environmental costs in firms and the implementation of cost-effective activities necessitates ex ante control. As with the development of new and effective control mechanisms for environmental costs, an ex ante control system carries more importance for many firms. However, there is a scarcity of models developed for cost planning and the control of environmental activities ex ante. The existing models reveal the need to control costs regarding environmental activities by taking production volume as basis. (Garrison, 2018) The existing models do not consider analysis of the environmental activities in firms in a holistic way; they rather concentrate directly on production operations and ignore a significant part of the other types of environmental costs such as the costs due to energy consumption.

**Case Studies of Successful Integration**

The construction of composite methods respecting the target costing within the framework of Green Target Costing and Activity-Based Budgeting has taken place in the section heading. Reflected case studies are currently realized to separately explore the integration of these two primary methods with companies. (Al-Saghir, 2011) Various confidential meetings have taken place and significant data was collected in the synthesis of targeted methods with the companies in question. Consequently, the case study analysis of successful integration is illustrated concerning the confidentiality clauses of the companies. Method application guideline preparation based on successful implementation was carried out through detailed case study analysis and synthesis results. In a competitive environment, companies are focusing on more sustainable production in an environmentally friendly way. (Abdel-Sadek, rtc.,2005) Green production is increasingly displayed in companies, and therefore a new costing method was developed, Green Target Costing. Currently, there are no studies allowing the construction of a budget target

method in the framework of business activities approved by the activities supporting the target price calculations of the Green Target Costing method in the literature. For the first time, a uniform method construction guideline is produced for such companies. Although the companies that have addressed different shortcomings in the literature are the subjects of the investigation, for confidentiality purposes, the guideline will be limited to calling separately. (AL-Sqir, 2011) Activity-Based Budgeting analysis is carried out for activities that are necessary in companies to facilitate target costing studies. Main materials using information are presented to portray activities toward companies. To standardize missing information and time intelligence for activity, a new method is proposed. The method limits manufacturing, service, or commercial operation cycle using time intelligence. Then, the usability of unique form prepared in target price calculations is examined. Target cost calculations are applied using the proposed form. Target price calculations are compared with the company's calculations. As a result, it is revealed that there is serious proximity between the results and their usability in companies.

**Analysis Techniques**

Activity-Based Budgeting A simple definition of activity-based budgeting is the budgeting of cost and amount of the resources required for the activities to achieve the output planned for the next operating cycle (Yuksel Pazarceviren & Celayir, 2014). In the business world, ABB can be defined as a budgeting method based on activity management that concentrates on activities that maintain operation, leading to increasing build of value, rather than management of the resources used for the activities. ABB embodies continuous development and establishment of a dynamic relation with final outputs regarding activity realization planned in future periods through use rate between activities and resources. ABB concentrates on activities, and cost, time, and quality which make strategic objectives of the organization are interrelated at the activity point of view. ABB is the newer management approach compared to other costing techniques in the context of their origin. As is known, ABB has emerged with the approach of Abc/M As. Activity-based management instead of traditional methods has necessitated a new budgeting method, ABB.

Green Target Costing A simple definition of green target costing is defined as the review of the whole production with the approach to the environmental effects and the determination of the limits for the production cost before the production step through the review of the possible effects and creation of an appropriate price for the final products. However, with the spreading of the Awareness of Care in the Environment Worldwide, the Green Target Costing is Coming to the Forefront. In the researches conducted on this subject, it has been understood that Gtc is not an easy process and it needs to be evaluated within the scope of the following elements. Even if there is a separation, GT is a unique method similar to standard cost system, and Gtc is considered as a development of target cost method. The main cost understanding of GT is defined as, every product has an inherent cost and the company's target, Realization of the given quality conditions within the list price. However, the sector's competitors' prices were the determining factor in the determination stage. Fixed price market, intensive. Smes or production companies with limited product range are the solution methods from the competitors. However, fixed costs and production volume are not directly proportional in the production technique arrangements; this will create a loss of control trend in the production cost.

**Literature Review**

The purpose of this study is creating a model for Green target costing based on ABC including the Sale Process of a product. The basis assumption of this study is Green target costing and ABC mutually complementary methods. Featured aspect of this study is target cost includes the cost including pre- and after-sale process.

The development of service firms was explained in terms of the overall process of diffusion of this particular innovation. Activity-Based Costing (ABC) is a relatively new technique that provides managers with the ability to allocate costs to products and services based on their actual consumption. Malaysian manufacturing companies are increasingly adopting ABC systems. The purpose of this empirical study is to provide a comparative analysis of the factors affecting the diffusion of ABC.

Activity-based budgeting (ABB) process development is focused. The ABB differs only in the way direct costs are included in the when compared with a traditional target costing. For example, target cost = target price – target profit in both target costing and in ABB. However, while setting target cost in ABB, resources of activities which are to be consumed in future periods are used. On the other hand, when setting target cost in target costing, design and of product is considered. The proposed approach a combination of green target costing and activity-based budgeting (GC & ABB) is introduced offering the capability to better simulate and control green cost management of a product.

**Previous Studies on Green Target Costing**

In the present competitive marketing conditions, in

order to achieve a sustainable competitive advantage, companies need to manage their costs effectively. The importance of cost management is increasing due to industrialization, globalization and the speed of technology development. Cost management has been directed toward new generation cost management techniques to adapt to changing conditions. One of these techniques is green target costing, which adopts a holistic and innovation-oriented approach. Green TC directly collects environmental cost data in the decision-making process and uses data in the price formation and process of the product. As a result, this innovative approach has helped to improve the environmental performance of products and reduce the cost of the product. ABM has been proposed as a solution to integrate ATC. ABB approach is expressed as an output, as the best cost alternative is to be chosen in the selection of possible alternatives. Possible alternatives are evaluated according to the scope of the target value approach and the alternatives are evaluated on a monthly basis, not in a separate evaluation. In this study, a methodology that can facilitate the operational application of the ABB approach as an output arising from the harmonization of the green AC and the ABB approach is proposed. Development cannot be achieved without protecting the environment and conserving resources. Manufacturers now examine all of their activities and make changes to reduce or eliminate the waste they generate. This is recognized as a waste prevention campaign or green production. The harmful effects of industry on the environment are increasingly discussed in the international arena with a growing sensitivity to global warming and climate change. On the one hand, legislation imposes a series of obligations on companies to reduce these effects, and on the other hand, consumer concern about the environment causes a change in production priorities and the growth of environmentally friendly products. In this competitive environment, companies aim to create and maintain strategic competitive advantages through their activities. Today, maintaining emphasis on product quality is not enough to be compatible in terms of price, quality, performance, appearance, quality and delivery in the international marketplace.

6.2. Previous Studies on Activity-Based Budgeting

In the 1990s, a significant change occurred in competitive environments of industrial companies. Rapid changes in technology and customer preferences indicated that the mass production of companies should be abandoned and the cost accounting system should accordingly be changed. Activity-based costing (ABC) is a product costing method that adds activities of the cost centers other than the productions costs in the traditional product costing systems. Consequently, ABC assigns overhead costs to the products more accurate than the traditional costing system (Yuksel Pazarceviren & Celayir, 2014).

Although ABC provided a fair approach to the cost allocation, the cost management had to be managed on the activities to reduce the cost. Because activities are the process of satisfying or meet up the customers demand. The relation between the activities and the costs of the activities can be analyzed by relating the activity costs with the activity level and the number of activities. Consequently, Activity-Based Budgeting (ABB) is the process of managing and estimate the costs of the required activities to get the desired output level (僚祐 et al., 2007). The costs need to be spent in the planned activities are determined in the budget. The activities in the organization are the work series and steps that are planned to produce a product and to offer a service. ABB is parallel to the activity life cycles so; it is known that the activities have identified in the life cycle. ABB is focused on the resources need in the activity management. Hence, the resources of the produced products and services in the activities to get a product or service in the organization are investigated, the cost centers are determined and the necessary resources for the cost center activities are estimated and then the budget is made. With using the budgets, the expenditures made in the activities are controlled and the decisions over the cost management and the activity management are revised. However, a comprehensive knowledge should be gained over the activities and the management of them.

**Gaps in Existing Literature**

There are several available relevant studies on management accounting and costing practices: from the adoption of advanced systems of cost planning and control (Cinquini et al., 2008) to the significance of how particular practices are shaped, adapted, and diffused in manufacturing-based organizations, as well as the pressure to adopt new advanced methods of production planning and control to study the question of the appropriateness of Activity-Based Costing (ABC). Increasingly prevalent are studies investigating ABC adoption itself, investigating in the round firm characteristics or investigating ABC adoption in conjunction with other events, such as the implementation of cost management practices more generally as a result of Total Quality Management or just-in-time initiatives. At a time of wider choice geography of cost accounting systems use, the determinants can be categorized in different ways, such as by explaining the choice of particular systems not being influenced by a firm's wider characteristics (e.g. size, industry, technology, ownership); by examining

firm–system interaction with a focus on some forms of fit (correspondence, moderation, mediation) as detailed in contingency theory; and by investigating the sequences of events surrounding system change. More recent work has concentrated on how costing systems are put to use, e.g. analyse the effect of changing management accounting practices on performance on a period-by-period basis rather than attempting merely to infer a contemporaneous relationship. The review concludes that overall, ABC has not been shown to have any greater impact on firm performance than traditional systems of cost planning and control. This perceived need has arguably contributed to the poor fit between firms and ABC, further limiting potential benefits and thus hindering potential.

## DISCUSSION

The study proposes a new ABBS model, which is an abbreviation of Activity-Based Budgeting of Support Activities, that helps the managers to determine the total activity expenditures according to cost drivers whose effect on the activity expenses can be found. ABBS, which is a parametric model, can be used both in the first and the second steps of the Green Target Costing Methodology. Because besides the effect of the volumetric capacity, the effect of the investment has made on the waste treatment systems on the mechanism of the increase in the price of the activity expenses referring to the pollution treatment activities can also be determined. This model is applied to a case company. After the integration of GTC and this ABB model, the environmental management team of the case company achieved a competitive pricing strategy for their new products.

### Implications for Businesses

This article deals with the integration of green target costing and activity-based budgeting; the main goal is to understand the implications for businesses. The article consists of 3 parts. The first part is a synthesis of literature review including green marketing, target costing, activity-based budgeting, green target costing, and activity-based budgeting applications. The second part states the materials and methods, followed by the presentation of the model towards the integration of green target costing and activity-based budgeting. The third part provides a detailed discussion of the model, key findings, limitations, and avenues for future studies.

A ‘manufacture-consumption-destruction’ cycle in the industrialized countries, where the bulk of industries is situated, is a major cause of serious global pollution in the form of waste, emission of pollutants and energy loss, all of which have been seriously curbing human health. To combat this, many industrialized countries have tightened the legal provisions related to environmental protection, pressurizing industries to develop environmentally friendly products and processes. The growing realization of this changed scenario, coupled with the environmental deterioration increasingly drawing consumer’s attention, has given rise to the new concept and practice of ‘green marketing.’ The introduction of stringent environmental laws and the growing concerns of WTO have heightened the crosscurrent of green pressures on domestic manufacturers participating in export markets.

To succeed in green marketing, manufacturing strategies must integrate it at the product design and development stages. This is where target costing (TC) comes in. In target costing, the target cost of a given product is ascertained first and later the technical specifications and the required resources are determined to confirm to the target cost, which, in turn, dictate the design of the product. (Yuksel Pazarceviren & Celayir, 2014) With the development of many design and industrial engineering technologies, the design and development duration is getting ever shorter and vital cost information may not be available at the early design stage. Consequently, the traditional cost control cannot meet the need of cost management of green marketing products. Activity-based budgeting (ABB) is called for, which is a technique within the broader framework of AVM (activity-based management). (Tamur, 2013) For two decades, activity-based costing (ABC) has attracted strong interest from both academia and industry and has remained a popular academic research topic. It is known that expert systems can support decision-making processes effectively. Even though their capabilities do not go beyond the knowledge base, they provide the opportunity to analyze problems in a systematic way and therefore cover the interdisciplinary nature of the decisions-making processes.

### Practical Aspect

1. An Introductory Overview of the State Company for Textile Industries in Hillah

The State Company for Textile Industries in Hillah was established in 1967 as part of the Iraqi Ministry of Industry and Minerals. It is one of the ministry's most important industrial entities. The company began with a single factory, called the Fine Spinning and Weaving Factory, which produced cotton, silk, and other fabrics. In 1976, another factory, called the Hillah Textile Factory, was established, producing cotton and koplan fabrics. The company underwent changes over the years, with its name being changed to the State Company for Textile Industries - Hillah in 1997. In 2005,

the State Company for Cotton Industries in Hillah, Diwaniyah, and the Men's Clothing Factory in Najaf were merged into the State Company for Textile Industries in Hillah, becoming subsidiary factories. The State Company for Textile Industries in Hillah also became one of the leading industrial companies in Iraq, taking over the production of various fabrics. The company continues to improve and develop its operations to meet the diverse needs of the market and strengthen the country's industrial sector.

With regard to the company's objectives, it seeks to support the national economy in the textile industry by producing a variety of fabrics, encompassing several factories and plants that meet these objectives.

2. The costing system applied in the study sample factory

The fundamental pillar of any manufacturing company depends primarily on the nature of the costing system applied within it. Most decisions made by senior management are based primarily on decisions related to pricing, production, and other important administrative decisions, based on the cost information generated by this system. Through studying and analyzing the reality of the costing system adopted by the study sample factory, the researcher found that the factory, unfortunately, does not follow a unified accounting system in its approach to the process and classification of cost elements and the preparation of its financial statements.

Production capacities for the men's suit product for the following years:

| Planned Production Rate | Percentage of Available Energy | Design Power Ratio | Actual Production | Planned Production | Available Energy | Design Energy | Year | N. |
|---|---|---|---|---|---|---|---|---|
| 70% | 10% | 8% | 9230 | 13248 | 92120 | 120420 | 2019 | 1 |
| 20% | 3% | 2% | 3000 | 15000 | 92120 | 120420 | 2020 | 2 |
| 48% | 8% | 6% | 7250 | 15000 | 92120 | 120420 | 2021 | 3 |
| 40% | 7% | 5% | 6000 | 15000 | 92120 | 120420 | 2022 | 4 |

The table above illustrates the production capacity (designed capacity, available capacity, planned production, and actual production) of the men's suit product. We clearly note how the actual production volume of this product has decreased significantly compared to different capacity levels. This decrease is attributed to changes in the competitive business environment, as the focus is on this product alone. The application of the study's topic to it is due to the product's importance to the factory in general and customers in particular, and its high selling price compared to competing imported products offered in the local market. Furthermore, the men's suit product possesses several basic components that, when applied, reflect the work of the departments involved in its production, as well as the practical activities performed by these departments from the beginning of the production process through to the final product. This latter product enhances the possibility of applying the study's techniques related to green target costing and time-driven activity-based budgeting, contributing to time management and cost reduction as a tool for achieving a competitive advantage under current competitive conditions by producing products that meet customer requirements in terms of sustainability, competitive pricing, quality, and production time. 3. Planned operating costs for the chest, jacket and hoodie sewing department for the year 2024

| Operating Cost | Cost Per Unit of Time (Dinar/Minute) | Activity Event Time (Minutes) | Activity | N. |
|---|---|---|---|---|
| 6033.7686 | 179.6834 | 33.58 | Receiving and transporting raw materials + sewing | 1 |
| 518.23548 | 287.9086 | 1.8 | Receiving work orders and materials requests | 2 |

| | | | | |
|---|---|---|---|---|
| 71.03331 | 78.9259 | 0.9 | Planning, designing, and evaluating templates + preparing work orders | 3 |
| 37.80925 | 75.6185 | 0.5 | Signing documents | 4 |
| 88.997625 | 71.1981 | 1.25 | Inspecting completed work | 5 |
| 88.14264 | 73.4522 | 1.2 | Maintenance | 6 |
| 78.3613 | 78.3613 | 1 | Transferring completed work | 7 |
| 6916.3482 | | | Total | 8 |

Using the table above, we can calculate the planned operating costs for the other divisions involved in the production of men's suits in the same manner. The calculations were carried out as follows:

A. Planned operating costs for the sleeve preparation and sewing division = 4,908.8157 dinars.

B. Planned operating costs for the lining preparation division = 4,193.5635 dinars.

C. Planned operating costs for the back and lining preparation division = 6,304.1554 dinars.

D. Planned operating costs for the jacket assembly and collar-to-body binding division = 7,532.9720 dinars.

C. Planned operating costs for the belly binding division = 5,099.2134 dinars.

H. Planned operating costs for the final sewing, inspection, cleaning, and packing section for the jacket = 9,216,1624 dinars.

G-C. Planned operating costs for the front of the pants sewing section = 7,570,4277 dinars.

D-D. Planned operating costs for the back of the pants sewing section = 6,336,1580 dinars.

I-D. Planned operating costs for the side seam joining section = 3,671,7667 dinars.

R-D. Planned operating costs for the waistband joining section = 4,920,9818 dinars.

G-G. Planned operating costs for the seat sewing section = 2,897,3643 dinars

| Total | Marketing and administrative cost 10% | Cost of manufacturing | Operating costs | Material cost | Men's suit production divisions |
|---|---|---|---|---|---|
| 21439.933 | 1949.0848 | 19490.8482 | 6916.3482 | 12574.5 | Jacket front seam and collar tying |
| 10826.9323 | 984.2666 | 9842.6657 | 4908.8157 | 4933.85 | Preparing and sewing the sleeve |
| 8412.5398 | 764.7763 | 7647.7635 | 4193.5635 | 3454.2 | Preparing the lapels |
| 14636.023 | 1330.5475 | 13305.4754 | 6304.1554 | 7001.32 | Preparing the back and collar of the jacket |
| 8625.1242 | 784.1022 | 7841.022 | 7532.972 | 308.05 | Assembling the jacket, joining the collar to the body, and tying the sleeves |
| 5995.2072 | 545.0188 | 5450.1884 | 5099.2134 | 350.975 | Tying the lapels |
| 21849.057 | 1986.2779 | 19862.7791 | 9216.1624 | 10646.6167 | Final seam, inspection, cleaning, and packing the jacket |
| 25162.4759 | 2287.4978 | 22874.9781 | 7570.4277 | 15304.5504 | Sewing the front of the pants |
| 21853.0255 | 1986.6387 | 19866.3868 | 6336.158 | 13530.2288 | Sewing the back of the pants |
| 9484.5142 | 862.2286 | 8622.2856 | 3671.7667 | 4950.5189 | Tying the sides of the pants |
| 16857.1412 | 1532.4674 | 15324.6738 | 4920.9818 | 10403.692 | Tying the waistband of the pants |
| 7127.9792 | 647.9981 | 6479.9811 | 2897.3643 | 3582.6168 | Sewing the seat |
| 8526.7301 | 775.1573 | 7751.5728 | 2694.4994 | 5057.0734 | Pants' hem, cleaning, and packing |
| 226240.8379 | 20567.3489 | 205673.489 | 72262.429 | 133411.06 | Total |

S-S. Planned operating costs for the trouser tuck, cleaning, and packing section = 2,694,4994 dinars.

**Calculating the planned cost of the product**

After calculating the planned operating costs for each division responsible for the production process of the men's suit product, using information obtained from the various resource groups, this was done through

Explain the cost reduction process for direct materials used in the production of men’s suits for the research sample factory for the year 2024.

addition. The required cost of the material element used in each division was added to the operating costs to derive the total manufacturing cost. Marketing and administrative costs were also added for each division to obtain the total planned cost of the men's suit product, as shown in the following table:

| Total | Marketing and administrative cost 10% | Cost of manufacturing | Operating costs | Material cost | Men's suit production divisions | N. |
|---|---|---|---|---|---|---|
| 21439.933 | 1949.0848 | 19490.8482 | 6916.3482 | 12574.5 | Jacket front seam and collar tying | 1 |
| 10826.9323 | 984.2666 | 9842.6657 | 4908.8157 | 4933.85 | Preparing and sewing the sleeve | 2 |
| 8412.5398 | 764.7763 | 7647.7635 | 4193.5635 | 3454.2 | Preparing the lining | 3 |
| 14636.023 | 1330.5475 | 13305.4754 | 6304.1554 | 7001.32 | Preparing the back and collar of the jacket | 4 |
| 8625.1242 | 784.1022 | 7841.022 | 7532.972 | 308.05 | Assembling the jacket, attaching the collar to the body, and tying the sleeve | 5 |
| 5995.2072 | 545.0188 | 5450.1884 | 5099.2134 | 350.975 | Tying the lining | 6 |
| 21849.057 | 1986.2779 | 19862.7791 | 9216.1624 | 10646.6167 | Final seam, inspection, cleaning, and packing the jacket | 7 |
| 25162.4759 | 2287.4978 | 22874.9781 | 7570.4277 | 15304.5504 | Trousers front seam | 8 |
| 21853.0255 | 1986.6387 | 19866.3868 | 6336.158 | 13530.2288 | Trousers back seam | 9 |
| 9484.5142 | 862.2286 | 8622.2856 | 3671.7667 | 4950.5189 | Tying the sides of the trousers | 10 |
| 16857.1412 | 1532.4674 | 15324.6738 | 4920.9818 | 10403.692 | Tying the waistband | 11 |
| 7127.9792 | 647.9981 | 6479.9811 | 2897.3643 | 3582.6168 | Sewing the seat | 12 |
| 8526.7301 | 775.1573 | 7751.5728 | 2694.4994 | 5057.0734 | Pants cleaning and packing | 13 |
| 5197.5 | 472.5 | 4725 | 1750 | 2975 | Width lining | 14 |
| 6583.5 | 598.5 | 5985 | 3150 | 2835 | Front adhesive | 15 |
| 4152.5 | 377.5 | 3775 | 2500 | 1275 | Canvas | 16 |
| 2230.8 | 202.8 | 2028 | 1560 | 468 | Textile adhesive padding | 17 |
| 3300 | 300 | 3000 | 1500 | 1500 | Pocket lining | 18 |
| 3343.89 | 303.99 | 3039.9 | 3000 | 39.9 | Gauze | 19 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3564 | 324 | 3240 | 3000 | 240 | Brim | 20 |
| 15716.25 | 1428.75 | 14287.5 | 8287.5 | 6000 | Fabric | 21 |
| 440 | 40 | 400 | 250 | 150 | Refrigerator | 22 |
| 165 | 15 | 150 | 100 | 50 | Nylon bag | 23 |
| 3630 | 330 | 3300 | 2400 | 900 | Suit bag | 24 |
| | 226240.8379 | 20567.3489 | 205673.489 | 72262.429 | 133411.06 | Total |

## CONCLUSION

1. Improving Environmental Efficiency: Integrating green target costing and activity-based budgeting helps improve an organization's environmental efficiency by reducing the negative environmental impacts of production activities.
2. Reducing Costs: Using activity-based budgeting, activities that cause excess costs can be identified and worked on to improve or eliminate them. This enhances the application of green target costing to improve overall cost performance.
3. Achieving Sustainability: Integrating the two techniques contributes to achieving sustainability by reducing the use of natural resources and waste, which has positive impacts on the environment and the company as well.
4. Enhancing Competitiveness: Integrating green target costing and activity-based budgeting improves product quality and reduces production costs, enhancing the company's competitive advantage in the market.
5. Improving Customer Satisfaction: Using both techniques, companies can better meet customer requirements by offering high-quality products with superior environmental performance, which enhances customer satisfaction and loyalty. 6. Improving Decision-Making: Integrating these two technologies provides accurate and comprehensive information on costs and environmental activities, which improves management and strategic decision-making.

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