



# Strategic positioning of the order penetration point

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## Abstract

The order penetration point (OPP) defines the stage in the manufacturing value chain, where a particular product is linked to a specific customer order. Different manufacturing environments such as make-to-stock (MTS), assemble-to-order (ATO), make-to-order (MTO) and engineer-to-order all relate to different positions of the OPP. These may be considered as product delivery strategies, having different implications for manufacturing objectives such as customer service, manufacturing efficiency and inventory investment. Furthermore, the OPP may differ between products and over time for a particular manufacturing firm. In this paper, the positioning of the OPP is treated from a strategic perspective. 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 are demand volume and volatility, and the relationship between delivery and production lead times. These factors are included in a model that allows the manufacturing firm to choose the right product delivery strategy. Different manufacturing strategies must be developed for pre-OPP operations (i.e. upstream; forecast-driven) vs. post-OPP operations (i.e. downstream, customer-order-driven), since these two stages are fundamentally different. As a consequence, a manufacturing firm that has an ATO product delivery strategy must differentiate between MTS operations (upstream the OPP) and MTO operations (downstream the OPP). For example, the competitive priorities differ: price for pre-OPP operations but delivery speed and flexibility for post-OPP operations. Therefore, decision categories, such as production planning and control, and performance measurement must be designed accordingly. Guidelines are provided for this strategic choice.

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## 1. Introduction

The positioning of the order penetration point (OPP) is successively becoming a topic of strategic interest. With global markets, increasing global competition and shorter product life cycles, the choices and shifts between make-to-order (MTO) and make-to-stock (MTS) policies must

be made faster and at a strategic level. The motivation for this paper is to investigate factors that affect the positioning and shifting of the OPP. Of special interest is the rationale of forward shifting, something that the author has experienced in a few manufacturing firms. Backward shifting is generally assumed to be desirable to reduce the number of activities that are planned using uncertain information, i.e. forecast-driven, potentially reducing or eliminating inventories.

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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 discussion in the literature on the strategic importance of the positioning of the OPP is very sparse. Sharman (1984) introduced the term OPP in a logistics context. He defines the OPP as the point where product specifications typically get frozen, and as the last point at which inventory is held. He argues that the OPP depends on a balance between competitive pressure and product cost and complexity. Olhager and Östlund (1990) discuss the use of push and pull systems relative the position of the OPP, arguing that pull-type systems are applicable upstream of the OPP and push-type systems are necessary for downstream operations. Their analysis also included the bottleneck position and product structure as factors influencing the integration of push and pull systems.

In this paper, we try to add factors and perspectives to derive a more holistic view of the strategic relevance of choosing the right product delivery strategy, i.e. choosing the right OPP position. First, we define the OPP and discuss its characteristics. The factors that affect and to some extent constrain the position of the OPP are categorised and a conceptual impact model is developed. The OPP is then related to a manufacturing strategy, implying that a distinction is necessary between pre-OPP and post-OPP operations, since these have fundamentally different characteristics. Then, the reasons and the means for redesigning or rebalancing the manufacturing value chain, by shifting the OPP backwards or forwards, are explored. Finally, a model is presented for choosing the right product delivery strategy.

## 2. Characteristics of the OPP

The OPP is traditionally defined as the point in the manufacturing value chain for a product, where the product is linked to a specific customer order. Sometimes the OPP is called the customer order decoupling point (CODP) to highlight the involvement of a customer order. Different manufacturing situations such as MTS, ATO, MTO and engineer-to-order (ETO) all relate to different positions of the OPP. The different manufacturing situations are related to the ability of the manufacturing operations to accommodate customising or a wide product range (see Fig. 1). Thereby, the OPP divides the manufacturing stages that are forecast-driven (upstream of the OPP) from those that are customer-order-driven (the OPP and downstream).

## 3. Factors affecting the positioning of the OPP

The positioning of the OPP is affected by many factors; see e.g. Sharman (1984), Olhager and Östlund (1990), Giesberts and Van der Tang (1992), Hoekstra and Romme (1992), Olhager (1994), Van der Vlist et al. (1997), Fisher (1997), Olhager and Wikner (1998, 2000), Pagh and Cooper (1998), Lehtonen (1999a, b), D'Alessandro and Baveja (2000), Mason-Jones et al. (2000), and Van Donk (2001). The majority of the literature deals with manufacturing operations, whereas Sharman (1984), Hoekstra and Romme (1992), Fisher (1997), Pagh and Cooper (1998), and Mason-Jones et al. (2000) primarily deal with supply chains. Case examples are found in Olhager and Östlund (1990), Van der Vlist et al. (1997), Lehtonen (1999a, b), D'Alessandro and Baveja

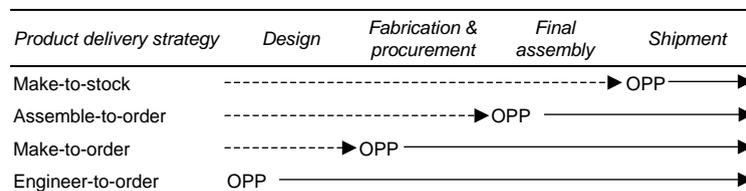


Fig. 1. Different product delivery strategies relate to different order penetration points. The dotted lines depict the production activities that are forecast-driven, whereas the straight lines depict customer-order-driven activities.

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