Managing Product Complexity to Increase Profitability and Customer Satisfaction

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Executive Summary

Increasing globalization, rising customer expectations, growing competition—what are ways product managers could respond? One common approach involves expanding the product portfolio to offer customers more choices, leading to higher sales and increased profits. However, many businesses are not experiencing the expected results. This paper discusses this phenomenon and presents a simple yet effective methodology to consider for managing product complexity. We believe integrating the methodology into product planning cycles can help maintain the correct mix of options and increase profitability.

The Challenge of Product Complexity

“We take innovation and new product development very seriously, and over the years have considerably expanded the depth and breadth of our product portfolio. However, profit and overall customer satisfaction have actually decreased during this period. What are we doing wrong?”

“Product complexity” refers to the increasing number of product options a company offers. Over the last century, the product options pendulum has swung from Henry Ford’s minimalist “You can have any color as long as it’s black” to today’s “Variety is the spice of life” excess.

What’s driving the increase in product complexity? Examples include:

- Increased globalization and more knowledgeable customers, pressuring companies to expand product offerings
- Improved manufacturing processes and modular designs, enabling companies to target smaller market niches
- Limited product-specific cost and benefit data leading to a less effective mix of product options
- Lack of an effective product phase-out process
- Inaccurate understanding of customers’ expectations

One common view is that more customer choices lead to higher sales and increased profits. However, today, based on our research, a growing number of businesses are not experiencing such results, but are seeing lower sales and decreased profits. Too many product choices are in many cases confusing customers and resulting in lost sales instead of increased satisfaction resulting in more sales. For example, two major automotive manufacturers recently reported that customers are confused by the growing number of vehicle options and frustrated when the exact model they want is not available. Additionally, the cost of managing product configurations increases with each increment of complexity. Many businesses have failed to recognize these negative impacts, as technological advancement has allowed them to efficiently produce more configurations. Some have attempted to tackle this problem, but without adequate product cost and benefit data, they often eliminate the wrong configurations.

However, although addressing product complexity is important, one should not conclude that offering more choices is always bad. In today’s society, customers have come to expect a certain level of customization. The goal should not be to stop providing customers with options, but, instead, to determine the correct mix of options that will increase profitability.
Conventional stock keeping unit (SKU) rationalization is myopic

Unfortunately, many companies have tried to address the negative impact of product complexity by applying conventional SKU rationalization techniques. While effective in a “make-to-stock” environment, these techniques fall short in a “make-to-order” environment. SKU rationalization focuses on product manufacturing and distribution costs with low attention to product development, marketing, and aftermarket service costs. What’s needed is a new and more holistic approach to managing product complexity that can be applied across discrete manufacturing, process, and service industries.

Step 1: Project Background

The first step of product complexity management is to analyze the current situation and understand lessons learned from past complexity management efforts. Scope and objectives are then defined and hypotheses are generated. An example hypothesis would be: “Revenue growth is flat because customers are confused by our large number of product options.”

The next step involves obtaining a market view and internal view of product complexity. Typically, companies focus their analysis on a subset of products, for example their most complex product line.

Step 2: Market View

The market view includes conducting competitor analysis, as well as clearly understanding customer preferences via market research. This is vital to assessing risk and understanding the effect of various complexity reduction strategies.

Step 3: Internal View

The internal view entails gathering product data such as sales invoices, unit volumes, supply chain costs, product development costs, marketing costs, and aftermarket service costs. The data are used to understand the cumulative sales by configuration, fulfillment costs by configuration, and average profit margin by configuration. Thoughtful use of spreadsheet and database applications can assist in integrating all product financial data and generating a full financial profile per unique configuration.

A Solution: Product Complexity Methodology

Product Complexity Methodology (see Figure 2) is a simple yet effective approach that facilitates the conversion of project, market, sales, cost, and product information into crucial business intelligence. More than a one-time exercise, the methodology is applied as part of a business’ ongoing product planning cycles to continually determine the most advantageous product mix.

Figure 1: Product Complexity Management vs. SKU Rationalization

![Product Complexity Management vs. SKU Rationalization](image)

Figure 2: Product Complexity Methodology
Cumulative sales by configuration

Obtaining the internal view begins with understanding the concentration of sales across the full range of market offerings. Product manager intervention to shape the cumulative-sales-by-configuration curve is a well-recognized strategy to improve profitability. In general, increasing the steepness of the curve can lead to greater productivity via standardization and economies of scale. In addition, “shortening the tail” of the curve can lead to greater profitability through reduced variation and operational complexity. However, this is not always the most effective strategy. For example, in some market segments, customers are willing to pay much higher prices for desired uniqueness. Therefore, product managers should resist their initial reaction to reduce the number of product offerings. Instead, they should match the cumulative-sales-by-configuration data against the cost of fulfillment and profit margin data to determine the best overall strategy.

Figure 3: Cumulative Sales by Configuration

Average profit margin by configuration

The third important aspect of the internal view is the average-profit-margin-by-configuration curve. Profit targets across all unique configurations should be developed based on pricing policies that complement product complexity strategies. Profit management begins with obtaining the average profit expectations from the corporate division. In most cases, the product-line target profit should be set to capture additional profit as the cost and effort necessary to customize products increases. The average-profit-margin-by-configuration curve enables spot investigations of poorly performing configurations. In addition, pricing issues become noticeable, allowing product managers to investigate and deal with them.

Figure 5: Average Profit Margin by Configuration

Average fulfillment costs by configuration

Another essential component of the internal view is to understand the relationship between fulfillment cost and complexity. Fulfillment costs include not only supply chain costs, but also costs related to product development, marketing, and aftermarket service. One method of shaping this relationship is broad-based cost reduction, which can enhance product-line profitability. An alternate strategy is to “flatten” the fulfillment cost curve. This can relieve the pressure to “shorten the tail” of the cumulative-sales-by-configuration curve. It is important to note that broad-based cost reduction and curve-flattening options are not mutually exclusive. The most effective strategy is one that takes into account both the internal view and the market view.
Product Complexity Methodology in Action

Thoughtful application of the Product Complexity Methodology can lead to improved profitability, an optimized product portfolio, and increased customer satisfaction. It can also be essential to good decision making by confirming—or refuting—what conventional wisdom advises is the “right” thing to do. Consider these cases in point.

The Case of the Multibillion-dollar Global Automotive Manufacturer – Time to rethink your options

Problem:
The company experienced difficulty managing its broad range of vehicle configurations, resulting in high inventory levels, slow sales velocity, strained dealer relationships, and deep discounts.

Objective
Determine the most effective mix of orderable vehicle configurations to achieve high profits.

Findings

Market View
The company's product offerings were more complex than its competitors' and lacked a regionally focused vehicle configuration strategy. Additionally, market research highlighted the importance of dominant decision-making attributes such as styling, engine performance, and sportiness.

Internal View
Data analysis revealed that low-volume vehicle configurations created to address niches and increase profitability actually detracted from total profit. Pushing high-profit, low-volume vehicles into the distribution network, without considering vehicle sales velocity, is a poor strategy.

Conclusion
A significant loss in sales revenue was attributed to increased levels of vehicle configurations. More really was less for this company. Customers were visiting dealerships but couldn’t find the car they had configured online. Dealers found it impossible to stock every possible configuration, resulting in lost sales and slow sales velocity. The solution? A product simplification strategy that reduced the vehicle configurations by more than 60 percent while significantly increasing profit. The strategy was forward-looking and took into consideration the overall customer market strategy. Key points included:

• Realigning the client sales and distribution model to execute market-driven vehicle configuration strategy
• Adopting an operating model for ongoing market-driven complexity management
• Migrating eliminated vehicle configurations to higher average sales velocity configurations, allowing the company and its dealers to sell vehicles more quickly and with lower inventory
• Focusing on dominant decision-making attributes

The Case of the Multibillion-dollar Office Equipment Manufacturer – Don’t Trust Your Intuition

Problem
The company hypothesized that the costs associated with the broad range of product offerings could be decreased by eliminating low-volume configurations.

Objective
Conduct a product-line pilot study to develop a deeper understanding of the impact of product complexity and either approve or reject the company’s hypothesis.

Findings

Based on the market and internal views, the company's original hypothesis was rejected. The combination of modular product design, outsourced production, and fixed-cost accounting created a situation in which product costs were “flat” across the full range of configurations. This allowed the company to meet unique customer demands, but still earn higher than average profit margins on low-volume configurations. This played to the company’s advantage, because market research revealed that customers would require discounts in order to accept similar but “not-quite-what-I-asked-for” configurations.
Conclusion

Had the company acted on the original hypothesis, it would have cut the majority of its profitable configurations. The product complexity assessment not only helped it avoid a bad business decision, but also identified numerous opportunities to help improve product revenues and margins. Some of the high-value improvement opportunities identified included:

- Improving price realization on high-volume configurations
- Initiating a new supplier cost-reduction program targeting the highest-cost modules
- Reducing order fulfillment lead times on a small group of high-volume configurations
- Shifting sales incentives toward high-margin configurations

Conclusion: Intuition is Not Enough

These case studies reveal that managing product complexity can lead to counterintuitive results. For the automotive manufacturer, complexity was eroding profits. However, for the office equipment manufacturer, complexity was a competitive weapon. When it comes to product complexity, intuition is not good enough. What’s needed is an approach that dissects all aspects of a company's product offerings and supports thoughtful product decisions. SKU rationalization alone is insufficient; evaluating the true costs and benefits of product complexity requires a more holistic approach that accounts for product development, marketing, and aftermarket service costs. In addition, the approach must cut across manufacturing and service industries, and apply to both make-to-stock and make-to-order environments. Product Complexity Methodology is a more comprehensive and effective approach for businesses struggling to determine the correct level of product complexity that will increase both profitability and customer satisfaction.

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