



Conceptual Design of Sustainable Outsourcing with Balanced Scorecard Using Analytic Hierarchy Process: A Case Study for Fajr Jam Gas Refining Company

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PAPER INFO

Paper history:

Received 20 October 2019

Received in revised form 15 November 2019

Accepted 24 November 2019

Keywords:

Analytic Hierarchy Process

Blanced Scorecard

Outsourcing

Sustainability

A B S T R A C T

The purpose of this paper was to design a conceptual model of sustainable outsourcing with a balanced scorecard using the hierarchical analysis process. In this research, success factors of outsourcing were identified based on previous studies conducted inside and outside of the country. To ensure the validity of the factors, in addition to the content validity and the validity index, the reliability was guaranteed using the inconsistency ratio of the paired comparison questionnaire based on the Expert Choice report. An affinity diagram developed using the brainstorming approach was implemented for strategic objectives of the model. Our findings indicated that a sustainable outsourcing model was successfully designed using a balanced scorecard. Economic, social and environmental sustainability was considered in each of the balanced scorecard faces used in the model. In this work, sustainable domestic business, customer satisfaction, and sustainable learning and growth were the main objectives. Finally, a balanced scorecard with 26 strategic objectives was designed and implemented. To this end, paired comparisons were performed to compute the importance of each strategic goal in every phase and make prioritization accordingly.

doi: 10.5829/ije.2020.33.01a.13

1. INTRODUCTION

Today, due to the complex nature of business and competition among manufacturers and suppliers, manufacturing organizations have moved toward optimal processes and decisions to ensure organization survival [1]. In the meantime, achievement of a sustainable competitive advantage has been pursued as a desired goal by a number of companies and organizations. In the world economy that has no consistent benchmark for supply chain success, it is essential for companies to carefully analyze their unique needs and determine which logistics solutions are suitable to meet their specific distribution demands [2]. Many companies have to carry out outsourcing to

further develop their business objectives. The reason is that they can be held accountable for changes due to competitive and economic pressures of the market only through this approach. According to McDougall [3], outsourcing is one of the modern and successful models in the field of management that helps companies achieve higher benefits compared to their competitors. Outsourcing is a good compromise between cost optimization and high level of flexibility [4]. In fact, outsourcing can be considered as one of the tools, which makes possible free access to resources available in the market. Many companies attempt to use all the required knowledge, techniques and innovative technologies so that they can provide a qualified and competitive product that satisfies the consumer and meets their demands [5]. Therefore, many companies prefer to outsource their non-core business to other companies in order to reduce costs and increase efficiency [2]. This

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may illustrate the importance of outsourcing. In fact, outsourcing has long been raised as a serious issue in Iran. This issue has been included in the country's development plans, in particular in paragraph B of Article 5 of the executive regulations, in the fourth and fifth development plans. In the past, outsourcing was used by organizations with unreliable sustainability, which had weak competition, faced a decline in capacity and were marked by financial catastrophes. However, nowadays, successful organizations are also using this tool to reform their structure. Considering macro-economic objectives, policies of the government and developments in the organization, privatization and public sector downsizing, civil services law, and Article 44 of the constitution and globalization, the status of outsourcing organizations' processes and changes in this direction is consistent with organizations' long-term policies, strategies and objectives.

Government agencies are moving toward agile organizations to achieve their objectives and milestones. According to reported protocols [6], the focus is on core missions, outsourcing technologies and activities using national research and developments; in addition, industrial capacities are emphasized to consider main policies and government agencies for agility. Most oil companies use outsourcing as a strategy for a sustainable business, which is effective on external influential parameters such as oil prices and production vulnerabilities [7]. The reason is that outsourcing is considered as one of the most effective strategies in today's business [5]. However, this strategy has not been so far used in subsidiaries of the Iran National Gas Company effectively. This is considered a serious challenge for the future of gas refinery companies, which are facing the constraints of hiring human resources. In the present study, the main issue was the non-use of the outsourcing strategy in subsidiaries of the Iran National Gas Company. The fear of change and failure of this outcome is considered as one of the most important problems related to the implementation of this strategy. Therefore, this challenge encouraged the researcher to conduct a related study using scientific approaches extensively and deeply in order to help senior managers in the organization to make appropriate and optimal decisions regarding *business process outsourcing*. Accordingly, the key question is how to incorporate sustainability-related issues, including environment, economy and society in refining company processes. Outsourcing aims to determine a sustainable strategy in this regard.

The main purpose of this paper was to develop a conceptual model of sustainable outsourcing. To this end, a balanced scorecard was implemented using the hierarchical analysis process to achieve the research objectives. Therefore, this article focused on sustainable outsourcing, which is a completely new topic. In most previous studies, sustainability was one of the

perspectives of a balanced scorecard. In this study, sustainability was integrated into each of the perspectives in a balanced scorecard. This has so far not been observed in any studies nationally or internationally.

2. MATERIALS AND METHODS

2. 1. Theoretical Background The definitions and theoretical foundations of keywords in this study including outsourcing, sustainability, balanced scorecard and hierarchical analysis with strategy, strategic goal, strategy implementation and company details are discussed in the theoretical background section. According to the literature [8], outsourcing is one of the best ideas, which allows many companies to focus on what they intend to perform. Moreover, outsourcing can be used for what others can do better, faster, cheaper and with higher efficacy. In fact, outsourcing as one of the concepts of successful business has become an organization management strategy [8]. In the present study, the operational definition was a contract between Fajr Jam Gas Refining Company and one or more service providers, regarding the transfer of management responsibilities of one or more activities of the company or work processes without transfer of ownership.

Many researchers have defined sustainability management as the regulation, implementation, and evaluation of environmental and socio-economic decisions and practices related to sustainability. Sustainable operations determine how a strategy is formulated and implemented. In fact, sustainability builds the bridge between strategies and operational worlds [9]. In the present study, sustainability referred to economic, social and environmental dimensions.

A balanced scorecard (BSC) presents a performance measurement system more comprehensive than financial measurement systems. In addition to financial indicators, BSC measures the status of an organization with some indicators on customer perspectives, processes, growth, learning, human resources and information systems. There is a significant relationship between objectives of these perspectives and causal relations. "Start from the end" refers to the hypothesis that financial results will only be available when customer satisfaction is achieved. A presentable value to the customer describes how sales and loyalties of target customers are realized. Internal processes create and provide a presentable value to customers. Intangible assets support internal processes. Coordination between the objectives in these four perspectives is considered as a key for creating values and sustainable strategies [10].

Fajr Jam Gas Refining Company has been exploited since 1967 for the gas purification of Nar and Kangan

gas fields in *Jam and Riz* regions, *east Bushehr*. Two stages were used for the design and implementation of refinery operations. In the first stage, about 34.8 million cubic meters of standard gas from the Nar gas field were purified daily through 18 wells. In the second stage, the purification potential of the refinery increased to a daily capacity of up to 79 million cubic meters from the Kangan gas field by drilling 29 wells. After the implementation of the plan to increase the refinery capacity in 2000, including optimization of purification plants with internal changes in operating units, the gas purification capacity reached 110 million cubic meters per day and the daily production reached 125 million cubic meters after the transfer of the Assaluyeh gas pipeline to the refinery in 2010. About 5000 cubic meters of stabilized liquefied gas per day along with dry gas were produced at the refinery.

2. 2. Experimental The integration of balanced scorecards, the analytic hierarchy process and performance analysis is useful for a decision maker to achieve a more realistic and accurate representation of the problem, and also allows managers to analyze the company's performance [2]. The practical foundations of the research are divided into three sections. In the first section, studies were carried out inside the country for a duration of ten years (2009-2018). In the second section, studies were conducted outside the country for a duration of ten years (2009-2018). The studies focused on factors effective in outsourcing, entitled factors or criteria affecting outsourcing, decision making criteria in outsourcing, outsourcing determinants, outsourcing effects, outsourcing motivations, and key and critical factors of outsourcing success. Outsourcing benefits and indicators affecting outsourcing were collected, and their effects on outsourcing were measured through content validity questionnaires by experts. The criteria confirmed in terms of content validity were extracted as outsourcing success factors. In the third section, outsourcing failure factors extracted from the studies conducted inside or outside of the country over the past ten years were compared to equate with success factors when making a list of final factors affecting outsourcing. After the required data were collected and analyzed, the results were discussed. In the studies conducted inside and outside of the country on factors affecting the success and failure of outsourcing in companies, more than 200 factors were extracted. Afterwards, the list was made and duplicated and then similar factors were eliminated and equated. Subsequently, the number of final factors reduced to 152. Next, factors affecting the success and failure of outsourcing were identified, of which 32 factors belonged to studies carried out inside of the country and 36 factors belonged to studies performed outside of the country. Table 1 summarizes the most important studies with regard to factors affecting outsourcing inside and

outside of the country. Moreover, the primary criteria affecting outsourcing were mostly mentioned in studies as outsourcing success factors.

2. 3. Research Methodology

This study was considered an applied research in terms of purpose and an exploratory research in terms of subject. Moreover, the present study was a descriptive-survey in terms of research design, but an analytical, exploratory research in terms of nature. The study was carried out using a combination of quantitative and qualitative models. In this study, the outsourcing success factors were first identified based on the studies conducted inside and outside the country. Then, the list was made and duplicate and similar factors were eliminated and equated.

The content validity ratio (CVR) and the content validity index (CVI) were used to measure the content validity.

In order to guarantee the reliability, the inconsistency ratio (IR) was used in the paired comparison questionnaires and also in the reliability analysis of the questionnaires according to the Expert Choice report. The statistical analysis of data was also performed in the Excel environment. The CVR index was designed by Lawshe. Experts' opinions were used on the content of the test to calculate this index. Lawshe (1975) developed a quantitative measure for assessing content validity called CVR. The CVR offers information about item-level validity. The procedure consisted in using a panel of experts to rate items according to the relevance to the domain of the scale. Each item of the scale was rated based on a 3-point rating system (1 – the item is irrelevant, 2 – the item is important, but not essential, 3 – the item is essential). For each item, a CVR was computed, that is basically the proportion of experts that considered items important or essential for the content of the scale. There was also the possibility of having an overall measure for the content validity of the scale. This is called an index and it is computed as a mean of items' CVR values [11]. Then, the CVR was calculated by the following formula.

$$CVR = \frac{n-I}{N} \quad (1)$$

n= Number of experts who considered items to be "essential" or "important, but not essential"

I= Number of experts who considered items "irrelevant"

N= Total number of experts

Given that 13 experts evaluated the items in the content validity questionnaire, the items whose CVR was less than 0.54 were eliminated according to the minimum CVR acceptable score of the number of experts. The reason is that they did not have the acceptable content validity, and the rest of the items were confirmed. Another quantitative measure used in this study was

TABLE 1. Factors affecting outsourcing inside and outside the country

No.	Outsourcing Success Factors (studies conducted inside the country)	Cited Literature
1	Financial savings, strategic focus on access to advanced technologies, provision of advanced services, acquisition of new skills and expertise, and organizational policies	Rezaian and Naeiji [12]
2	Strategy, quality, management, economics and technology	Rezaian and Naeiji [12]
3	Paying attention to the strategy, business relationships, capital investments, knowledge sharing and quality of service	Cram [13]
4	Monitoring activities, reducing costs, proper communication, expert human resources	Yallahoo and Nahar [14]
5	Having an strategic vision for planning and understanding the intended application of outsourcing, determining assignable processes for outsourcing, proper selection procedures, financial planning and analysis, management of communication between clients and suppliers, adjusting the contract, building trust between organizations and suppliers to determine criteria adopted for the measurement of supplier performance, having valid certificates such as ISO 9001, ESO or CMM supplier and senior management support of partnerships with suppliers	Akbari [15]
6	Financial factors, strategic factors, other factors such as customer satisfaction, following the fashion, staff morale reduction and security problems	Gasparyan et al. [16]
7	Reducing asset costs, facilitating core competencies to reduce production costs, strategic flexibility and reducing administrative costs	Gunasekaran et al. [17]
8	Measuring processes or services continuously against the market during the contract period, effective management of the contract during the contract period, selection of the right performance appraisal system and basic performance metrics critical to the success of outsourcing	Mackerron et al. [18]
9	High quality support from professionals, monitoring, contract and measurement performance, implementation of the transfer and integration and security of data and active communication with contractors, clear understanding and discussion about requirements and steering the relationships between two contractors	Hayler [19]
10	Quality of communication within the supplier organization, personnel preparation in the outsourcing company for the new role, process of sourcing for outsourcing success during the implementation phase of a contract, client motivation to participate in the outsourcing IT contract, organizational culture of service provider and their customer, type of outsourcing work, ability to empathize with the seller and hiring a support consultant	Delen et al. [20]

CVI proposed by Waltz and Bausell (1983) [11]. The experts were then asked to rate each item based on relevance, clarity, simplicity and ambiguity on a four-point Likert scale. Therefore, the experts specified the features of "relevant", "clear", "simple" and "ambiguous" for each item abased on the four-point Likert scale, as shown in Table 2. Then, the value of each CVI was calculated by the following formula [21].

$$CVI = \frac{\text{The number of expert who have given sources 3 and 4 to the item}}{\text{Total number of experts}} \quad (2)$$

The minimum acceptable value for each CVI index was equal to 0.79; items with values less than 0.79 were eliminated. Overall, 114 items out of the total 152 items were confirmed according to the formula above.

In this study, the population included Iran's gas refining companies, and Fajr Jam Refining Company was selected as a case study. Validity assessment, incompatibility rate calculation, and pairwise comparisons were conducted through distribution of a content validity questionnaire and a paired comparison questionnaire among 13 experts according to Table 3.

Two main questions were designed in the form of eight sub-questions in order to achieve the results of the research; the main questions included:

Question 1: What are the strategic objectives of each of the balanced scorecard perspectives to achieve a sustainable outsourcing model?

Question 2: What is the importance of each of the objectives determined for balanced scorecard perspectives of the sustainable outsourcing strategy in Fajr Jam Refinery Company using the hierarchical analysis process?

The method used in this study was as follows: after extracting 152 initial success factors, a content validity questionnaire was distributed among experts and CVR and CVI were calculated. In fact, 114 criteria were confirmed in terms of validity. Then, according to the

TABLE 2. Criteria for measuring content validity

1. Relevance	3. Simplicity
1= Not relevant	1= Not simple
2= Needs some revision	2= Needs some revision
3= Relevant but needs minor revision	3= Simple but needs minor revision
4= Very relevant	4= Very simple
2. Clarity	4. Ambiguity
1= Not clear	1= Doubtful
2= Needs some revision	2= Needs some revision
3= Clear but needs minor revision	3= No doubtful but needs minor revision
4= Very clear	4= Meaning is clear

TABLE 3. Experts' profiles in this study

No.	Criterion	Experts' profiles in Fajr Jam Refinery Company	Number of Experts
1	Management experience	Above 20 years	6
		Above 20 years	7
		Less than 10 years	0
2	Organizational rank	Lower than Organizational Rank 17	3
		Organizational Rank 17	4
		Above Organizational Rank 17	6
3	Education	Bachelor	1
		Master	10
		Above Master (PhD student)	2
4	Age	Less than 40 years	2
		Between 40 and 50	9
		Above 50 years	2

theoretical foundations and experts' views, the confirmed factors were classified into three dimensions of sustainability including economic, social and environmental dimensions, and sustainability output criteria were classified based on the theoretical foundations of the balanced scorecard in the perspectives of learning and growth, internal processes, customer and financial. Afterwards, strategic goals of each sector were determined based on the research questions through the affinity diagram. The goals were included on a balanced scorecard. Finally, the importance of each of the strategic goals of the balanced scorecard was determined by distributing a paired comparison questionnaire, incompatibility rate. The above steps were conducted based on the conceptual model of research according to Figure 1.

3. RESULTS AND DISCUSSION

The required information and data were collected and reviewed, and success factors were classified into sustainable dimensions. The balanced scorecard perspectives were identified using the affinity diagram through research experts with 26 strategic objectives, as given in Table 4. As shown in this map, four strategic economic goals, two social strategic goals and two environmental strategic goals in the learning and growth perspective; three strategic economic goals, two social strategic goals and two environmental strategic goals in the internal processes perspective; two strategic economic goals, two strategic social goals and two environmental strategic goals in the customer perspective; and two strategic economic goals, two social strategic goals and one environmental strategic goal in financial perspective were extracted. After the strategic goals were identified and the parameters of each goal were determined, a paired

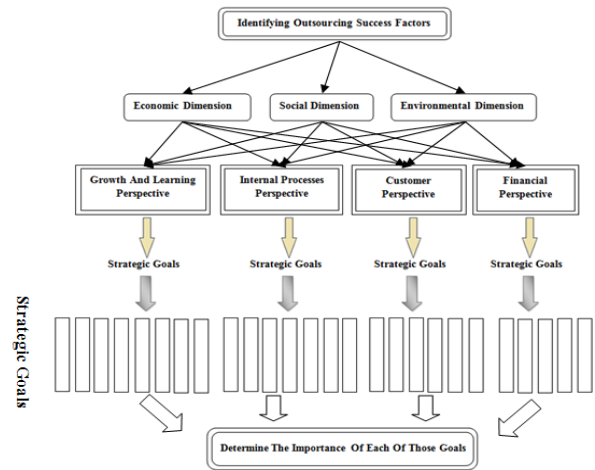


Figure 1. The conceptual model of research

comparative questionnaire of balanced scorecard perspectives was distributed among the research experts to compare the goals of each perspective. All the questionnaires were analyzed in such a way that at first the incompatibility rate of all paired comparisons of each questionnaire was calculated. Their paired comparisons were analyzed and their incompatibility rates were determined with the help of the Expert Choice software. For this purpose, the paired comparison test of the main criteria of each BSC perspective was performed using the hierarchical analysis process. As listed in Table 5, the compatibility rate of all pairwise comparisons was less than 0.1. Therefore, all pairwise comparisons were confirmed.

The measurable factors in these four perspectives were considered in a causal relationship, according to the theoretical foundations of the research. Financial performance depends on customer satisfaction or dissatisfaction. Customers' satisfaction and dissatisfaction are the result of the efficiency and quality of organizations' processes. How processes are performed depend on the quality of their workforce, their motivation and authority, as well as their information systems. In a balanced scorecard measurement system, managers measure and control their organization in a more comprehensive and complete manner [10]. Thus, it can be concluded that sustainability must be considered in all perspectives of BSC for the sustainability of the outsourcing strategy model, and if it is not sustainable in each of these aspects, it will lead to sustainability in the whole outsourcing process. Therefore, the sustainability plan is not confirmed in one perspective scientifically.

The results of this study were consistent with the results reported in the literature [10], reporting that the integration of a balanced scorecard, the analytic hierarchy process and performance analysis was useful for a decision maker to achieve a more realistic goal.

TABLE 4. The balanced scorecard map of the sustainable outsourcing and parameters

Balanced Scorecard Perspectives	Financial	Amendment of cost structure and increasing financial power (FEc1)	Social capital development (FSo1)	Green economy (FEn1)
		Outcome income from outsourcing (FEc2)	Economic justice (FSo2)	
	Customer	Quality of products and services provided (CEc1)	Social responsibility (CSo1)	Clean and healthy environment (CEn1)
		Performance satisfaction (CEc2)	Trust and cooperation (CSo2)	Product or service safety (CEn2)
	Internal processes	Outsourcing process management (PEc1)	Communication management (PSo1)	Environmental management (PEn1)
		Financial management of contract (PEc2)		
		Establishing a performance assessment system for service providers (PEc3)	Social capital management (PSo2)	Employee health management (PEn1)
	Growth and learning	Knowledge management (LEc1)		Obtaining appropriate certification with an outsourced activity (LEn1)
		Using modern knowledge and technology (LEc2)	Making culture (LSo1)	
		Standardizing processes (LEc3)		Observing the principles of environmental health and staff health (LEn2)
		Focusing on core competencies (LEc4)	Service providers' commitment to fulfill contractual provisions (LSo2)	
	SBSC	<i>Economic</i>	<i>Social</i>	<i>Environmental</i>
		Sustainability Dimensions		

TABLE 5. The compatibility rate of pairwise comparisons of the questionnaires

Paired comparisons test	Incompatibility rate	Result
Paired comparison of main balanced scorecard criteria	0.04	acceptable
Paired comparison of growth and learning perspective	0.02	acceptable
Paired comparisons of internal business processes perspective	0.02	acceptable
Paired comparison of customer satisfaction perspective	0.02	acceptable
Pairwise comparison of financial performance perspective	0.01	acceptable

The pairwise comparisons of the main criteria of the balanced scorecard were first performed using the Expert Choice software. Output results were listed in the following, according to Matrix No. 1.

The weights of the criteria were obtained after the model was made in the Expert Choice and the pairwise comparisons matrices were entered. Four criteria have been prioritized using the Expert Choice software according to the views of the subjects. Based on comparisons made and weights obtained in the form of the sub-criteria of the balanced scorecard, the criterion "financial performance" was of the highest importance. The importance of prioritizing BSC main criteria is illustrated in Figure 2. The perspectives "internal business processes" and "customer satisfaction" were ranked as the next priorities.

Compare the relative importance with respect to: Goal: Sustainable Outsourcing By BSC				
	financial	customer	internal process	learning
financial		4.89	3.54	4.62
customer			2.11	1.43
internal process				3.69
learning	Incon: 0.04			

Matrix 1. The paired comparison of the main balanced scorecard criterias

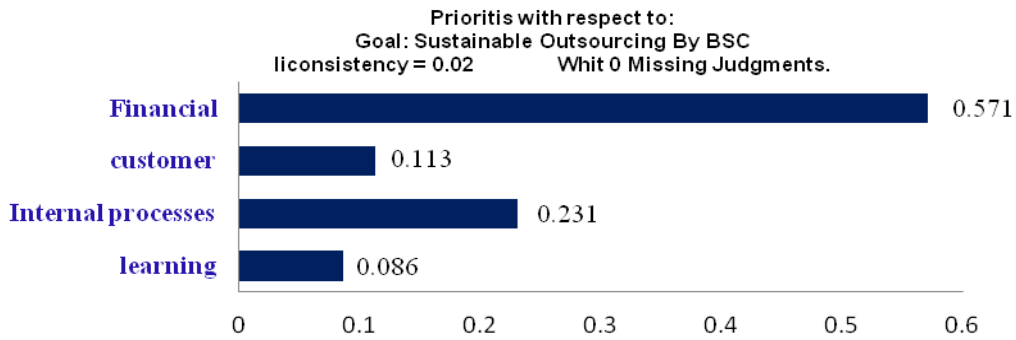


Figure 2. Prioritizing the importance of BSC main criterias

Then, the Expert Choice software was used to make paired comparisons between BSC learning and growth perspectives. Output results were listed in the following, according to Matrix No. 2.

Therefore, according to comparisons made and weights obtained in the form of sub-criteria for the learning and growth perspective, the criterion "service providers' commitment to fulfill the contractual provisions" was of the highest importance. The

importance of prioritizing learning and growth criteria is shown in Figure 3. The criteria "culture-building" and "focus on core competencies" were ranked as the next priorities.

Then, the Expert Choice software was used to make paired comparisons between internal business processes criteria. Output results were listed in the following, according to Matrix No. 3.

	LEc1	LEc2	LEc3	LEc4	LSo1	ISo2	LEn1	LEn2
LEc1		4.2	2.92	2.41	1.45	3.19	1.82	2.13
LEc2			1.14	1.52	1.07	1.1	1.58	1.05
LEc3				1.23	1.83	1.28	1.83	1.03
LEc4					1.07	1.36	2.08	1.45
LSo1						1.0	1.29	1.07
ISo2							2.28	1.29
LEn1								1.62
LEn2								

Matrix 2. The paired comparison of learning and growth criterias

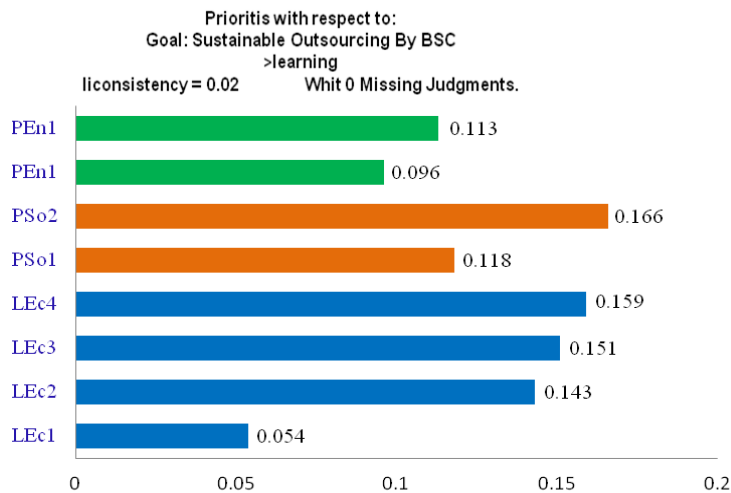


Figure 3. Prioritizing the importance of learning and growth criterias

Compare the relative importance with respect to: internal process							
	PEc1	PEc2	PEc3	PSo1	PSo2	PEn1	PEn2
PEc1		1.37	1.65	3.95	2.39	1.07	1.2
PEc2			2.47	5.68	4.51	2.62	2.69
PEc3				4.19	2.9	1.03	1.16
PSo1					2.74	3.07	3.69
PSo2						1.45	1.57
PEn1							1.34
PEn2	Incon: 0.02						

Matrix 3. The paired comparison of internal business processes criterias

Therefore, according to comparisons made and weights obtained in the form of sub-criteria for the internal processes perspective, the criterion "financial management of the contract" was of the highest importance. The criteria "establishing a performance assessment system for service providers" and "outsourcing process management" were ranked as the next priorities. The importance of prioritizing internal business processes criteria is depicted in Figure 4. According to the value of the inconsistency rate index, 0.02, the comparisons matrix was appropriate.

Then, the Expert Choice software was used to make paired comparisons of internal business processes

criteria. Output results were listed in the following, according to Matrix No. 3.

Therefore, according to comparisons made and weights obtained in the form of sub-criteria for the customer perspective, the criterion "the quality of the products and services provided" was of the highest importance. The importance of prioritizing customer satisfaction criteria is shown in Figure 5. The criteria "product and service safety" and "performance satisfaction" were ranked as the next priorities. According to the value of the inconsistency rate index, 0.02, the comparisons matrix was appropriate.

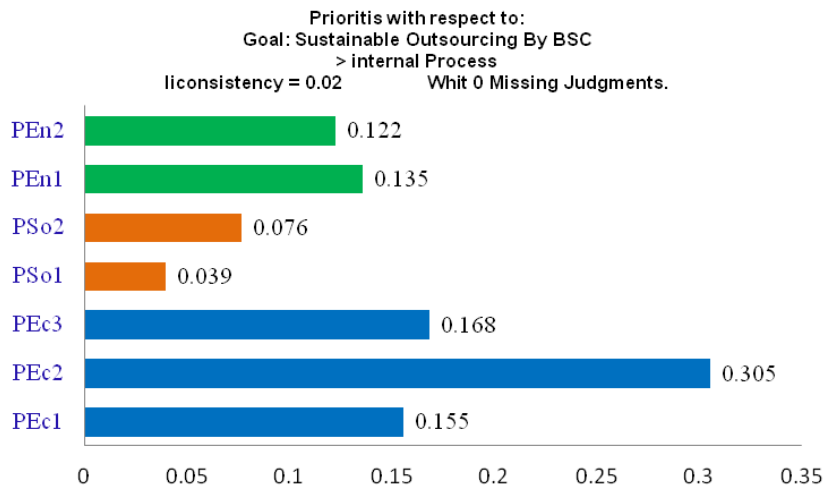


Figure 4. Prioritizing the importance of internal business processes criterias

Compare the relative importance with respect to: customer						
	CEc1	CEc2	CSo1	CSo2	CEn1	CEn2
CEc1		1.8	4.14	4.19	1.78	1.2
CEc2			1.4	3.49	1.18	1.26
CSo1				1.72	1.19	1.92
CSo2					1.92	2.17
CEn1						1.07
CEn2	Incon: 0.02					

Matrix 3. The paired comparison of customer satisfaction criterias

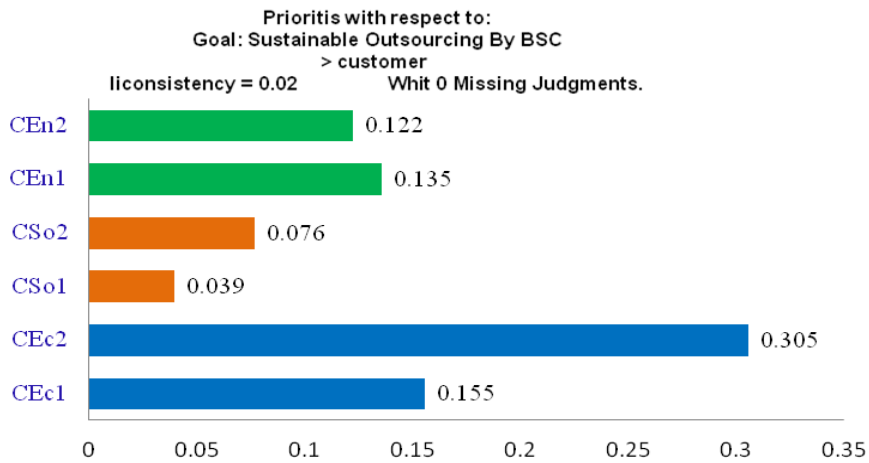


Figure 5. Prioritizing the importance of customer satisfaction criterias

Then, the Expert Choice software was used to make paired comparisons of the customer perspective criteria. Output results were listed in the following, according to Matrix No. 4.

Therefore, according to comparisons made and weights obtained in the form of sub-criteria for the financial perspective, the criterion "cost structure and

financial sector reform" was of the highest importance. The importance of prioritizing financial performance criteria is illustrated in Figure 5. The criteria "income from outsourcing" and "economic justice" were ranked as the next priorities. According to the value of the inconsistency rate index, 0.01, the comparisons matrix was appropriate.

Compare the relative importance with respect to: financial					
	FEc1	FEc2	FSo1	FSo2	FEn1
FEc1		1.82	3.8	2.88	2.9
FEc2			1.86	2.28	1.66
FSo1				1.55	1.15
FSo2					1.12
FEn1					
Incon: 0.01					

Matrix 4. The paired comparison of financial performance criterias

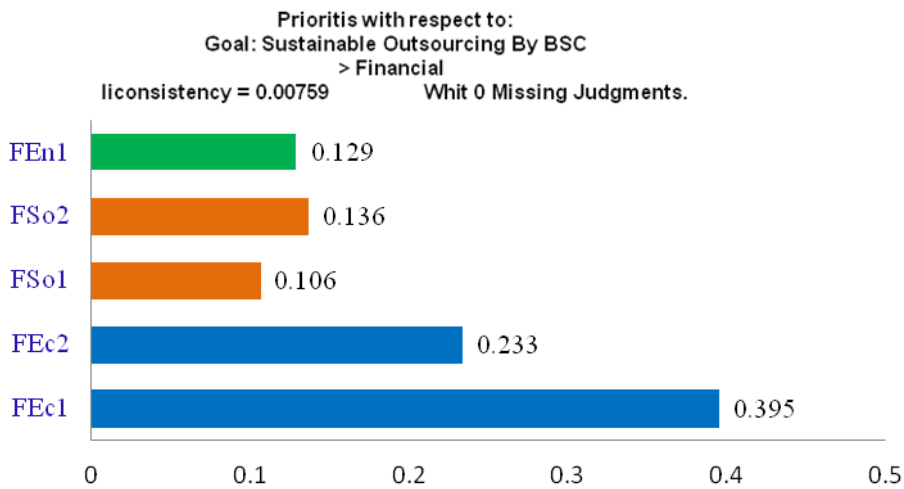


Figure 6. Prioritizing the importance of financial performance criterias

With the help of the experts of Fajr Jam Refining Company, the importance of each of these goals was determined according to Table 6, using a paired comparison questionnaire.

The measurable factors in these four perspectives were considered to be in a causal relationship according to the theoretical foundations of the research.

Financial performance depends on customer satisfaction or dissatisfaction. Customer satisfaction and dissatisfaction are the result of the efficiency and quality of organization processes. How processes are performed depends on the quality of their workforce, their

motivation and authority, as well as their information systems. In a balanced scorecard measurement system, managers measure and control their organization in a more comprehensive and complete manner [10]. Thus, it can be concluded that sustainability must be considered in all perspectives of BSC for the sustainability of the outsourcing strategy model, and if it is not sustainable in each of these aspects, it will lead to sustainability in the whole outsourcing process. There, the sustainability plan is not confirmed in one perspective scientifically.

TABLE 6. The importance and priority of balanced scorecard indicators

Prospective	Next weight	Criteria	Importance	Rank in the perspective	Overall rank
Growth and learning	0.086	Service providers' commitment to fulfill contractual provisions	0.166	1	8
		Focus on core competencies	0.159	2	9
		Standardizing processes	0.151	3	12
		Use of modern knowledge and technology	0.143	4	13
		Making culture	0.118	5	18
		Observing the principles of environmental health and employees health	0.113	6	19
		Obtaining appropriate certification with an outsourced activity	0.096	7	22
		Knowledge management	0.054	8	25
Internal processes	0.231	Financial management of contracts	0.305	1	2
		Establishing a performance assessment system for service providers	0.168	2	7
		Outsourcing process management	0.155	3	10
		Environment management	0.135	4	15
		Employees health management	0.122	5	17
		Social capital management	0.076	6	23
		Communication management	0.039	7	26
Customer	0.113	Quality of the products and services provided	0.304	1	3
		Product or service safety	0.191	2	5
		Performance satisfaction	0.175	3	6
		Clean and healthy environment	0.154	4	11
		Social responsibility	0.107	5	20
		Trust and cooperation	0.069	6	24
Financial	0.571	Amendment of cost structure and Increasing financial power	0.396	1	1
		Outcome income from outsourcing	0.233	2	4
		Economic justice	0.136	3	14
		Green economy	0.129	4	16
		Social capital development	0.106	5	21

4. CONCLUSION

This study aimed to design a sustainable outsourcing strategy model with a balanced scorecard using the hierarchical analysis process. According to the results, the social, economic, and environmental sustainability in each of the balanced scorecard perspectives must be considered in order to achieve sustainable learning and growth, internal business processes, customer satisfaction and financial performance.

Afterwards, the balanced scorecard was designed with 26 strategic goals. Then, the importance of each strategic goal was calculated in each BSC perspective and the desired goals were coded using pairwise comparison.

The final results showed that in order to achieve sustainability for each of the balanced scorecard perspectives, strategic goals related to that perspective were determined. Moreover, it was indicated that a criterion was developed for the desired goal with measurable indicators. The indicators then measured sustainability in each criterion by measuring the performance of that criterion after the implementation of the outsourcing process. For each perspective, strategic goals were identified. In order to achieve sustainability in the growth and learning perspective, eight strategic goals were extracted. The goals included knowledge management, use of new knowledge and technology, standardization of processes, focus on core competencies, construction of culture, service providers' commitment to fulfill contractual provisions, achievement of valid credentials with outsourced activity and observation of environmental health and employee health principles. Further, to achieve sustainability in the internal business processes perspective, seven strategic goals were extracted. The goals consisted of outsourcing process management, contract financial management, establishment of service provider performance assessment system, communication management, social capital management, environmental management and employee health management. Similarly, to obtain sustainability in the customer perspective, six strategic goals were extracted. The goals comprised quality of provided products and services, performance satisfaction, social responsibility, trust and collaboration, clean and healthy environment, and product or service safety. In addition, to achieve sustainability in the financial perspective, five strategic goals were derived. The goals were cost structure and financial sector reform, income from outsourcing, social capital development, economic justice and green economy using a scientific method. In order to evaluate the sustainability performance of outsourcing, indicators for measuring strategic objectives should be specified and the minimum amount of each indicator should be determined. After defining

quantifiable and measurable indicators of each strategic goal, it is possible to determine sustainability or unsustainability in each of the balanced scorecard perspectives.

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Conceptual Design of Sustainable Outsourcing with Balanced Scorecard Using Analytic Hierarchy Process: A Case Study for Fajr Jam Gas Refining Company

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PAPER INFO

چکیده

Paper history:

Received 20 October 2019

Received in revised form 15 November 2019

Accepted 24 November 2019

Keywords:

Analytic Hierarchy Process

Balanced Scorecard

Outsourcing

Sustainability

هدف از این مقاله طراحی مدل مفهومی برون سپاری پایدار با استفاده از کارت امتیازی متوازن و فرآیند تحلیل سلسله مراتبی می باشد. در این تحقیق ابتدا نسبت به شناسایی عوامل موفقیت برون سپاری بر اساس مطالعات قبلی انجام شده در داخل و خارج کشور اقدام شده است. برای روایی محتوایی عوامل مذکور نیز از شاخص نسبت روایی محتوایی و شاخص روایی محتوایی و برای تضمین پایایی نیز از شاخص نرخ ناسازگاری در پرسشنامه‌های مبتنی بر مقایسه زوجی بر اساس گزارش نرم‌افزار EXPERT CHOICE استفاده گردیده است. شناسایی اهداف استراتژیک این مدل از نمودار همبستگی بین عوامل روش طوفان مغزی از طریق نمودار وابستگی بین عوامل انجام شده است. یافته‌های تحقیق نشان داد برای طراحی مدل مفهومی برون سپاری پایدار با استفاده از کارت امتیازی متوازن، می بایست پایداری اقتصادی، اجتماعی و زیست محیطی در هر یک از وجه‌های کارت امتیازی متوازن لحاظ گردد که با استفاده از این مدل بتوانیم وجه‌های یادگیری و رشد پایدار، فرآیند‌های داخلی پایدار، مشتری پایدار و وجه مالی پایدار داشته باشیم. در نهایت کارت امتیازی متوازن با ۲۶ هدف استراتژیک طراحی و با استفاده از مقایسه زوجی اهمیت هر یک از اهداف استراتژیک هر وجه محاسبه و اولویت بندی گردید.

doi: 10.5829/ije.2020.33.01a.13