COMPREHENSIVE PLANNING MATERIALS AND PRODUCTS OF PARS KHAZAR INDUSTRIAL COMPANY

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Abstract:
In the last two decades wonderful changes is formed about technology information and computer systems that this matter causes the change of old view and the orient activity structure and gives its place to process point of view. According to view and process management of all steps required to reach a conclusion considered as chain and therefore will be tried to create uniformity between existing capacities and all steps necessary to strengthen the efficiency and effectiveness of processes. Accomplishing this on the current individual members of a supply chain planning, control and coordination of the entire supply chain process perspective (supplied) should be implemented. In this project was tried to first is attempted to identify supply chain Pars Khazar and finally a mathematical model that encompasses the important restrictions is the chain members to reduce the overall cost of materials, parts and product to be offered.

Keywords: supply chain, comprehensive planning, small appliances, Operations Research Models

Introduction:
During the last two decades of manufacturing and service firms, into event have reached to this conclusion that in order to increase market share and profitability of the company is required to identify the facilities to their ability into identify, plan and control power tooth other component in your chain and by creating coordination in whole chain, compared to sharing of the existence information in whole sets order to use each of these components can be taken. Almost in all Iranian companies still dominate the traditional island and its ultimate success of any company depends on the optimization of the supply chain independent of the other nodes know. This matter causes the reduction of overall effectiveness and, accordingly will decrease the efficiency of the industry in GDP. In order to integrate both as a supply chain (supply) in order to increase the above parameters required the three current financial information and plannings should be integrated in the chain. Integrated planning of material flow in the design profit has much more effective.

Under this approach since the late eighties, the term "supply chain management" was introduced and widely used in the nineties. Before these years the organization area was madewith respect to the harmonies, the terms and phrases such as "Operations Management" and "logistics"
was a frequent usage. One of the most completed definitions are provided by Michael Hughes's book on supply chain management "principles of supply chain fundamentals" are given below:

"Supply chain management is coordinating production, inventory, and location in the transport chain components in order to achieve the best combination between responsive and efficiency of the market. In the following provide brief review Pars Khazar products and finally with trying will be presented a mathematical model for comprehensive planning chain. It should be noted is the product of a reverse distribution (sales returns for any reason) in a supply chain is important but is not included in this study.

A brief about the Pars Khazar supply chain:

Pars Khazar Company by over 40 years experience about the production of small household appliances, with the largest and most experienced production companies in the country. The company was founded in the Rasht city in 1347 partnered with Japan's Toshiba called Toshiba Pars Corporation and in 1359 the name was changed to Pars Khazar Industrial Company. The experience of small household consumption in Iran is less than 50 years and at the beginning of this equipment generally was supplied by imports.

Products containing iron, fan, juicer, rice cooker, meat grinders and mainly from Germany, USA, Japan, the UK and France was imported. This company has more than 330 dealers after sales services in 205 cities and 30 provinces and an average production capacity of about 42% of the total capacity of the country which it shares of 64% of the production fan, 43% of the production rice cooker and about the vacuuming and meat grinders are about 30% of total capacity.

Household production model is the variation due to the differences, there are many similarities in the overall process can be made as follows:

1-Manufacturing process: The process of predominantly sheetmetal parts and stages wire forming and they are joined by welding, are produced.

2- Complete process: manufacture metal parts above the stage this type of cleaning, operation, protection, coating, smooth, coating and plating are ready to use in the final product.

3-Provision of different parts contractors: or considering outsourcing some parts due to the high investment and as well as being specialized for collaborative assembly line produced by contractors are reutilized. In the case of raw materials, parts, semi-structured format, and... Contractors in the safe and put the parts in the assembly of the final product they receive from them.

4- Supply and procurement of parts: large number of parts or products due to their low consumption due to the complexity of fits production, investment and expertise required to produce the plant was not cost-effective and are purchased from other domestic and foreign contractors. Including fittings and gaskets, electronic components, board and cardboard....
5- **sub-assembly:** number of parts supply and production, the assembly line before the application needs into is prepared for the operation of the sub-assembly is pre-assembled. For example: pasting decor pieces, preparing the headwires.

6- **Assemble product:** This is the final receipt of all completed parts, sub-assembly or assembly line interconnecting the different stages of purchase and finally after ensuring the quality and performance of products in acarton and Sharing and is forwarded to the warehouse for distribution.

7- **The storage, distribution and sales:** Products produced on the above three companies and some of the requests According to previous sales figures are sent to the warehouse. One of these warehouses is in Rasht Industrial Park and other storage is in 11 km Special Road. According to orders received after the order confirmed during required Quit command was issued from the warehouse and the transfer of the warehouse, the warehouse manager compared to provide required vehicles (Van, single trucks and twin lorries) attempted and Towards to sending goods are attempted. Determine the order in which the goods are to be sent to the warehouse or storage charges what is related into, Based on past records, and currently does no have a comprehensive and scientific.

Then the new system is set up under the distancesales. The system According to SMS, e-mail or phonenettowards get the information required processes the order and attempted inventory control units and are available. After issuing towards necessary coordination of inventory controlsheet attempted buyer information (address, phone, etc.) and put it in the inventory. Inventory required to be installed on the production and transport of a specific space. Prepared Packages on the daily tracking code is placed in the email. Ordered by the customer can be tracked by the tracking code.

A sale of this sector shares much of the company's current sales and almost no one way is to limited and specific. By advancement of science and knowledge management, supply chain planning and limited previous functional perspective has been converted to the planning process and therefore, instead of a specific range of activities, planning of procurement processes - production and distribution, and the accuracy is evaluated. Therefore, in this study, we will pay towards to investigate the possibility of optimization Wholesale and preparation a comprehensive model in order to optimization and reducing the cost of materials and component supplier and producing the product and its distribution. In next page there is a recycling materials, components and products graph in Pars Khazar Company supply chain.

**Description of Comprehensive Planning Model (Advanced) Supply Chain Pars Khazar (about the cycle of materials and products):**

In this section we evaluate the objective function and constraints of supply chain planning model has been discussed.

Whatever accuracy of the above in expressing conditions and models is better, the designed model is more effective and efficient planning and reducing cost in the supply chain will work. The aim of solving the mathematical model developed in this section, reduced total cost of the supply chain's moving materials is Pars Khazar. The reduced cost includes:
1-Reducethe costofpurchasingthesetrequirementsandorders.

2-Reduced maintenance costsitems(materials, parts) stockavailability

3-reducedcostsduetoshortagesof materials andcomponents

4-Reducethe cost ofproduction(manufacturing, filling, pre-assembly andfinal assembly)

5-Reducethe cost ofproductionandtoparts shortagescaused bythefraction of relevant

6-Reducethe cost ofproductionandreduceproductiontimeandreduceproductcost,shortagecostof productshortages

7-reducingmaintenancecoststorageproducts.

8-Reducingcostof productionand distributioncompanyrepresentatives.

Totalcosts, the costof materials andcomponents andcirculatingitthroughout thesupply chainwill
determinePars Khazar. It is obvious in each ofthesecases;a large numberofother componentscan
beidentifiedaschaincosts because of little effect it has not been modeled or complication. If the
number ofmodelcomponentsistoo high, is impossibleto solve the model andobtaingoodresult,sorit
will be difficult. Therefore,therestrictionshavensignificant effectonthe decisionakeof
simplicityof the modelhas not beenconsidered. [3]

Later will be discussed the investigatedlimitations of the model. Mostmajor reason forthis
limitationis due tothelimitationsof available resources, there is providedthe following:

1 - Limited capacity of suppliers: Due to resource constraints It is obvious that each supplier is
required to supply the parts that have been ordered from the company, to take action.
Supplier capacityconstraintsandnegotiationsmust bemade
throughmutualagreementinvestigatethesupplier andMSAccess that specifiesthe
maximumcapacityofits allocation to companies,
should be determined.

2-Limits Capacity contractors: similar tothe abovedescription and presentationmust be clear limits
topotential contractors.

3- Limitation offactory production: As previously described, each product according
to the constituent parts and materials necessary to the operation of machinery, manpower and
meter and... During certain times of the obese children of different uses. Due to the limited capacity
and resources needed for them to take action.

4-Materials, parts storage space limitations: Due to limited storagespace, each produced in different
part of the space allocated for each piece and there are certain limitations which should be the model.
This restriction includes all the places that can be allocated to these segment or materials included.

5-Limited storage capacity: Product specific storage has shelf
products (according to the procedures in the storage and transportation of products)
certain limitations and capabilities of the model must be designed.
6-Distribution limited production: number of the cars used to transport products, at different times and days of high and low limits that must be considered in planning. It should be noted that this limitation is manifested in many cities. Therefore it is important for storage is more Rasht.

7-The amount of demand: the current system of sales (Sales Order). Sales of products require good estimates of the various agencies and records must be bought in years past periods. It is obvious that whatever accurate the estimate becomes closer and closer to the reality of the estimated cost will be calculated and minimized.

8-Equilibrium Materials and device storage limitations: it is limited to the balance in the model parameters and determines the amount of input, output, storage period of availability is scarce.

9-Balance products in storage limits: these limits are exactly the same restrictions mentioned on the product.

Decision variables:

According to this model have been described to determine the amount of each of the following variables: [4]

1. What materials and components which can be purchased from a supplier in the course?

2. What extent and at what period pieces to be produced by the production units, factories and contractors?

3. The numbers of what kind of product from what is produced and stored?

4. Variety of products in terms of how many various stores to be transferred?

5. Needs and demand of consumers, which is covered by warehouses?

Mentioned in any of the decision variables which determine the final amount of the settlement will be achieved.

The mathematical model: in following is paid to describing the related mathematical model.

Indices:

i. is used in order to define the components and the sold materials.

t. is used in order to define the period of investigation (month).

j. is used in order to define the production component.

s. is used in order to define suppliers.

K. is used in order to define the products variety.

e. is used in order to define the product storage.

p. is used in order to define the materials and components storage.
m. is the determinant of the different work station.

**Variables and Parameters:**

- \( \text{OR}_{ist} \): the amount of the purchased components \( i \) in period of \( t \) from the source \( s \).
- \( \text{SC}_{its} \): the cost of the purchased components \( i \) in period of \( t \) from the source \( s \).
- \( \text{HC}_{itp} \): the cost of keeping the components in the period of \( t \) in storage \( p \).
- \( \text{IN}_{itp} \): the amount of existence component \( i \) in period of \( t \) in storage \( p \).
- \( \text{DC}_{it} \): the leakage cost of component \( i \) in period of \( t \) in storage \( p \).
- \( \text{DQ}_{it} \): the leakage amount of component \( i \) in period of \( t \).
- \( \text{CL}_{it} \): the carriage cost of each component unit \( i \) from the supplier \( s \).
- \( \text{PC}_{it} \): the cost of component product \( j \) in period \( t \).
- \( \text{IP}_{it} \): the existence component \( j \) in period \( t \).
- \( \text{XP}_{it} \): the amount of component product \( j \) in period \( t \).
- \( \text{HP}_{it} \): the cost of keeping component \( j \) in period \( t \).
- \( \text{IP}_{it} \): the component existence \( j \) in period \( t \).
- \( \text{DGC}_{it} \): the leakage cost of component \( j \) in period \( t \).
- \( \text{DGQ}_{it} \): the leakage amount of component \( j \) in period \( t \).
- \( \text{XPP}_{kt} \): the produced amount of product \( K \) in period \( t \).
- \( \text{CPP}_{kt} \): the produced cost of product \( K \) in period \( t \).
- \( \text{HPC}_{kte} \): the keeping cost of product \( K \) in period \( t \) in storage \( e \).
- \( \text{IPP}_{kte} \): the existence amount of product \( K \) in period \( t \) in storage \( e \).
- \( \text{DPC}_{kt} \): the leakage cost of product \( K \) in period \( t \).
- \( \text{DPQ}_{kt} \): the leakage amount of product \( K \) in period \( t \).
- \( \text{DPX}_{ke} \): the amount of sells product \( k \) from the storage \( e \) to buyer \( l \) in period \( t \).
- \( \text{CPX}_{kel} \): the cost of transmission product \( k \) from the storage \( e \) to buyer \( l \).
- \( \text{LP}_{kte} \): the amount of commodity \( k \) in period \( t \) transferred to storage \( e \).
- \( \text{CLP}_{kte} \): the transmission cost of commodity \( k \) in period \( t \) to storage \( e \).
- \( \text{CC}_{its} \): the production capacity of component \( i \) in period \( t \) by supplier \( s \).
\( B_{ik} \): the amount of utilization sold component \( i \) in product \( k \).

\( B_{jk} \): the amount of utilization produced component \( j \) in product \( k \).

\( T_{jm} \): the required time in order to produced component \( j \) in step \( m \).

\( CC_{jm} \): the production capacity of component \( j \) in step \( m \).

\( S_{ip} \): the occupied space by component \( i \)in storage \( p \).

\( CS_{p} \): the storage capacity of \( p \) in order to store materials.

\( CS_{e} \): the storage capacity \( e \) in order to store product.

\( S_{jp} \): the occupied space by the produced component \( j \) in storage \( p \).

\( SP_{ke} \): the occupied product space \( k \) in storage \( e \).

\( D_{kt} \): the request of product \( k \) by the costumer \( l \) in period \( t \).

The purpose accessory:

The product cost + the components product cost + the purchase of components cost = Min

The shortage cost of components and products + the product distribution cost + the cost of the purchase components keeping + the purchase component cost (sum) = min

The cost of components portage + the cost of the purchased component leakage + the cost of keeping the product existence + the cost of component production (sum) + the cost of the component production lack + the cost of production keeping + the cost of product production (sum) + the lack of product + the cost of portage to distribution storage + the cost of distributing product (sum)

\[
\text{Min} = \text{sum} ( (OP_{its} \times SC_{its}) + (HC_{itp} \times IN_{itp}) + (DC_{it} \times DQ_{it}) + (CLS_{js} \times OR_{its} )) \\
+ \text{sum} ( (PC_{jt} \times XP_{jt}) + (HP_{jt} \times IP_{jt}) + (DGC_{jt} \times DGQ_{jt})) \\
+ \text{sum} ( (XPP_{kt} \times CPP_{kt}) + (HPC_{kte} \times IPP_{kte}) + (DPC_{kt} \times DPQ_{kt})) \\
+ \text{sum} ( (DPX_{kelt} \times CPX_{kel}) + (L_{pkte} \times CLP_{kte}))
\]

The limitation:

1- the power and the capacity of suppliers => the order amount of materials and components:
\( OR_{its} \leq CC_{its} \)

2- The amount of required component in order to produced productions in period \( t \) = \( \text{<} \) the component order in period \( t \) _ the existence amount of component in period \( t \):\( \text{Sum(IN}_{itp} \) + \( \text{sum(OR}_{its} \) >\text{= sum(B}_{ik} \times XPP_{kt}) \)
3- The capacity of step \( m \) production \( \Rightarrow \) the required time in step \( m \) * the amount of required component: \( \text{Sum} (XPP_{kt} * B_{jk}) * T_{jm} CC_{jm} \)

4- The available space in storage \( \Rightarrow \) (the occupied space * the amount of material) sum: \( \text{Sum} (IN_{tp} * S_{ip}) \leq CS_{p} \)

5- The available space in storage \( \Rightarrow \) (the occupied space * the amount of components production) sum: \( \text{Sum} (IP_{jt} * S_{jp}) \leq CS_{p} \)

6- The available space in storage \( \Rightarrow \) the required space in order to store the receiving product in storage \( e \) + the occupied space the existence amount of the storage product \( e \)

\[ \text{Sum} (LP_{kte} * Sp_{ke}) + (IPP_{kte} * SP_{ke}) \leq CS_{e} \]

7- The request of costumers \( \Rightarrow \) the sending commodity to costumers: \( \text{Sum} (DPX_{kelt}) \leq D_{klt} \)

8- The existence product in storage \( e \) + receiving commodity during \( t \) in storage \( e \) \( \Rightarrow \) the sending commodity from storage \( e \): \( DPX_{kelt} \leq IPP_{kte} + LP_{kte} \)

9- Sending during \( t \) - the receiving during \( t \) + the existence during \( t \) = the existence production during \( t+1 \): \( IPP_{kt+1e} = IPP_{kte} + LP_{kte} - \text{sum} (DP_{Xkelt}) \)

10- Consuming during \( t \) – producing during \( t \) + the existence during \( t \) = the existence production component during \( t+1 \): \( IP_{jt+1} = IP_{jt} + XP_{jt} + \text{sum} (XPP_{kt} * B_{jk}) \)

11- Consuming during \( t \) + buying during \( t \) + the existence during \( t \) = the existence of purchased component during \( t+1 \): \( IN_{jt+1e} = IN_{jtp} + \text{sum} \)

**Recourses:**


[3] Stadtler , H &Kilger , Ch;2008 " supply chain management and advanced planning ", springer : Hamburg