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Develop a Framework of strategic positioning for the order penetration point/decoupling point

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ABSTRACT: Recent global challenges to appropriate implementation of manufacturing value chain, their specific product is linked to specific customer order. The order penetration point defined to value addition of manufacturing value chain. According to strategic perspective, different factors such as Market, product, and production factors are identified that affect the OPP positioning and the shifting of the OPP upstream or downstream in the manufacturing value chain. The major factors such as demand volume and volatility and their relationship between delivery lead time and production lead time and logistic service integration have identified. Comparison of manufacturing strategies must be generate between pre-OPP operations (i.e. upstream; forecast-driven) and post-OPP operations (i.e. downstream, customer order-driven), which has fundamental differences examine. And finally develop a framework to the order penetrations point or decoupling point which has affected in different factors and strategic decision categories to such as production planning and control..

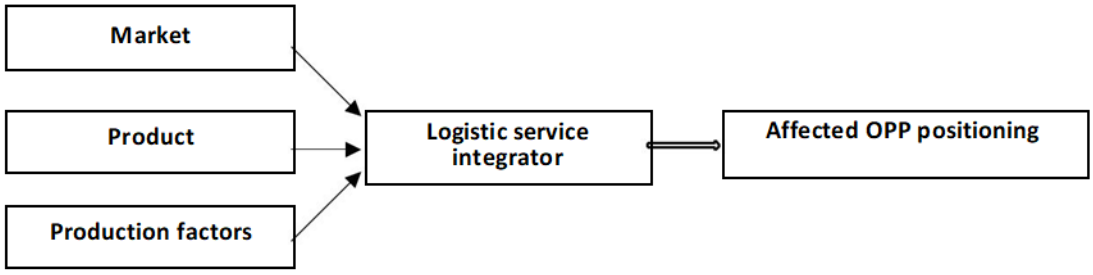
Keywords: order penetration point, Customer order decoupling point, manufacturing strategy, Product delivery strategies, Make to order, Make to stock, Mass customization logistics service (MCLS)

I Introducton

The positioning of the order penetration point (OPP) is more necessity for successively achieve of market strategic opportunity. In the recent scenario, globalization has additive force to global competitions to accurate match the delivery of product requirement and compete the shorter product life cycles. Due to shorter product life cycle, therefore tends to achieve the market strategic position shifts between make to order to make to stock (MTS) policies better design to faster and strategic level to achieve. Recently growing demand for customized logistic service, many logistic enterprises are expending their business beyond a mass service or change logistic service model to provide customized service.

These enterprise are starting to provide mass customization logistic service (MCLS) instead of mass logistic service (Chandra and Grabis, 2004).

Chart 1: Affected OPP positioning



MCLS environment many logistics emprises corporate and integrate to from a logistic service supply chain (LSSC) to meet the individualized service requirement of customers and to achieve the capabilities for offering mass service (Choy et al., 2007; Liu et al., 2011). As a final results key factors in determining the competiveness of the LSSC has becomes whether customized services at the cost of mass service through reasonable scheduling (Liu et al., 2012). Implication of order insertion is situation could be occur in supply chain scheduling, both in terms of production supply chain (Hoogeveen et al., 2012) and in service supply chain (Oliveira and Lourenço, 2002). Motivation: To study the factors influence on the positioning of the OPPs. The domain area is the rationale of forwards shifting, most of evidence of by authors has experienced in a few manufacturing firms. And backward shifting is fruitful for generally considers to be reduce the number of unnecessary activities resources and better planned for uncertain information environment. i.e forecast driven, potentially reducing or eliminating inventories redundancy.

2. Literature of OPP

Berry and Hill (1992) refer to the OPP choice as that of choosing a master planning approach, distinguishing between MTS, assemble-to-order (ATO), and MTO. This approach is further developed in Vollmann et al. (1997) and Hill (2000). The importance of Strategic positioning of the OPP is vital role play in competitive market. Sharman (1984) explored the term of OPP in a logistic perspective.

It defines that OPPs as the point where product specification generally exist in frozen, and as the last point at which inventory is held. Basically, the OPP depends on a balance phase between competitive global environment pressure and product price and complexity. Olhager and Ostlund (1990) reveals that application of push and pull system strategy to relative the position of the OPP, discuss that pull type system are using upstream of the OPPs and similarly push type systems are essential for downstream operations. The overall analysis is also explore the bottleneck position and product structure complexity as factors influencing for integration of push and pull systems. Various factor and perspective to derive a more holistic approach of the strategic relevance for selecting the right product delivery strategy, i.e selecting the right OPP position.

Definition of OPP and characteristics basically develop a framework to study the factors influence and determine the extent constrain the position of the OPP. The implement of OPP in manufacturing strategy, and distinctions among Pre-OPP and post-OPP operations, since these have fundamentally different characteristics. Therefore, repositions or redesigning and rebalancing capability to achieve the manufacturing value chain, by shifting the OPP backward or forwards positions strategy. Finally, a model is presented for selecting the right product delivery strategy with value addition in product. According to Logistics service integrator (LSI) must be focus insert a new order in scheduling plan that has produced for the original orders. In such circumstances, LSI must be encompasses the new order by constructing a new optimal scheduling plan (Hoogeveen et al., 2012).

In the MCLS environments, the focus on CODP is key point that divides the customized service from the mass service. The inserting a new order into the schedule, the abruptness and urgency of the new order will change the optimal CODP, as well as the total cost and the comprehensive satisfaction of the LSI. Hence, LSI the implementation of order insertion on the CODP would be explored according to management and counter gauge development strategy. According to theoretical and empirical evidence explored that recent most study on the CODP have covered on production supply chain scheduling and definition & implication of CODP (Ji et al., 2007; Olhager, 2003; Rafiei and Rabbani, 2011; Wikner and Rudberg, 2005), the shifting of the position of the CODP Qin, 2011; Rafiei and Rabbani, 2011; Rudberg and Wikner, 2004; Van Donk, 2001) and methodology to determine the position of CODP(Berry and Hill, 1992; Ji et al., 2007; Olhager, 2003; Olhager et al.,2001).

3. Characteristics of the OPP.

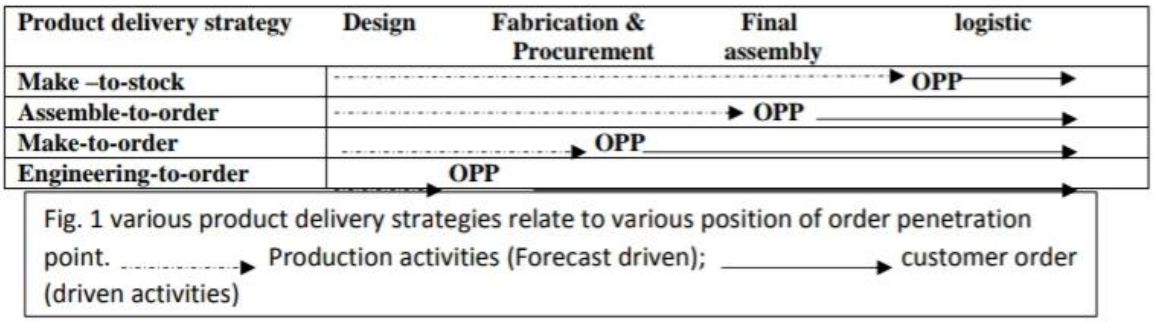
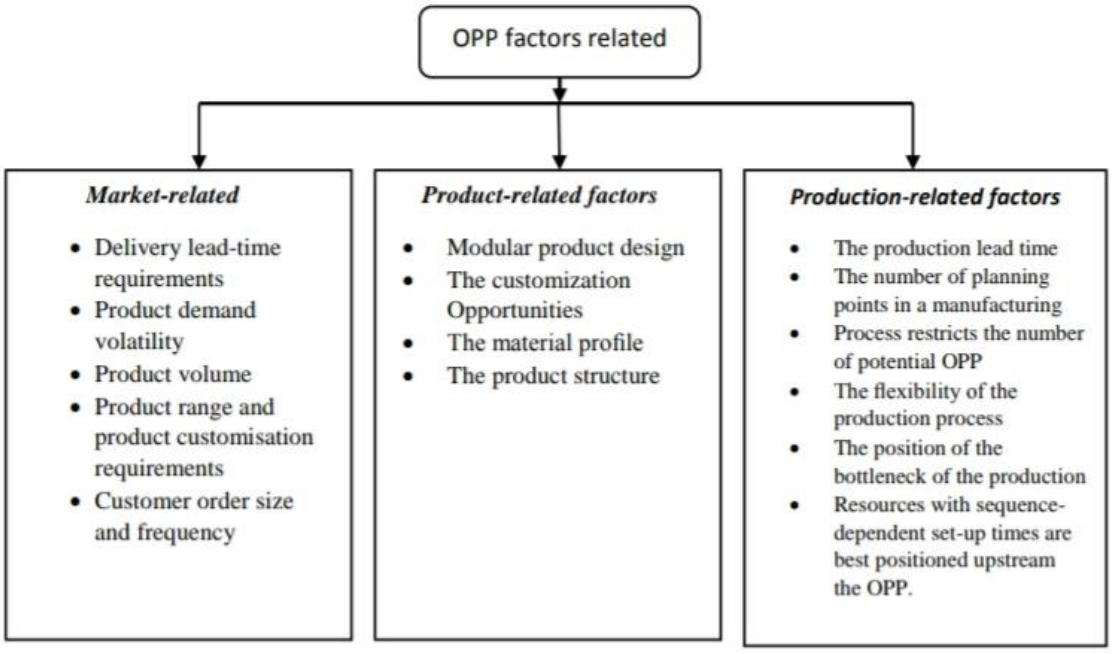


Fig. 1 various product delivery strategies relate to various position of order penetration point. ⋯→ Production activities (Forecast driven); ⟶ customer order (driven activities)

Conventional definition of OPP as the point in the manufacturing value chain for a product, their product is linked to a specific customer order desired. On the other hand, The OPP is called the customer order. Moreover, the OPP is called the customer order decoupling point (CODP) to indicate better fit to involvement of a customer order. It is clearly depicted in Figure:1, Considering various manufacturing strategy such as, Make –to-stock MTS, Assemble –to-order ATO, make-to-order MTO and Engineering –to-order (ETO) all are related to different position of the OPP. The different situation of manufacturing strategies are related to the ability of manufacturing operations to accommodate customizing or a wide product range. Therefore, OPP divides the manufacturing stages that are forecast –driven (upstream of the OPP) from their customer order driven (the OPP and downstream).The most of the factors are directly dependent of the demand volume, volatility and existing relationship among the delivery strategy and production lead time. These factors are included in a model that implemented to manufacturing firms to selecting the right product delivery strategy. In the contrast of manufacturing strategies must be built for pre-OPP operations (i.e. upstream; forecast-driven) vs. post-OPP operations (i.e. downstream, customer order-driven), due to two different stages are fundamentally different.

Chart 2: OPP factors related



Decision categories in manufacturing strategy, the difference between Pre –OPP and post-OPP operations. For example, the flow steady oriented production process is more applicable for upstream operations because the number of limited product is available (product layout and product facility covers), the downstream operations has necessity to flexibility inherent in job shop (process layout and process facility exist) it is depicted in the Table.

Table : 1 process layout and process facility exist

Attributes Factors	*Pre-OPP operations*	*Post-OPP operations*
Market and product		
Nature of Product types	Standard, commodities	Special
Existing Product range	Predetermined, narrow	Wide
Demand Pattern	high volume, predictable	Low volume, volatile
Order winners	Price	Design, flexibility, delivery speed
Market qualifiers	Design, quality, on-time delivery	Price, quality, on-time delivery
Production (decision categories)		
Process	Line, high-volume batch	Job shop, low-volume batch
Capacity	Lag/track	Lead/track
Facilities	Product focus	Process focus
Vertical integration	Supplier relationships, OPP buffer/post-OPP operations	Customer relationships, OPP buffer/pre-OPP operations
Quality	Process quality focus	Product quality focus
Organisation	Centralised	Decentralised
Production planning and control	Level S&OP strategy Order promising based on stock availability Rate-based material planning Pull-type execution	Chase S&OP strategy Order promising based on lead time agreement, and material and capacity availability Time-phased material planning Push-type execution
Performance measurement	Cost, productivity	Flexibility, delivery lead times

4.0 Forward shifting of OPP

Generally two types of driving forces are responsible for shifting the OPP forwards (i) Reduce the delivery lead time to customer. (ii) An improve the manufacturing efficiency. Therefore, optimization of bottlenecks operations. In such a situation, sequence are generally dependent setup time on a bottleneck situations, it would be opportunity to optimization point decide and its can be able to run with resource based on a forecast, instead of having to react expect penetration of customer order items and quantity decides. This strategy to achieve by generally two types of key points address (i) delivery speed and reliability (ii) price respectively. According to modular design for products or pre-fabrication. A good modularization will leading to an ATO policy. The main focus of lead times for downstream activates would reduce the delivery lead time (forward shifting) but will not change the OPP with respect to the material flow in the product structure per se. in contrast of lead time reduction will typically use shifting the position of backward OPP. The shifting of OPP forward direction has negative effect and the strategic issue. In a given Table: 2 clearly depicted.

Table: 2 OPP forward shifting effect on strategic issues

Competitive edge	Forward shifting	Negative effects
Delivery speed Delivery reliability	Reduce the customer lead time	Rely more on forecasts (risk of obsolescence)
Price	Process optimisation (improved manufacturing efficiency)	Reduce product customisation (to maintain WIP and inventories levels) Increase work-in-process (due to more items being forecast-driven)

4.1. Backward shifting of OPP.

The driving force for shifting in such a situation in backwards is to enhance the knowledge of contents to customer order at the accurate time of production and value added. i.e to achieve the higher degree of customization and reduced the resources of work in process inventory redundancy. Performing more activities based on actual customer order quantity penetration, the organization added the value addition and quality enhancement, therefore these activities during the delivery lead time must be yield. In a given Table 4.

Table: 3 OPP Backward shifting effect on strategic issues

Competitive edge	Backward shifting	Negative effects
Product range Product mix flexibility	Increasing the degree of product customisation	Longer delivery lead times and reduced delivery reliability
Quality	Reduce the reliance on Forecasts Reduce or eliminate WIP buffers Reduce the risk of obsolescence of inventories	(if production lead times are not reduced) Reduced manufacturing efficiency (due to reduced possibilities to process optimisation)

5. Strategic Perspective of the positioning of the OPP

The strategic positioning of the OPP are major affected by delivery lead time ratio (P/D) and the relative demand volatility. The definition of demand volatility as coefficient of variation, i.e the standard deviation of demand relative the average demand.it is also clearly depicted in Figure2, and Figure 3 revels that if, The P/D =1, this value is related to whether production can await a customer order before production activities must begin or not. The P/D <1, an MTO product delivery strategy is possible. However, in order to capitalise on economies of scale for common items, these may be produced to stock. This is expressed through the RDV, such that a low RDV indicates that some parts can be produced to stock, potentially leading to ATO situation. Low demand volatility (DV) indicate that some prats can be generate/produced to stock, potential leading to the ATO situation. The low DVs MTS strategy can be pursued. It means that through P/D ratio would be explore for MTO, the firms select an MTS policy with pursue to increase productivity.

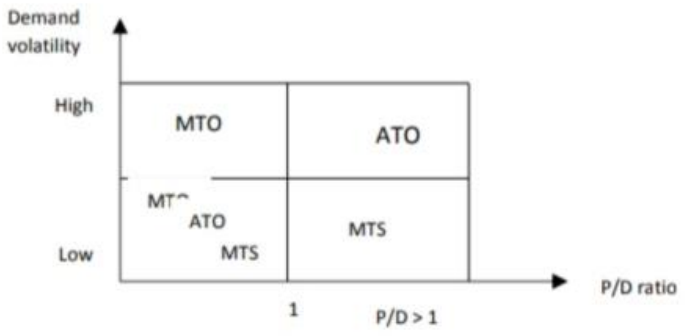


Fig: 2 the slandered deviation of demand relative average demand

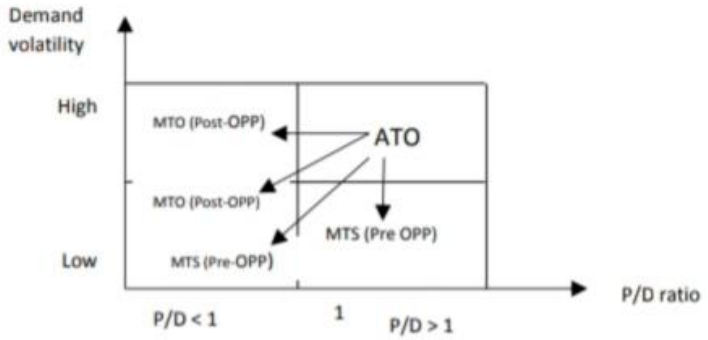


Fig: 3 Decoupling point based on economic of scale

Suppose if the market a shorter delivery lead time, more burden put on manufacturer to reduce led time to quality for wider choice of product delivery strategies. If in such a situation manufacturer lead time is longer than MTO will not select. A manufacturing firm's work on proactively cuts lead times may create opportunities, where delivery speed can be order winner, at few markets for few product strategy. Such action resembles the ultimate strategic role of manufacturing i.e that is extremely supportive according to Hayes and Wheelwright (1984). If suppose the delivery variability is too higher for using the MTS policy, inventory stocking in some point is very necessary for internal manufacturing value chain. Basically, this point is called coefficient of variations, i.e the demand vitality is smaller. Typically, Lower of DV coincides with higher demand volume. i.e the higher the product volume, the lower the relative demand fluctuation. This has been illustrated in empirical evidence by such action resembles the ultimate strategic role of manufacturing i.e that is extremely supportive according to Hayes and Wheelwright (1984). ATO is implemented to deals with volatile demand and delivery lead time requirement ATO has combined both MTS upstream and MTO downstream the OPP, it is possible to reposition ATO. In the Figure 2, and Figure3 depicted, to implemented Pure MTS and MTO policies for Pre-OPP and Post-OPP operations respectively. According to separation of ATO into two parts that has less than delivery lead time. According to definition MTO must less than P/D ratio is less than one. MTS feasible option for any circumstances with low DV. Finally observed that P/D ratio in combination of larger DV makes MTO strategy successively and more applicable. In such a situation decoupling an ATO situation around the OPP. Both strategy can be feasible.

Conclusions:

According to depict Figure: 4, it has completely explore that various factors effected in order penetration point or decoupling point decision. It Cleary reveals that market characteristics, Mass customization logistics services, and product characteristics, and production characteristics are affected by delivery lead time, and logistic integration and customized logistics services. Various manufacturing strategies such as MTS, MTO, ATO and ETO have significant influence role to achieve the Order penetrations point decides. Decoupling point stocking location is key role pay to market winner and qualifier. The key role pay by inbound and out bound logistic customization role and smooth integrate logistic flow frequency and order penetration point to achieve better opportunity of scheduling accurate location and delivery strategy of market strategy to achieve. It is clearly explores that various factors affect the position of the OPP, and strategic rationale the OPP forward or backward. Extreme position of backward shifting will place the firms in an ETO situation, in order winner has required to design, delivery speed and flexibility. In such a situation of forward shifting as far as possible to leads to an MTS situation, where price is main dominating order winner. In such changing of market condition and situation are related to competitive advantages in terms of order winner criteria dependent and strengthened or appropriate position stocking point and variability of market lumpy demand pattern. The

trade-off between (i) maximum manufacturing efficiency that that leads to Pre-OPP operations (ii) the requirement of minimum inventory investment that dominates the post-OPP operations, while at the same time maintain a higher and consistent level of customer service. In the context of positioning of the OPP is very closer to the trade-off. The OPP divide into two separate parts of manufacturing value chain, it must be differentiate with respect to manufacturing strategy. The implementation of Pre-OPP operations and for Post-OPP operations. We presented some basic strategic issues related to pre-OPP vs. post OPP operations. The framework has developed product delivery strategy with respect to demand volume and volatility and generate the relationship between the OPP, its characteristic and strategic importance product and delivery lead times.

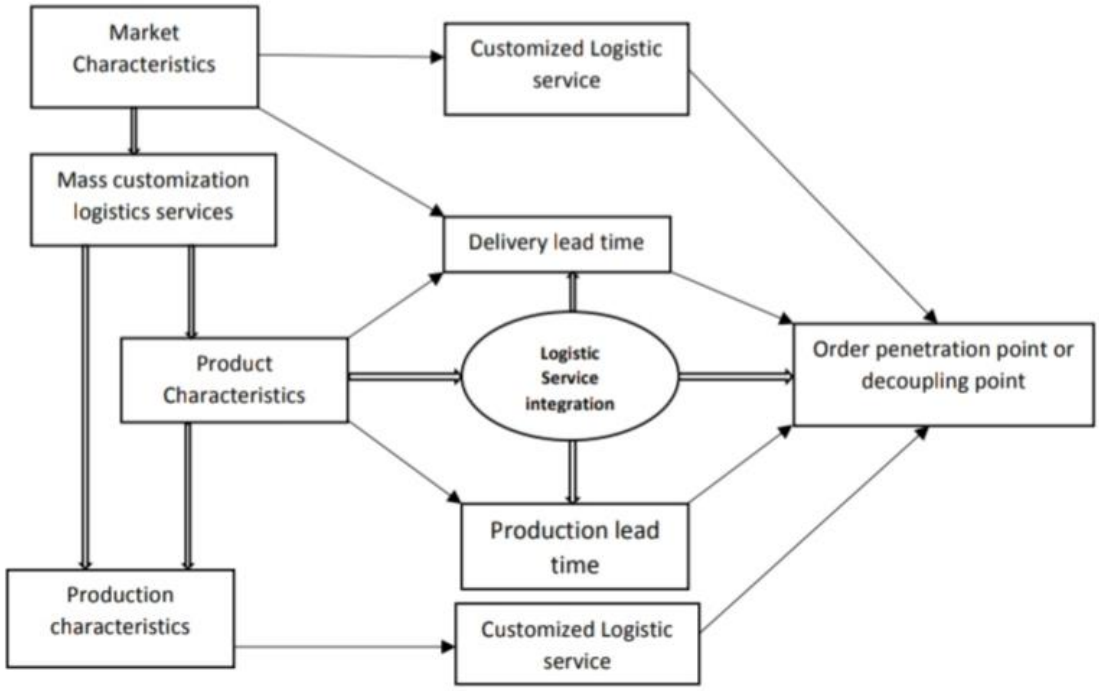


Fig. 4 Framework for affecting the positioning of the OPP/DPs

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