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A LITERATURE REVIEW OF TARGET COSTING IN SSCI AND SCI&SCI-EXPANDED INDEXES

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ABSTRACT

Target costing as a cost management and profit planning system is used by many competitive firms since 1970s. Although the concept is simple, the implementation needs an extensive collaboration inside and outside of the organization. In contrast, many organization managers think that target costing is just related with accounting and finance staff. Our study aims to review the literature of this important concept; target costing by examining 41 English articles published in SSCI and SCI&SCI-Expanded between 1985-2008. The study aims to briefly explain the content of each article to show the reader what has accomplished so far.

Keywords: *Target Costing, Literature Review, Cost Management, Profit Planning, Japanese Assembly Industry, Critical Factors of Target Costing Implementation, The Downside of Target Costing*

INTRODUCTION

Target Costing, as a backwards approach for determining costs (Feil et al., 2004), is not solely about a cost management and also a system of profit planning that ensures that new products and services meet market determined prices and financial returns (Ansari et al., 2007). Bhimani and Okano (1995) described target costing as an organizational process rather than a technique and since 1970s, it was the Japanese auto industry, particularly; Toyota that combined the elements of target costing and turned it to a holistic system of profit and cost management and many of the Japanese assembly industries today use target costing extensively (Ansari et al., 2007). Target costing is based on the idea that a product's quality, functionality, and cost are largely determined during the design stage of the product lifecycle (Ax et al., 2008) and target costing is a widely used technique for cost management during product development (Filomena et al., 2009). Cooper and Chew (1996) highlighted the fact that 80% of product costs are estimated to occur at the design phase which exhibited that major and significant cost reduction opportunities are available only at this stage. However, the organization managers often underestimate the power of this strategic weapon and they think it is a process that is related to accounting and finance staff (Ansari et al., 2007). Target costing is a market-driven

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approach and needs a wide organizational commitment. Extensive market research, focus on customer demands, design characteristics of the products, cross-functional teams, supplier integration and many other factors affect the success of target costing. Although the definition of the process connotes a practical approach, the implementation of the process is not that simple (Horsch, 1998).

Our study includes reviews the target costing literature in SSCI and SCI&SCI-Expanded between 1985-2008. There are 41 articles reviewed for the coverage of our study. The first part defines and summarizes target costing process. The second part exhibits the principles of target costing. The third part explains the data collection process of the study. The fourth part explains the content of each article reviewed in accordance with their indexes and years. The fifth part summarizes the content findings. And the sixth part is the conclusion.

1. TARGET COSTING

Intense competition in new business environment, where conventional cost management and cost plus pricing strategies are not very effective (Castellano, 2003), and pressure from customers forced the companies to reduce their costs to remain competitive in the market place with the consideration of "*voice of customers"* but without comprising the quality and functionality of the products (Schmelze et al., 1996). As an effective method for cost reduction; target costing is a Japanese management technique used to manage costs during a product's planning and design stages (Margaret and Discenza, 1993) which are used in Japan since 1970s by auto manufacturers (Freedman, 1993). Koons (1994) stated that a target cost is a top-down cost that reflects the demands of the marketplace and the company's goals. As it is seen from the definition, the target costing is a process for negotiating the demands of the customers and the ability of the producers to design and offer the products that best suit to these demands and the company's goals. Thus, target costing approach assumes that the price is determined in the market place and the desired profit can be achieved only if the companies design and sell products to meet target cost (L. Tatikonda and M. Tatikonda, 1994). As exhibited in the following equation; target cost is a function of the selling price and a desired profit (Schmelze et al., 1996).

Target Cost=Estimated Selling price-Desired Profit margin (Ellram,2000).

Target costing originally introduced in Japan under the name of "*Genka Kikaku"* (Nicolini et al., 2000; Feil et al., 2004), differs from the traditional cost plus approach. In traditional cost-plus approach, firms set their products' prices by adding a certain amount of profit margin to the production costs that is in accordance with the stakeholders' expectations assuming that the production costs are relatively fixed in the short run (Chen and Chung, 2002). On the other hand, the target costing process is a backward method and begins with a targeted sales price (Helms et al., 2005). Cooper and Kaplan (1998) described the approach in three stages: a) the marketplace determines the selling price of the future product b) the profit margin that the company wants to achieve is subtracted from this price c) The result is the target cost at which the product must be manufactured (Dal-Ri et al., 2005). Therefore, target costing process covers the entire life cycle of a product (Nicolini et al., 2000; Agndal and Nilsson, 2008) by actively involving the entire value chain (Ansari et al. 1997) and it is a technique that is design-centered and market driven (Catellano and Young, 2003; Cooper and Slagmulder, 1997) which occurs at the product development (Filomena et al., 2009). The key point in its focus

on design is the fact that 80% of product costs are estimated to occur at the design phase which exhibited that major and significant cost reduction opportunities are available only at this stage (Cooper and Chew, 1996; Modarress et al., 2005). The other factor that is vital for target costing process is the customer demands. Target costing begins with clarification of the quality and functionality levels that will succeed with the predetermined, market based selling price and then the organization makes its efforts to achieve the desired profit (Cooper and Chew, 1996). This process includes a major involvement of upstream staff of the organization where product designers frequently estimate the product cost and compare the estimate with the target to measure the performance of cost reduction (Koga and Davila, 1999). Chen and Chung (2002) stated that the resulting target costs are often well below the currently achievable costs which are based on the standards established by product/process engineers which make that target costs benchmarks and driving force for the company's cost improvement activities. In addition, Souissi and Ito (2004) defined target costing as motivation for design engineers to look for innovative ways to manage cost while not compromising other crucial dimensions. Gagne and Discenza (1995) argued that target costing is used by Japanese management accountants to stimulate employees to follow long term strategic goals. All of these efforts aiming to offer the market only the products which meet the customer demands which will ensure economic success for the company (Cooper and Chew, 1996).

2. PRINCIPLES OF TARGET COSTING

The CAM-I Target Cost Group established six key principles for target costing. These are (Ansari et al.,1997);

- **Price-Led Costing:** As market prices are the determinants of product and profit plans, the target costing process needs an active market analysis.
- **Focus on Customers**: Product feature and functions during product development take place to meet customer expectations, and customers are willing to pay for them which will at the end enhance company's goals.
- **Focus on Design:** Target costing systems encourage all participating functions of the firm to examine designs which enable to manage costs before they are incurred rather than afterward due to the fact that majority of production costs occur at the design stage.
- **Cross-Functional Involvement:** Cost management activities during target costing process requires product and process teams with members representing design and manufacturing engineering, production, sales and marketing, materials procurement, cost accounting, service and support. One of the most important participant in the cross-functional teams are the suppliers and many studies study the involvement of suppliers in target costing process (Ellram, 2000; Lockamy and Smith, 2000; Nicolini et al., 2000; Zsidisin and Ellram, 2001; Ellram, 2002; Swenson et al., 2003; Zsidisin et al., 2003; Helms et al., 2005; Ellram, 2006; Agndal and Nilsson, 2008).
- **Life Cycle Orientation:** Target costing considers all the costs of owning a product over its entire life and from a customer's viewpoint; life cycle focuses on lowering the costs of operating, using, repairing and disposing of the product and from the producer's viewpoint; it focuses on minimizing the costs of development, production, marketing, distribution, support, service and disposition costs.

- **Value-Chain Involvement:** All members of the value chain such as suppliers, dealers, distributors, and service providers are involved in the target costing process to execute an extended enterprise to create customer value and minimize costs which are also the core goal of target costing.

3. DATA COLLECTION

The study reviewed 41 English articles published in SSCI and SCI&SCI-Expanded Indexes within the years of 1985-2009. The articles are first classified according to the indexing of journals they are published in namely, Social Science Citation Index (SSCI) and Science Citation Index & Science Citation Index Expanded (SCI&SCI-Expanded). The classification may be seen in Table 1.

Table 1 Classification of Journals and Articles According to Their Indexes

No:	**Journals in SSCI**	**Number of Articles**
1	Accounting Horizons (2004)	1
2	British Journal of Management (2000)	1
3	Harvard Business Review (one in 1988, two articles published in 1996)	3
4	International Journal of Operations & Production Management (2002)	1
5	International Journal of Project Management (2005)	1
6	Management Accounting Research (MAR) and MAR In Press (1)	3
7	Metalurgia International (2007)	1
8	Quality And Reliability Engineering International (2008)	1
9	R&D Management (1998)	1
10	Sloan Management Review (one in 1997, three in 1999)	4
11	The European Accounting Review (1999)	1
12	The International Journal of Advanced Manufacturing Technology (one each in 2004, 2008)	2
Total		*20*
No:	**Journals in SCI**	**Number of Articles**
1	International Journal of Production Research (1985)	1
2	European Journal of Information Systems* (2002)	1
3	International Journal of Production Research (2005)	1
4	Chemical Engineering (2007)	1
*The journal is both indexed in SSCI and SCI. We included the journal in only SCI for our following analysis.		
Total		*4*
No:	**Journals in SCI-Expanded**	**Number of Articles**
1	Industrial Management + Data Systems (1994, 2000)	2
2	International Journal of Production Economics (one in press, two in 1994; one each 2003, 2004,2007, three in 2008)	9
3	Scientia Iranica (2008)	1
4	Journal of Systems Science and Systems Engineering (2007)	1
5	Journal of Mechanical Design (2006)	1
6	Computers & Industrial Engineering (two in 1998)	2
7	International Journal of Technology Management (1997)	1
Total		*17*

As there are only 4 articles in SCI, we combined SCI and SCI-Expanded as one index dimension namely SCI&SCI-Expanded for the following analyses in the study.

4. CONTENT APPROACH FOR THE ARTICLES REVIEWED

Ansari et al. (2007) stated that a literature review organized extant literature in order to make readers understand what has been accomplished already and also provided a way to identify opportunities to fill knowledge gaps and highlight areas that need further replication or testing. For the purpose to show the readers what has been accomplished so far, we have specified the main purpose of the study, and if that is an applied study, the results of each article have been exhibited with a classification of the index of the journal that the article had been published in. The articles in each classification have been ordered in respect of their years of publication. We preferred to give this information in a table format in order to make the reader to have knowledge about the target costing literature and highlighted areas during last 23 years. Table 2a presents the content analysis of the articles in SSCI Index and Table 2b presents the content analysis of the articles in SCI&SCI-Expanded

Table 2a The content analysis of the articles in SSCI

No:	Article Name:	Main Content
1	Another Hidden Edge: Japanese Management Accounting	Hiromoto (1988) introduced target costing to English literature by describing the target costing system at Daihatsu. Hiromoto used the Japanese word “genka kikaku” for describing target costing under the title “accounting for market-driven design”.
2	Target Costing Support Systems: Lessons From Leading Japanese Companies	Kato (1993) explored the contribution which target costing was making to the cost reduction activities of Japanese Companies and described the information systems which were necessary to support the target costing philosophy. The author stated that target costing support systems should have an ability to decompose product functions into sub-functions by various criteria, facilities to convert the value of functions into price, a market research toolbox with various forecasting techniques, a user-friendly interface, a value-price conversion table or database and simulation functions (what-if, goal seeking sensitivity analysis, what-best or etc).
3	Target Cost Management in Japanese Companies: Current State of The Art	Tani et al. (1994) conducted a questionnaire research to find out the usage of target costing in Japanese Companies in 1991 and found that the transportation equipment industry (%100), the electrical/electronics industry (%88, 46) and machine industry (%82,76) were the most target costing applied industries which had been using or had used the target costing for the primary purpose of cost reduction. The design department found as the most effective department in target costing process and direct material costs had been the mostly focused cost element of target cost management.

4	Control Tomorrow's Costs Through Today's Designs	Cooper and Chew (1996) conducted a multi-site case study at Olympus, Komatsu and briefly Isuzu for their implementations of target costing. Cooper and Chew stated that being first to market and designing the appropriate bundle of product attributes was not enough anymore because of pressure of lean competitors that reacted in a very short time. Cooper and Chew implied that target costing, aimed to maximize a product's total profitability rather that minimizing its costs, was achieved with a clear understanding of customer preferences, an integrative organizational structure with cross-functional means and managing costs from design phase forward. They also described the benefits expected from adopting the target costing strategy.
5	How Chrysler created an American Keiretsu	Dyer (1996) explained how Chrysler's new model had achieved a significant success by including cross-functional teams, target costing, choosing suppliers early in the vehicle's concept-development stage, and having Chrysler's and its suppliers' engineers work side by side to develop components at the end of 1980s. The author stated that Chrysler's supplier alliance program called SCORE had helped Chrysler involve suppliers deeply in the company's efforts to lower costs and make processes more efficient.
6	The Evolution of Japanese Subcontracting	Nishiguchi and Brookfield (1997) examined the evolution of Japanese subcontracting and informed that in the case of an auto maker where he could jointly evaluate various possibilities with the supplier, they could reduce the combined costs of the parts without degrading specific part quality through the process of target costing.
7	Architectural innovation in product development through early supplier integration	Bozdogan et al. (1998) defined target costing as an important contributing factor for pro-actively integrating suppliers at an early stage in the concept exploration and definition stages

		of product development with the example of two case studies.
8	Develop Profitable New Products with Target Costing	Cooper and Slagmulder (1999) studied seven Japanese firms which had mature and effective target costing in order to document the procedure they applied. They described three main elements (market-driven costing, product-level target costing and component-level target costing) of target costing process and stated that in a highly competitive environment; companies must manage costs to survive and three target processes ensured that only profitable products would be launched. Cooper and Slagmulder (1999) emphasized that target costing and value engineering provided considerable payoffs to early adopters.
9	Case Study Target Costing as a Strategic Tool	Shank and Fisher (1999) conducted a case study at Montclair Paper Mill and stated that the implementation of target costing enabled the firms have significant cost reduction opportunities. The author emphasized that target costing was too narrowly defined which made managers think it was not related to their business.
10	Target costing, co-ordination and strategic cost management	Ewert and Ernst (1999) presented a theoretical analysis about target costing as a strategic management accounting tool. The authors analyzed three distinct characteristic of target costing such as its usage in market orientation, its usage as co-ordination instrument and its interaction with other factors affecting long-term cost structure in the form of strategic learning. The study found that the more strategic dimension were added to the problem of cost management, the less valid were strategic management accounting proposals in terms of the way target costing was employed.
11	Strategy, value innovation, and the knowledge economy	Kim and Mauborgne (1999) emphasized that rather than following conventional practices for maximizing profits; successful value innovators that pursue strategy by offering new and superior buyer value in existing markets or by enabling the creation of new markets through quantum leaps in buyer value, use a different market approach that consists of strategic

		pricing for demand creation and target costing for profit creation.
12	Can Target Costing and Whole Life Costing be Applied in the Construction Industry?: Evidence from Two Case Studies	Nicolini et al. (2000) examined the case for using target costing in the UK construction industry by two pilot projects and stated that although significant benefits were developing, the actual target costing process did not fit the general iterative approach to reduce the gap between the current best-practice cost and the target cost and the data suggested that the absolute purpose of target costing had been only partially understood by participants. Nicolini et al. (2000) implied that for a fully-fledged target costing process; sufficient time, focus on supply-chain relationships and improved methods of collaborative cost determination was needed.
13	Cost targets and time pressure during new product development	Everaert and Bruggeman (2002) investigated the impact of using cost targets during new product development (NPD) in terms of design quality, product cost and development time. The authors compared a new product development environment with cost targets with an NPD environment by designing a lab experiment with a 2*2 factorial design consisting of 64 undergraduate students (16 students for each cell) in business administration to design an attractive carpet where design engineers receive no specific cost targets but were expected to minimize the cost level of future products with customers asking for the highest design quality. The study exhibited that cost targets during NPD led to lower-cost new products while not damaging design quality or development time but under high time pressure, cost targets led design engineers to work longer on design without a corresponding cost decrease.

14	Designing Cost-Competitive Technology Products through Cost Management	Davila and Wouters (2004) identified alternative practices rather than target costing because the authors implied that it presented several limitations when factors such as technology, time-to-market or customer needs were more pressing. The authors conducted observations from a field study of product development practices in high-technological firms and evidence from other field studies and identified the practices such as parallel cost management teams, modular design for cost, clearly defined cost management strategies and cost policies, and product portfolio planning. The authors exhibited that the companies in the sample used these practices but not target costing during product development when cost management was most effective but the development teams still kept their attentions on the critical success factors of time-to-market, technology and customer needs.
15	Using target costing concept in loss function and process capability indices to set up goal control limits	Wu (2004) mentioned the relationship among the loss function, process capability indices and control
16	Appraisal of value engineering in construction in Southeast Asia	Cheah and Ting (2005) conducted a questionnaire survey among fifty four industrial practitioners to identify the possible causes why value engineering was rarely applied in the Southeast Asian construction industry and found that there was a lack of understanding in value engineering concepts among industrial practitioners. The authors stated that the government should foster in promoting value engineering practices in domestic projects and the scope of value engineering could be broadened to address corporate-level systems and initiatives.
17	Quality function deployment planning for platform design	Jariri and Zegordi (2006) applied the mathematical programming model which used QFD (Quality Function Deployment) data and provide the starting solution for the platform design team in an automaker company located in the Middle East for the target costing process. The model essentially optimizes customer satisfaction subject to target cost. The comparison had been made between the company's solution and mathematical model solution and showed

		the quality of the mathematical model solution which exhibited an increased customer satisfaction by 5.4% and a reduced cost by 7.7%.
18	The Target Costing	Gheorghe (2007) described the stages of methodology of target costing in four stages, namely decomposition of the product into its individual functions to be considered by customers; establishment of the degree of contribution for each technical component of the product; establishment of percent importance for each component and correlation analyze of costs and of percent importance, associated to each component, for performance of functions.
19	Reliability as an Added-value Factor in an Automotive Clutch System	Teixeira and Cavalca (2007) discussed tools and methods applied to planning and assurance of quality, which had to be taken into account at the product conception project, which concerned the phase in which quality, reliability and the final price of a product were technically defined. Teixeira and Cavalca (2007) proposed a methodology for the analysis which was a combination of the KANO method, target cost and value analysis with respect to the assessment of client requirement compliance levels and the determination of the choice of functions, whose relative costs were above relative needs, therefore offering optimization or elimination potential. The authors used an automotive clutch product as the case study and exhibited that the method that was proposed proved to be efficient because it assessed not only the tangible and intangible customer requirements but also the final performance of the product, constantly seeking the optimum cost/benefit solution.
20	Interorganizational cost management in the exchange process	Agndal and Nilsson (2008) conducted a study of three buyer-supplier relationships to explore interorganizational cost management activities which can be defined as buyers' and suppliers' coordinated effort to reduce costs during exchange process and stated that although many authors argued that target costing was especially appropriate in the case of selecting suppliers for complex components that require a great deal of R&D, the authors indicated

		that this situation presented serious difficulties when attempting to apply the exact target costing logic, since neither party could specify the component in detail at this stage and pushing the market-derived price further up the supply chain was almost impossible.

able 2b The content analysis of the articles in SCI&SCI-Expanded

No:	**Article Name:**	**Main Content**
1	New Approach to the Function evaluation System in value Engineering	Tanaka (1985) proposed an approach to the construction of the functional block diagram and function evaluation system to enable applying design-stage value engineering and/or production-stage value engineering, aiming to describe and illustrate a formal procedure for the graphic presentation of the functional block diagram and the evaluation of function items, given the necessary information concerning the relation of each function item to each other function item with a pen marker example to derive the target cost for each part and/or each function.
2	Controlling software development costs	Morgan (1994) examined the application of target costing to software development costs and informed that it built the design-based approach for controlling life-cycle costs rather than costs in production and was largely the same process for manufacturing industries with the same principles only some different functional steps..
3	Interorganizational cost management-systems - the case of the Tokyo-Yokohama-Kamakura supplier chain	Cooper and Yoshikawa (1994) conducted a field study analyzing the cost management practices of three Japanese firms in the same supplier chain by identifying the development of inter-organizational cost management systems. These systems were designed to create downward cost pressures on the entire supplier chain. This pressure was achieved through several different mechanisms including target costing systems, minimum cost investigations, and quality-price-functionality tradeoffs. The authors stated that by designing products jointly, the firms could try to reach a global minimum cost instead of a series of local minimum costs.
4	Applying functional cost analysis in a manufacturing environment	Yoshikawa et al. (1994) examined the functional cost analysis approach from products to areas of manufacturing overhead costs and with using activity-based costing information. This approach involved the application of functional cost analysis methodology to business processes such as procurement, ordering, quality control and production scheduling.

5	Strategic cost management: preliminary lessons from European companies	Hinterhuber (1997) described strategic cost management within the framework of strategic management reflecting the European approach at that time and found that European companies were making core competencies the guiding ideas of their strategies, and striving aggressively to increase their value, first by reengineering practices, and second by inventing new markets and satisfying all stakeholders, not only the shareholders, better and quicker than the competitors were able to do.
6	Cost engineering with quality function deployment	Bode and Fung (1998) integrated design costs into the QFD framework by proposing an approach that enabled designers to optimize product development resources towards customer satisfaction and conduct analytical investigations to facilitate decision making in product design and development.
7	Application of fuzzy theory to value engineering	Nagasawa (1998) introduced the Fuzzy Theory into the function evaluation in order to address fuzziness in Value Engineering job plans.
8	Target for supply chain management: criteria and selection	Lockamy and Smith (2000) discussed Price-based, value-based, and activity-based cost management approaches for target costing as a means to improve the management of supply chains to improve customer satisfaction. The authors concluded that a price-based approach to target costing was good for supply chains whose relationships were characterized by open-market negotiations or simple cooperative arrangements and for value-based target costing was proper for trading partners whose relationships were characterized by joint efforts to simplify overall supply chain operations and finally, for an ABCM-based approach for target costing to be effective; trading partners whose relationships should be characterized not only by joint efforts to improve the supply chain, but also by joint efforts to develop and improve products.
9	The organisational learning effects of management accounting information under advanced manufacturing technology	Choe (2002) conducted a questionnaire survey to test the organisational learning effects of the nonfinancial performance information provided by management accounting information systems (MAISs) under advanced manufacturing technology (AMT). He suggested that that under a high level of AMT, for the provision of information to result in an increase of performance through organisational learning, a target costing system must be introduced and a large amount of information should be provided frequently and quickly.
10	A survey of the adoption and use of target costing in Dutch firms	Dekker and Smidth (2003) surveyed the adoption and use of target costing in Dutch firms among the Dutch firms listed at the Amsterdam stock exchange and found that Nineteen out of thirty-two manufacturing firms claimed to use costing practices similar to target costing although those firms did not call these practices as target costing. The authors stated that adoption was highest among assembling firms and was related to a competitive and unpredictable environment where cost reduction was the main objective and benefit of these practices. The authors also implied that the target cost management process was mainly led by the product development and design departments which was mainly performed in team structures.

11	Parametric vs. neural networkmodels for the estimation of production costs: A case study in the automotive industry	Cavalieri et al. (2004) compared the results of the application of parametric and artificial neural network techniques as cost estimation predictive models in the first stages of the product development process for the case study of the estimation of the unitary manufacturing costs of a new type of brake disks produced by an Italian manufacturing firm. The authors claimed that, as a parametric model, artificial neural network was giving better results in the sample.
12	Kaizen costing for lean manufacturing: a case study	Modarress et al. (2005) presented a case study of kaizen costing as practiced by Boeing Commercial Airplane Company, Industrial Relations Centre (IRC) Division, aimed to describe a method used to set kaizen costs which will provide relevant cost data to support lean production decisions that would be useful to practitioner. The authors argued that adopting new target costing methods and financial practices using kaizen costing and value-added analysis had helped to further IRC's lean manufacturing implementation.
13	Integrating target costing into perception-based concept evaluation of complex and large-scale systems using simultaneously decomposed QFD	Shun and Kosuke (2006) presented a system design methodology that integrated perception-based concept evaluation and target costing of complex and large-scale systems by using quality function deployment matrices simultaneously for both requirements and structure in order to allocate the worth and target cost of the modules in a system in order to satisfy both customer and financial requirements.
14	Target	DiPaolo (2007) examined the target costing from the perspective of drug maker companies.
15	Product development process with focus on value engineering and target-costing: A case study in an automotive company	Ibusuki and Kaminski (2007) suggested a methodology for the product development process in an automotive company, aiming at the correct systematic approach of Value Engineering (VE) and target-costing in cost management by validating the approach in a case study focused on the engine-starter system of a vehicle, aiming at improved product cost, functionality and quality accomplishment, in accordance with customer needs and the company strategy. The methodology includes three different steps of VE technique; Concept-VE: focused on the conceptual stage of product development, Project-VE: focused on the design stage of the product and process and Validation-VE: focused on the validation stage of the product and process. Through the case study, the authors found that it was possible to identify the real cost reduction opportunity (%10 in the price of the starter) even improving the main function of the product.
16	Framework of setting up goal control limits of target costing for non-normal distributions	Hsin-Hung and Fong-Jung (2007) provided a framework of target costing to extend its original scope when the underlying distribution was non-normal. The authors provided an example to illustrate the usefulness of the proposed framework of target costing by relentlessly reducing cost and improving product quality to gain competitiveness in the marketplace.

17	The influence of time-to-market and target costing in the new product development success	Afonso et al. (2008) conducted a questionnaire survey of eighty two Portuguese manufacturing firms to test the relationship between the use of new product development firm practice and the product's development time and cost and found that target costing and reduction of time-to-market (duration of product introduction to market) together provided considerable advantages to users of these practices and such companies could achieve reductions in new product development cycle time and cost without compromising quality and functionality
18	Competitive advantage by adjusting design characteristics to satisfy cost targets	Iranmanesh and Thomson (2008) developed a cost–design parameter method that optimized cost and design characteristics simultaneously during product development and which was based on quality function deployment and which related desired product attributes to design characteristics. The authors (2008) validated the model with the use of a loud speaker where customer satisfaction versus new expenditure on the product was calculated and they stated that the use of the cost–design parameter method was straightforward and assisted designers to choose the correct expenditure on design functions in order to optimize product value and the cost–design parameter method was a useful tool when doing value engineering
19	The impact of competition and uncertainty on the adoption of target costing	Ax et al. (2008) examined the impact of competition and uncertainty on the adoption of target costing. The authors implied that previous studies generally argued that target costing adoption rated positively correlate with the intensity of competition and perceived environmental uncertainty. However, using data provided by a web-based survey of Swedish manufacturing firms, the authors indicated that the adoption of target costing and the intensity of competition positively relate, although the effect reduced with an increase in perceived environmental uncertainty and there was no evidence of a direct relationship between perceived environmental uncertainty and the adoption of target costing.
20	Quality Function Deployment, Value Engineering and Target Costing, an Integrated Framework in Design Cost Management: A Mathematical Programming Approach	Jariri and Zegordi (2008) incorporated three design cost management methods, called: Quality Function Deployment (QFD), Value Engineering (VE) and Target Costing (TC) into a mathematical programming model in order to achieve the maximum benefit of each method. The model essentially optimized customer satisfaction subject to target cost. The tool was a mixed integer zero-one nonlinear programming. A simple automobile design example was formulated and solved to show the performance of the model.
21	Target costing operationalization during product development: Model and application	Filomena et al. (2009) proposed and applied a target costing model for developing early-stage cost parameters for a specific product development process effort at a mid-sized Brazilian bus body automotive manufacturer and broke down cost targets into product parts, features and common elements, focusing on creating parameters for cost control during product development.

5. ANALYSIS OF CONTENT FINDINGS

Hiromoto (1988) was the introducer of the target costing to English Literature with its case study at Daihatsu Motors in Japan. So much so that, the interpretation of "genka-kikaku" to English had not been made at that time. In this part, we have summarized and the classified the findings according to the information given in Table 2. The most obvious emphasis of articles have been developed in six headlines, namely Benefits of Target Costing, The Industry Type, The Cross-Functional Team, The role of Supplier Involvement, The Supporting Systems and The Downside of Target Costing. Now, brief information for each headline will be given below.

i. Benefits of Target Costing

Target costing literature consists a great deal of studies that exhibit the benefits of target costing. It is a common finding that the product design and development stage offers significant opportunities for cost reduction because from 70% to 80% of product cost remains unchanged after the design stage. Many of the studies reveal the importance of this fact (Kato, 1993; Cooper and Chew, 1996; Davila and Wouters, 2004).

Some studies exhibited the derived benefits of target costing by using case studies. As seen in the target costing history, automotive sector is the one which has applied the elements of target costing extensively since 1970s, and it is not surprising that there are case studies that exhibit the benefits of target costing in automotive sector. For example, in the study of Cooper and Chew (1996); the authors conducted a case-study in Japanese Isuzu and highlighted that target costing was an efficient strategy versus the pressure of lean competitors that reacted in a very short time. In an automaker company located in Middle East, Jariri and Zegordi (2006) showed evidence of increased customer satisfaction and reduced cost by using target costing and QFD.

It is not only the automotive sector based case studies that exhibit the benefits of target costing. Thus, the literature used various sectors to observe the effect of target costing implementation. Shank and Fisher (1999) conducted a case study at Montclair Paper Mill and stated that the implementation of target costing enabled the firms have significant cost reduction opportunities. Moreover, Cooper and Slagmulder (1999) studied seven Japanese firms and emphasized that target costing and value engineering provided considerable payoffs to early adopters.

Although the new product design stage offers significant reduction opportunities for target costing process, Shank and Fisher (1999) argues that target costing might be applied to existing products and also at the manufacturing stages of the product life cycle. To this end, target costing may provide significant benefits even for the firms that did not have an effective cost management systems.

ii. The Industry Type

Tani et al. (1994) found that the transportation equipment industry (%100), the electrical/electronics industry (%88, 46) and machine industry (%82,76) were the most target costing applied industries which had been using or had used the target costing for the primary purpose of cost reduction. The design department found as the most effective department in target costing process and direct material costs had been the mostly focused cost element of target cost management. But Tani et al.'s (1994) study revealed an area for target costing application for indirect costs. Tani et al.'s (1994) study indicated that the 80,7% of sample Japanese Companies employed target costing for overhead and 83,3% of them employed it for depreciation of new investments.

Dekker and Smith (2003) revealed that the entire sample Dutch companies in textile, rubber, steel, electrical/electronic and precision equipment industry applied target costing and for the purpose of cost reduction like in Japan. The main industry characteristic in which target costing is applied, found as the assembly-oriented industries and it is also exhibited in some studies (Kato, 1993; Shank and Fisher, 1999; Afonso et al., 2008).

iii. The Cross-Functional Team

The cross-functional team structure is another critic component of target costing system. In the case studies of Cooper and Chew (1996) at Olympus, Komatsu and Isuzu; it was underlined that these companies deployed cross-functional team structure in their target costing implementations. Dyer (1996) explained how Chrysler's new model had achieved a significant success by including cross-functional team structure.

iv. The role of Supplier Involvement

The other issue that the literature focused on is the relationship of target costing with the supply chain during target costing process. As value-chain involvement is the one of the main principles of target costing, the literature highlighted the supplier involvement during the early design as the core necessity of target costing.

The study of Dyer (1996) which informed how Chrysler's new model had achieved a significant success by making its suppliers involve in company's efforts through a supplier alliance program is one of the proof the supplier involvement's importance. Also, Nishiguchi and Brookfield (1997) stated that an automaker jointly could reduce the combined costs of the parts with the supplier.

Although many studies claim the deep importance of supplier involvement during target costing process, Agndal and Nilsson (2008) conducted site-visits and exhibited that in the case of selecting suppliers for complex components that require a great deal of R&D, there were serious difficulties when attempting to apply the

exact target costing logic, since neither party could specify the component in detail at this stage and pushing the market-derived price further up the supply chain was almost impossible. In addition, Tani et al. (1994) examined target costing practices in Japan and found that only 7% of firms include suppliers in their target costing teams The case study seem to support the fact that supplier involvement is relatively low in even the cooperative culture of Japanese Nation

v. The Supporting Systems

There is a great variety of techniques that support target costing which resemble us target costing is s system which is fed by various disciplines. For translating customers' preferences to technical requirements, the literature stated Quality Function Deployment offering some important benefits. Jariri and Zegordi (2006) applied the mathematical programming model which used QFD (Quality Function Deployment) data and provide the starting solution for the platform design team in an automaker company located in the Middle East for the target costing process. The model essentially optimizes customer satisfaction subject to target cost. The comparison had been made between the company's solution and mathematical model solution and showed the quality of the mathematical model solution which exhibited an increased customer satisfaction by 5.4% and a reduced cost by 7.7%. Bode and Fung (1998) integrated design costs into the QFD framework by proposing an approach that enabled designers to optimize product development resources towards customer satisfaction and conduct analytical investigations to facilitate decision making in product design and development. Shun and Kosuke (2006) presented a system design methodology that integrated perception-based concept evaluation and target costing of complex and large-scale systems by using quality function deployment matrices simultaneously for both requirements and structure in order to allocate the worth and target cost of the modules in a system in order to satisfy both customer and financial requirements. Iranmanesh and Thomson (2008) developed a cost–design parameter method that optimized cost and design characteristics simultaneously during product development and which was based on QFD and which related desired product attributes to design characteristics. Jariri and Zegordi (2008) incorporated three design cost management methods, called: QFD, Value Engineering and Target Costing into a mathematical programming model in order to achieve the maximum benefit of each method. The model essentially optimized customer satisfaction subject to target cost. Also, Value Engineering is regarded as the steps for the realization of target costing purposes in the literature. Cooper and Slagmulder (1999) emphasized that target costing and value engineering provided considerable payoffs to early adopters. Ibusuki and Kaminski (2007) aimed to develop a correct systematic approach of value engineering and target-costing in cost management by validating the approach in a case study focused on the engine-starter system of a vehicle and found that it was possible to identify the real cost reduction opportunity even improving the main function of the product.

vi. The Downside of Target Costing

There are also some disadvantages reported related to target costing process. Kato (1993) stated that designers and engineers engaged in target costing face strict time pressure and long working hours which make

the staff become tired and exhausted. Davila and Wouters (2004) criticized the target costing process because of its great attention on cost drivers but less attention to revenue drivers such as time-to market, technology and understanding evolving customer needs. The authors also declared that target costing is too bureaucratic, time consuming and detailed.

6. CONCLUSION

Target costing as a cost management and profit planning system is used by many competitive firms since 1970s. Many organization managers think that target costing is just related with accounting and finance staff. However, the implementation needs an extensive collaboration inside and outside of the organization. In contrast, many organization managers think that target costing is just related with accounting and finance staff. Our study aims to review the literature of this important concept; target costing by examining 41 English articles published in SSCI and SCI&SCI-Expanded between 1985-2008. The study aims to briefly explain the content of each article to show the reader what has accomplished so far.

Many studies name target costing as a beneficial tool especially at design stage where most of the costs occurred at this stage in the product lifecycle. These studies commonly reveal that target costing implementation clears the way for increased customer satisfaction and reduced cost. The assembly-oriented industries seem to gain the most value by target costing implementation and direct material costs are the main focus of cost reduction. As the studies reveal that cross functional team approach and supplier integration into target costing process are the critical elements for a successful target costing implementation. And Quality Function Deployment and Value Engineering are the supporting systems for an integrated and holistic target costing process. However, there is evidence that target costing process may be too time consuming, bureaucratic and put extensive pressure to employees.

The literature also points out some unclarified areas for further research. Even the high emphasis of the importance supplier involvement in the target costing cross-functional teams in the literature exists, the real life situations seem not to support it. The country wide case studies exhibit the low participation of suppliers even in Japan. The reasons of it are still not clearly identified. This is a motive for further research.

Second, there is not any single idea how to make target costing on indirect costs in literature. The further research may handle the subject by making case studies in the companies that use target costing on indirect costs. Japanese companies seem to be an opportunity for this kind of case study where Tani et al. (1994) reported that many Japanese companies employed target costing for overhead and for depreciation of new investments.

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