

## Integration between open records and target cost to effectively manage supply chain costs

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### CHRONICLE

### ABSTRACT

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During the past few years, there have been tremendous attempts among various companies to implement the principles of supply chain management to increase their capabilities. Reduction in supply chain cost is an important element to support competitive advantage. However, to manage the cost of supply chain, managing target and order costs is essential. Reduction in both target cost and order cost is crucial to maintain reasonable supply chain cost, which directly influences the competitive advantage. Thus, the primary objective of this study is to support competitive advantage by the help of integration between target cost and order cost. To achieve this, quantitative research technique was adopted based on a survey technique and 300 questionnaires were distributed among the managerial employees of supply chain companies in Iraq. While analyzing the data through Smart PLS 3, it was revealed that any reduction in target cost and order cost could decrease the overall supply chain cost and this helps to sustain competitive advantage. Therefore, supply chain cost plays the mediating role to enhance competitive advantage through integration of the target cost and the order cost. Finally, this study is beneficial for supply chain companies to enhance competitive advantage through reduction in supply chain cost.

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## 1. Introduction

Now a day, companies are unable to sustain competitive advantage, particularly in cost (Cooper, 2017; Cooper, 1995; Fine, 1998; Metri, & Kaur, 2018; Schonberger, 1996; Wheelwright & Clark, 1992). This issue is most common in Iraqi based supply chain companies. Supply chain companies are not able to handle high cost and cannot sustain the low cost for longer time. In this situation, domestic companies in Iraq are struggling to get market dominance which is also one of the worldwide practice. Based on the supply chain cost control issues and intense competition, Iraqi supply chain companies are unable to get competitive advantage. High cost supply chain process increases the overall supply chain cost, which decline the competitive advantage (Collis & Montgomery, 1995; Cooper & Chew, 1996; Cooper & Slagmulder, 1997; Shepherd, 1997). Result of core competencies could be in form of various types of competitive advantage such as competitive advances in services, products, skills of employees, innovation, technology and cost benefits.

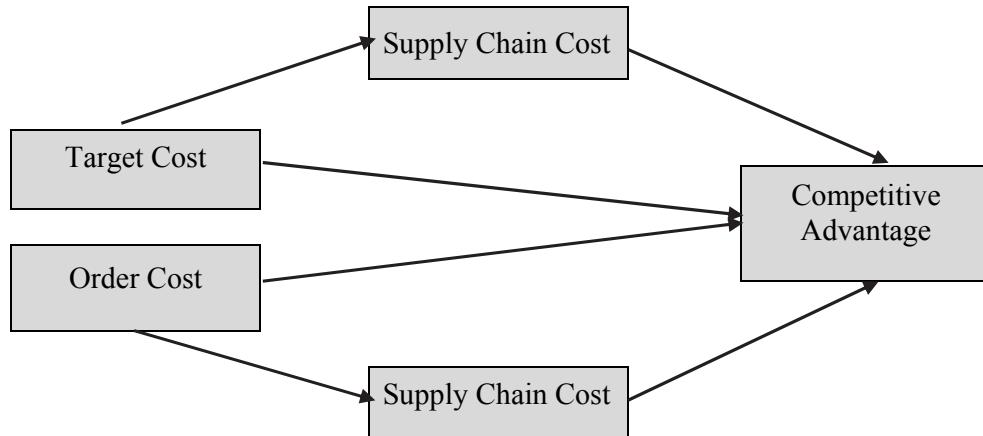
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To handle supply chain cost and to sustain competitive advantages, target cost and order cost control are the key elements. As it is demonstrated by Marginean and Bobescu (2014) the target costing method is one of the most appropriate methods to control the cost and most suitable to evaluate product price and profit margin. Moreover, Jack (2008) suggests applying target costing procedure based on the usefulness of cost control. Therefore, target costing is the appropriate technique to lower down the supply chain cost and gain competitive advantage. Similarly, any decrease in inventory levels of raw materials, work-in-process, and finished items has emerged a primary point of attention for supply chain management companies and now the companies are investing to reduce the order cost (Zhang et al., 2007). Any reduction in order cost influences positively on both supply chain cost and competitive advantage.

Most of the latest previous studies (see, for instance, Palandeng et al., 2018; Prajogo et al., 2016; Singh et al., 2018; Wu et al., 2018) on supply chain management and competitive advantage, have disregarded the target cost and order cost to reach competitive advantage by lowering the supply chain cost. Thus, the current study is one of the attempts to fill this gap. As in rare cases any study formally documented the integration of target cost and order cost to reach sustainable competitive advantage, as shown in Fig. 1. Therefore, the prime objective of this study is to support competitive advantage by the help of integration between target cost and order cost. To achieve this objective, the sub-objectives are as follows;

1. To investigate the role of target cost and order cost to minimize the supply chain cost.
2. To investigate the role of target cost and order cost to sustain competitive advantage.
3. To investigate the mediating role of supply chain cost.

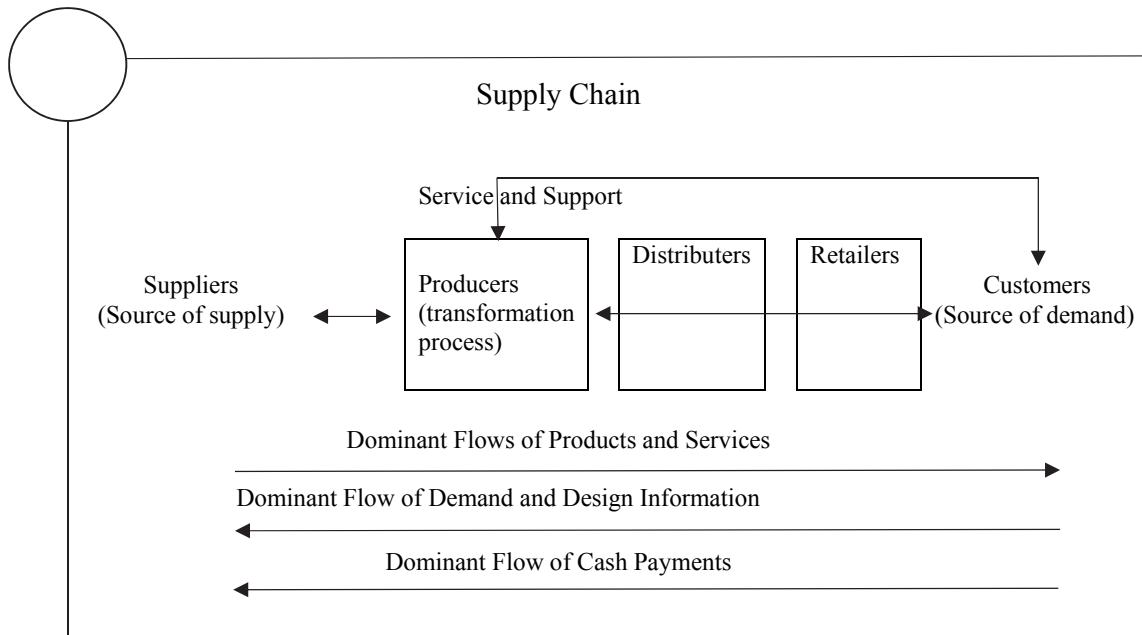


**Fig. 1.** Theoretical Framework

## 2. Literature Review and Hypotheses Development

In a competitive era of industrialization, competitive advantage is most important for supply chain companies. Competitive advantage can be defined as, “a condition or circumstance that puts a company in a favorable or superior business position” and competitive advantage is the most important element for every company (Smith & Lockamy, 2000). In Iraqi firms, supply chain management is crucial to gain competitive advantage. However, supply chain management is central to attain competitive advantage. “Supply chain management is a joint, cross-enterprise operating strategy that bring into line the flow of inward materials, manufacturing, as well as downstream supply in a manner responsive to changes in customer demand without creating surplus inventory” (Cooper & Ellram, 1993; Ganeshan et al., 1999; Quinn, 1998). As described by Balsmeier and Voisin (1996), supply chain management is

not the old wine of “supplier management” poured into a colorful bottle. In its place, supply chain management is a fresh as well as potent approach that integrates the system of various operating units into a well-managed distribution system that improves the customer value, moreover, increases the satisfaction level among customers and that defends the competitiveness of the whole supply chain (Lummus & Vokurka, 1999). Fig. 2 shows the supply chain process in detail.



**Fig. 2.** Supply Chain Management

To attain competitive advantage, cost control in supply chain process is most crucial. As the supply chain is one of the complete process which involves all the steps from raw material to customers, that is the reason cost control is much crucial. In the competitive market, cost control is one of the important elements, which influence competitive advantage. However, to control supply chain cost, target cost (Smith & Lockamy, 2000) and order cost (Zhang et al., 2007) are most important. As the use of credit in both target and order cost is most important (Arif et al., 2017). Target costing is one of the systematic procedure for confirming that a product launched with definite quality, suitable functionality, and sales price can be formed at a life-cycle cost that produces the needed level of profitability for company (Cooper & Slagmulder, 1997). However, incompletely masked by different variation in its implementations element, the targeting costing system has a specific structure.

The origins of target costing comes from the Japanese car industry in the early 1960s (Monden, 1995; Nicolini et al., 2000; Yook et al., 2005; Ansari et al., 2007). After that there has been an extensive evidence of the implementation of related target cost concepts by Ford at the start of the 20<sup>th</sup> century, such as the formation of a target price to guide the different development process of the Model T (Monden & Sakurai, 1989; Cooper & Slagmulder, 1997; Feil et al., 2004). Now a day, most of the companies try to use target cost as one of their tools to gain or sustain the competitive advantage. Therefore, any decrease in target cost will increase the competitive advantage by decreasing the supply chain cost of companies.

Early in the process, a firm fixes the price which customers are ready to pay for a product, for its different functionality, specific quality, and all available substitute products provided by competing companies. From this price, the firm deducts the profit margin essential to satisfy its various stakeholders and to fund the research as well as development of unique future products (Smith & Lockamy, 2000). This deduction of profit to satisfy the stakeholders such as material providers,

employees, suppliers and any other stakeholders has significant influence on competitive advantage through supply chain cost. This deduction of profit should be minimized to get competitive advantage.

On the other hand, ordering costs are the expenditures experienced to create as well as process an order to the concerned supplier. Generally, these costs are comprised of the determination of the economic order quantity for an inventory item. Various examples of ordering costs are including; cost to make a purchase order and labor cost needed to scrutinize goods when they are received. This cost is the most important to define the overall supply chain cost (Woo et al., 2001). Any decrease in target cost and order cost, decreases the overall supply chain cost. Decrease in supply chain cost, increases the ability of supply chain firm to attain or sustain competitive advantage in highly competitive market. Therefore, Iraqi companies should adopt different strategies to cut the target cost and order cost, as both are most crucial (Smith & Lockamy, 2000; Zhang et al., 2007).

Developed for repetitive production, generally the procedure operates with targets to achieve for cost while expected manufacturing period. Decrease in target cost is a consequence of the expectancy that competition from new products as well as price pressure from competitors will drive down the overall selling prices over the manufacturing lifespan of the any type of product (Jørgensen, 2005; Jørgensen, & Emmitt, 2009). Thus, in this situation, any reduction in target cost is most crucial. According to Roslender and Hart (2002), target cost is largely seen as a broad-based management philosophy and not a management accounting procedure, and generally, it is better selected by the phrase ‘target-cost management’. This target cost management has significant link with supply chain cost. A better target cost management influences positively on overall supply chain cost. Supply chain cost management influences positively on competitive advantage which affects on the overall firm performance. Thus, it is concluded that;

**H1-** Target cost is significantly related to supply chain cost.

**H2-** Target cost is significantly related to competitive advantage.

In a competitive environment, a buyer has the privilege of decreasing the ordering cycle. However, the ideal ordering cycle preferred by the buyer may not be the most cost-effective for the various vendors. To restructure the supply chain, the vendor is likely to orchestrate his production cycle in a well-managed system, as well as the raw material procurement cycle, with the buyers’ ordering cycles, therefore, that the total cost of inventory for the whole chain can be reduced (Zhang et al., 2007).

Moreover, Yang and Wee (2000) established an integrated economic ordering policy for various worsening items for buyer and vendor. This establishment of integrated economic ordering policy also focuses on lowering the ordering cost. In the same direction, Wu and Wee (2001) considered the multiple lot size distributions in the model proposed by Yang and Wee (2000). Nevertheless, Ouyang et al. (2004) offered a single-vendor single-buyer integrated production inventory model with the assumption that lead time demand is stochastic and the lead time can be decreased at an added cost. All these policies have some positive influences on any company’s competitive advantage by decreasing the average ordering cost.

For instance, it is quite possible to decrease ordering cost as well as time by utilizing third-party logistics system and vendor-managed inventory. Executing electronic data interchange (EDI) not only links, but also automates the inquiring, ordering, payment and shipping actions between buyers and vendor. Additionally, Porteus (1985) considered investment in different reduced setups in the economic order quantity (EOQ) model. Various other studies established economic production quantity (EPQ) models with setup cost reduction (see, for instance, Billington, 1987; Coates et al., 1996; Kim et al., 1992).

Therefore, from the literature, it is evident that ordering cost has significant relationship with competitive advantage. The ordering cost also has a significant relationship with overall supply chain cost of a company. Hence, it is concluded that;

**H3-** Order cost is significantly related to supply chain cost.

**H4-** Order cost is significantly related to competitive advantage.

Moreover, as discussed earlier the target cost and order cost have significant relationships with supply chain costs, additionally supply chain cost has significant relationship with competitive advantage. A decrease in target cost and order cost decreases the supply chain cost, which enhances the competitive advantage. Thus, in this situation, supply chain cost plays essential role as mediating variable between target cost and order cost, and competitive advantage. Hence, below hypotheses are proposed;

**H5-** Supply chain cost mediates the relationship between target cost and competitive advantage.

**H6-** Supply chain cost mediates the relationship between order cost and competitive advantage.

Additionally, from above discussion, it is revealed that;

**H7-** Supply chain cost is significantly related to competitive advantage.

### **3. Research Methodology**

#### *3.1 Research Design*

The current study is based on the quantitative research technique rather than qualitative. Data were collected only one time; therefore, it is cross-sectional research design. Supply chain companies in Iraq were selected. Data were collected from the managerial employees of supply chain companies. Only those employees were selected having direct involvement in supply chain activities.

#### *3.2 Sampling Design*

Probability sampling was used to collect the data from managerial employees of supply chain companies and cluster sampling was used to distribute the survey instrument. This sampling techniques was selected based on the reason that it is one of the suitable techniques, which best represents the population (Sekaran & Bougie, 2016).

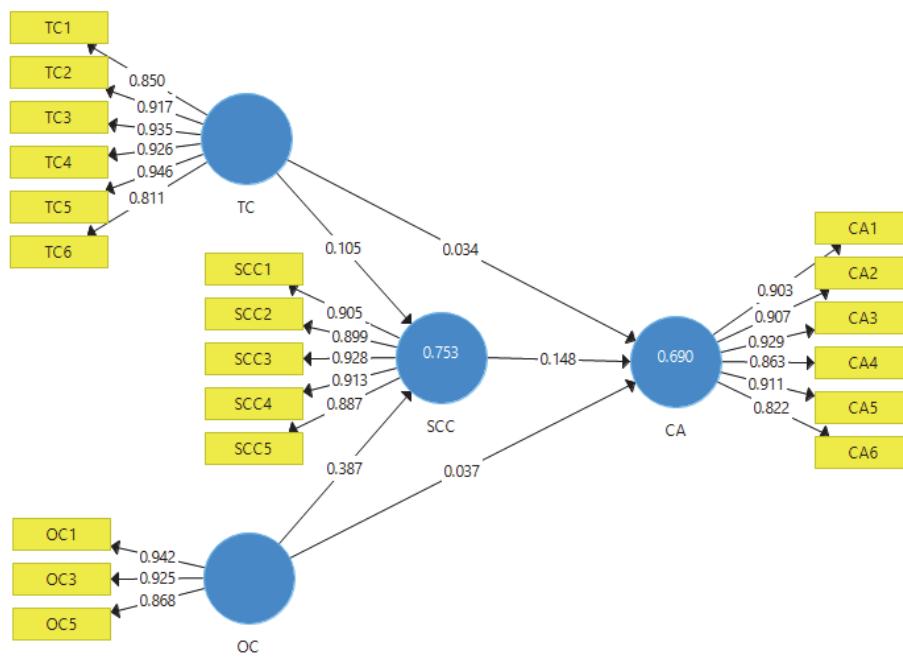
#### *3.3 Sample size*

Sample size was selected based on Comrey and Lee (1992) inferential statistics. According to this series, 200 sample size is sufficient to satisfy the requirements of any research analysis. Thus, 200 questionnaires were distributed among the managerial employees of supply chain companies in Iraq.

Moreover, 5-point Likert scale was selected, as it is one of the best scale to measure the attitude as well as opinions of various individuals. 5-point Likert scale was selected and Smart PLS was used to analyze the collected data.

### **4. Data Analysis and Results**

In the start of data analysis, before testing the hypotheses, outer model was examined. It is one of the essential requirements to move further to test inner model. In outer model examination, factor loading was examined, it should be more than 0.5 as stated by Hair et al., (2010). Cronbach alpha and composite reliability were also examined, and they should be more than 0.7. Additionally, to examine the internal consistency or convergent validity, average variance extracted (AVE) was examined. Fig. 3 shows the outer model assessment.

**Fig. 3.** Outer Model Measurement

It is clear from Fig. 3 that all factor loadings satisfying the minimum requirement since they are higher than 0.5. Moreover, in Table 1 average variance extracted (AVE) is also shown which is more than 0.5. Thus, convergent validity was also attained through internal consistency by examining average variance extracted (AVE).

Table 1 shows the results of outer model. These results show that all the values were more than acceptable range which confirm the outer model assessment. It is clear that, composite reliability based on Cronbach alpha is more than 0.7 which is minimum level to accept. However, 2 items were deleted from the whole scale.

**Table 1**  
Outer Model Results

CONSTRUCT	INDICATORS	LOADINGS	CRONBACH ALPHA	COMPOSITE RELIABILITY	AVE
<b>COMPETITIVE ADVANTAGE (CA)</b>	CA1	.903	.947	.958	.792
	CA2	.907			
	CA3	.929			
	CA4	.863			
	CA5	.911			
	CA6	.822			
<b>SUPPLY CHAIN COST (SCC)</b>	SCC1	.905	.946	.958	.822
	SCC2	.899			
	SCC3	.928			
	SCC4	.913			
	SCC5	.887			
<b>TARGET COST (TC)</b>	TC1	.850	.952	.962	.808
	TC2	.917			
	TC3	.935			
	TC4	.926			
	TC5	.946			
	TC6	.811			
<b>ORDER COST (OC)</b>	OC1	.942	.950	.962	.836
	OC3	.925			
	OC5	.968			

Moreover, discriminant validity was examined through square root of average variance extracted (AVE) and cross loadings. Square root of average variance extracted (AVE) is given in Table 2 and cross loadings are shown in Table 3.

**Table 2**  
Discriminant Validity

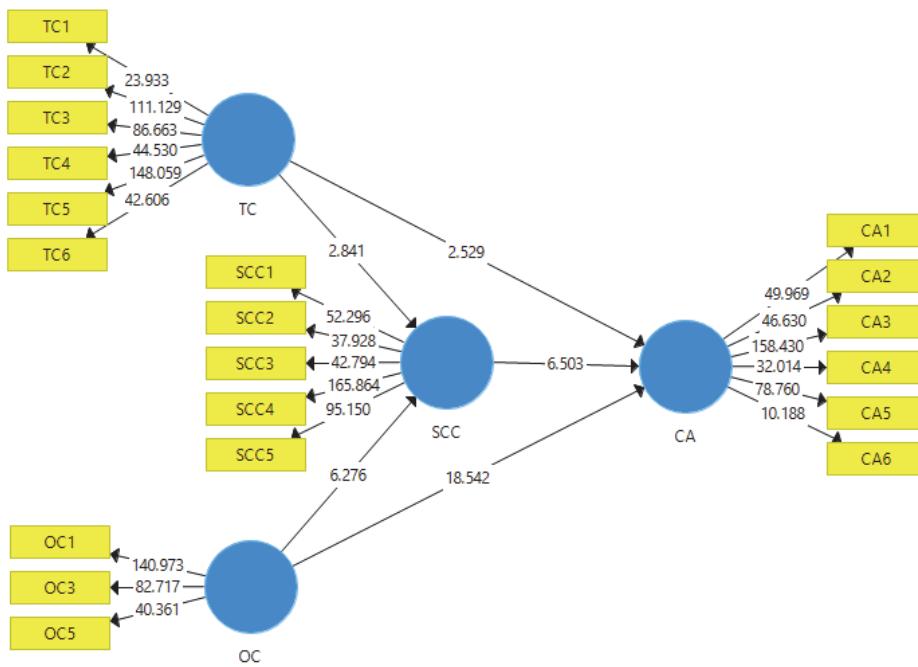
	CA	OC	SCC	TC
<b>CA</b>	0.890			
<b>OC</b>	0.771	0.914		
<b>SCC</b>	0.802	0.850	0.906	
<b>TC</b>	0.759	0.866	0.811	0.899

**Table 3**  
Cross-Loadings

	CA	OC	SCC	TC
<b>CA1</b>	<b>0.904</b>	0.708	0.712	0.700
<b>CA2</b>	<b>0.907</b>	0.680	0.710	0.637
<b>CA3</b>	<b>0.929</b>	0.782	0.808	0.750
<b>CA4</b>	<b>0.863</b>	0.590	0.658	0.643
<b>CA5</b>	<b>0.911</b>	0.730	0.713	0.717
<b>CA6</b>	<b>0.821</b>	0.603	0.670	0.595
<b>OC1</b>	0.708	<b>0.937</b>	0.758	0.814
<b>OC3</b>	0.717	<b>0.937</b>	0.757	0.834
<b>OC5</b>	0.714	<b>0.828</b>	0.813	0.683
<b>SCC1</b>	0.748	0.779	<b>0.905</b>	0.728
<b>SCC2</b>	0.703	0.746	<b>0.899</b>	0.686
<b>SCC3</b>	0.709	0.760	<b>0.928</b>	0.704
<b>SCC4</b>	0.741	0.806	<b>0.913</b>	0.806
<b>SCC5</b>	0.732	0.759	<b>0.887</b>	0.745
<b>TC1</b>	0.595	0.705	0.646	<b>0.850</b>
<b>TC2</b>	0.724	0.789	0.773	<b>0.917</b>
<b>TC3</b>	0.683	0.787	0.734	<b>0.935</b>
<b>TC4</b>	0.732	0.824	0.773	<b>0.926</b>
<b>TC5</b>	0.717	0.839	0.797	<b>0.946</b>
<b>TC6</b>	0.630	0.716	0.629	<b>0.811</b>

After analyzing the internal and external consistency, inner model was examined to test the hypotheses. However, in this part direct and indirect effects were examined. In direct effect, all the direct hypotheses were examined without involving mediating variable. In indirect effect, mediating hypotheses were tested. Fig. 4 shows the inner model assessment.

Table 4 shows the results of inner model in which all direct hypotheses are tested and Table 5 shows the mediation results. Moreover, 0.05 minimum level of p-value was considered to accept or reject the hypothesis. The p-value should be equal to 0.05 or less to accept the hypothesis. From all the direct effect, it is clear that all relationships have p-value below 0.05. Moreover, it is also clear from Table 5 that all the mediation effects were significant as the p-value is less than 0.05. Therefore, all the hypotheses are accepted.

**Fig. 4.** Inner Model Assessment

**Table 4**  
Direct effect results

	(B)	(M)	(STDEV)	T-VALUE	P-VALUES
<b>OC → CA</b>	-0.241	0.321	0.013	18.542	0.000
<b>OC → SCC</b>	0.590	0.587	0.094	6.276	0.000
<b>SCC → CA</b>	-0.431	0.381	0.066	6.503	0.000
<b>TC → CA</b>	-0.205	0.164	0.081	2.529	0.021
<b>TC → SCC</b>	0.308	0.307	0.108	2.841	0.017

**Table 5**  
Indirect effect results

	(B)	(M)	(STDEV)	T-VALUE	P-VALUES
<b>TC → SCC → CA</b>	0.254	0.229	0.072	3.538	0.003
<b>OC → SCC → CA</b>	0.133	0.112	0.031	4.274	0.000

Additionally, Table 6 and Table 7 provide the R-Squared ( $R^2$ ) value, effect size ( $f^2$ ) of each exogenous variable and finally, quality of the model through predictive relevance ( $Q^2$ ). Table 6 shows that R-Squared ( $R^2$ ) is equal to 69%, which is substantial (Chin, 1998). It indicates that all the variables are expected to bring 69% of the changes in dependent variable, namely; competitive advantage.

Moreover, Table 7 shows the effect size ( $f^2$ ). Target cost (TC) and order cost (OC) had moderate effect size ( $f^2$ ). Furthermore, supply chain cost (SCC) also maintained moderate effect size ( $f^2$ ), however, it is close to moderate (Cohen, 1988). Additionally, predictive relevance ( $Q^2$ ) is shown in Table 8 which is more than zero (Chin, 1998).

**Table 6**R-Squared ( $R^2$ )

LATENT VARIABLE	( $R^2$ )
COMPETITIVE ADVANTAGE (CA)	69 %

**Table 7**Effect size ( $f^2$ )

	F-SQUARED	$F^2$
SUPPLY CHAIN COST (SCC)	0.148	Small
TARGET COST (TC)	0.034	Small
ORDER COST (OC)	0.037	Small

**Table 8**Predictive relevance ( $Q^2$ )

	SSO	SSE	$Q^2 = (1-SSE/SSO)$
COMPETITIVE ADVANTAGE (CA)	552.000	273.914	0.504
SUPPLY CHAIN COST (SCC)	460.000	195.658	0.575

## 5. Research Findings

This study is based on Iraqi supply chain companies. The role of target cost and order cost was examined to minimize the overall supply chain cost and its effect on competitive advantage. Results of the analysis have indicated that target cost had significant relationship with competitive advantage and supply chain cost with p-value 0.021 and 0.017, respectively. The p-value is significant for both relationships with  $\beta$ -values of -0.205 and 0.308, respectively. Thus, hypotheses H1 and H2 are accepted. Negative  $\beta$ -value (-0.205) for the relationship between target cost and competitive advantage shows that an increase in target cost will decrease the competitive advantage.

It indicates that decrease in target cost will decrease the supply chain cost. Increase in target cost will increase the supply chain cost. Increase in supply chain cost will disturb the competitive advantage of the existing companies. Moreover, decrease in supply chain cost will increase the competitive advantage. As the relationship between supply chain cost and competitive advantage is significant with p-value and  $\beta$ -value of 0.000 and -0.431, respectively. The hypothesis H7 is accepted.

Moreover, the results of the analysis show that order cost had significant relationship with supply chain cost and competitive advantage with p-value 0.000 and 0.000, respectively, however, the  $\beta$ -values of 0.540 and -0.241 respectively, which indicate that any decrease in order cost will decrease the overall supply chain cost. Nevertheless, it indicates that an increase in order cost will decrease the firm's ability to gain competitive advantage. Thus, companies should decrease the order cost which will significantly decrease the supply chain cost. As the relationship between order cost and supply chain cost is significantly positive. Thus, H3 and H4 are accepted.

Furthermore, indirect results of the current study show that supply chain cost is a mediating variable between target cost and competitive advantage with p-value 0.003 and  $\beta$ -value 0.254. In the same direct, supply chain cost also plays a mediating variable between order cost and competitive advantage with p-value 0.000 and  $\beta$ -value 0.133.

Finally, from the results, it is found that target cost and order cost maintained a significant positive relationship with supply chain cost. However, target cost and order cost have significant negative relationship with competitive advantage. Moreover, supply chain cost has significant negative relationship with competitive advantage. Additionally, supply chain cost mediates the relationship between target cost and competitive advantage, and order cost and competitive advantage.

## 6. Conclusion

While conducting this study, by exploring literature, books, theories and finally by analyzing the data, the study has come up with the decision that competitive advantage in supply chain companies could be attained through proper management of cost related to supply chain. To manage supply chain cost, target cost and order cost are most crucial. Competitive advantage can be supported by the integration of target cost and order cost. It is concluded that any decrease in target cost and order cost had significant influence on reducing the supply chain cost. Any decrease in supply chain cost is one of the greatest edge for existing companies. This decrease in supply chain cost through target cost and order cost enables the companies capable to gain and sustain competitive advantage.

Thus, it is recommended to the Iraqi companies to enhance their supply chain management activities. These companies should decrease the target cost and order cost. It will automatically decrease the overall supply chain cost and help to gain competitive advantage.

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