

Assessing the ability to implement ISCM for procurement in construction companies in Iraq (Al-Rasheed state contracting construction company as a case study)

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Abstract

Constructions industry by their projects and works is regard one of the biggest and important industries in most countries, which most of construction projects needing large amounts of materials, goods and services from different types. It can easily be seen that there is a consistently higher rate for the construction projects in Iraq when compared with the country's other industrial Activities. Integrated supply chain management for procurement processes from planning through good administration to contract closeout give best value from purchasing, storage and delivery just in right amount and time.

The objective of this research is to review the concept, definition, and benefits of ISCM for Procurement processes with assessing the implementation of such a procurement world class system for construction companies in Iraq through field survey and developing a "checklist" to investigate, record, weighting, and analyze the facts of existing procurement chain management of Al-Rasheed State contracting construction Company as case study. The research conclusions show that Al-Rasheed CO. implementation percentage of procurement management about 36.3%. where the management isn't aware of procurement management importance, so little knowledge about ISCM and its benefits for procurements processes to company and its projects, , therefore hasn't contrapuntal department for procurement . Several proper solutions were recommended to improve the existing supply chain management for procurement such as establishing procurement department, the role of leadership and commitment to procurement, documentation of ISCM, and proper database for vendors, materials, information and catalogs by modern Information's technology.

Key Words : Integrated Supply Chain Management, Procurement Processes, Construction companies

تقييم القدرة لأداء إدارة سلسلة التوريد المتكاملة للمشتريات في الشركات الإنشائية في العراق (شركة الرشيد العامة للمقاولات الإنشائية كحالة دراسية)

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الخلاصة

تعتبر الصناعة الإنشائية بمشاريعها وأعمالها واحدة من أهم واكبر الصناعات في معظم الدول، حيث معظم المشاريع الإنشائية تحتاج إلى كميات كبيرة من المواد والبضائع والخدمات ومن مختلف الأنواع، من السهولة ملاحظة وجود معدل مرتفع وبثبات لقطاع الإنشاءات في العراق مقارنة مع بقية الصناعات في البلد. إدارة سلسلة التوريد المتكاملة لعملية المشتريات ابتداءً من التخطيط مروراً بالإدارة الجيدة وانتهاءً بغلق ملفات العقود يعطي أفضل قيمة لعملية الشراء والخزن والتوزيع بأفضل وقت وبأفضل كمية.

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هدف هذا البحث هو استعراض الفكرة والتعريف والمنافع لإدارة سلسلة التوريد المتكاملة لعملية المشتريات مع تقييم التطبيق لمثل هذا النظام العالمي للمشتريات للشركات الإنشائية في العراق من خلال المسح الميداني وإعداد قائمة تدقيق للتحقق وتسجيل الحقائق الحالية لإدارة سلسلة المشتريات لشركة الرشيد العامة للمقاولات الإنشائية ثم قياس وزنها وتحليلها كحالة دراسية للبحث، الاستنتاجات أظهرت أن نسبة التطبيق لنسبة إدارة المشتريات بحدود 36.4%، حيث إدارة الشركة غير مدركة لأهمية إدارة المشتريات، لذلك قلة المعرفة بإدارة سلسلة التوريد المتكاملة وفوائدها لعملية المشتريات للشركة وكافة مشاريعها، لذا لا تمتلك قسم مختص بالمشتريات. لذلك عدد من التوصيات اقترحت لتطوير إدارة سلسلة التوريد متضمنة إنشاء قسم للمشتريات، ودور قيادة الشركة والتزامها تجاه المشتريات، والتوثيق المستمر واعتماد قاعدة بيانات متطورة للبائعين والمجهزين، والمواد والمعلومات والنماذج بأحدث تقنيات المعلومات.

1. Introduction

The ISCM process covers the entire lifecycle of procurement and includes the Procurement Plan, Strategy and Processing, Contract Management, and Letters of Credit[1].

Supply chain management (SCM) is a concept originating from the supply system by which Toyota was seen to coordinate its supplies, and manage its supplier's. In terms of lean production; SCM is closely related to lean supply. Until now, in construction, initiatives belonging to the domain of SCM have been rather partial covering a subset of issues (e.g., transportation costs) in a limited part of the construction supply chain (e.g., the construction site). In most cases, the issues are regarded from a main contractor's point of view.[2,3]

Vrijhoef and Koskela show that main contractors are purchasing more labor and material than previously. For instance, in 1994, in Dutch construction industry (i.e. residential, commercial and industrial building), the main contractors' share in the total national turnover had decreased to 24%. Thus, suppliers and subcontractors represented about 75% of turnover. Currently, this is expected to be more.

Thus, the goal of this paper is to assess the possibility of ISCM for procurement management and clarify its process s in construction.

The focus of this paper is on the supply chain of main contracting companies for effective procurement system at the international standard levels.

2. Research Justification

The reasons behind carrying out this research paper are:

- Construction industry has a large amount of purchasing, deliver, storage and usage of materials and goods in the projects works.
- The construction companies depend majority on experience, judgment and management of projects manger for their projects procurement.
- Top- managements of construction companies in Iraq aren't aware of importance to mange procurement by a world system (ISCM) for providing better value to their projects and business.

3. Research Objectives

The objective of the research is to assess the implementation of ISCM for procurement plan, process and management for construction companies in Iraq.

4. Supply chain management in manufacturing

4-1. Origin of supply chain management

SCM is a concept that has originated and flourished in the manufacturing industry. The first signs of SCM were perceptible in the JIT delivery system as part of the Toyota Production System.

This system aimed to regulate supplies to the Toyota motor factory just in the right - small - amount, just on the right time. The main goal was to decrease inventory drastically, and to regulate the suppliers' interaction with the production line more effectively [2].

After its emergence in the Japanese automotive industry as part of a production system, the conceptual evolution of SCM has resulted in an autonomous status of the concept in industrial management theory, and a distinct subject of scientific research, as discussed in literature on SCM. Along with original SCM approaches, other management concepts (e.g., value chain, extended enterprise) have been influencing the conceptual evolution towards the present understanding of SCM.

4-2 Concept of Supply Chain Management

The supply chain has been defined as 'the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer(1)(2).

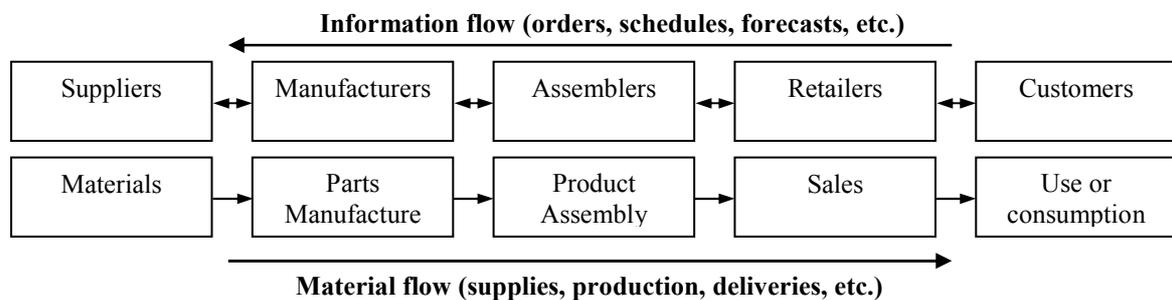


Figure 1: Generic configuration of a supply chain in manufacturing[2,3]

SCM looks across the entire supply chain (Figure 1), rather than just at the next entity or level, and aims to increase transparency and alignment of the supply chain's coordination and configuration, regardless of functional or corporate boundaries.

According to some authors, the shift from traditional ways of managing the supply chain towards SCM includes various elements (Table 1). The traditional way of managing is essentially based on a conversion (or transformation) view on production, whereas SCM is based on a flow view of production.

The conversion view suggests that each stage of production is controlled independently, whereas the flow view focuses on the control of the total flow of production[2].

4-3 Definition of Supply Chain Management

Supply chain is the term used to describe the linkage of companies that turns a series of basic materials, products or services into a finished product for the client.

All construction companies, be they client, main contractor, designer, surveyor, sub-contractor, or supplier are therefore part of a supply chain. Because of the project based nature of construction and the way that procurement normally operates, they are usually members of different supply chains on different projects.

Each company in the chain has a client – the organization to which the services are provided – but an integrated supply chain will have the objective of understanding and working wholly in the interests of the 'project client'[4].

"Yaros Perez" define Supply Chain management is a network of facilities and distribution options that integrate the functions of; procurement of materials, transformation of these materials into finished products, and the distribution of these finished products to customers.

The most important thing need is a mechanism through which these different functions can be integrated together. Supply Chain management is a strategy through which such integration can be achieved[5].

The integrated supply chain is an evolving concept focusing on merging a buyer's requirements directly into a supplier's production schedule. The objective is no less than to ensure the timely deliver of a properly configured product, to the right place, at the right time [6].

5. Methodology of Supply Chain Management

In the literature on SCM, three degrees of complexity have been seen. The 1st degree is called "direct supply chain", the 2nd degree is called "extend supply chain", The 3rd degree is called "ultimate supply chain"[1]. And many supply chain methods have been proposed. Most methods of ISCM address logistical issues of the supply chain, e.g., quality rates, inventory, lead-time and production cost.

The methods of "supply chain modeling" and "logistics performance management" analyze stock levels across the supply chain. The "LOGI method" studies time buffers and controllability problems of the delivery process. "Supply chain costing" focuses on cost build up along the supply chain. Integral methods like "value stream mapping" and "process performance measurement" offer a toolbox to analyze various issues including lead time and quality defects.[2,7]

Table 1: Characteristic differences between traditional ways of managing the supply chain and SCM [2]

Element	Traditional management	Supply chain management
Inventory management approach	Independent efforts	Joint reduction of channel inventories
Total cost approach	Minimize firm costs	Channel-wide cost efficiencies
Time horizon	Short term	Long term
Amount of information sharing and monitoring	Limited to needs of current transaction	As required for planning and monitoring processes
Amount of coordination of multiple levels in the channel	Single contact for the transaction between channel pairs	Multiple contacts between levels in firms and levels of channel
Joint planning	Transaction-based	Ongoing
Compatibility of corporate philosophies	Not relevant	Compatibility at least for key relationships
Breadth of supplier base	Large to increase competition and spread risks	Small to increase coordination
Channel leadership	Not needed	Needed for coordination focus
Amount of sharing risks and rewards	Each on its own	Risks and rewards shared over the long term
Speed of operations, information and inventory levels	“Warehouse” orientation (storage, safety stock) interrupted by barriers to flows; localized to channel pairs	“Distribution center” orientation (inventory velocity) interconnecting flows; JIT, quick response across the channel Besides assessing and improving the supply chain, other elements are essential

Besides assessing and improving the supply chain, other elements are essential to the Methodology of SCM. A generic methodology of SCM can be deduced combining and generalizing the commonalities of different SCM methods. In a way, the SCM methodology bears resemblance to the Deming Cycle (Figure 2). Generically, the methodology of SCM consists of four main elements: (1) Supply chain assessment, (2) Supply chain redesign, (3) Supply chain control, and (4) Continuous supply chain improvement.

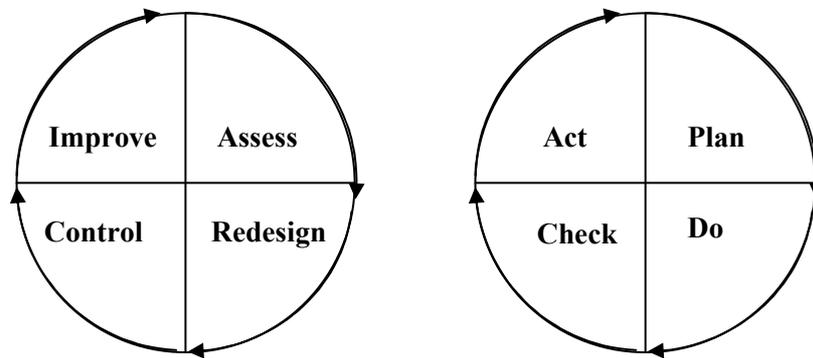


Figure 2: Generic SCM methodology compared to the Deming Cycle [2]

The first step is to assess the current process across the supply chain in order to detect actual waste and problems. The issue here is to find the causality between the waste and problems, and locate their root causes. Once the causality is understood, and having found out about the root causes, the next step is to redesign the supply chain in order to introduce structural resolution of the problems. This includes redistribution of roles, tasks and responsibilities among the actors in the supply chain, and a review of procedures. The next step is to control the supply chain according to its new configuration. An important part of the control is the installation of a monitoring mechanism to continuously assess how the supply chain operates. This includes systems to measure and estimate waste across the supply chain process, and feedback systems to discuss and evaluate underlying problems. The objective is to continuously identify new opportunities, and find new initiatives to develop the supply chain. In fact, this continuous improvement implies the ongoing evaluation of the supply chain process, and the recurring deployment of the previous three steps: assessment, redesign and control (Figure 2) [2].

6. Benefits of Effective Supply Chain Management

The Supply Chain includes all activities and processes to supply a product or service to the final customer. Effective Supply Chain Management is the key to a competitive business advantage.

"The eight major benefits to effective Supply Chain Management can be summarized as follows:

1. Improved customer service: having the right products, available for delivery when requested, at a good price.
2. Reduction of costs across the Supply Chain and more efficient management of working capital
3. More efficient management of raw materials, work-in-process, and finished goods inventory
4. Increased efficiency in the transactions between Supply Chain partners
5. Better manufacturing resource management
6. Optimized manufacturing schedules
7. Optimal distribution of existing inventory across the Supply Chain
8. Enhanced customer value, often in the form of lower prices"

Each benefit has distinct business and technical challenges, but they all are focus on the customer satisfaction and improvement of business goals[5].

7. Management of Construction supply Chain

The management of CSC and their design should be based on four roles SCMC can assume first role focuses on the immediate interface between the construction site and supply chain. Second role focuses on the entire supply chain that provides resources to a construction site, but not on the site itself. The third role focuses on transferring activities from the construction site to the supply chain, e.g., pre-fabricated initiatives. Finally the fourth role suggests that the entire supply chain and

the construction site should be managed in an integrated fashion[7]. Where (figure 3) show the supply chain coordinated by the main contractor for the residential building

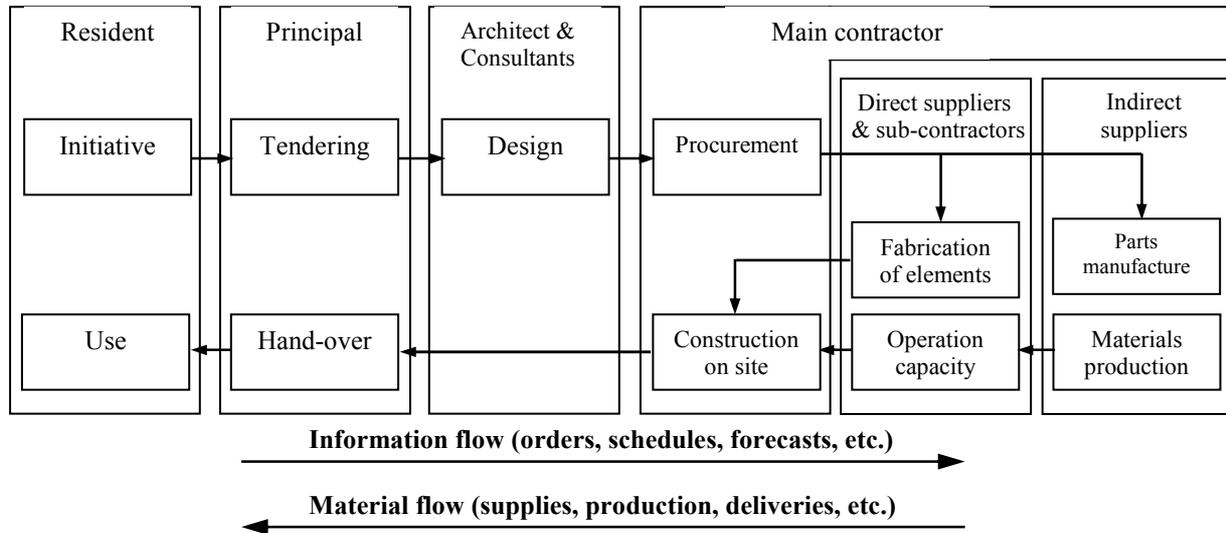


Figure 3: Generic configuration of a traditional supply chain in residential building⁽²⁾

7-1 SCM guidance for the procurement process

Give interact efficiency with the clients and to anticipate needs. And assure the strategic handling of procurement that includes best practices to evolve toward procurement integration of goods and service agreements. Then evolve toward assets management through inventory optimization, warehousing rationalization and sale of unproductive assets. Also unite efforts to improve the competitiveness of the suppliers and to maximize its participation. Finally develop a culture of service orientation, added value, business vision and teamwork.

8. The Supply Chain for the Iraqi Government Establishments

National Capacity Development Public Management (TATWEER) has mentioned that the supply chain for most of Iraqi ministries and its projects as shown below in (figure 4), which procurements process represent the main element in it, where (figure 5) illustrate the chain value for the procurement process as part of effective ISCM.[8]

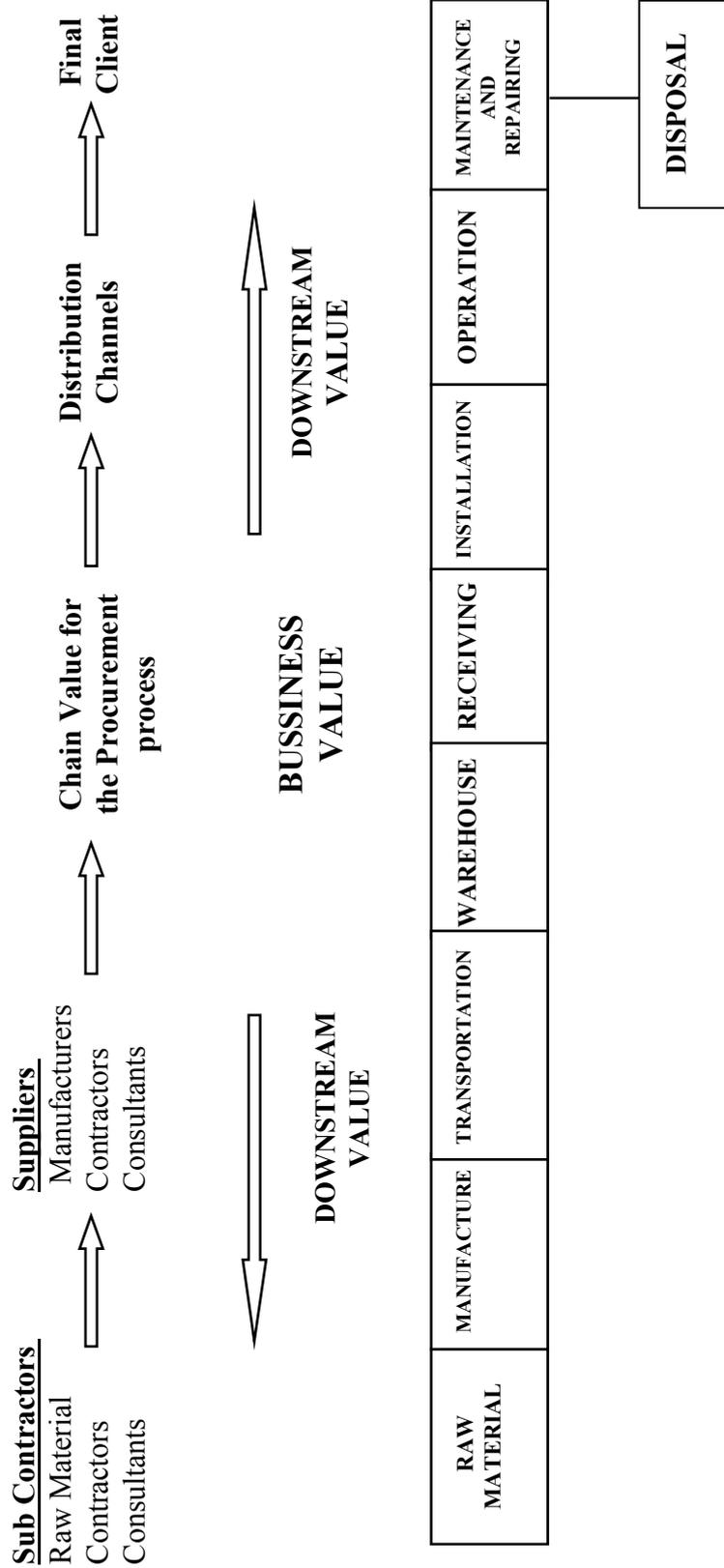


Figure 4: GoI / Supply Chain^[8]

9. Integrated Supply Chain Management in Construction

Project procurement management in the integrated supply chain takes six major processes in most cases as explained in the diagram bellow in (figure 6)[8],So the ISCM process covers the entire lifecycle of procurement and includes the Procurement Plan, Strategy and Processing, Contract Management, and Letters of Credit.

9.1 The Project Procurement Management Major Processes:

- A. Procurement planning: - determining what to procure and when.
- B. Solicitation planning: - documenting product (goods, services,...)requirements and identifying potential sources.
- C. Solicitation:- obtaining quotations, bids, offers, or proposals, as appropriate.
- D. Source selection:- choosing from among potential sellers.
- E. Contract administration:- managing the relationship with seller.
- F. Contract closeout:- completion and settlement of contract, including resolution of any open items.

These processes interact with each other and with the processes in the other knowledge areas as well. Each process may involve effort from one or more individuals or groups of individuals, based on needs of the project.[9,10]

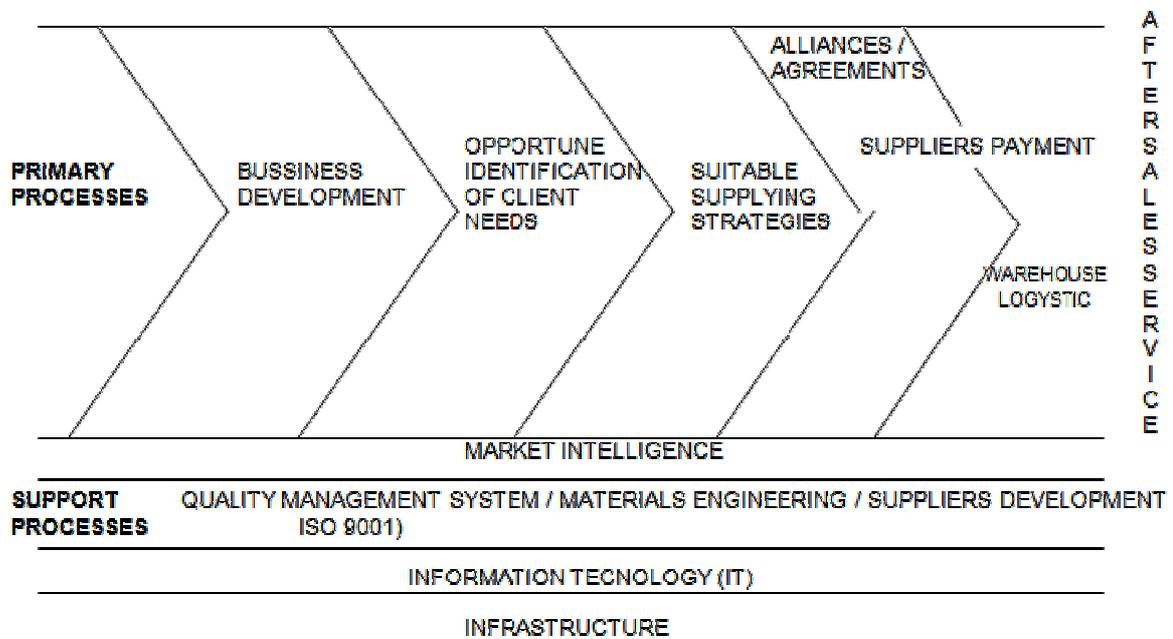


Figure 5: Chain Value for the Procurement^[8]

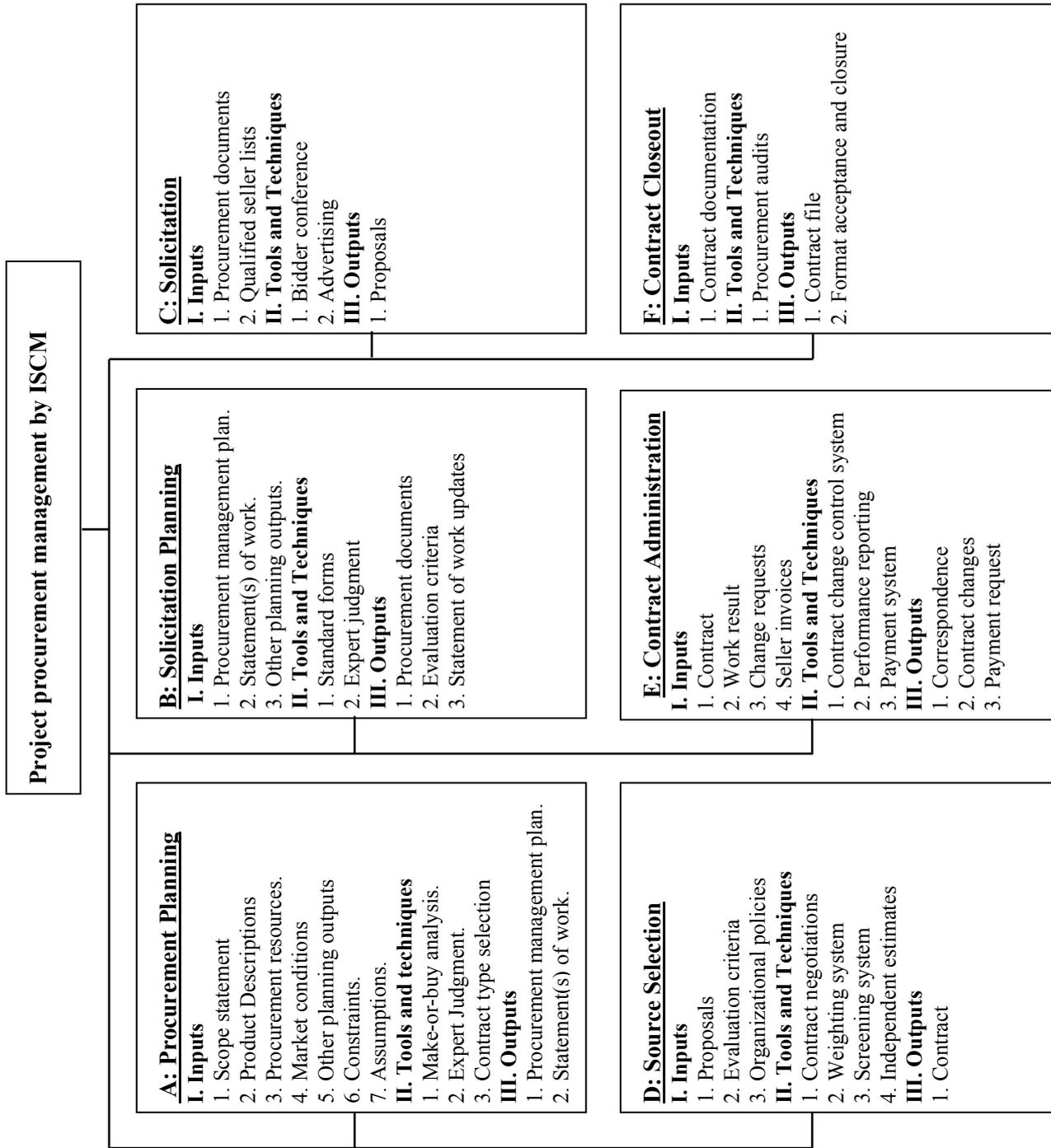


Figure 6: Project procurement management overview^[9]

10. Research Methodology

- G. The research work, undertaken to achieve the research objective, has adopted the following methodology:
- H. Literature survey includes reviewing of pertinent literature, covering; scientific references including textbooks, conferences, journals and magazines that outlined and discussed the ISCM and procurement management subjects.
- I. Field survey includes developing "checklist" to investigate and record the facts of the existing procurement system and its chain management of Al-Rasheed state contracting construction company as case study (Appendix-A).
- J. Analyzing the collected data to study and assess the existing system and indicate the major weakness, lacks and bottlenecks.
- K. Introducing the required recommendations to apply and adopt them.

11. Field survey of the ISCM through case study

A "checklist" of ISCM for procurement is prepared, where it contained three main questions parts, then Al-Rashid state construction contracting company has been visited as case study and series meetings with the Co. purchasing officials (3 members) were held to answer the checklist and discussing the company procurement management and purchasing contracts so the supply chain that was depended, where the answers to the checklist is explained in (Appendix-A). This series of meeting and questions successfully identified several issues of concern and key bottlenecks and weakness in the procurement process.

12. Analyzing and Assessing the ISCM for Procurement system

12-1 Implementation of ISCM for procurement

1. Little knowledge about ISCM and its benefits and importance so weakness in implement the ISCM (about 36.3%) to procurement and its plan, process and contracts.
2. The company hasn't support procurement management by a Quality management system (ISO 9001).
3. Absence of IT systems- software, hardware, and internet, where the present working culture is based on outdated manual methods of procurement planning and inventory control.

12-2 Weighting criteria Analysis

Four weight scales have been selected for checklist can use it to assess the percentage of implementation according to importance degree for each procurement main steps, which the weight of (very=1, medium=0.66, little=.33, none=0).

So according to weighting criteria, percentage of implementation for total procurement management for Al-Rasheed state Co. can be evaluated from formula (1).where it about 36.3% as shown in (figure 7).

$$\text{Total Percentage of Implementation} = \sum_{I=1}^6 X_I * F_I \quad (1)$$

Where:

X_I = Implementation number for procurement major processes

F_I = Importance degree from checklist

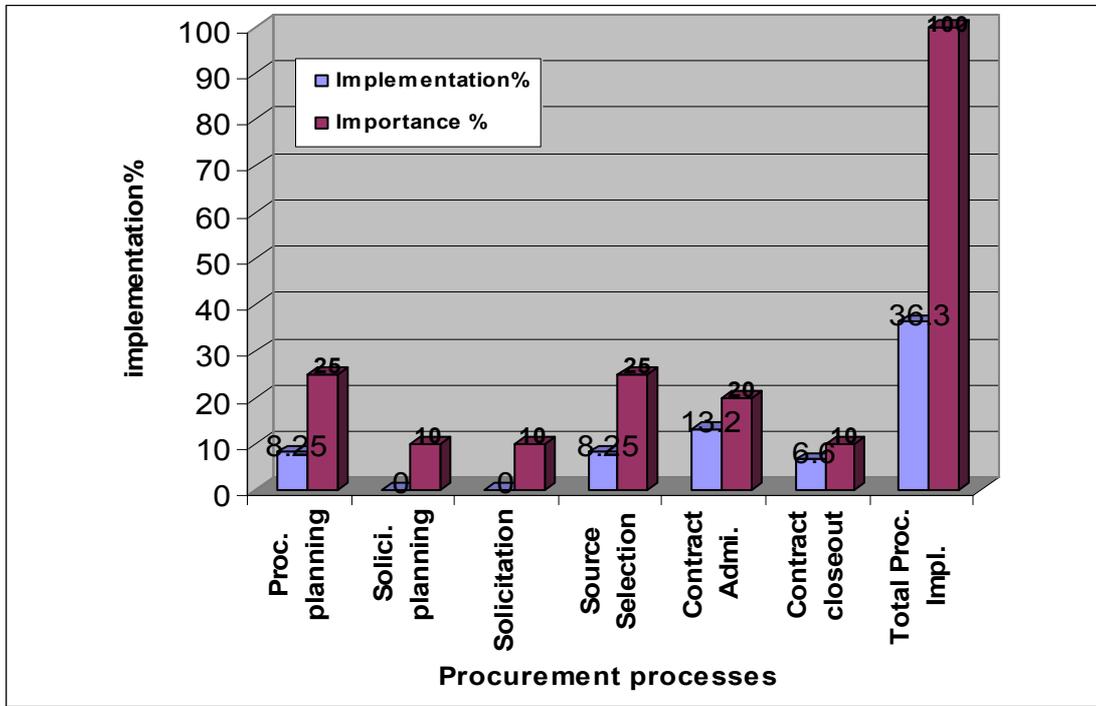


Figure 7: Percentage of Implementation

13. Conclusions

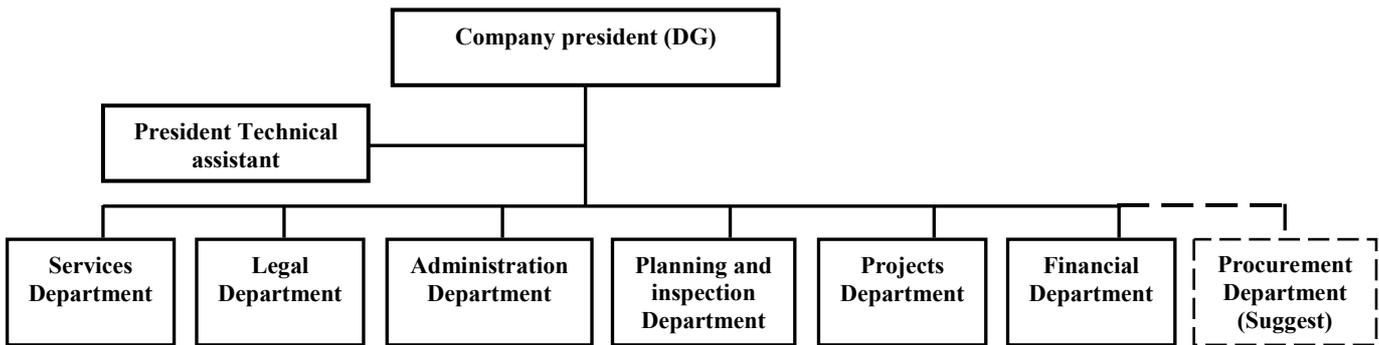
The observations and information gathered during the procurement management checklist analysis and the meetings presented for Al-Rasheed state Co. the following conclusions have been drawn:

1. There are no department in the Co. for procurement and its plans and management.
2. Percentage of implementation of ISCM for total procurement management for the Co. about 36.3%.
3. The company has weakness in the information technology (IT) system for procurement management.
4. Zero percent for continues implement of the solicitation planning for (information, vendors list, materials, specification). Therefore, no solicitation.
5. Inadequate inventory planning and control process. Relies on manual record-keeping and individual knowledge and experience about stock, needing and ordered things.
6. Breakdowns in communications: the communication flow between departments and between different sections in Co. itself and projects is not fluid or accurate or timely.
7. Contract Administration procedures are not widely used. Contract administration is not practiced through the end stages of a contract. Contract closure and contract auditing processes are not systemically used.
8. Limited procurement specifications and information. Access to and awareness of detailed, up-to-date information on vendors, product specifications, and pricing and estimates is limited.

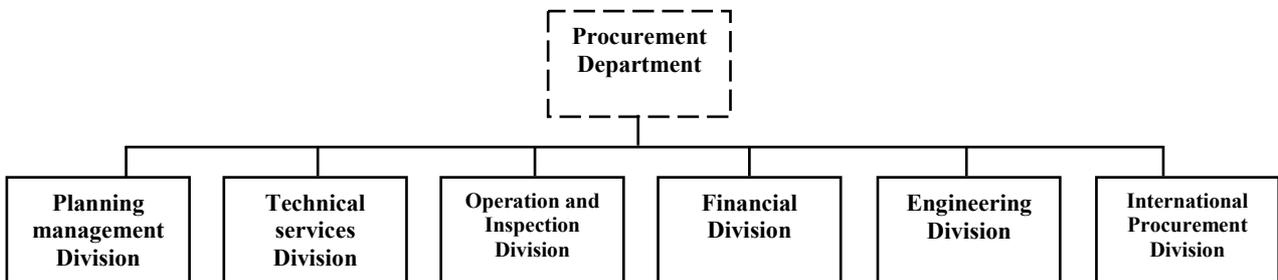
14. Recommendations

According to the aforementioned analyzing, evaluating, and the drawn conclusions, the following recommendations have been given to enhance ISCM procurement strategies and management:

1. Establishing a department for procurement connecting directly to the Company director general as the following organizational structure in (figure 10).
2. Top management must demonstrate their leadership and commitment to procurement so that officials understand that procurement is a main job.
3. Utilize a team of professionals, on each from purchasing, contracts, and projects and others to formulate a procurement plan and procurement strategy prior to initiating procurement actions. This core team should be associated with the budget planning team.
4. Complete IT systems with suitable hardware, software, and internet facilities should be installed and made accessible to the entire procurement team.
5. Providing training courses and workshops for officials working in purchasing to ward ISCM for procurement and contract management to develop their skills and efforts.
6. Ensuring that procurement plan, process and ISCM are in place, implemented, and periodically reviewed to keep them up to date should any thing goes wrong.
7. Create and maintain a database containing current listings of information necessary to efficient procurement processing, such as lists of vendors, prices and estimates, product specifications, and master parts catalogues.
8. Ensure procurement planning is a routine part of company work activities including review of projects tasks and needs with project managers prior to performing it.



A: Al-Rasheed state Co. Organizational Structure



B: Suggested Procurement Department

Figure 10: Suggested procurement Department for Construction Companies

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Appendix - A

CEHECKLIST

Company:.....

Official Name:.....

Official Degree:.....

Part one: Implementation of ISCM for procurement process

1st : Basic Questions

Freq.	Question	Very	Medium	Little	None
1	What is your knowledge about ISCM?			√	
2	Do you use ISCM process			√	
3	The CO. has a world-class procurement system				√
4	The Co. depends QMS (ISO 9001)				√
5	The Co. has Information technology (IT)			√	

2nd: Implementation for Procurement Management Major Processes (Implementation Scale)

Freq.	Procurement Process	Very	Medium	Little	None
1	Procurement planning			√	
2	Solicitation planning				√
3	Solicitation				√
4	Source Selection			√	
5	Contract Administration		√		
6	Contract closeout		√		

Part two: Weighting criteria for assessing the procurement management Processes Importance

3rd: Importance Degree for procurement Management major Processes

Freq.	Procurement Process	%
1	Procurement planning	25
2	Solicitation planning	10
3	Solicitation	10
4	Source Selection	25
5	Contract Administration	20
6	Contract closeout	10

4th: Importance Degree for procurement Management major Processes Details

I- Procurement planning	
Inputs to procurement planning	%
1. Scope statement	20
2. Product Descriptions	25
3. Procurement resources.	20
4. Market conditions	20
5. Other planning outputs	5
6. Constraints.	5
7. Assumptions.	5
Tools and techniques to procurement planning	%
1. Make-or-buy analysis.	40
2. Expert Judgment.	25
3. Contract type selection	35
Outputs	
1. Procurement Management plan	2. Statement(s) of work

II- Solicitation Planning	
Inputs to Solicitation Planning	%
1. Procurement management plan.	35
2. Statement(s) of work.	35
3. Other planning outputs.	30
Tools and Techniques to Solicitation planning	%
1. Standard forms	50
2. Expert judgment	50
Outputs	
1. Procurement documents	2. Evaluation criteria
	3. Statement of work updates

III- Solicitation	
Inputs to Solicitation	%
1. Procurement documents	40
2. Qualified seller lists	60
Tools and Techniques to Solicitation	%
2. Bidder conference	50
3. Advertising	50
Outputs	
1. Proposals	

IV- Source Selection	
Inputs to Source Selection	%
1. Proposals	40
2. Evaluation criteria	25
3. Organizational policies	35
Tools and Techniques to Source Selection	%
1. Contract negotiations	35
2. Weighting system	25
3. Screening system	15

4. Independent estimates	25
Outputs	
1. Contract	

V- Contract Administration		
Inputs to Contract Administration		%
1. Contract		30
2. Work result		20
3. Change requests		30
4. Seller invoices		20
Tools and Techniques to Contract Administration		%
1. Contract change control system		30
2. Performance reporting		40
3. Payment system		30
Outputs		
1. Correspondence	2. Contract change	3. Payment requests

VI- Contract Closeout	
Inputs to Contract Closeout	
1. Contract documentation	
Tools and Techniques to Contract Closeout	
1. Procurement audits	
Outputs	
1. Contract file	2. Format acceptance and closure

Part three: General notes

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