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Value Scorecard: A Balanced Scorecard for Measuring Value in Supply Chain

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ABSTRACT

Value creation in supply chain is a competitive advantage for supply chains in today's market. To improve value creation through business activities, it is needed to measure supply chain performance. There are many methods, frameworks and metrics utilized in the literature, to measure supply chain performance but there isn't a value framework to measure supply chain performance focused on value creation. This paper provides a framework for measuring supply chain value focusing on stakeholders' value index based on a real case study by using BSC approach. Firstly the main value drivers have been defined by expert managers in the biggest home appliance manufacturing company located in Iran. Value drivers' indices gathered from in-depth interviews and observation technique with all stakeholders. Finally the value indices have been classified into four BSC perspectives by selected experts with respect to stakeholders' value indices and VALUE-BSC framework has been proposed. The proposed framework helps managers to measure value metrics in supply chain and align strategic decisions to value creation with respect to supply chain stakeholders.
KEYWORDS: supply chain, balanced scorecard, value measurement, stakeholders

1. INTRODUCTION

The objective of supply chain is to maximize the overall value generated [1]. The value a supply chain generates is the difference between what the final product is worth to the customer's request. In most of the commercial supply chain, value is correlated with the profitability. Supply chain, emerging in the 1980s, is an internationally used term that encompasses every effort engaged in production and delivering of final products and services, from the suppliers' suppliers to the customers' customers [2]. Zhou et.al [3] mentioned that the integration key business process from end-users through original suppliers that provide products, services, and information and add value for customers and other stakeholders.

The creation of value is concerned with diverse groups of stakeholders like shareholders, customers, personnel, society and environment [4]. Nevertheless, customers are the predominant group among all of stakeholders in a way that if the supply chain is capable of creating the customers' expected value, creation of the other stakeholders' expected value is assured. In order to enhance supply chain value, considering value from the stakeholders' point of view, at first it should be measured. Thus provision of a set of indices is needed for a comprehensive measurement of supply chain value.

There are numerous studies proposing models, approaches and metrics to measure supply chain performance focused on speed maximization or cost minimization rather than value creation but there isn't any model to measure supply chain value. The most studies in literature discussed about value creation for some stakeholders in supply chain especially customers and shareholders. In these studies the concept of 'value' has gone beyond the preliminary view of exclusive value generation just for customers and shareholders. Organizations must be evaluated by generation of not only economic but also ecological and social values. In other words, organizations should consider value creation for all stakeholders who are engaged with the company. It should be noted that although all of the offered metrics within selected articles are suitable, they lack a holistic view for value creation assessment from all stakeholders' point of view.

So the main objective of this study is proposing a framework to evaluate value creation with respect to all stakeholders affect on supply chain performance to help companies increasing stakeholder's satisfaction. Balanced scorecard an effective approach to evaluate supply chain performance, have been applied to assess value creation. Therefore defining key stakeholders as value drives in supply chain, identifying value indices and discovering the relationship between value drives and balanced scorecard perspectives are the main contributions of this study. So this study to establish a framework to measure value metrics throughout supply chain with respect to every prospective stakeholder via balanced scored card approach.

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The remainder of this study proceeds as follows. The following section depicts reviewing past studies concerning evaluation of supply chain focused on value creation. The next section explains balanced scorecard as an effective approach to evaluate supply chain performance. In the section four, the supply chain value drives have been identified. Supply chain value metrics have been defined in section five. Then, linkages of supply chain value drives and value metrics with balanced scorecard perspectives have discussed in section six. In this section BSC-value framework have been proposed. And finally, section eight concludes the paper.

2. LITERATURE REVIEW

Every firm engages a wide variety of partners called stakeholders. In fact stakeholders are all those people who affect performance of the firm. Accordingly every stakeholder deserves considerable attention and satisfaction during provision of services or production. As Murphy et al. [5] stated "the ultimate objective of a business is to create value for all of its stakeholders beyond Kotler and Armstrong's long-term value for just customers. According to Jensen, [6] the term stakeholder implies every individual or group who are able to greatly influence the welfare of the firm. With respect to the above definition, five groups of stakeholders can be recognized along the supply chain: Customers, Society, Shareholders, Employees and Suppliers. According to J.M. Donovan et al [7], T.L. Doorley III and J.M. Donovan [8], A.G. Hillman and G.D. Keim [9], A. Kothari and J. Lackner [10], and C. Salter [11], the major stakeholders of an organisation are shareholders, customers, employees, suppliers, community residents, governments, and the economy.

Kothari and J. Lackner [10] mentioned that the business firms must deliver value to some groups that participate in their business; these groups include the investors who have provided capital to them, the customers who buy the products or services, the suppliers who contribute to their market power, the economy or environment in which they operate, and the employees who are behind their productivity.

In order to treat all of these groups equally, their needs and expectations should be firstly identified and then met by the firm. Customers should be satisfied personally by provision of high value in their products and services in a continuous manner. The individuality of each employee should be respected and an environment whereby employees' creativity and productivity can be fostered, appreciated and be rewarded, should be provided. Suppliers should be considered as partners who play a prominent role in the achievement of firm's goals such as highest quality standard and greatest consistent level of service. Firms can create the value of community by striving to be caring and supportive corporate citizens among the global communities. Finally, by enhancement of return on investments, the value concerning shareholders and financial communities should be augmented. According to J.M. Donovan et al [7], performance measurement helps in identifying what determines value in an organisation and measuring those things that lead to value creation for stakeholders. They believed that in any model for stakeholder value analysis there was a need for performance measures that captured the dynamics of inter-related variables and structures of a firm's value system.

This study mentions some literature papers that discussed about supply chain performance focused on value creation. According to yu, [12] performance measurement and strategic management should focus on the value creation process. They stated that balanced scorecard (BSC) is a useful strategic model applied in business processes. In their study they have identified values and strategies for facilitation of strategic management activities. Camerinelli & Alessandra [13] have presented a framework, linking operational indices with income statement, balance sheet items and also shareholder value in the shape of the economic value added (EVA) and with supply chain processes. Hofmanna & Locker [14] have studied performance measurement concept based on value in packaging industry. In their proposed concept operational supply chain activities and shareholder value creation can be created and linked in accordance with the Economic Value Added (EVA). The purpose of their method is to compare the operative key performance indicators directly by means of value drivers to the ultimate measure of the value generation in a firm. Hongxia, & Zhipeng [15] have introduced Value Engineering (VE) to develop new index systems of performance evaluation of supply chain. Afterwards, in order to analyze them, they have adopted AHP-multistage fuzzy comprehensive appraisal method. To effectively involve stakeholders in IT implementation projects. Alvarado et al. [4] have proposed a value mapping framework with the aim of improving supply chains performance. Their study presents a unique value mapping framework that embodies the effective involvement of stakeholders for enhancement of supply chain performance.

Estampe et al. [16] have stated that supply chain management creates value for companies, customers and stakeholders who are interacting along the supply chain. Their study concerns diverse models for assessing supply chains through highlighting their special characteristics and applicability in different situations. Lu, Y et al. [17] have proposed a multi-dimensional indicator system which embodies twenty four indices and is constructed with respect to six perspectives, i.e. products' competitiveness, partners' ability, financial value, supply chain operations, customer satisfaction, and sustainable development. Believing that the combination of quantitative and qualitative index along with the application of fuzzy-number make the evaluation systems more reasonable, they have used the method of FAHP to evaluate supply chain performance. They looked at the problem form a knowledge discovery and data mining perspective. Gilani nia et al [18] proposed a program in success of business design with holding meetings between customers and suppliers as supply chain stakeholders in topics such as performance evaluation, product innovation and quality, and value analysis, accountability, customer relationship, information exchange and cooperation in supply network.

There are limited studies in literature that discussed about value metrics for stakeholders. For example Nabizadeh and gharib [19] discussed about affecting advertising on perceived value for customers. Gilani nia et al [20] and Heidarzadeh and Andervazh [21] indicated that brand value has higher correlation to total value perceived by customers. The lack of value metrics system in literature, in this study actual supply value metrics have been defined in section five.

3.BALANCED SCORECARD (BSC)

The BSC has been used by many firms as a powerful management tool to measure business performance focused on comparing against the strategy. The BSC is also useful for integrating strategic management and communicating to employees the innovation expectations in measurable terms [22]. The balanced scorecard is a means to evaluate corporate performance from four different perspectives: the financial, the internal business process, the customer, and the learning and growth. BSC can be used as the foundation for strategic management system and to align businesses to new strategies, to move away from cost reduction and towards growth opportunities based on more customized, value-adding products and services [23]. The BSC translates the organization mission and strategic objectives into operational measures that everyone in the organizations should follow in order to align customer relationships with market segments and increase the financial results [24]. This study aligns value initiatives with strategic objectives by using value metrics. So BSC has been used to integrate value with strategy by integrating value metrics with respect to value drivers in supply chain.

4.MHETODOLOGY

This study has been used Delphi technique, in-depth interviews and observation techniques explained thought next sections.

5. SAMPLE

Statistical population in this research is including Industrial Experts (with at least 3 years experience) in Parskhazar Company and composed of three management levels (Operational managers, Middle managers and Top managers). Parskhazar is the largest home appliance manufacturing company in IRAN. This company used BSC approach to evaluate s upply chain performance and emphasis to increase their stakeholders.

6. VALUE- BALANCEDCARD FARAMEWORK

To create value in supply chain it's very important to identify value index in point of view of supply chain stakeholders and link them to supply chain performance metrics so it should be represent a balanced approach and should be classified at stakeholder's value levels. So it needed to develop an effective approach by effective metrics than can align to value metrics in supply chain. Each of value metrics in supply chain in point of stakeholders' view have to linked to the four main perspectives of BSC to increase value creation and stakeholder's satisfaction. So this study proposes a framework to classify real value indices into four main BSC perspectives to link stakeholder's satisfaction to supply chain performance.

6.1. Stage 1: Supply chain value drives

According to literature, value can enhance the firm's performance in several aspects. Different value dimensions are employed in the literature to represent the firm value creation. In order to explore empirically what the main value drivers are, a questionnaire was developed and a survey was conducted in a period of 1 month in 2011. Based on the research literature, ten value viewpoints concerning the supply chains and business activities were indentified during the first phase. Then, Delphi technique was utilized to identify the main criteria of the supply chain total value using expert interviews and questionnaires [25]. The initial survey draft was discussed with firms' executives and pretested through 10 pilot interviews to ensure that the wording, format, and sequence of questions were appropriate.

The size of Delphi panels can vary widely and there is disagreement about what constitutes an appropriate panel size but Most Delphi studies use panels of 15 to 35 people [26]. In this study sample was composed of 35 experts or chief managers of 10 home appliance manufacturing firms in Iran who had a good understanding of the company's performance. Thus, the questionnaire was applied simultaneously through mail surveys and face-to-face interviews with sample. Identification of main criteria was carried out in three steps using Delphi technique. In each step the criteria were screened through controlled feedback. Finally five perspectives were determined as the main criteria of supply chain total value based on mean value of expert's opinions with values exceeding 7. The five Supply chain value perspectives are illustrated in Figure 1. According to the result the five value drivers (stakeholders) are illustrated: customer, supplier, employee, shareholder and society.

6.2. Stage 2: Supply chain value indices

The method of qualitative observation and in-depth interviews was applied in the research to explore and identify stakeholders' perspective of values. Data has been gathered through observation and in-depth interviews with stakeholders. Qualitative in-depth interviews were an explore research technique with the ability of giving well-

grounded, rich descriptions and explanations [26] [27]. These methods permit concepts and meaning to be explored in greater than questionnaires. 35 people of each stakeholder group (customer, supplier, employee and shareholder) were selected. Each of the interviews lasted from 20-30 minutes and was open-ended although structured by interview guides to ensure coverage of issues relevant to the researchers. They were asked to explain what they mean value to participate with company and how company create value for them. The result of observation and interviews for five groups are used in figure1.

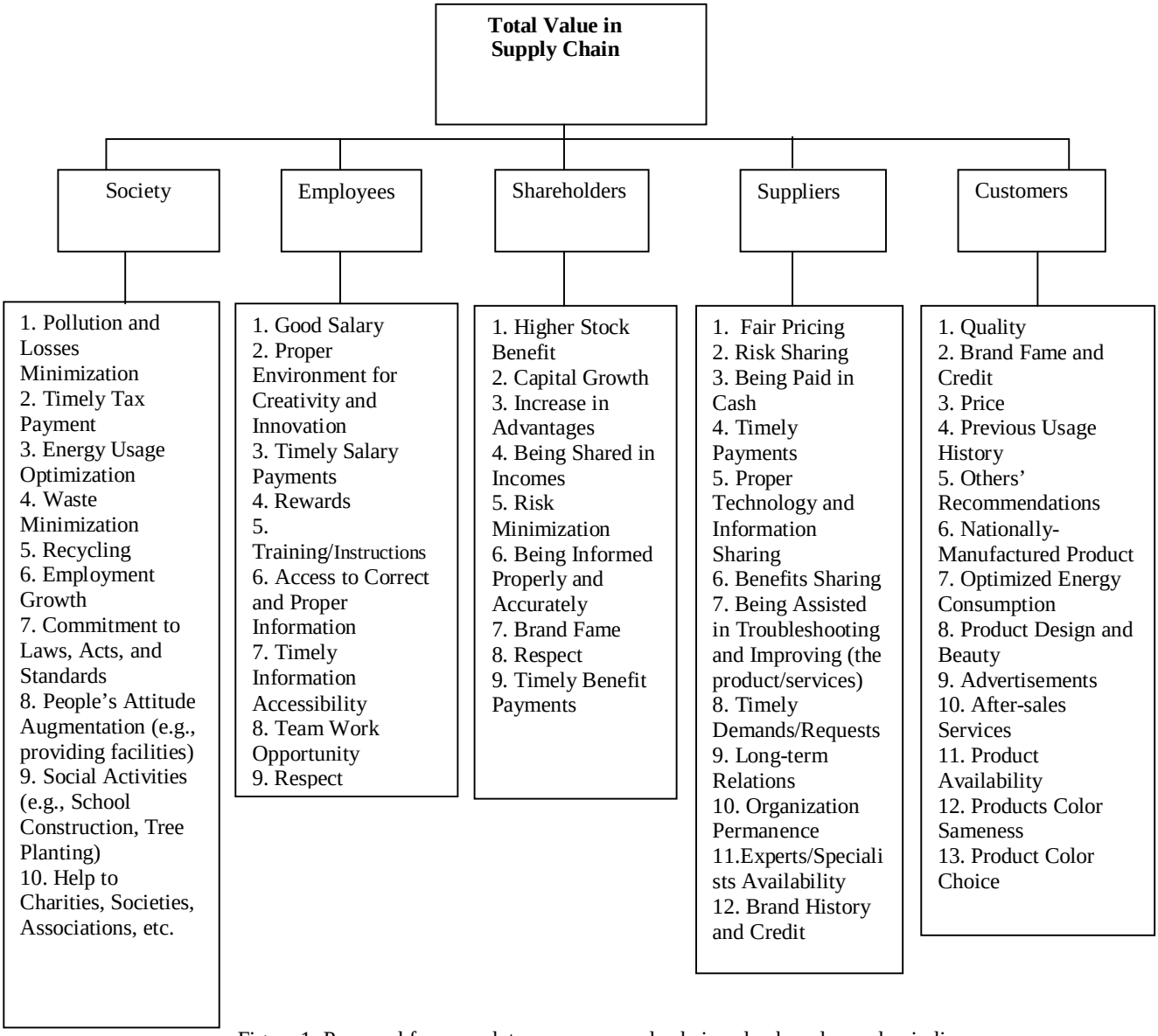

Figure 1: Proposed framework to measure supply chain value based on value indices

6.3. Stage 3: Data and methodology

In the last stage to classify value indices into BSC perspectives, a questionnaire has been developed and a survey has been conducted which take in period of 2 months. Delphi technique has been utilized to classify the value indices using expert interviews and questionnaires as stage1. The initial survey draft was discussed with firms' executives and pretested through 10 pilot interviews to ensure that the wording, format, and sequence of questions were appropriate. In this stage sample was composed of 35 experts and chief managers who participate in stage 1. Thus, the questionnaire was applied simultaneously through mail surveys and face-to-face interviews to the sample.

Classification of value indices has been carried out in three steps using Delphi technique. In each step the criteria were screened through controlled feedback. Finally all value indices were categorized into the main BSC perspectives based on mean value of expert's opinions with values exceeding 7. Every single index is classified into BSC perspective. The result of descriptive statistics is specified in table 1.

Table1: VALUE- BALANCEDCARD FARAMEWORK

BSC PERSPECTIVE	STAKEHOLDER	METRICS
Financial perspective	supplier	Price
	supplier	Fair Pricing
	supplier	Risk Sharing
	supplier	Being Paid in Cash
	supplier	Timely Payments
	supplier	Benefits Sharing
	shareholder	Higher Stock Benefit
	shareholder	Capital Growth
	shareholder	Increase in Advantages
	shareholder	Being Shared in Incomes
	shareholder	Risk Minimization
	Employee	Good Salary
	society	Timely Tax Payment
	society	Waste Minimization
	society	Help to Charities, Societies, ...etc
Performance metrics for the customer perspective	customer	Quality
		Brand Fame and Credit
		Price
		Previous Usage History
		Others' Recommendations
		Nationally-Manufactured Product
	Customer-society	Optimized Energy Consumption
	customer	Product Design and Beauty
		Advertisements
		After-sales Services
		Product Availability
		Products Color Sameness
		Product Color Choice
	society	People's Attitude Augmentation (e.g., providing facilities)
Performance metrics for the internal business perspective	supplier	Long-term Relations
	supplier	Timely Demands/Requests
	supplier	Organization Permanence
	shareholder	Timely Benefit Payments
	employee	Timely Salary Payments
	employee	Timely Information Accessibility
	society	Pollution and Losses Minimization
	society	Employment Growth
Performance metrics for the innovation and learning perspective	supplier	Proper Technology and Information Sharing
	supplier	Being Assisted in Troubleshooting and Improving (the product/services)
	supplier	Experts/Specialists Availability
	supplier	Brand History and Credit
	shareholder	Being Informed Properly and Accurately
	shareholder	Brand Fame
	Shareholder- employee	Respect
	employee	Proper Environment for Creativity and Innovation
	employee	Rewards
	employee	Training/Instructions
	employee	Access to Correct and Proper Information
	employee	Team Work Opportunity
	society	Recycling
	society	Commitment to Laws, Acts, and Standards
	society	Social Activities (e.g., School Construction, Tree Planting)

7. DISCUSSION

There are many supply chain performance indices in literature that some of them focused on value creation. It's difficult to monitor all supply chain performance index for managers in supply chain. It's necessary to identify actual value index for all supply chain stakeholders and define correlation between supply chain value index and supply chain performance index. There is the lack of definition for supply chain value index to create value for all stakeholders.

Managers usually continue to pursue supply chain metrics as a means to increase value without attention on what really mean value in supply chain. We defined actual supply chain value indices according to proposed BSC framework. The proposed framework helps managers to measure value metrics in supply chain and align strategic decisions to value creation with respect to supply chain stakeholders.

8. CONCLUSION

In contrast to the traditional supply chain management, nowadays there is a fierce competition among supply chains rather than among firms. Value creation through business activities plays an important role in the competitive market. So it should be noted that satisfaction of all categories of stakeholders leads to the total value of supply chain. To increase value created through supply chain activities, it is needed to measure supply chain performance. There are many methods, frameworks and metrics utilized in the literature, to measure supply chain performance but there isn't a value framework to measure supply chain performance focused on value creation. Managers usually continue to pursue supply chain metrics as a means to increase value without attention on what really mean value in supply chain. We defined actual supply chain value metrics according to proposed framework. Since usually the applied internal supply chain performance indices that concern just a specific group of stakeholders such as customers or shareholders, the literature lacks a study proposing a framework whereby all stakeholders are considered simultaneously for the process of value measuring. In order to fill this gap, this study has proposed the use of a VALUE-BSC framework with effective metrics to align companies' strategies and supply chain performance for creating more value. At first a review of studies concerning evaluation of supply chain from a value perspective was conducted. Then the main value drivers have been defined by expert managers in a home appliance manufacturing company. Value drivers' metrics gathered from observation and in-depth interview techniques with all stakeholders in supply chain. Finally value metrics have been categorized into four BSC perspectives by selected experts and VALUE-BSC framework has been proposed by this study to measure value in supply chain. The proposed framework provides comprehensive metrics to evaluate supply chain performance focused on creating more value.

There are many metrics in literature to evaluate supply chain performance. Evaluating all these metrics is difficult for managers and they miss monitoring the effective metrics because of measuring majority of them so it is necessary to identify main value drives and actual value metrics to improve supply chain performance. The proposed framework would help managers to better grasp the main facets of supply chain performance evaluating and take the right actions to enhance the overall performance and to speed up supply chain improvements focused on value creation. Companies can by on-going evaluating each value metric via each of four BSC perspectives improve all angels of supply chain performance and increase stakeholder's satisfaction.

Further research is necessary to test reliability of value indices by using questioner and develop a dynamic models specially based on knowledge management to generate index system and quantify value index by using different methods for measuring value in supply chain. Identifying the relationship within value indices and between supply chain value indices and supply chain performance indices is an issue for future research. Due to the fact that the significance of every group of stakeholders differs from each other in every specific firm, future works could focus on the prioritization of stakeholders in diverse industries. Furthermore, one more subject for future work can be utilization of a model or framework to link value indices to operational supply chain indices as well as quantifying them.

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