Competitive Advantage Assessment Through Supply Chain Management (SCM) Processes

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Abstract: Supply chains are the lifeblood of any organization. They connect suppliers, producers, and final customers in a network that is essential to the creation and delivery of goods and services. Effective supply chain management (SCM) has become a potentially valuable way of securing competitive advantage and improving organizational performance.Since competition is no longer between organizations, but among supply chains.The aim of this research is conceptualizing the relationship between supply chain management (SCM) processes (demand management, order fulfillment, manufacturing flow management, and product development and commercialization) and competitive advantage. Data collection was performed using Analytical Hierarchy Process (AHP). Research results show that the significant positive relationship between supply chain management processes and competitive advantage, also conclude thatdemand management and order fulfillment are stronger indicators of competitive advantage than manufacturing flow management and product development and commercialization.

Keywords: supply chain management processes, competitive advantage, AHP

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introduction: Supply Chain Management (SCM) is management of material, money, human resources, and information within and across the supply chain to maximize customer satisfaction and to enhance competitive advantage. The challenges associate with getting a product and service to the right place at the right time at the lowest cost. Organizations began to realize that it is not enough to improve efficiencies within an organization, but their whole supply chain must be made competitive. The understanding and practicing of supply chain management (SCM) hasbecome an essential prerequisite for staying competitive in the global race and for enhancingprofitably [1]. This research used the definition of SCM as defined by the Global Supply ChainForum (GSCF). "The GSCF, a group of non-competing firms and a team of academic researchers, has been meeting regularly since 1992 with the objective to improve the theory and practice of SCM" [2]. According to the GSCF, "supply chain management is the integration of key business processes from end user through original suppliers that provide products, services, and information that add value for the customers and other stakeholders" [3].

The goal of SCM is to integrate both information and material flows seamlessly across the supply chain as an effective competitive weapon. Many organizations have begun to recognize that SCM is the key to building sustainable competitive edge for their products and/or services in an increasingly crowded marketplace [1].

Literature Review

The supply chain role for a company makes a difference in terms of the specific supply chain practices that lead to better performance. SCM practices that lead to better performance depend on the position of the company in its supply chain. The general link between practice and performance may be erroneous without considering the specific context of the company concerned [4]. In the research of [5] the author described the role of SCM and its effect on competitive advantage, the empirical research results identify the relationship between SCM practices and competitive advantage. Also, SCM has been defined to explain the dual purpose of SCM which are: improving the performance of organizations and improving the performance ofthe whole supply chain. Moreover, the research results indicated that price, quality, and time to market are stronger indicators of competitive advantage than the delivery dependability and product innovation. The correlation between SCM processes, competitive advantage and organizational performance is a significant positive relationship, results showed that the

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implementation of SCM processes on a high level of competitive advantage has a significant positive impact on the performance of the organization [6]. More specifically the benefits associated with SCM are:1) Providing the structure for the development and maintenance of relationships with customers. 2) Defining customer requirements.3) Designing a network that enables an organization to meet those requirements in a cost-effective manner. 4) Actively managing all activities associated with returns, reverse logistics, gatekeeping.5) Avoidance with cross-functional input through the strategic development of SCM processes appears to be valuable to an organization pursuit towards increases in competitive advantage and organizational performance[7]. Higher levels of supply chain management practice can lead to enhanced competitive advantage and improved organizational performance [1].

Research Framework

Supply Chain Management Processes

Supply chains are the lifeblood of any business organization, they connect suppliers, producers, and final customers in a network that is essential to the creation and delivery of goods and services. This research used the definition of SCM as defined by the Global Supply Chain Forum (GSCF) “supply chain management is the integration of key business processes from end user through original suppliers that provide products, services, and information that add value for the customers and other stakeholders” [3].

The GSCF defines eight key SCM business processes. Fully implementing each of the eight processes at once may prove to be difficult and challenging but, may also be necessary to avoid sub-optimization [9].

This research will delve deeper in to the implications of implementing four of the eight processes, figure (1) shows the eight SCM processes by [10].

Each key process has sub-processes at the strategic and operational level that are inherent to that process, but these sub-processes are also interferes with the other key processes. Analysis of these interference can lead to an evaluation of the level and strength of the relationships between the key processes.

The strategic level is primarily focused on establishing, managing and providing implementation guidance for the process as opposed to the operational level, which is the actualization of the process once it has been established [11].

The next paragraphs present the GSCF definitions of SCM processes adapted in this research.

Customer Relationship Management(CRM)– provides the structure for how relationships with customers are developed and maintained. Cross-functional customer teams tailor product and service agreements to meet the needs of key accounts, and segments of the other customers.

Supplier Relationship Management (SRM) – provides the structure for how relationships with suppliers are developed and maintained. Cross-functional teams tailor product and service agreements with key suppliers.

Customer Service Management (CSM) – provides the firm’s face to the customer, a single source of customer information, and the key point of contact for administering the product service agreements.

Demand Management (DM) – provides the structure for balancing the customers’ requirements with supply chain capabilities, including reducing demand variability and increasing supply chain flexibility.

Order Fulfillment (OF) – includes all activities necessary to define customer requirements, design a network, and enable the firm to meet customer requests while minimizing the total delivered cost.

Manufacturing Flow Management (MFM) – includes all activities necessary to obtain, implement and manage manufacturing flexibility and move products through the plants in the supply chain.

Product Development and Commercialization (PD&C) – provides the structure for developing and bringing to market products jointly with customers and suppliers.

Returns Management (RM) – includes all activities related to returns, reverse logistics, gatekeeping, and avoidance [9].

Framework Items

The four processes adopted in this research are as following:

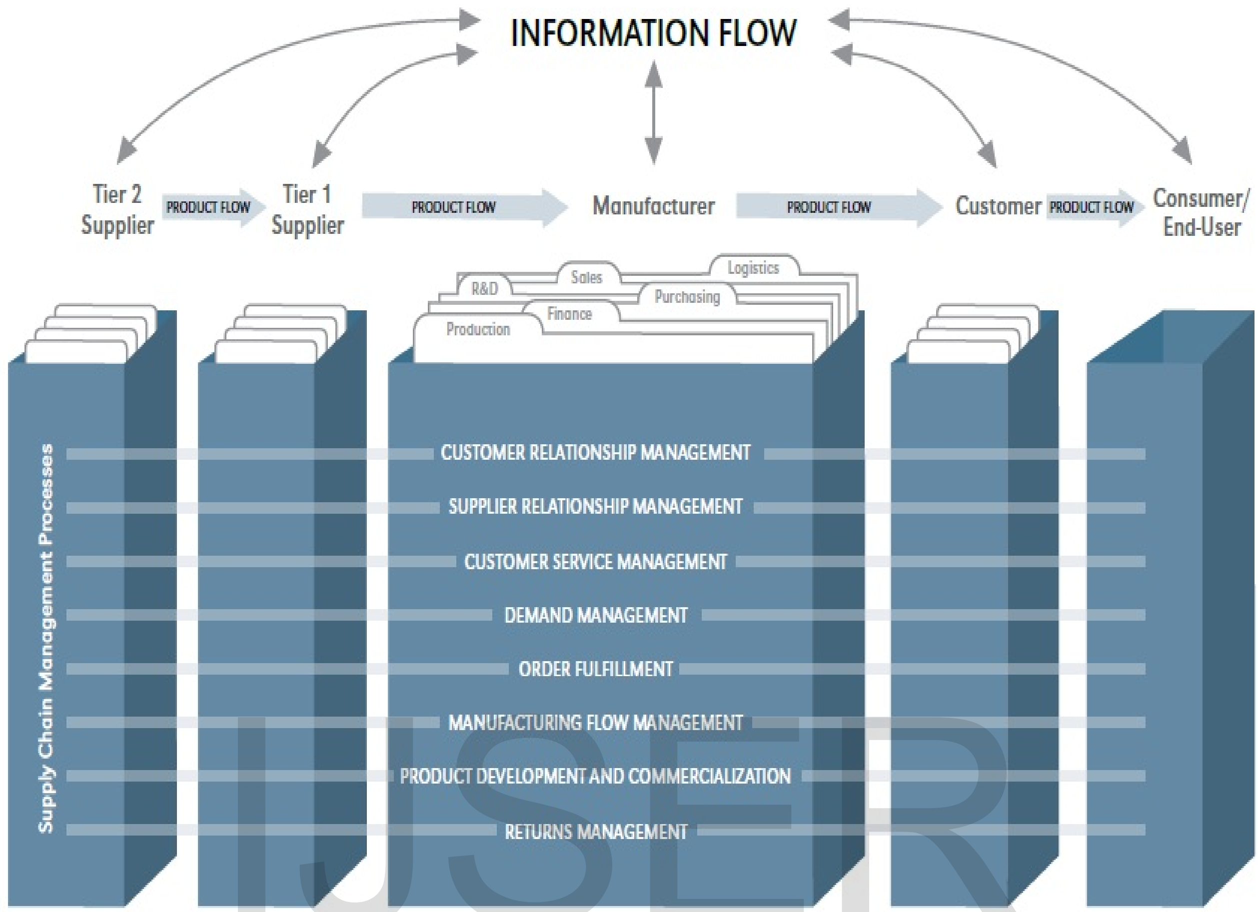

Figure (1) shows the supply chain management processes

Demand Management Process

The demand management process is centered around determining how demand can be synchronized with the capabilities of the supply chain. It includes forecasting, synchronizing, reducing demand variability, increasing supply chain flexibility, and developing contingency management plans for potential interruptions to supply or unexpected changes in demand. With the correct procedure in place, management can match supply with demand proactively and execute the arrangement with insignificant disruptions.

Order Fulfillment Process

Order fulfillment includes generating, filling and delivering customer orders. To finish these tasks, the cross-functional order fulfillment process team must design a network and a process that allows the firm to meet customer requests while minimizing the total delivered cost. This includes establishing order fulfillment policies and evaluating the role of technology in the process. The goal is to develop a consistent process from suppliers to the firm and to its various customer segments.

Order fulfillment is regularly seen as the area of logistics since most of the operational activities are executed inside the logistics function. However, at the strategic level, different business capacities play a critical role in the design of the process.

Manufacturing Flow Management Process

Manufacturing flow management is worried about determining and executing manufacturing flexibility over the supply chain. The administration of manufacturing flexibility requires arranging and execution beyond the four walls of the manufacturer. To efficiently move items through plants, the operations of the firm and its suppliers should be pulled by demand. Keeping in mind the end customers' demand to the manufacturing activities of the firm and its suppliers, proper cross-functional association is essential.

Product Development and Commercialization Process

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Product development and commercialization provides the structure for association is essential. to market new products with the association of key customers and suppliers. The procedure enables management to organize the effective stream of new products over the supply chain and helps with the increase of manufacturing, logistics, marketing and other related activities to support commercialization of the product.

Each of the key processes has sub-processes at the strategic and operational level as shown in table (1), the strategic sub-processes provide the structure for how the process will be implemented, and the operational sub-processes provide the detailed steps for implementation.

Processes	Strategic sub-processes	Operational sub-processes
Demand management	1. Determine demand management goals and strategy 2. Determine forecasting procedures 3. Plan information flow 4. Determine synchronization procedures 5. Develop contingency management system 6. develop framework of metrics	1. Collect data/information 2. Forecast 3. Synchronize 4. Reduce variability and increase flexibility 5. Measure performance
Order fulfillment	1. Review marketing strategy, supply chain structure & customer service goals 2. Define requirements for order fulfillment 3. Evaluate logistics network 4. Define plan for order fulfillment 5. development framework of metrics	1. Generate & communicate order 2. Enter order 3. Process order 4. Handle documentation 5. Fill order 6. Deliver order 7. perform post-delivery activities and measure performance
Manufacturing flow management	1. Review manufacturing, sourcing, marketing, and logistics strategies 2. Determine degree of manufacturing flexibility requirement 3. Determine push/pull boundaries 4. Identify manufacturing constraints and determine capabilities 5. development framework of metrics	1. Determine routing and velocity through manufacturing 2. 2. Manufacturing and materials planning 3. Execute capacity and demand 4. Measure performance
Product development and commercialization	1. Review corporate, marketing, manufacturing and sourcing strategies 2. Develop idea generation and screening processes 3. Establish guidelines for cross-functional product development team membership 4. identify product rollout issues and constraints 5. Establish new product project guidelines 6. develop framework of metrics	1. Define new products and assess fit 2. Establish cross-functional product development team 3. Formalize new product development project 4. Design and build prototypes 5. Make/buy decision 6. Determine channels 7. Product rollout 8. measure process performance

Table (1) The strategic and operational levels for the supply chain management processes

The strategic process is a necessary step in integrating the firm with other members of the supply chain, and at the operational level is also necessary to show how that the day-to-day activities are done [2].

Competitive Advantage

Competitive Advantage is defined as the "Capability of an organization to create a defensible position over its competitors" [1]. In today's competitive business there is an increased focus on delivering value to the customer [12]. However, competition is considered a war of movement that depends on anticipating and quickly responding to changing market needs [13].

Competition appears in various aspects such as the speed of product delivery or customer service, increase product quality and reduce the price of product or service. To this aim organizations need to move faster in manufacturing, assembly, distribution and supply [6], [14]. Competitive advantage emerges from the creation of superior competencies that are leveraged to create customer value and achieve cost and/or differentiation advantages, resulting in market share and profitability performance[15], [16], [17], [18], [19]. Since manufacturing companies to gain competitive advantage and maintain its position need to be understanding the processes of supply chain [6], [9].

The five dimensions of competitive advantage construct are

1- Price/cost.
2- Quality.
3- Delivery dependability.
4- Product innovation.
5- Time to market.

Table (2) shows the definition of competitive advantageobjectives:

Construct	Definition	References
Price/Cost	The ability of an organization competes against major competitors based on low price.	[19], [20],[21],[22], [23]
Quality	The ability of an organization to offer product quality and performance that creates higher value for customers.	[1], [23], [24], [25]
Delivery Dependability	The ability of an organization to provide on time the type and volume of product required by customer.	[1], [22], [23], [26]
Product Innovation	The ability of an organization to introduce new products and features in the market	[1], [23], [27]
Time to Market	The ability of an organization to introduce new products faster than major competitors.	[1], [28], [29], [30], [31]

Research Framework

The framework developed in this research presented in Fig (2). This frameworkintegratesboth SCMprocesses (demand management, order fulfillment, manufacturing flow management, and product development and commercialization) and competitive advantage to assess competitive advantage through SCM processes. Also finding the relations and weights of both SCM processes and competitive advantage items. Moreover, from the weights of the model, the ranking of SCM processes items are obtained.

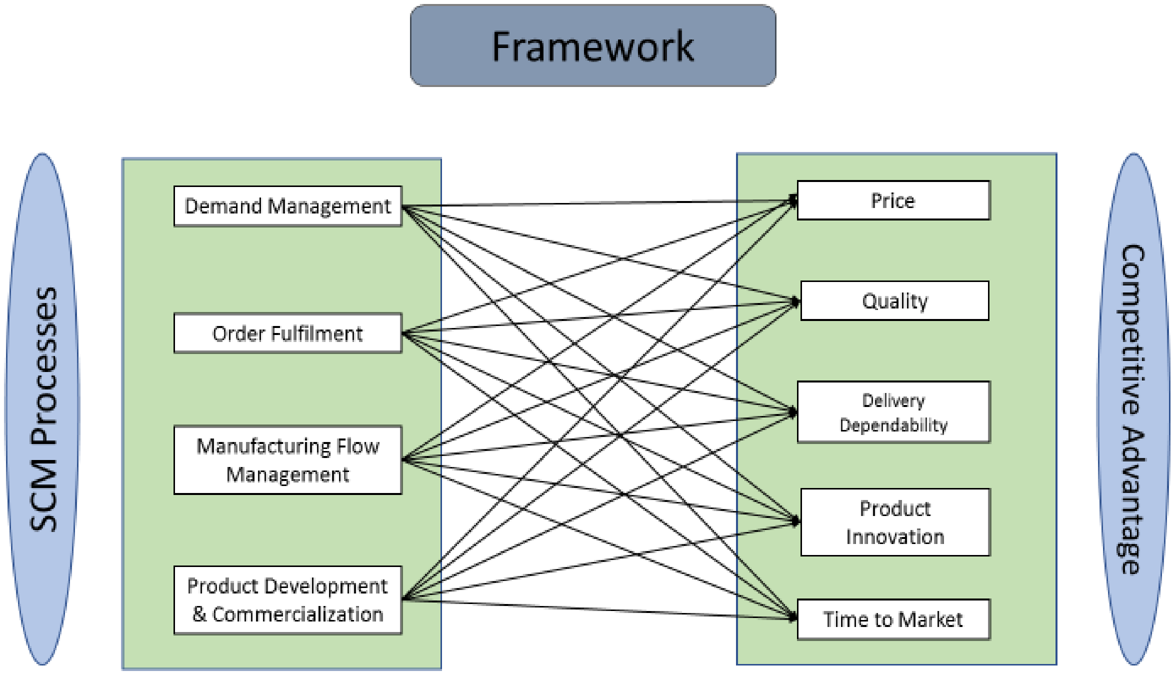

Fig. (2) Research framework

SCM processes depends on various factors such as forecasting, information flow, synchronization, contingency management, marketing, SC structure, logistics, manufacturing,quality of product, and financial measures. These major criteria are composed of sub-criteria that may also affect the evaluation of the system. Some companies may have fewer criteria or sub-criteria than others based on experience or maturity level of the organization. The weight (effect) of each criteria and sub-criteria will be determined by discussing expertsabout their opinions for relative importance. The purpose of this discussion is to formulate the AHP model.

Analytical Hierarchy Process (AHP)

AHP is one of the multiple criteria decision-making method that was originally developed by Thomas L. Saaty 1977. AHP a powerful and understandable methodology that allows groups or individuals to combine qualitative and quantitative factors in decision making process. The three major levels of the hierarchy are the goal, objectives and alternatives. AHP captures priorities from paired comparison judgments of the elements of the decision with respect to each of their parent criteria. Paired comparison judgments are arranged in matrix. Derives priorities among criteria and alternatives, provides measures of judgment consistency.

Table (3)Saaty scale

Intensity of Importance	Definition	Explanation
1	Equal Importance	Two activities contribute equally to the objective
2	Weak or slight	
3	Moderate importance	Experience and judgement slightly favor one activity over another
4	Moderate plus	
5	Strong importance	Experience and judgement strongly favor one activity over another
6	Strong plus	
7	Very strong or demonstrated importance	An activity is favored very strongly over another; its dominance demonstrated in practice
8	Very, very strong	
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation
1,1/2,1/3,1/4,1/5, 1/6,1/7,1/8,1/9	Use reciprocals for inverse comparisons	

Research methodology

In this research,first, data was collected from literaturereview to construct the main elements of the framework. second, interview experts in the field of SCM about the weights of the framework elements. To analyze and evaluate the normality of data, AHP was used to determine the relationship between the four SCM processes, as defined by GSCF, and competitive advantage.

The main five items of the framework used in this study are demand management(DM), order fulfillment(OF), manufacturing flow management (MFM), product development and commercialization (PD&C), and competitive advantage.

Data for this research was collected using an interview with senior managers in the FMCG (fast moving consumer goods), steel industry and home appliances.

Data collection and calculation steps (methodology)

In order to rank SCM processes in respect to competitive advantage using AHP, a decision support system framework is developed as shown in Fig. (2).

Following the decision support framework shown in Fig. 2,the goal of ranking the SCM processes is determined. In this research price, quality, delivery dependability, product innovation and time to market were defined as main criteria for competitive advantage based on literature review. The main criteria are ranked based on experts‘opinions using interview. Experts were asked to perform pair wisecomparison of the criteria based on the importance scale shownin Table 3.The following steps are for calculating the ranking of the SCM processes with respect to competitive advantage.

Step 1: Generation of pair wise comparison matrixfor example:

Matrix "A"	Price	Quality	Delivery Dependability	Product Innovation	Time to Market
Price	**1**	a_{12}		a_{1j}	a_{1n}
Quality					
Delivery Dependability	a_{i1}	a_{i2}		a_{ij}	a_{in}
Product Innovation					
Time to Market	a_{12}	a_{n2}		a_{nj}	**1**

The values of the upper diagonal were taken from saaty scale table 3, to fill the lower triangular matrix, we use the reciprocal values of the upper diagonal. If a_{ij} is the element of row i column j of the matrix, then the lower diagonal is filled using this formula $a_{ji} = 1/a_{ij}$

Step 2: Normalization

This step is to normalize the matrix by dividing each element of the pair wise matrix by the sum of the respected column.

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Step 3:

The weights of the matrix elements were obtained by calculating the average of each row of the normalized matrix.

Step 4:

Multiplying the weight matrix by pair wise comparison matrix to obtain the eigen value (λmax)

where (λmax) equal to sum of multiplication of the weights and pair wise matrices.

The judgment is considered consistent when (λmax) is close to the criteria order of matrix.

Step 5: Consistency analysis

The purpose of this step is to make sure that the original preference ratings were consistent.

The consistency ratio (CR) is calculated as follow:

- Calculate the consistency index (CI).

$CI = \lambda\text{max} - n/n - 1$(where *n* is order of matrix).

Then the consistency ratio$CR = CI/RI$.

The consistency ratio is acceptable once CR ≤ 0.1.

where RI is a random index from the table 3 below.

Table (4) shows the value of RI for each *n*

N	1	2	3	4	5	6	7	8	9
Random Index RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45

Results

The expert's opinion of pair wise comparison using table (3)aresummarized and shown in the following tables.

Experts no.1 in thefield of FMCG, pair wise comparison for the objectives of competitive advantage

FMCG

Table (5) Pairwise comparison among objectives

Matrix "A"	Price	Quality	Delivery Dependability	Product Innovation	Time to Market	Weights
Price	1	2	2	2	3	0.3331
Quality	1/2	1	1/2	1/3	2	0.1297
Delivery Dependability	1/2	2	1	2	3	0.2516
Product Innovation	1/2	3	1/2	1	2	0.1996
Time to Market	1/3	1/2	1/3	1/2	1	0.0860

CI=0.0559CR=0.0499

Table (6) pairwise comparisons among SCM processes with respect to price

	DM	OF	MFM	PD	Weights
DM	1	5	3	2	0.4803
OF	1/5	1	1/2	1/3	0.0879
MFM	1/3	2	1	2	0.2302
PD	1/2	3	1/2	1	0.2015

CI=0.05 CR=0.059

Table (7) pair wise comparisons among SCM processes with respect to quality

	DM	OF	MFM	PD	Weights
DM	1	9	4	3	0.5516
OF	1/9	1	1/5	1/2	0.0550
MFM	1/4	5	1	4	0.2739
PD	1/3	2	1/4	1	0.1195

CI=0.085 CR=0.094

Table (8) pairwise comparisons among SCM processes with respect to delivery dependability

	DM	OF	MFM	PD	Weights
DM	1	8	4	3	0.5472
OF	1/8	1	1/7	1/3	0.0509
MFM	1/4	7	1	2	0.2519
PD	1/3	3	1/2	1	0.1499

CI=0.055 CR=0.0614

Table (9) pairwise comparisons among SCM processes with respect to product innovation

	DM	OF	MFM	PD	Weights
DM	1	6	3	3	0.4990
OF	1/6	1	1/5	1/4	0.0580
MFM	1/3	5	1	3	0.2822
PD	1/3	4	1/3	1	0.1608

CI=0.077 CR=0.085

Table (10) pair wise comparisons among SCM processes with respect to time to market

	DM	OF	MFM	PD	Weights
DM	1	8	3	6	0.5821
OF	1/8	1	1/3	1/2	0.0655
MFM	1/3	3	1	5	0.2600
PD	1/6	2	1/5	1	0.0924

CI=0.054 CR=0.059

Table (11) represents matrix of scores

	Price	Quality	Delivery Dependability	Product Innovation	Time to Market	Ranking
DM	0.4803	0.5516	0.5472	0.499	0.5821	0.53204
OF	0.0879	0.055	0.0509	0.058	0.0655	0.06346
MFM	0.2302	0.2739	0.2519	0.2822	0.26	0.25964
PD	0.2015	0.1195	0.1499	0.1608	0.0924	0.14482

The above-mentioned results are based on AHP procedures,according to the data collected from FMCG expert. Ranking of competitive advantage objectives are as follow: price (33%), quality (13%), delivery dependability (25%), product innovation (20%) and time to market (9%), with consistency ratio of 0.09.the judgment is consistent since the inconsistency ratio is ≤ 0.1

Also, the results showed that the weights of SCM processes with respect to:

- Price: DM (48%), OF (9%), MFM (23%) and PD (20%).
- Quality: DM (55%), OF (6%), MFM (27%) and PD (12%).
- Delivery Dependability: DM (55%), OF (5%), MFM (25%) and PD (15%).
- Product Innovation: DM (50%), OF (6%), MFM (28%) and PD (16%).
- Time to Market: DM (58%), OF (7%), MFM (26%) and PD (9%).

Thus, the ranking of SCM processes among competitive advantage is DM 53%, OF 6%, MFM 26% and PD 15%.

Experts no.2 in the field of steel industry, pair wise comparison for the objectives of competitive advantage

Steel Industry

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Table (12) represents pairwise comparisons among objectives

Matrix "A"	Price	Quality	Delivery Dependability	Product Innovation	Time to Market	Weights
Price	1	3	5	8	9	0.5049
Quality	1/3	1	7	3	6	0.2766
Delivery Dependability	1/5	1/7	1	2	4	0.1060
Product Innovation	1/8	1/3	1/2	1	3	0.0758
Time to Market	1/9	1/6	1/4	1/3	1	0.0367

CI=0.0997 CR=0.089

Table (13) represents pairwise comparisons among SCM processes with respect to price

	DM	OF	MFM	PD	Weights
DM	1	4	9	6	0.6122
OF	1/4	1	3	3	0.2002
MFM	1/9	1/3	1	1/5	0.0517
PD	1/6	1/3	5	1	0.1359

CI=0.104 CR=0.093

Table (14) represents pair wise comparisons among SCM processes with respect to quality

	DM	OF	MFM	PD	Weights
DM	1	2	8	3	0.4831
OF	1/2	1	3	4	0.3017
MFM	1/8	1/3	1	1/4	0.0624
PD	1/3	1/4	4	1	0.1528

CI=0.088 CR=0.097

Table (15) represents pairwise comparisons among SCM processes with respect to delivery dependability

	DM	OF	MFM	PD	Weights
DM	1	4	7	6	0.5836
OF	1/4	1	8	3	0.2684
MFM	1/7	1/8	1	1/2	0.0544
PD	1/6	1/3	2	1	0.0936

CI=0.069 CR=0.077

Table (16) represents pairwise comparisons among SCM processes with respect to product innovation

	DM	OF	MFM	PD	Weights
DM	1	3	8	4	0.5610
OF	1/3	1	4	3	0.2582
MFM	1/8	1/4	1	1/2	0.0633
PD	1/4	1/3	2	1	0.1175

CI=0.0319 CR=0.0355

Table (17) represents pair wise comparisons among SCM processes with respect to time to market

	DM	OF	MFM	PD	Weights

DM	1	3	9	4	0.5320
OF	1/3	1	8	3	0.2804
MFM	1/9	1/8	1	1/6	0.0389
PD	1/4	1/3	6	1	0.1487

CI=0.07 CR=0.0779

Table (18) represents matrix of scores

	Price	Quality	Delivery Dependability	Product Innovation	Time to Market	Ranking
DM	0.6122	0.4831	0.5836	0.561	0.532	0.55438
OF	0.2002	0.3017	0.2684	0.2582	0.2804	0.26178
MFM	0.0517	0.0624	0.0544	0.0633	0.0389	0.05414
PD	0.1359	0.1528	0.0936	0.1175	0.1487	0.1297

The above-mentioned results are based on AHP procedures, according to the data collected from FMCG expert, ranking of competitive advantage objectives are as follow: price (50%), quality (27%), delivery dependability (11%), product innovation (8%) and time to market (4%), with consistency ratio of 0.089. the judgment is consistent since the inconsistency ratio is≤ 0.1.

Also, the results showed that the weights of SCM processes with respect to:

- Price: DM (61%), OF (20%), MFM (5%) and PD (14%).
- Quality: DM (48%), OF (30%), MFM (7%) and PD (15%).
- Delivery Dependability: DM (58%), OF (27%), MFM (6%) and PD (9%).
- Product Innovation: DM (56%), OF (26%), MFM (6%) and PD (12%).
- Time to Market: DM (53%), OF (28%), MFM (4%) and PD (15%).

Thus, the ranking of SCM processes among competitive advantage is DM 55%, OF 27%, MFM 5% and PD 13%

Experts no.3 in the field Home Appliances, pair wise comparison for the objectives of competitive advantage

Home Appliances

Table (19) represents pairwise comparisons among objectives

Matrix "A"	Price	Quality	Delivery Dependability	Product Innovation	Time to Market	Weights
Price	1	3	4	5	9	0.4527
Quality	1/3	1	5	6	8	0.3181
Delivery Dependability	1/4	1/5	1	2	3	0.1050
Product Innovation	1/5	1/6	1/2	1	5	0.0903
Time to Market	1/9	1/8	1/3	1/5	1	0.0340

CI=0.102 CR=0.09

Table (20) represents pairwise comparisons among SCM processes with respect to price

	DM	OF	MFM	PD	Weights
DM	1	1/2	4	3	0.3135
OF	2	1	6	2	0.4344
MFM	1/4	1/5	1	1/5	0.0647
PD	1/6	1/2	5	1	0.1875

CI=0.067 CR=0.075

Table (21) represents Pairwise comparisons among SCM processes with respect to quality

	DM	OF	MFM	PD	Weights
DM	1	1/2	6	4	0.3561
OF	2	1	7	2	0.4341

MFM	1/6	1/7	1	1/3	0.0549
PD	1/4	1/2	3	1	0.1548

CI=0.0405 CR=0.045

Table (22) represents pair wise comparisons among SCM processes with respect to delivery dependability

	DM	**OF**	**MFM**	**PD**	**Weights**
DM	1	1/2	6	5	0.3358
OF	2	1	5	7	0.4988
MFM	1/6	1/5	1	1/3	0.0624
PD	1/5	1/7	3	1	0.1030

CI=0.085 CR=0.094

Table (23) represents pairwise comparisons among SCM processes with respect to product innovation

	DM	**OF**	**MFM**	**PD**	**Weights**
DM	1	1/3	4	2	0.2487
OF	3	1	5	3	0.5011
MFM	1/4	1/5	1	1/4	0.0678
PD	1/2	1/3	4	1	0.1824

CI=0.08CR=0.09

Table (24) represents pairwise comparisons among SCM processes with respect to time to market

	DM	**OF**	**MFM**	**PD**	**Weights**
DM	1	1/3	3	3	0.2372
OF	3	1	6	5	0.5501
MFM	1/3	1/6	1	1/4	0.0670
PD	1/3	1/5	4	1	0.1457

CI=0.087 CR=0.096

Table (25) represents matrix of scores

	Price	**Quality**	**Delivery Dependability**	**Product Innovation**	**Time to Market**	**Ranking**
DM	0.3135	0.3561	0.3358	0.2487	0.2372	0.29826
OF	0.4344	0.4341	0.4988	0.5011	0.5501	0.4837
MFM	0.0647	0.0549	0.0624	0.0678	0.067	0.06336
PD	0.1875	0.1548	0.103	0.1824	0.1457	0.15468

The above-mentioned results are based on AHP procedures, according to the data collected from FMCG expert, ranking of competitive advantage objectives are as follow: price (45%), quality (32%), delivery dependability (11%), product innovation (9%) and time to market (3%), with consistency ratio of 0.09. the judgment is consistent since the inconsistency ratio is≤ 0.1

Also, the results showed that the weights of SCM processes with respect to:

- Price: DM (31%), OF (43%), MFM (7%) and PD (19%).
- Quality: DM (36%), OF (42%), MFM (6%) and PD (16%).
- Delivery Dependability: DM (34%), OF (50%), MFM (6%) and PD (10%).
- Product Innovation: DM (25%), OF (50%), MFM (7%) and PD (18%).
- Time to Market: DM (24%), OF (55%), MFM (6%) and PD (15%).

Thus, the ranking of SCM processes among competitive advantage is DM 30%, OF 48%, MFM 6% and PD 16%

Conclusion

Prioritizing the SCM processes plays avital role in the supply chain performance of the organization in order to meet competitive advantage objectives. This research proposed a framework for ranking the SCM processes with respect to competitive advantage objectives. The framework was implemented on three case studies for different types of industries (FMCG, steel industry and home appliances) in Egypt.

Due to the complexity of the problem, we used the multicriteria decision making tool (AHP). The problem is divided into two hierarchies (main criteria and sub criteria). The main criteria (price, quality, delivery dependability, product innovation and time to market) are identified based on literature review. These criterions are ranked based on the experts' opinions using AHP pair wise comparison approach.

The results of ranking of the main criteria areprice (33%), quality (13%), delivery dependability (25%), product innovation (20%) and time to market (9%) within consistency ratio of 0.0499 according to first expert. Sets of sub criterion is identified and ranked with respect to their associated main criteria using the same procedures such as demand management and order fulfillment are ranked with respect to price.

The results of ranking the main criteria by the second expert are as follow: price (50%), quality (27%), delivery dependability (11%), product innovation (8%) and time to market (4%) within consistency of 0.089. Regarding the third expert ranking of the main criteria price (45%), quality (32%), delivery dependability (11%), product innovation (9%) and time to market (3%) within consistency of 0.09 as shown in table (26).

Table (26) shows the summery of ranking competitive advantage objectives according to expert's opinions.

Competitive advantage	Expert 1	Expert 2	Expert 3
Price	33%	50%	45%
Quality	13%	27%	32%
Delivery dependability	25%	11%	11%
Product innovation	20%	8%	9%
Time to market	9%	4%	3%

Ranking of SCM processes shows that there is a different impact levels of SCM processes on competitive advantage regarding to experts.

In this research noted that DM impacts on competitive advantage with variety of ranking 53%,55%and 30%, OF impacts on competitive advantage with variety of ranking 6%, 27%, and 48%, MFM impacts on competitive advantage with variety of ranking 26%,5%, and 6%. Finally, PD&C impacts on competitive advantage with variety of ranking 15%,13%, and 16%. according to the three experts respectively as shown in table (27).

Table (27) shows the summery of ranking of SCM processes according to expert's opinions.

SCM processes	Expert 1	Expert 2	Expert 3
DM	53%	55%	30%
OF	6%	27%	48%
MFM	26%	5%	6%
PD	15%	13%	16%

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