INBOUND TRANSPORT MANAGEMENT AND THE OVERALL PERFORMANCE OF UPSTREAM SUPPLY CHAIN OF AUTOMOTIVE COMPANIES; CASE OF SUPPLIER OF 1ST RANK

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ABSTRACT

Increased competition in industry requires companies to control the triptych "Quality, Cost, Delay", to stay competitive, it is essential to be efficient not only in optimizing production but also in the inventory level satisfaction which requires a total control of upstream logistics. It is in this context that our article will show the direct impact of inbound transport on the overall performance of the company. The paper consists of four parts. The first presents a review of the literature on inbound transport management and its role in upstream supply chains. The second explains the problem. The third shows the impact inbound transport management on the overall performance of upstream supply chain for a company with several suppliers. We conclude with a conclusion and perspectives of this work.

KEYWORDS: *Performance, Upstream Logistics, Impact, Customers Deliveries & Supply Chain*

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1. INTRODUCTION

Automotive industry is one of the most known industries that are working under just in time, with its tight reaction time with customers; long lead time with suppliers localized in all over the world and transport constraints. Industries that are using this strategy need to structure all their supply chain composite to be able to take this challenge and keep their places on this market.

Nowadays As the global automotive sector is experiencing a phase of significant growth with an increase in demand and supply to emerging countries. This has forced investors to look for new locations into countries with a competitive global offer (proximity to large markets, logistics offer, skilled labor, etc.). In this new context, the Moroccan automotive industry is strengthening its position in the global automotive value chain, as evidenced by the remarkable performances recorded in recent years [1].

2. LITERATURE REVUE ON UPSTREAM TRANSPORT AND ITS IMPORTANCE IN SUPPLY CHAIN

2.1 Upstream Supply Chain in Just in Time Mode

The supply chain is a system of subcontractors, producers, distributors, retailers and customers, between which the material flows are exchanged in the direction of the suppliers towards the CIE47 Proceedings, 11-13 October 2017, Lisbon / Portugal.

Suppliers, customers, and the flows of information in both directions [1]. Each intervener has its input and output flows of goods and associated services that bind it with the outside world before and after production takes

place. [2]

From this definition we can define 5 major process in supply chain

Figure 1: Supply Chain in just in Time Mode.

We then distinguish the upstream logistics that bind the company to these suppliers (inbound flows procurement and supply), internal logistics (planning and production) and downstream logistics directly related to customers (delivery and customer contact) [4].

To have a structured supply chain; operators in automotive industries need to focus on all supply chain component and not only one.

Planning direct customer need is the first element that declare a need to produce material so to procure raw material and ensure inbound transport of the material, then it is the production role to ensure finish good on time; the outband transport or deliveries is the last component of this supply chain.

Upstream logistic start from sending orders to suppliers and end with delivering material to production, the major two components are placing orders in correct way and ensuring inbound transport with the minimum premium freight needed.

Upstream, logistics is crucial because it determines production satisfaction. This satisfaction is judged by:

The reliability of deliveries by ensuring a continuous flow of raw material deliveries at the lowest cost, never experiencing breakdown while having the lowest possible stock levels.

Flexibility in building up safety stocks to alleviate transport hazards and reductions in potential...

The reactivity to a sudden event coming out of the inbound dysfunction such as delay or absence of deliveries.

Companies should adapt to these challenges requested by customers, their supply chain must have a better performance with a higher reactivity and a clear improvement in the quality of service

Many articles have touched these two major components procurement and inbound transport management we can present the major paperwork as below:

Title	Mean Containing	Year	Author
Transport integration tools for supply chain management	research carried out by Cardiff University has studied the opportunities to integrate freight transport better into supply chains.	1-May-06	Kevin Boston and Donald L. Grebner University of Georgia
Establishing a transport operation focused uncertainty model for the supply chain	establish a supply chain uncertainty model that explicitly incorporates transport operations and hence the logistics triad; supplier, customer and transport carrier	13-Jun-08	Vasco Augusto Sanchez Rodrigues, Damian Stantchev and Anthony Whiteing
The impact of freight transport capacity limitations on supply chain dynamics	capacity limitations in the transportation system affect the dynamic behavior of supply chains	2-Jan-14	Virginia L. M. Spiegler and Mohammed M. Naim Cardiff University
Achieving supply chain resilience: the role of procurement	understand the role of procurement in identifying and managing the intra- and inter-organizational issues which impact supply chain resilience	2-Sep-14	Carla Roberta Pereira (UFSCar: Federal University of São Carlos)Martin Christopher (Cranfield University)
Linking procurement operations to power-influence in a supply chain	This paper examines procurement dynamics when there is a power imbalance between a supplier and a buyer. It also compares this power-based profit sharing with the benefit of a quantity discount on bulk purchases	1-Oct-16	Vipul Jain (Victoria University of Wellington)Sameer Kumar (University of St. Thomas (Minnesota))Charu Chandra (College of Business Administration)
Evaluation of the supply chain in the automotive industry: Models Measuring the Performance	Present Key Performance Indicators and models of measuring supply chain performances in Moroccan automotive industry	11-Apr-17	Rim Sghiouri; Chouaib Elhammouchi and Abdellah Abouabdellah Laboratory of System Engineering MOSIL, ENSA University Ibn Tofail
Exploitation of the forecasted need to pilot upstream logistics in Moroccan automotive industries	Proposal of an approach to design an indicators system on upstream logistic to follow it impact into the global supply chain.	26-Jul-18	Rim Sghiouri; and Abdellah Abouabdellah Laboratory of System Engineering MOSIL, ENSA University Ibn Tofail

Figure 2: Literature Review of Supply Chain Valuation Evolution.

2.2 Industrial Context

The structure of the supply chain in the automotive sector is composed of 4 parts:

Suppliers row 2 ➡ Suppliers row 1 ➡ Constructor ➡ Distributor

For a final manufacturer, the upstream part is very important because it assembles sub-assemblies made largely by equipment suppliers (supplier row 1 and 2), the purchase share is around 70% of the cost price [6], and logistics costs on supplies are significant because of the distances of a global sourcing.

In our study, we will measure the impact of upstream logistics on a 1st rang supplier company performing in automotive industry and impact on the global supply chain;

2.3 Problematic

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” [5], for this reason we need now to measure the impact of inbound transport management and the overall performance of the supply chain and 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 valuable one.

3. INBOUND TRANSPORT MANAGEMENT IMPACT INTO THE PERFORMANCE OF THE UPSTREAM SUPPLY CHAIN FOR A 1ST RANG SUPPLIER IN AUTOMOTIVE INDUSTRY

3.1 Impact of the Performance of the Upstream Transport on the Procurement Management

Procurement role is to ensure raw material on time with exact needed qty and with minimum transport cost required, for that reason we will try to measure the impact of inbound transport on the procurement performance; any delay or no occurrence of an inbound transport operation will lead directly to a production line stoppage or premium freight operation with high non- recoverable cost.

In our case, our supplier during the year 2018, arranged 285 premium freight operations;92 of them related to major forces (bad weather ...) and 193 occurred due to the bad coordination between procurement and transport management

Figure 3: Raw Material PF Repartition.

By analyzing the types of Premium Freights related to the logistics, it was found that:

- 70 about delays in deliveries without causing stoppage of the lines of production.
- 15 about delays of deliveries that caused disruptions to customers' production lines'.
- 45 about the correspondence between the delivery and the order.
- 20 about the loss of the shipping documents.
- 18 about the missing notices of dispatch before the departures of the deliveries.

- 25 claims about the losses of the goods.

It can be concluded that most of logistical Premium freight concern the upstream part related to deliveries from suppliers.

3.2 Evaluation of the Impact of the Performance of the Upstream Transport on the Overall Performance of the Company

To evaluate this impact, we have applied the MMOG / LE (Materials Management Operations Guideline / Logistics Evaluation) [6] which is used to judge the overall performance of the company according to several interfaces to show how the downstream logistics (customers, expedition, Transportation,) impacts the overall performance of the company.

The result of the evaluation of the performance of the downstream logistics obtained:

Figure 5: Evaluation of the Overall Performance of the Company.

4. PROPOSAL OF KPI TO FOLLOW IMPACT OF INBOUND TRANSPORT AT THE GLOBAL SUPPLY CHAIN BASED ON THE FORECASTED NEED

4.1 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. Transport BudgetECT;

Proposal of Key Performance Indicator.

4.2 Proposal of Key Performance Indicator

In a way to ensure the needed raw material on time without impacting the transport Targets we propose a KPI that could calculate the projection of our performance against what was forecasted on short and long-term horizon, this KPI combined the calculation of the real transport cost occurred and projection of the forecasted real costs against what was assigned as a target.

With this method we can detect in advance on which month; week; we will be over the budget and react on time to not deteriorate results and to never end as over target.

Definitions

Initial Value is the value of our global inbound transport consumed.

Production Back flush: is the value of our production planning based mainly on forecasted need received from customer in term of cost of inbound transport (5% of the global cost of the finish good.

Scheduled receipts: is the value of the inbound transport from suppliers.

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

Backlog Premium freight is the total value of expected Premium freight due to Raw Material backlog to be received from suppliers or to major forces Premium freight.

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 Value = IV Production Back flush=PB

Scheduled receipts=SR Target or Total FCST= TFC

Backlog Premium freight =BPFVariance to FCST= VTFC

Final inventory=FI

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

VTFC=TFC-FI

5. RESULTS

As Indicated before Inbound transport is impacting directly the performances of our upstream supply chain which impact the overall supply chain, in our case after applying this new KPI we could manage to detect and react in time in case of potential deviation from inbound transport cost target and minimize the number of potential Premium freight.

The new performance of Inbound transport was presented as below.

Figure 6: Inbound Transport Performance.

6. CONCLUSIONS

Our studies have shown that the Inbound transport have a considerable impact on the upstream supply chain, it also showed that if we can manage to detect and react on time to the potential deviation upcoming in the future we can reduce this impact and so reduce the impact on the performance of the overall supply chain.

As mentioned on our previous article [5] upstream logistic is impacting directly the overall performance of the company. the procurement is also having a huge impact on the upstream Supply chain the future challenge will be to combine between procurement and inbound transport management to have a hybrid model that allow the optimize usage of both function, this challenge will be the aim of our future studies.

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