

Unlocking Value in Healthcare Delivery Channels

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Summary: With the introduction of new technologies and federal regulations for tracking drugs down to the user, pharmaceutical innovators are actively reshaping their role in the supply chain. Our objective was to support our Sponsor Company, a “Big Pharma” company with a wide range of medicines, to understand the key cost drivers of their current distribution channel and to explore the impact that a shift to an alternative distribution channel would have from a financial and operational standpoint. A cost-to-serve model framework can be applied within the pharmaceutical industry when considering an omni-channel distribution strategy.

Before coming to MIT, Qi Zhang worked in Commercial Operations at Shenzhen Mindray Bio-Medical Electronics, the largest medical devices manufacturer in China. Prior to that, she graduated with a Bachelor of Mathematics from University of Waterloo (Canada) and a Bachelor of Business Administration from Wilfred Laurier University (Canada).

Before coming to MIT, Muching worked across Africa at the pharmaceutical division of Imperial Logistics, a global logistics company based in Johannesburg, South Africa. Muching earned a Bachelor’s in International Affairs from George Washington University in Washington, DC. She will be joining Agios Pharmaceuticals after MIT.

Key Insights

1. For special pharmaceutical products, omni-channel distribution channels can create a win-win situation to the pharmaceutical manufacturer as well as patients. Where patients benefit from closer point of care and manufacturer benefits from better patient adherence and increased sales.
2. Cost-to-serve methodology can be adapted to the specified product of concern and developed into a decision evaluation tool to help companies assess overall cost implications of business decisions including alternative distribution channel.
3. A cost-to-serve evaluation tool can help companies facilitate internal functional integration as it maps out the complete value chain activities and promotes global optimization across the corporate supply chain.

Introduction

Our objective was to analyze a targeted product’s distribution network within the US by building a *cost-to-serve* model, which maps out the end-to-end service components conducted by the Sponsor Company. With this model we were able to test the supply chain impacts of volume change and a gradual shift to alternative distribution channels. The results of the model showed that for this particular product, working capital was a key cost driver, so shifting volumes to alternative distribution channels is highly beneficial; even some

significant increases in operating costs are effectively neutralized by reductions in working capital for the entire channel. We recommend further refining cost and productivity assumptions and suggest that this ‘bottom-up’ costing model be extended for other products and geographies and used to inform the company’s overall corporate strategic planning exercise.

Operational Context

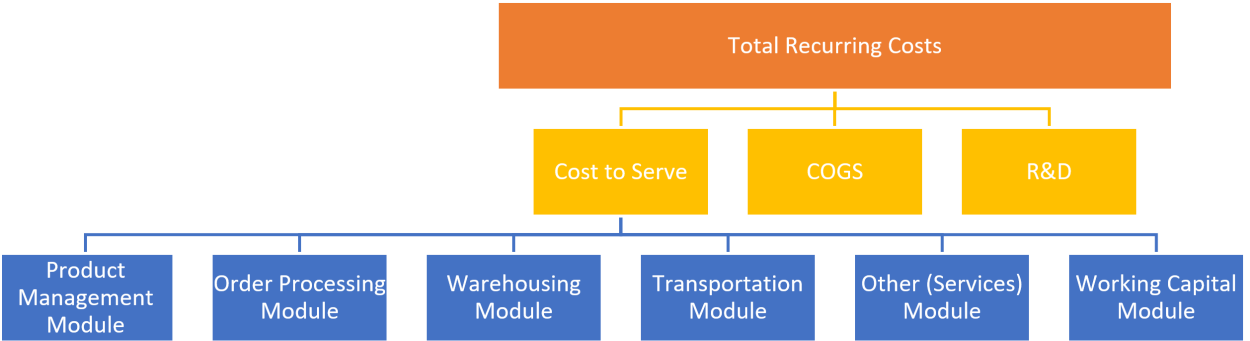
The pharmaceutical supply chain (hereafter referred to as ‘PSC’) has historically had very clear segregation of duties. Pharmaceutical manufacturers focused upstream on clinical research and development of the active ingredients, outsourcing the order fulfillment and distribution function once a drug was approved to a network of third parties (wholesalers and distributors). These companies then worked with a host of customers, including retail pharmacies and hospital networks who ordered the drugs, and insurance providers who paid for them. The wholesalers and distributors are collectively referred to as ‘channels’ and have significant negotiating power, as they buy across the entire range of thousands of products, leveraging their combined volumes and range for preferential prices.

Because payers and providers had decision-making power in prescribing and reimbursing the drug, they were in effect the end consumer rather than the actual patients. However, the industry is shifting to the “value-based care” model, in which drug reimbursements are determined by patient-centered health outcomes. This model has become more popular due to pressure from government and payers to contain spiraling healthcare costs.

However, this landscape is shifting both from the top down, as governments seek to regulate drug pricing and intermediaries continue to consolidate and vertically integrate, as well as from the bottom up, as consumers seek personalized, “on-demand”, technology-driven solutions for healthcare similar to what they can utilize for e-commerce, transport etc.

Method, Data and Preliminary Results

We first established an analytical framework for categorizing and evaluating the operational cost drivers for the drug manufacturer to implement its current distribution network and explored how these cost drivers would be affected by changes in customer demand as well as a service model change to reach consumers directly rather than through the current channels. We focused the analysis on one product within their portfolio that is particularly well-suited for a direct-to-patient model, as it is a high-value, low-value treatment for a chronic condition.



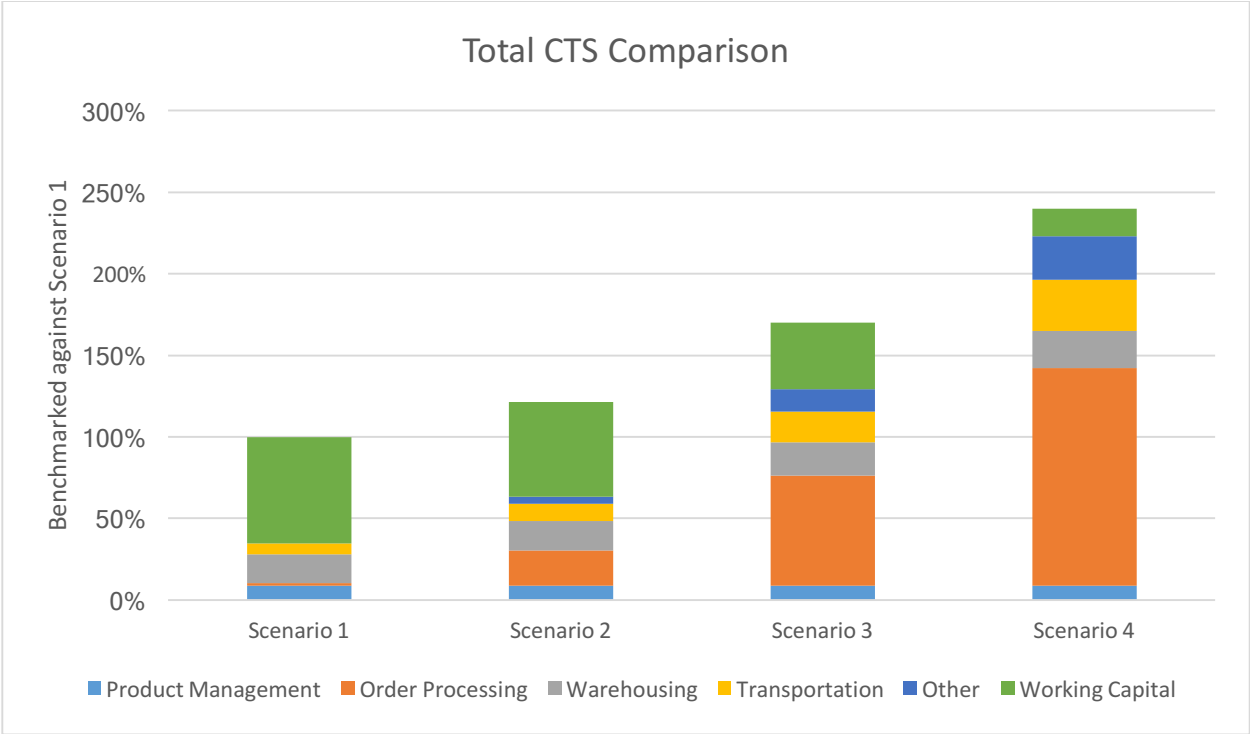
We then ran the model against the baseline data to identify a) key cost drivers by activity module, and b) key cost drivers by channel (if different). With historical 2016 sales volume (baseline scenario), price points, and sales mix among customer groups (no individual sales as of yet) the biggest cost was from working capital

investment, then followed by Product Management and Warehousing. Due to the expertise of the sales and marketing team, and the additional costs incurred from travel and administrative expenses on top of the higher salaries paid to the sales staff, this was by far a bigger labor cost driver than warehouse and even order management workers. This is something to bear in mind when planning for staff productivity improvements as well as planning for future volume growth.

We explored the impact on CTS if the distribution channels shifted from the existing customer groups to a direct-to-pharmacy model. We used 2018 projected volume and price figures to test a range of scenarios, from baseline (no shift to alternative channels) to the most extreme, 100% shift to alternative channels.

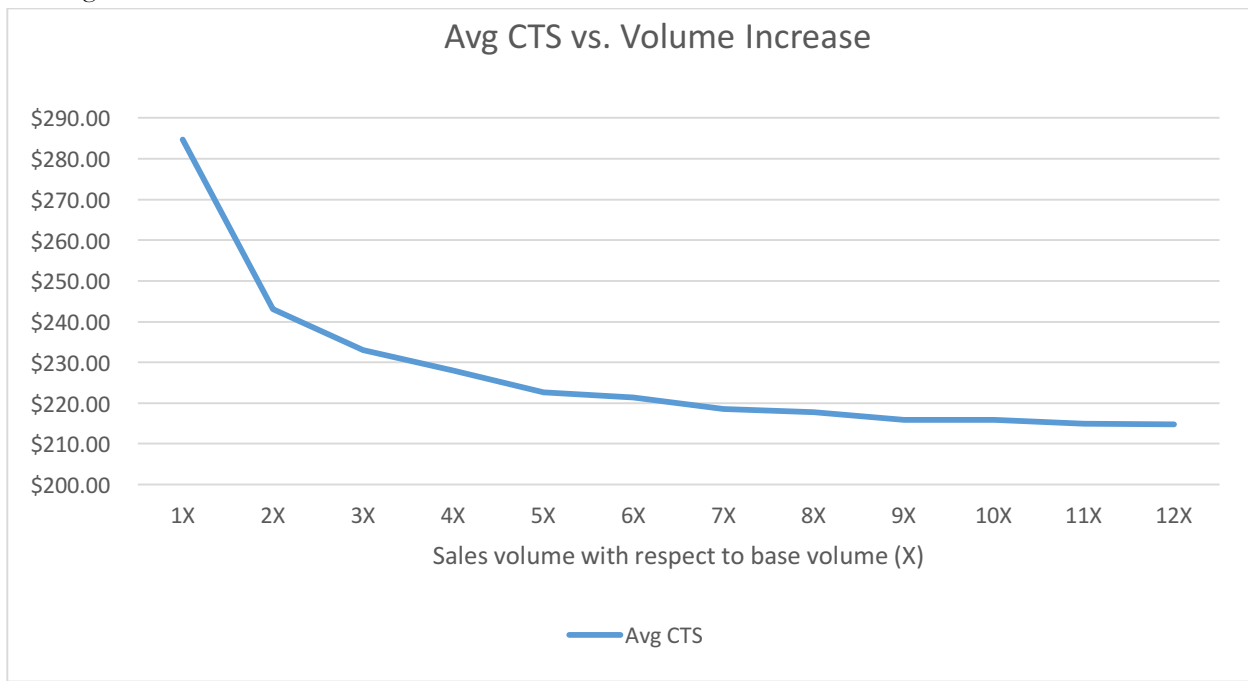
Results

Although it is very expensive to serve individual customers, selling direct also means a significant increase in profit margin due to the fact that the vendor can charge the end price directly, when currently the sale price to wholesale customer almost doubles by the time it reaches the patient. Thus, as more sales are made via direct channels, the rate of increase in total cost to serve is much higher than the rate of increase in revenue. However, due to the extreme high profit margin of product P, the dollar value increase in revenue value is still significantly positive and thus justifies the business case at 100% direct sales. Therefore, from the profitability stand point, it is definitely recommended for the company to try to go direct as much as possible.



This project has demonstrated for us that using a relatively well-established framework such as the cost-to-serve analysis, can be powerful in unexpected ways when applied in a new context. The utility of this model is that it does not rely on complicated software or a “black box” of algorithms and formulas that users across a large organization cannot validate or understand; rather it is built from the bottom up, with inputs derived from the operations and the unique constraints and market conditions of the company and the product. This provides an opportunity for stakeholders to ensure data accuracy and feel ownership of the decision-making process.

Doing this kind of analysis is useful for understanding the cost implications of strategic supply chain options. In the case of the Sponsor Company, this originated with a new formulation of the product that would allow for potential market growth. In performing this exercise, the company was able to evaluate their strategy, to be closer to patients, in a more focused and evidence-based way, especially when designing their operations to be able to meet this future need. In developing the model, it helps the company understand and be able to quantify economies of scale (or, the lack thereof) and cost drivers within in. In this case, the results showed that there would be some initial cost savings due to economies of scale, but not past 2X volume growth. In addition, the cost to serve would be significantly higher if the distribution model were to incorporate drop shipments, but the expected revenue would far outweigh this cost, as it would reduce inventory requirements and return a layer of margin to the manufacturer.



Conclusion

We strongly recommend that going forward, independently of this specific thesis project, our Sponsor Company and similar Big Pharma companies undertake this exercise and proactively involve senior leadership to ensure that the parameters are reflective of actual performance and costs, as discussed in the limitations of the model. There are also ways to make it more customized and user-friendly so that operational leads can also engage directly with the model and improve accuracy of the parameters/assumptions. Finally, we hope that it will be extended to other portfolios and markets, both within specialty pharma and other product portfolios to test the robustness of the model.

The good health and well-being of patients is the objective of all stakeholders, and in this complex landscape with skyrocketing costs, it can be difficult to find financially and operationally viable interventions that are actually good for patients. Our research and our model indicate that alternative delivery is one such intervention.