

EXECUTIVE SUMMARY

The onset of the era of mass customization has led to an increase in the variety of products on offer while reducing the lead times for order fulfilment. One of the popular methods of adapting to the customization wave is postponement. The concept of postponement or delayed differentiation has been used by a number of companies across a range of industry segments such as apparel, automotive and technology. Postponement reduces the forecasting horizon and therefore works on the concept of risk pooling to reduce the forecast inaccuracy which results in operational improvements for the firm. However, the use of postponement along with the philosophy of supply chain re-engineering yields great results as is seen in the case of Benetton. Supply chain re-engineering enables companies to undertake radical changes in business processes to dramatically improve the performance of the firm.

The thesis evaluates the effect of postponement on the total relevant cost of an apparel manufacturing company with production facilities in China and Vietnam. The paper also looks at implications on time and risk of the different postponement scenarios. For the firm under consideration, conversion of the generic product to a specific happens at the cutting stage, and hence shifting the cutting operation downstream is expected to improve the forecast accuracy for the firm by reducing the horizon over which the company forecasts. In accordance with the principles of supply chain re-engineering the paper proposes three different postponement scenarios – postponement of cutting operation to Vietnam, movement of both dyeing and cutting operation to Vietnam and reconfiguration of the manufacturing process to enable cutting at China and dyeing at Vietnam.

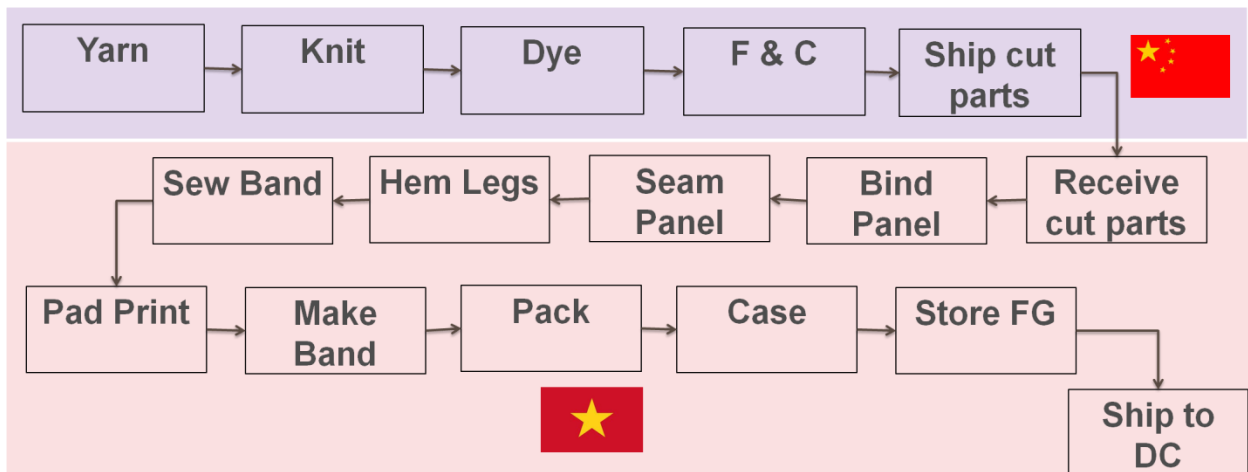


Fig: Current Process Flow

We formulate a linear objective function for the total relevant cost of each of the postponement scenarios. The costs under consideration are the inventory costs, warehousing costs, transportation costs, labor and overhead costs and the cost of quality. The inventory cost looks at the cycle inventory and the holding cost of inventory. Warehousing costs will differ because in the proposed processes the firm will be shipping fabric rolls from China to Vietnam instead of cut parts. The transportation costs consists of land freight, ocean freight, terminal handling and import-export clearance costs. The labor and overhead costs looks at

the net differential of labor costs and labor productivity between the two countries. Finally, the cost of quality ensures that we account for the less efficient nature of operations at Vietnam compared to China. The paper incorporates a three tiered framework – cost, time and risk – to look at postponement alternatives. For the purpose of the thesis, we have assumed that there is no significant change in process time due to any of the alternatives presented. Risk has been analyzed qualitatively to determine the magnitude of impact on the supply chain performance across the different scenarios. We look at business continuity, fiscal and monetary policies and inflation of labor rates as major influencers of supply chain risk.

PARAMETER	SCENARIO			
	Current As-Is	Postpone Cutting operation	Postpone Dyeing	Reconfigure operation - cutting then dyeing
Total Relevant Cost	Baseline	Savings of USD 9.3 m\$ over baseline	Savings of USD 14.3 m\$ over baseline	Savings of USD 3.84 m\$ over the current baselines
Cycle Inventory Value	Baseline	46% reduction over baseline	69% reduction over baseline	22.2% reduction over baseline
Time	Baseline	Reduces the forecasting horizon by 4 weeks by postponing the differentiating process to a more downstream location	Reduces the forecast horizon by 3 weeks by postponing the dyeing operation to a more downstream location	Reduce the forecasting operation by 4 weeks by postponing the differentiating process to downstream
Risks	Baseline	Minimal risk. In case of disruption in fulfillment process, the infrastructure is in place to complete the operations at China as a risk management process	Moderate risk. Cost of maintaining an additional dyeing infrastructure as backup could significantly affect the profitability. The absence of dyeing infrastructure could serve as a major source of disruption	High risk. Requires backup of both cutting and dyeing at both locations. Cutting is a manual process and hence the risk exposure to labor rates in China is high

Fig: Comparative Analysis of different scenarios

The thesis recommends the use of cutting postponement to Vietnam in comparison to the other alternatives. The postponement of cutting operation reduces the total relevant cost by around 9 million USD while exposing the firm to limited risks. The significant cost benefit of this method is attributable to the presence of infrastructure required for the cutting operation at both the China and the Vietnam plant. The conservative risk profile of the

recommendation is due to a relatively stable political situation in Vietnam accompanied by nominal inflation of labor rates over the past few years. The movement of the dyeing operation to a downstream location will result in a net benefit only if the capital outlay for the setting up of the dyeing operation at Vietnam is significantly less than the savings from the inventory holding value. Given the limitations of the timelines of this project, we have not been able to delve to greater depth on this expenditure. The reconfiguration of operations that allow the completion of cutting before dyeing would be appropriate if the demand variability of the differentiated product at the dyeing stage is greater than the demand variability of the product after the cutting stage i.e when the demand of an SKU varies more at the color level than at the size-set level. To quantitatively arrive at the conclusion, we need to analyze the demand patterns of every SKU at both the size-set and the color level. The challenge to the reconfiguration option could be the cost of maintaining the dyeing equipment at both locations in China as well as Vietnam. This is again to ensure continuity of supplies of dyed fabric should there be any disruptions in the dyeing operation at Vietnam.