Abstract NO: 025-0956

Title: The Delivering Time and Cost strategic proposition for Thai Automotive Logistics Operations

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POM23rd Annual Conference, Chicago, Illinois, U.S.A. April 20 to April 23, 2012

The current stock-push vehicle supply model in the Thai automotive industry which fulfills the majority of orders from existing stock appears to be no longer a viable proposition. Cost pressure from rising stock and inventory levels coupled with the high discounts needed to sell these vehicles have forced vehicle manufacturers to rethink their order fulfillment strategy shifting to one favouring stock less build to order systems. More responsive order fulfillment at the vehicle manufacturer level, however, will not only require flexible and responsive component supply and vehicle assembly, but will also have wide ramifications for all logistics operations in the Thai automotive supply chain. Based on the finding of delivering cycle time, identified in this paper, a comparison will be made of inbound, outbound and other transportation logistics, leading to the development of a strategic framework for future Thai automotive logistics operations.

Keywords: Thai automotive industry, logistics

1. Introduction

Beyond the day of Henry Ford, high variety of “mass production”, and first adoption of lean production concepts, the industry is threatened by global production over capacity and rising stock levels of unsold vehicles. Thai automotive manufacturer companies have attempted to meet the challenges through a series of global mergers and acquisition, hoping for better economies of scale through platform and component sharing. As Dracker (1946) refer to “the industry of industries” which is in motion on it guest to find the next source of

competitive advantage, that is why build to order has received so much attention in the last few days in order to reducing the stock and inventory levels.

Building to order, rather than forecast is not a new idea (Delbridge and olive, 1991; Hall, 1993). It has been discussed for almost a decade, however this research for the first time seriously questions the viability of the make to forecast and sell from stock approach in the Thai automotive manufacturers. In Thailand, even lower at half of all vehicles are sold from stock, the remainder are sold from build to order, but the all manufacturers wish zero percentage for sell from stock, but not. However, the cost of holding inventory at the most expensive point in the supply chain (Fisher, 1997), and discounting needed to sell these vehicles are costing the industry very much.

The shift from forecast-driver to customer driven vehicles supply will have wide ramifications for the whole supply chain. Not only will suppliers have to be more flexible, it also puts a question make on current global sourcing strategies. At the same time as build-to-order has been discussed on a generic level (Holweg and Jones, 2001; Holweg and Pil, 2001). Moreover, the logistics plays a crucial role within a build-to-order system (Bowersox and Closs, 1996), which is highlighted in the case of A, B and C in this research aiming to reduce the order to delivery cycle time. This paper will focus specifically on the logistics aspects of build-to-order regarding to identify the order to delivery cycle time in each of case, and what cost and environmental implications would result from adopting a build to order strategy.
Rather than focusing on a single view type of logistics operations in isolation, this research aim at providing an overview of the main issues and implications of the major logistics operations in the automotive supply chain. This also allows for comparison of the issues within the three main logistics operations: inbound operations between first tier suppliers and assembly plants, vehicle distribution logistics between factories and dealers, and the deep and

other transportation logistics operations such as short-sea vehicle shipping, and air transportation operations.

2. Research Methodology

The research approach employs both survey and in-depth case studies of inbound, outbound and other transport such as sea, air transport and so on within the Thailand. In particular, a case studies method was felt that it would be more suitable to provide the in-depth understanding of the current process and issues within these logistics schemes. Furthermore, 15 semi-structured interviews were conducted with operations and planning, and logistics staffs in order to cover 'softer' issues and perceptions of the key problem areas in the system, also, where available secondary data was collected. On the whole, this multi-method approach allowed for data triangulation (Jick, 1979, 1998; Burgess, 1984; Mentzner and Flint 1997; Van Maanen, 1979).

In conclusion, in this study, the mix of survey and follow up case study methods was adopted. The study includes two separate but complementary methods: a questionnaire survey, followed up by semi-structured interviews within case study. In detail, three cases each of inbound and outbound operations have been analysed. The case comprised of three inbound collection schemes delivering predominantly into Thai car assembly plants, three outbound delivery operations from Thai car plants into the domestics and international markets.

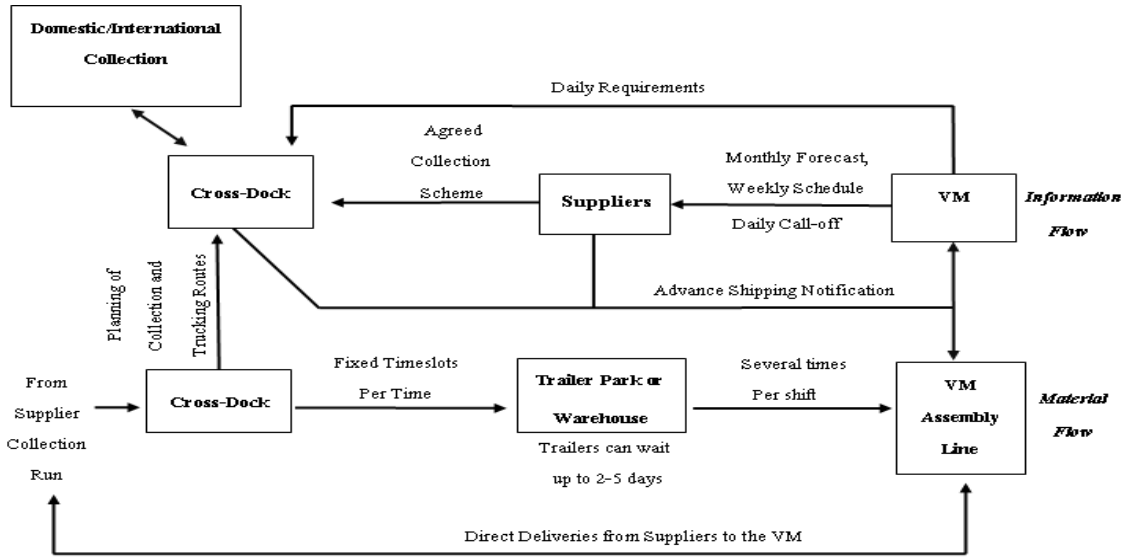
3. A comparative viewpoint of the implications

1. Inbound logistics

The main task of the inbound process is to collect goods from suppliers, to re-assemble these into delivery loads per time slot for each of the assembly plants, and to deliver these at minimal cost when they are needed. Cost is determined mainly by three factors, inventory in

the system, load efficiency, and vehicle mileage on both collection and delivery runs. The process described in Figure 1 shows a generic supplier collection scheme based on Thai suppliers and international deliveries feeding into a Thai vehicle manufacturer. The processes were similar across all cases, with regard to key process steps. Small differences in the operational performance relating to lead-time and efficiencies were found, but did not add to the comparative analysis.

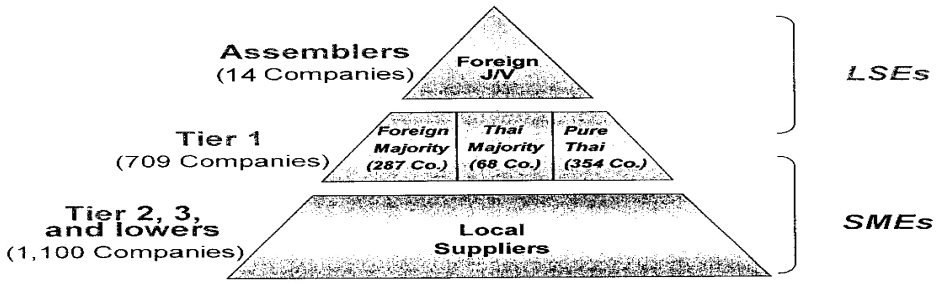
Figure 1: The inbound Logistics Operations processes



All three cases, company A has type of owner which are America 93% Thai 7%, B - Japan 75% Thai 25% (effective since August, 2004), and C- Thai 100%. These cases cover supplier collection of only 709 first tier suppliers shown in Fig 2 and deliveries into 6 assembly plants, a third party Logistics company organized collections from a selection of suppliers. There were delivered into the vehicle manufacturer (VM) either through a milkrun direct to the VM plant, a milkrun through a cross-dock warehouse, or direct from the supplier to the VM plant. Collections from suppliers were made between twice a week and more than daily, depending

on bulk and parts volume. On average, a typical VM requires daily or more collections from around 54% for passenger cars and 62% for commercial vehicles, with the rest of the suppliers being collected less frequently. This is based on current demand variability, schedule lead times and schedule reliability.

Figure 2: the structure of Thai Automotive Industry



Source: Thailand Automotive Institute

There are the main differences between the schemes relate to the information flow. Across the cases, the collection requirements for the logistics companies were either transmitted directly from the VM (and concurrently to the supplier), transmitted from the supplier, or transmitted through the logistics company to the supplier. In the first case the information direct from the VM allowed a rapid response for collection, as the within 1-3 hours, in case of last minute changes to the build schedule. In the second case, the collection requires a fourteen days change interval, and 14-21 days in the last case; as land-based mail is still used as means of communication for the shipping schedule.

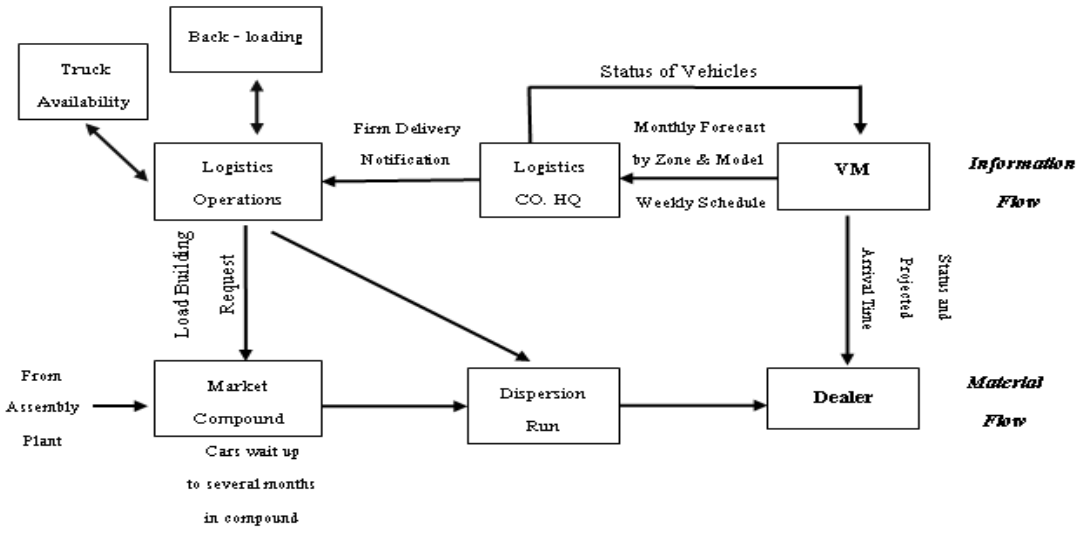
Although actual transit times were very similar between 24 and 36 h, the more rapid information flow obviously allows for quicker response to changes in the VMs material requirements. In addition, high variety type of parts, packaging and the use of cardboard in general was seen as adversely affecting load efficiency. To sum up, the two first cases show short overall lead-times except the last case, however, because of the differences in the

information processing, have a very different abilities to react to changes of the vehicle manufacturer. It is noted that Thai vehicle manufacturer is normally only concern the quantities and type of parts collected, rather than the actual routing of the collection itself.

2. Outbound logistics

The main task of outbound logistics is to deliver vehicles from Thai car plants into the dealership or the end customer. There are two main routes; 1) from car plants to distribution centre (DC), and 2) from DC to dealership/or customer. (as shown the main processes step in Figure 3). Outbound logistics combine the just in time and customer-driven delivery concepts relating the vehicle stock in car plants where they await an order, upon which they are delivered to the dealership. Only customer-ordered vehicles are cross-docked in these compound concepts for soonest possible delivery to the dealership or end customer.

Figure 3: The outbound Logistics Operations processes



In general, the current information on flow is the main limitation to more responsive delivery of vehicles. Although the logistics company receives information in advance relating to the

total volume and types of vehicles, exactly when and where delivery is required is generally not known in advance due to the throughput unreliability of the assembly plants. This fact was most strongly criticized by the logistics companies, and even claim to wait until the cars have been manufactured and inspected before planning for delivery can even begin. The generally delivery lead-time in Thailand is 2-5 days, much of which is used to plan the loads for more efficient transport. This mainly relates to picking up a 'backload' on the run on the next pick-up point, which has to be arranged individually for each load by ringing the competitors, and is responsible for most of the delay in the process.

3. Other transportation logistics

3.1 sea vehicle transportation operations

Sea transport is Thailand's major mode of vehicle transport accounting for 89 percent of the total international transportation; sea transport appears to have largest contraction among all other transport modes (NESDB, 2010). However, it is interesting to mention that a number of large Thai and vehicle logistics services providers employed multimodal transport by connecting road transport to marine and air transport until completely achieve rapid door to door shipment service with more than 30 percent cost reduction (NESDB, 2010)

The sea transportation is fundamentally to vehicles as the same process as outbound logistics. Sea transport means that transportation lead-times are long, yet the transit costs are comparatively lower due to the bulk nature of the transport. As the actual shipping lead-time can hardly be changed, this study focuses on the dock-side Operations and the overall integration in the vehicle logistics views. The key problem for shipping is again related to the information flow, but unlike other cases the integration of sea and road transportation. Due to the lack of communication and reliable planning information the shipping company will only ship what is available at the port compound, and often simply in a FIFO process, which

makes forward planning for specific vehicles impossible. This not only results in uncertain delivery dates for the customer, but is a core reason for the high stock levels in the port compounds. The other problem related to information uncertainty at the destination port. In many cases distribution companies at the receiving market do not know exactly which vehicles are arriving by ship, which results in further delays for load planning.

3.2 Railway and Air transportation operations

Railway and air transport of vehicles are hardly used in Thailand. The volume of transport of vehicles of almost all modes except road transport contracted significantly in 2009 compared in 2008, 3 percent reduction. Rail transport contracted the most with 49 percent reduction followed by air transport with 15 percent reduction and maritime transport with 6 percent reduction (NESDB, 2010).

It is noted that the railway transport in Thailand, rail transportation has a number of limitations which have not been effectively tackled by responsible government agencies including unreliable train timetables, insufficient locomotives and carriages and less-than-demand services frequency. Moreover, a system of double-track railways for major transport routes is still under construction. Therefore, alternative modes of transport such as rail transport is failed to distribute the vehicles.

4. Necessities for the build to order logistics

Hill (1993) stated that automotive logistics operations have found a number of barriers allowing build-to-order logistics to function effectively and effectively within an order-to-delivery cycle of as little as 2-5 days. The results at the inbound logistics case studies, it is clear that transit lead times from suppliers in Thailand in the first and second cases are short enough except the last case vehicle company. To implement build-to–order logistics without

holding excess stocks requires integrated information systems, which pass requirements information as soon as defined by vehicle assembly plants. In some cases collection and delivery frequencies may need to increase to reduce the impact on stocking costs. To mitigate the resulting lower trailer utilization. Best practice in packaging standardization can help increase load utilization, increasing the scope of milk-runs can also increase utilization, but adds to the transport lead-time, as well adding complexity to the cross-docking operation.

The cases studies also demonstrated that were significant delays in the outbound logistics process from final vehicle assembly to delivery to the dealer in most cases. The cause of delay is the lack of information or operation planning. The vehicle plants need to maximize economies of scale which is using large transporters can also be addressed by diversifying the transporter fleet and not only using large transporters but smaller ones instead. The sea shipping of vehicle also presents significant challenges-to-order logistics. The lead-times for sea transport will always be long and compared in flexibility due to the size of the ships, compared to road or air. The emphasis should then be put on shortening the dock-side operation such as pre-delivery inspection to reduce the overall lead times for delivery.

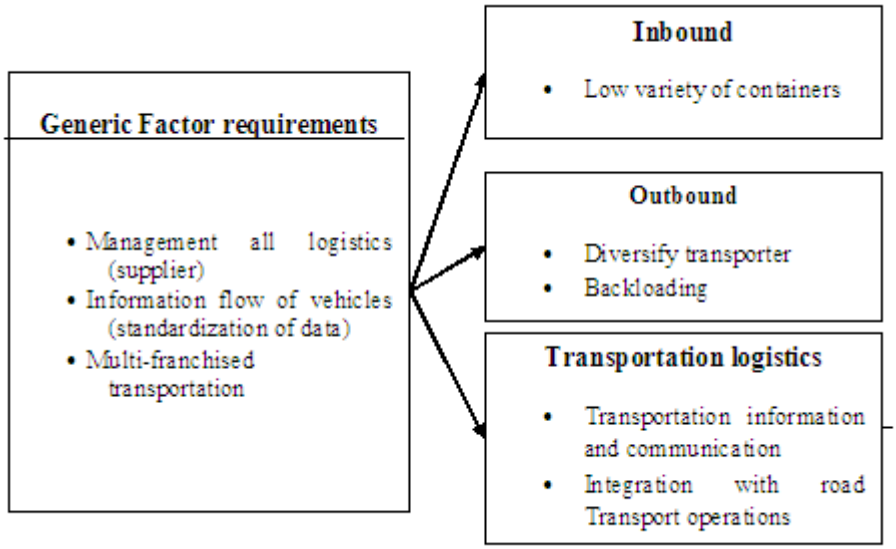
To sum up, the evidence from the cases studies clearly highlights that build-to-order will result in increased costs and environmental impacts in order to achieve the required service levels.

5. A strategic framework

Based on the case finding from all three areas of automotive logistics is shown in Fig 4, the main generic factor is the provision of stable and transparent demand information. Currently, all logistics companies claim that the planning uncertainty as a result of the lake of forward planning information is the main inhibitor to the effectiveness and efficiency of their operation. Fluctuating demand, and uncertainty in general, has also been strongly highlighted

as an inhibitor to supply chain performance in the general supply chain management debate (Forrester, 1958; Davis, 1993; Lee et al., 1997 Lee and Whang, 1998). Moreover, multi-franchised transportation can mitigate the cost and emission impacts by keeping load efficiencies high, despite the short lead-time delivery. This requires vehicle manufacturers to agree to multiple brand transportation on the same vehicle transporter which to date many manufacturers are resisting.

Figure 4: A strategic framework for logistics



Related to standardization is needed. Similarly to component suppliers, logistics companies have to deal with bespoke systems and individual data formats for each vehicle manufacturer, which results in unnecessary duplication of effort. Standardization is needed, in particular to support trade-exchanges. Also, standardization of data was highlighted by the inbound operators as an obstacle to achieving load efficiency. The another factor is focused on multi-franchised of transportation brand, which can mitigate the cost impacts by keeping load efficiencies high, even though the lead time delivery is short. This requires vehicle will agree to use the multi-brand transportation on the same vehicle transporter. However, date of many manufacturers is still have a problem.

Also, concerning to the sea transportation operations it was found that the latter are the least integrated with road transport operations so far. Whilst inbound operators communicate frequently with suppliers, manufacturers and dealers, the shipping operation is largely left outside this inner circle with a low variety of containers. Centralization of assembly plants and global vehicle sourcing will require responsive sea transportation followed by road transportation, in order to avoid costly air transportation.

To sum up, strategy needs to consider future requirements and opportunities. In particular, current outsourcing developments in the automotive sector opens up new possibilities not only for suppliers, but also for logistics service providers; these include the management of entire logistics and supplier views. However, strategies frame which is proposed could benefit through lower costs and new market opportunities in particular for the Thai automotive vehicle manufacturers.

6. Conclusion

Delivering cycle time and build to order have a strong impact on the automotive supply chain, and logistics operations. The impacts could be mitigated through operational improvement (e.g. through provision of better planning information), As highlighted in the case of case company A, logistics is a critical function in the supply chain, yet in its current form has to be classified as be short delivery cycle time, and an inhibitor of build-to-order vehicle supply. Moreover, the integration of inbound, outbound and export shipping planning and operations could hold large benefits. Also, strategic imperatives derived from build-to-order supports the integration of the whole logistics supply chain; it can be applied to automotive vehicle manufacturers.

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