

Managing Complexity in New Product Development: A Framework for Assessing and Mitigating Over Featuring

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Theoretical Framework Introduction

The tendency to add non-essential or marginally useful features during the New Product Development (NPD) process, commonly referred to as Over-Featuring (OVF), is recognized as one of the top 10 risks contributing to NPD failures. OVF is characterized by the addition of features that exceed user needs, market requirements, and internal development capabilities, often resulting in scope and feature creep, inefficient resource allocation, delays, reduced usability, and post-launch dissatisfaction, such as feature fatigue or perceived overcomplexity (Thompson et al., 2005; Marzi, 2022).

While OVF is frequently reported in industry as a common cause of poor product performance, academic research on the topic remains limited. In particular, there is a gap in understanding how behavioral and organizational decision-making processes contribute to OVF across different phases of NPD. This research aims to address this gap by conducting a multi-study experimental investigation to conceptualize and empirically examine OVF from both the demand-side (consumer) and supply-side (firm) perspectives.

The study is structured around three complementary streams:

- (1) Consumer Perspective: How consumers form expectations about a product's capability and usability based on its feature composition before use, and how these expectations compare to their actual experience after interacting with the product.
- (2) Firm Perspective: How firms make feature-related decisions under uncertainty in early-stage NPD, particularly when operating with limited market feedback, resource constraints, and behavioral biases.
- (3) Misalignment Analysis: How divergences between consumer value perceptions and firm assumptions emerge, and which antecedents drive such misalignments, ultimately leading to systematic OVF.

Considering the conditions of uncertainty that characterize the early stages of the NPD process, two categories of antecedents can be identified that may lead to the inclusion of unnecessary or low-value features and contribute to OVF:

- Intentional antecedents: in which decision-makers are consciously aware of adding features that may not be strictly necessary. They are often driven by market-facing strategies (e.g., "all options fit all") or technical constraints (e.g., "leave all options open") (Gillier, 2015; Marzi, 2022).
- Unintentional antecedents: which stem from cognitive biases that distort configuration decisions without the awareness of the individual. (Shmueli et al., 2015; Belvedere et al., 2013).

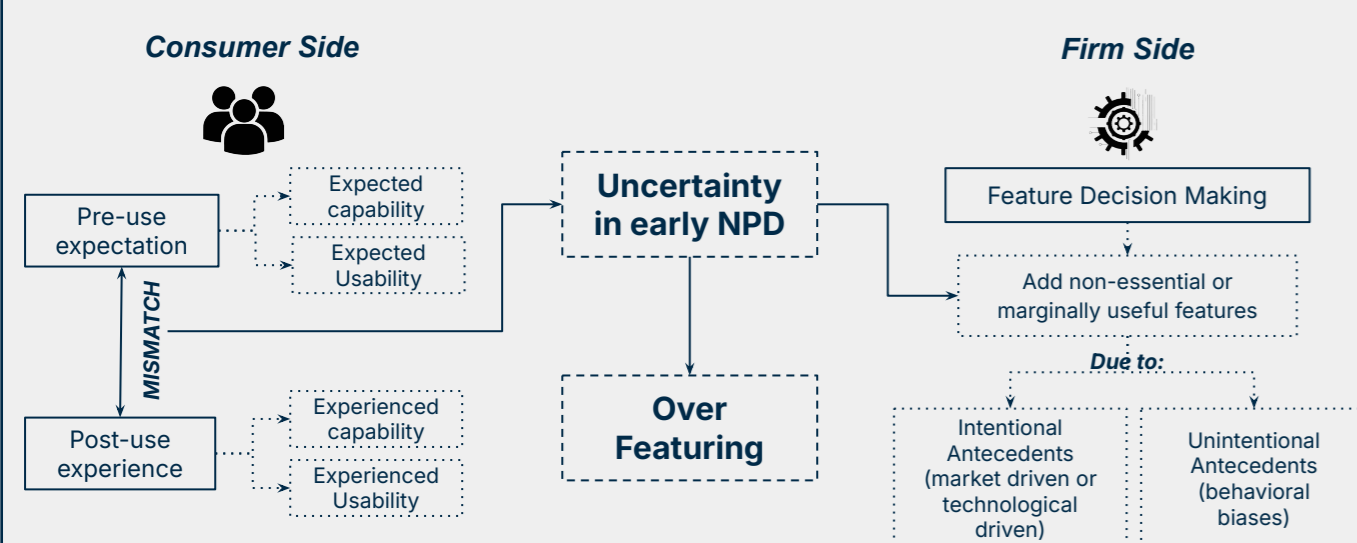


Figure 1. Conceptual framework illustrating how uncertainty in early-stage NPD leads to Over-Featuring on both the consumer and firm sides.

By experimentally isolating these two categories of antecedents, the study seeks to disentangle strategic rationalizations from behavioral distortions, assess their role in consumer-firm misalignment, and contribute to the NPD literature by providing a behavioral explanation of OVF and a foundation for future decision-support tools.

Research Questions and Hypothesis

Research Question 1:

Does over-featuring reduce overall value for the consumer?

H1a (Directional):

Expected product capability increases as the number of features increases.

H1b (Directional):

Expected product usability decreases as the number of features increases.

H1c (Directional):

Experienced product capability increases with the number of features, but to a lesser extent than expected product capability.

H1d (Directional):

Experienced product usability decreases with the number of features, and this decline is stronger than that observed in expected product usability.

H1e (Directional):

Net overall value, operationalized as the difference between experienced product capability and experienced product usability, increases with the number of features up to a certain point, and then decreases as usability deteriorates. This inverted-U pattern reflects the onset of feature fatigue, whereby additional features begin to undermine perceived ease of use and reduce the long-term value of the product for the consumer.

Research Question 2:

To what extent do firms prioritize feature quantity and innovation over usability and product quality, leading to a gap between the configuration that maximizes consumer utility and the product configuration developed by firms?

H2 (Directional):

The average number of features included in firm-developed product configurations will exceed the number of features that maximizes the overall perceived value of the product, as evaluated by consumers.

Expected outcomes

The expected outcomes of this research are threefold:

- I. Consumers are hypothesized to systematically overestimate the value of feature-rich offerings during the purchase phase, but later report lower perceived capability and usability for many of the added features after use.
- II. Firms are expected to add more features than necessary due to uncertainty, market strategies, incomplete information, and cognitive biases.
- III. The interaction between these two dynamics is likely to produce products that are overloaded, costly to develop, delayed, and misaligned with market needs.

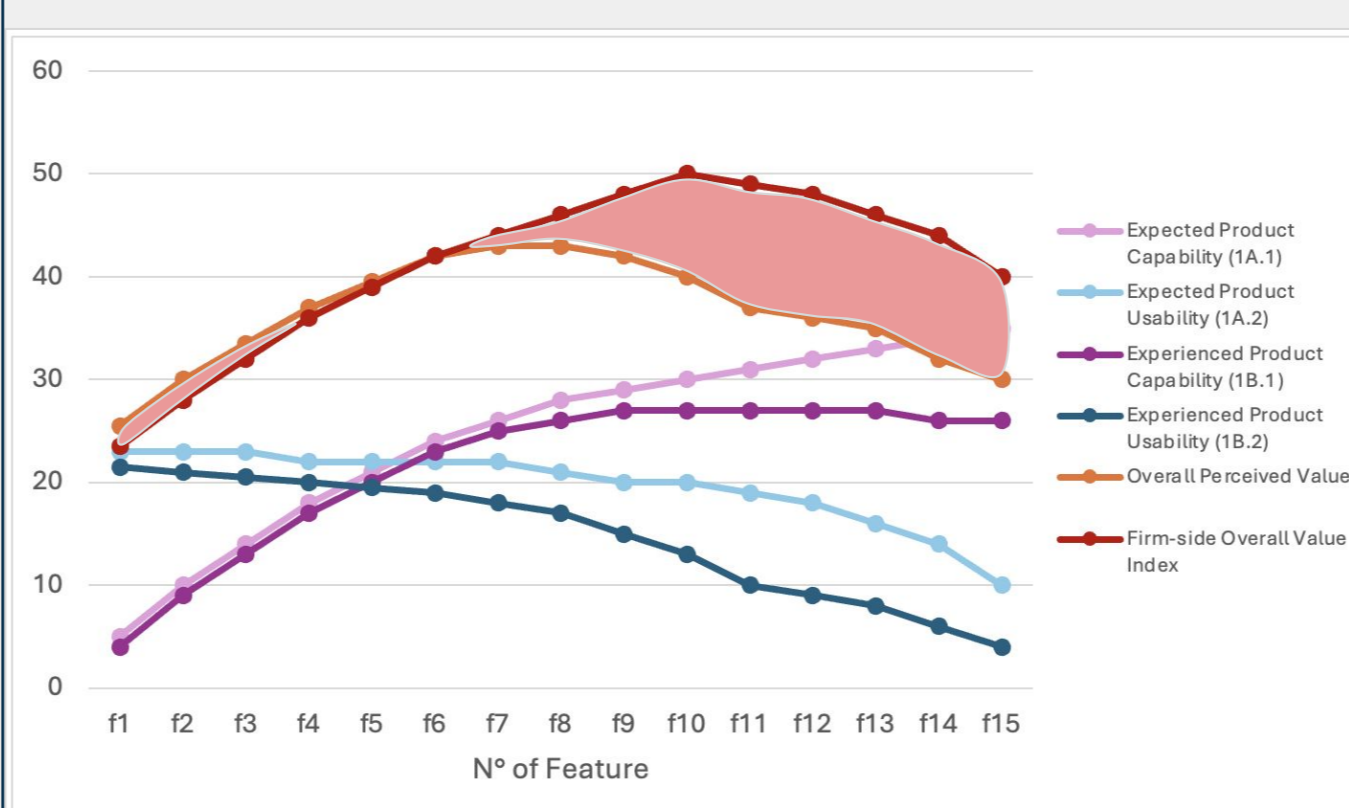


Figure 2. Expected outcome trends

Methodology

This research adopts a multi-study experimental design to investigate OVF from both the consumer and firm perspectives, with a focus on the cognitive and strategic antecedents that drive misalignment in product configurations.

STUDY 1: Consumer Perspective

A between-subject design compares perceptions before and after product use.

Study 1-A (Pre-use):

Participants configure a digital product by selecting features from a list.

After configuration, they evaluate expected capability, usability, and purchase intention.

Study 1-B (Post-use):

A separate sample interacts with different product versions and completes usage tasks.

Participants then rate experienced capability and usability.

The consumer-optimal configuration is derived where the curve of overall value (capability – usability) peaks, identifying the optimal number and type of features.

STUDY 2 – Firm Perspective

This study explores how professionals configure the same product under realistic development constraints and investigates the antecedents of OVF.

→ Participants: Developers, PMs, designers (recruited online)

→ Task: Configure a product with limited budget and time, using the same feature list as in Study 1

→ Additional inputs:

- ◆ For each selected feature, participants indicate why it was included (market need, tech constraint, scope adherence, or other)
- ◆ They estimate the product's expected capability and usability, generating a firm-side value curve
- ◆ New features can be added freely and are validated in a post-wave with experts

Manipulated Conditions (Between-Subjects):

Participants are randomly assigned to one of three conditions designed to activate cognitive biases under uncertainty:

- Time Pressure
- Initial Commitment
- Effort Saliency
- Control Group (No manipulation)

Key Measures Across Studies:

- Feature Count Deviation (firm configuration vs. consumer-optimal configuration)
- Content Mismatch Score (consumer-prioritized features omitted or replaced by firms)
- Area under the curve comparison (difference between firm-side and consumer-side perceived value curves; visualized as red area in Fig. 2)
- Incidence of OVF Contribution by Antecedent Type

References

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