

Systems Approach to Product Code Optimization in Wound Closure Supply Chain



BUSINESS PROBLEM

Pledgets are a critical component in non-absorbable suture systems used in cardiovascular and other surgical procedures. An increase in pledget quality complaints drew attention to these components that have undergone little lifecycle management in the last 40 years. In that time, the component portfolio had proliferated, introducing substantial product and process complexity. There is a need for a systematic, end-to-end supply chain management approach to decrease pledget component variety, reducing manufacturing complexity and enabling quality and process improvements.

DATA SOURCES

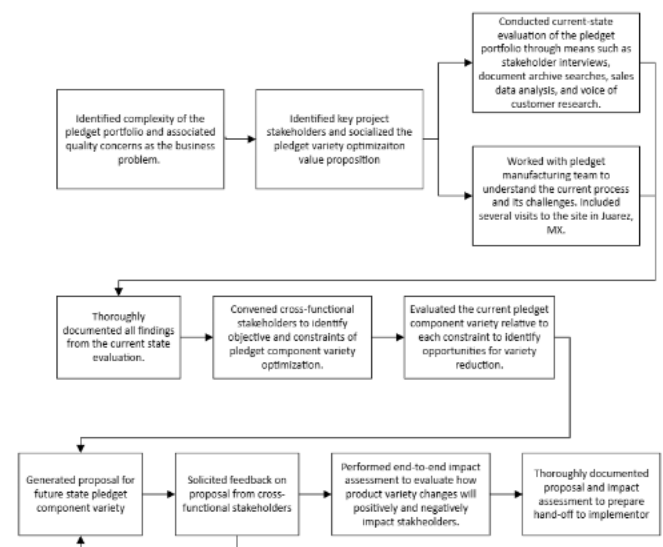
Most data were pulled from the Tableau for the business unit that aggregates sales, production, and quality data. This includes global sales data, component production data, finished good production data, and bill of materials. Other internal data includes complaint and material waste data. Public product catalogs for J&J MedTech and its competitors were used to get data on product attributes.

Data Types and Format

Product complaint images, product attributes (categorical), structured data for production and sales.

APPROACH

First, an end-to-end evaluation of the pledget variety captured the current-state of the portfolio. Second, cross-functional stakeholders defined the objective and constraints for pledget variety optimization. Third, the variety was evaluated with respect to each constraint. Fourth, a variety optimization strategy was proposed. Fifth, an end-to-end assessment evaluated impacts of variety changes.



IMPACT

The proposed portfolio changes reduce the pledget component variety by 60%, exceeding the original target of 40% and meeting each of the three constraints. The constraints were informed by the cross-functional stakeholders' priorities for variety optimization: Continue to meet customer needs: this methodology reduced the component variety by 29% with no impact on the customer. The remaining reductions were informed by updated voice of customer research to ensure the future variety meets today's customers' needs. Protect J&J MedTech's competitive position in the market: the reduced component variety covers the same size range, ensuring that gaps in offerings cannot be leveraged by competitors. An evaluation of product code pricing also drew attention to opportunities for margin improvement. Reduce manufacturing complexity: The reduced component variety shifts volume to the more repeatable pledget punching manufacturing process. Reduced manufacturing complexity also brings clarity to the root cause of the product quality issues and which investments in capital equipment and process improvement will provide the most value to the business. This work presents a systematic, end-to-end approach to portfolio optimization to reduce manufacturing complexity and improve product quality and alignment between the portfolio and business strategy. This methodology offers a replicable model for similar legacy product portfolio optimization in the medical device industry.

DRIVERS	A recent increase in customer product complaints drew attention to the pledget portfolio. Many of these complaints originate from cardiovascular surgeons, as pledgets are commonly used in these surgeries. Given the increasing importance of the Cardiovascular portfolio to the Wound Closure & Healing business, there was concern that these product quality issues may lead to customer attrition.
BARRIERS	Data availability – there were gaps in process and supply chain data. For example, it was not possible to calculate the scrap rate for the different pledget processes or monitor impact of implemented solutions. Timeline – Implementation was not possible on the six-month timeline of this work given the administrative, quality system, and global regulatory changes that will be required.
ENABLERS	Stakeholder Buy-In – This project needed support and involvement from cross-functional stakeholders. With a compelling value proposition, stakeholders were willing to buy in despite sometimes conflicting priorities. Company Mission – J&J is a very mission-driven company, and most decisions come back to the responsibility to serve customers and patients, serving as a true guiding principle.
ACTIONS 	This work culminated in a comprehensive review of the current state evaluation for the pledget portfolio and recommendations for component variety optimization. I presented the recommendations to multiple leadership teams, stakeholders, and those I was handing the project off to before I left. Solution implementation began after my project was complete.
INNOVATION	The literature on product variety management and optimization provides variety optimization methods that focus on a single stakeholder's perspective. Unilateral approaches could not be leveraged, as an effective, compliant solution will require input from cross-functional stakeholders. This project also proposes qualitative approaches to portfolio optimization given lack of data availability.
IMPROVEMENT	The five-stage of variety optimization proposal reduces component variety from 42 to 17 pledget codes, a 60% decrease compared to the 40% objective. The proposed variety spans the same size range as the original variety, preserving portfolio competitiveness. The proposal shifts 42% of total pledget volume to the more repeatable round corner punching process with a 32% raw material cost increase.
BEST PRACTICES	Executing a comprehensive baseline or current-state evaluation of the portfolio is critical, as justification for all recommendations will rely on this evidence and data. Identify and engage cross-functional stakeholders from the outset. Understanding their true priorities and individualized value proposition shaped the optimization constraints to inform the future-state portfolio recommendation.
OTHER APPLICATIONS	This method can be applied to other variety optimization cases with different motivations (inventory buildup, change in customer needs), objectives (increasing margins or capacity), and constraints (regulatory, change execution time). Ensure the scope of the variety optimization is not excessively broad, as a deep understanding of the individual component variety enabled the analysis.