

Exploitation of the forecasted need to pilot upstream logistics in Moroccan automotive industries

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Abstract

This article propose an approach to design an indicators system on upstream logistic to follow it impact into the global supply chain. Our method consists to use the forecasted need received from customer, combine with result of our research on the performances indicators used in automotive industries to be able to have a Hybrid model of management.

We propose to present the result of applying this Hybrid model into a 1st rank supplier working under Just in Time notion in Moroccan automotive industry.

The paper contain five parts, first one present a literature revue of professional referential that have evaluated performance of automotive industry in Morocco. The second part explain the problematic and research methodology ; the third one propose an hybrid Key performance Indicator to follow upstream logistic management using the forecast need received from customer .the fourth one provide impact of using this KPI on upstream logistic into the overall performance of the supply chain .we end by a conclusion and perspectives of this work.

Keywords

Supply Chain Management, Automotive industry, Just in Time, Key Performance Indicators, Upstream logistics, and impact of inventory.

Introduction:

Nowadays the evaluation of supply chain management is the first priority for each company to succeed its strategic vision and achieves the Aims. A task that remains difficult given the complexity of these systems .For this purpose all the composite of supply chain need to be evaluated and followed with clear indicators and Targets.

Our research problematic focuses on how to pilot our upstream logistics and follow its entire composite with a performing dashboard that includes all the needed Key Performance Indicators using the forecasted need received from customer

I-Literature Revue:

The just in time notion mainly for inventory reduction [1] was introduced by Toyota in the 1950s and adopted by operators in Automotive industries, this method consist to put all the Supply chain under pressure ; as it push all the composite of this supply chain to follow directly the customer need.

In a way to Pilot Supply Chain working under Just in time conditions we need to have one or several Key Performance Indicators using the forecasted need received from customer; we can define two driving mode Centralized management and decentralized one [2].

Centralized management consist on delegating all the management activities or one part of these activities to a third party or an external partner, this mode provide the advantage of having a global vision while choosing the rules of management and allow to have significant decision in all the SC , which present the key element of success ; While inside decentralized management each of its composite keep autonomy in terms of rules and decisions; the information exchange between composite is restricted to only command between customer and supplier.

We can define several models of management of the SC , and several references that evaluated the performance of the logistics chain [3]; According to our research, there are a large number of repositories in the field of logistics, operations management and SCM [4] [5], references for professional or academic uses.

The ASLOG [6] framework established by the French Association for Logistics, aims to place logistics within the company, analyze logistical processes strategically, tactically and operationally, evaluate performance and propose actions. It is composed of 10 chapters: Management strategy and planning, logistics in design and projects, procurement, production, moving, storage, sales, return, performance management indicators and continuous improvement. It has 3 levels of evaluation, either by risk, by method or by continuous progress.

The SCOR repository of SCC [7], its objective is to model and describe the logistics chain, to analyze all the processes of the company from the standardized process, it helps Benchmarking the process in proposing best practices, Standardized performance and matching of processes; Its evaluation consists of classifying practices according to leading practices, best practices, common practices and poor practices.

The Global MMOG / LE (Materials Management Operations Guideline / Logistics Evaluation)of Odette and AIAG (Automotive Industry Action Group) references [8] [9], its objective is to design a common reference framework that helps to set up Plans for continuous improvement, establish elements of a logistics system for suppliers of goods and services specifically in the automotive industry.

The mastery of logistics chain has become a vital need for the development of a company operating in the automotive sector due to the increase in the diversity of demands, the minimization of product costs as well as the appearance of tools of performance measurement. Competition and one of the first factors that prompted operators in this field to re-check all the components of their logistics chain while respecting the triangle cost, quality and lead time in order to keep their positions in an environment characterized by broad competition and therefore the control of the logistics chain upstream and downstream become an obligation and not an advantage

II-Problematique:

Our studies were made in automotive industry for a supplier of first rank with several suppliers; Most of the industries for automotive sectors are working under just in time in pushed system. In a way to control the supply chain we need to control all the composite of the SC and have a structured dashboard.

The impact of the upstream logistic into the global SC was already measured in our previous work paper “upstream logistics and the overall performance of automotive companies’ case of supplier of 1st rank” [10], for this reason we need to follow it in closure to achieve the targets;

the aim is to use the forecasted need received from customers in term of value \$ to propose KPI to not deviate from targets. as most of the KPIs are based on quantitative calculation not value one.

Industrial Context

Our study is carried out in a company operating in the automotive sector as being a producer of automotive cables supplier of first rank (direct supplier). The study is based on the results of 2years performance.

The aim of our study is to demonstrate the impact of following the upstream logistics in closure to follow targets and not impact the overall performance of the company. When the necessity to have a reliable Key Performance Indicator.

III-Proposal of KPI to follow impact of upstream logistic at the Global SC based on the forecasted need:

Forecasted need:

The forecasted need are the direct orders received from customers , these orders are received on a weekly basis within EDI and contain 1 week as firm and 11 week of forecast ; this forecast could be accepted as below:

1st week → no change.

2nd week → 25% variation.

3rd week → 75% variation.

From 3rd week on → all variation accepted.

The forecasted need is the elementary Key of all calculations; needed production hours; needed operators, needed raw material...ECT

Proposal of Key Performance Indicator:

In a way to follow the customer need without impacting the targets we propose a KPI that combine between forecasted need received directly from the customer; and production plan together with targets of the orders ;

This Indicator provide us a clear vision on our orders VS targets in term of upstream supply chain and allow us to have possibility to adjust orders if any deviation detected , to not impact the overall performance of the company mainly on inventory levels on both finish good and raw material.

Calculation method:

As previously mentioned the indicator is a combine model of calculation of projected inventory based on sum of the total inventory we have; schedule receipts and backlog.

The aim is to track our inventory level on weekly basis and analyze if any deviation to the design to be able to adjust the orders in time to not miss the monthly targets and not allow upstream logistic to impact the global SCM .

Definitions:

Initial Inventory (WIP included); is the value of our global Raw material inventory.

Production Back flush: is the value of our production planning based mainly on forecasted need received from customer.

Scheduled receipts: is the value of the Raw Material reception from suppliers.

Target or Total FCST: is the Value of the target in terms of raw material based on the explosion of the received forecasted need to raw material.

RM backlog: is the total value of expected RM backlog to be received from suppliers.

Variance to FCST= is the GAP between value of forecast and target value.

We can take below nomination to the mean composite of our indicator calculation.

Initial Inventory (WIP included) = IV

Scheduled receipts=SR

RM backlog=RMB

Final inventory=FI

Production Back flush=PB

Target or Total FCST= TFC

Variance to FCST= VTFC

$FI = \sum (IV+SR+RMB)-PB$

$VTFC=TFC-FI$

this calculation method is based on value of inventories and not qty's it allow us to detect on exact moment if any deviation from target so to adjust orders and production plan .

as the indicator calculation is for an horizon of at less 36weeks the VTFC provide a clear vision on real projection of FI vs targets , the check is made on weekly basis once orders received from customer the example of this calculation method is mentioned as annex [11].

IV-Impact of upstream logistic on the overall supply chain of company and measure of the new impact using the new KPI :

As mentioned on our previous article [10] upstream logistic is impacting directly the overall performance of the company .

following the same method by applying it on our case study result was as below .

1 Impact on the overall function of the company:

As Efficiency is the key indicator in the policy of our case study, in 2016 efficiency was only 57%, of which 70% of losses 70% Efficiency losses were directly related to stock-out (Poor management of upstream logistics).

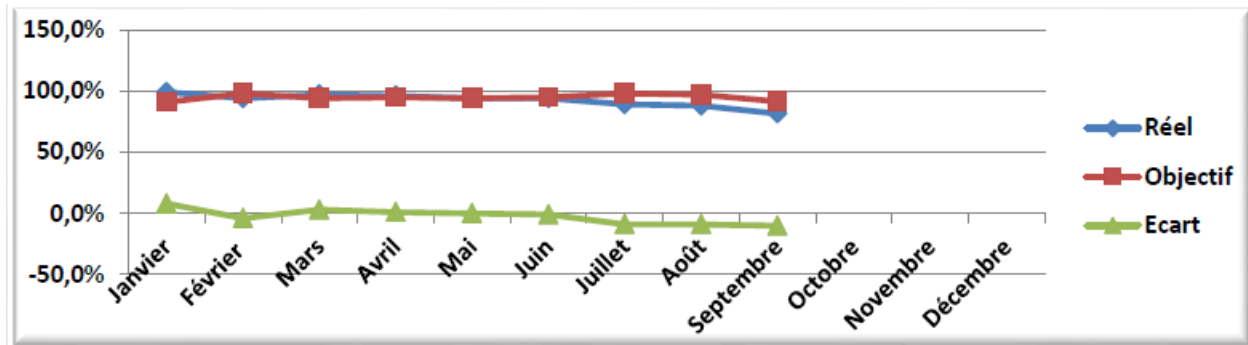


Figure 1: Efficiency per month

According to our study we found that the upstream logistics directly impact the overall performance of enterprises being given the input element of this process.

2 Impact on Inventory level :

the raw material inventory level VS targets trend allow to follow the inventory levels change . Since 2015 this trend as mentioned on below figure was always over targets by at less 282K\$ for our case study; we could not reduce this GAP which impact directly the overall performance of the company.

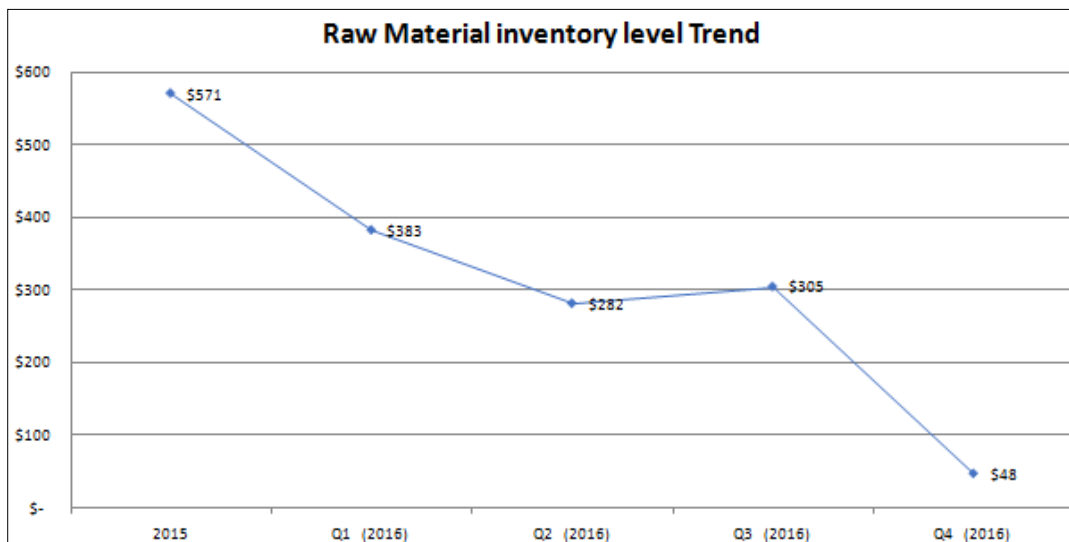


Figure 2: Inventory Vs target trend for the previous years

3 Measure of the new Impact of upstream logistic using the new KPI:

the Measure of impact was made based on results since 2015 as previously mentioned the min value achieved before 2017 on our trend was 282K\$ but starting of 2017 and by applying the new VTFC indicator to adjust orders and production plan this inventory level GAP value Vs target was reduced and stabilized on 48K\$.

this reduction was based on the weekly orders adjustment after VTFC check, both procurement team and planning were sensibilized to the necessity to follow this indicator on weekly basis and adjust all below elements:

- firm orders sent to suppliers;
- forecast sent to suppliers;
- production planning at plant as it impact directly the procurement so the inventory levels;
- declare the impact f any customer variation time to not have shortages nor huge inventory levels ;

As the overall analysis was based on value not quantities the new trend is presented as below

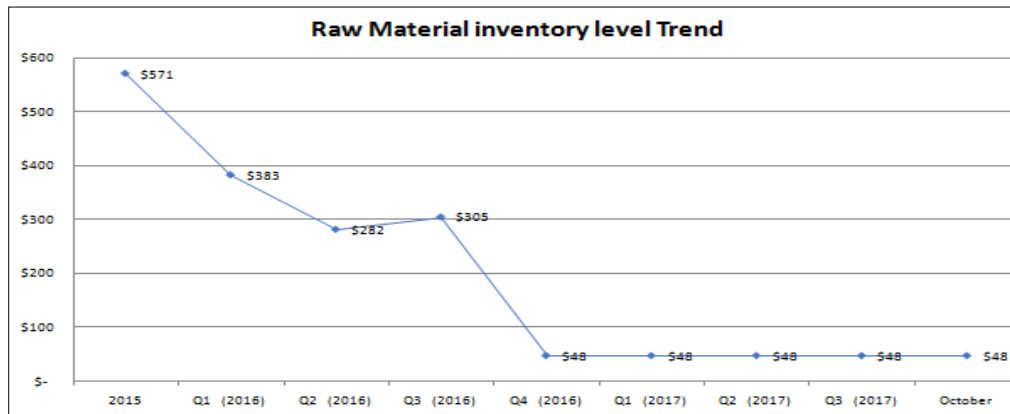


Figure 3: Inventory Vs target trend by applying the VTFC adjustment model

V- CONCLUSION:

Our studies have demonstrate that the proposed indicator provide reduction possibility of inventory levels by following forecast need check on weekly basis which allow upstream logistic mastery of a company.

As the upstream logistics is not impacting only the performance of the logistics chain but also its impact on the overall performance of the company. this element should be controlled to be efficient and performing, The questions that arise now are:

How we can control the upstream chain in global not only inventory levels?

How we can make our suppliers efficient to avoid all problems related to the upstream part?

How we can construct a global and performing dashboard that allow to follow the upstream logistic in global for companies working under Just In Time notion not only a composite of this supply chain?

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Plant:	Kenitra	W52	W01	W02	W03	W04	W05	W06	W07	W08	W09	W10	W11
INVENTORY WEEKLY WALK													
		25-Dec	1-Jan	8-Jan	15-Jan	22-Jan	29-Jan	5-Feb	12-Feb	19-Feb	26-Feb	5-Mar	12-Mar
Raw Material		FCST	FCST	FCST	FCST	FCST	FCST	FCST	FCST	FCST	FCST	FCST	FCST
Initial Inventory (WIP included)		\$4,332,780	\$7,382,967	\$5,756,241	\$6,801,316	\$6,627,689	\$6,735,681	\$6,448,154	\$6,208,428	\$7,253,503	\$7,079,876	\$7,187,868	\$6,900,341
Scheduled receipts		\$1,663,187	\$2,349,131	\$3,173,980	\$2,803,928	\$3,000,559	\$2,901,813	\$2,349,131	\$3,173,980	\$2,803,928	\$3,000,559	\$2,901,813	
Production Backflush		\$0	-\$2,588,856	-\$2,128,906	-\$2,977,554	-\$2,892,567	-\$3,189,340	-\$2,588,856	-\$2,128,906	-\$2,977,554	-\$2,892,567	-\$3,189,340	
Variations / Improvements													
1./ GIT & IC		\$1,217,000	-\$1,217,000										
2./ NO BO receipts													
3./ RM backlog													
4./ PO for new project parts in the system													
5./ Hold regular shipment receptions													
6./ Pending transit record (past to be received)													
7./ Components backup Romania													
8./ ADC Implementation													
9./ RM order optimization (Change of scheduling parameters)													
10./ Stock level reduction (Kanban, ADC)													
11./ Inventory adjustment in QAD													
12./ Write off													
13./ Scrap													
14./ Raw material surplus													
15./ Inventory loss													
16./ Material sales to other Lear plants													
17./ Deviation/Wires													
20./ Russia shipment													
21./ Order postpone to next week													
23./ SCRAP Adjustment													
24./ Over shipment		\$50,000	-\$50,000										
Final Inventory		\$7,382,967	\$5,756,241	\$6,801,316	\$6,627,689	\$6,735,681	\$6,448,154	\$6,208,428	\$7,253,503	\$7,079,876	\$7,187,868	\$6,900,341	\$6,900,341
Total FCST		\$7,573,000	\$7,094,004	\$7,094,005	\$7,094,006	\$7,094,007	\$7,094,008	\$7,094,009	\$7,094,010	\$7,094,011	\$7,094,012	\$7,094,013	\$7,094,014
Variance to FCST		-\$190,033	-\$1,337,763	-\$292,689	-\$466,317	-\$358,326	-\$645,854	-\$885,581	\$159,493	-\$14,135	\$93,856	-\$193,672	-\$193,673

Biographies

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