



**From Prophet to Profit**

# **Next Generation Assortment Optimization**

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# Introduction

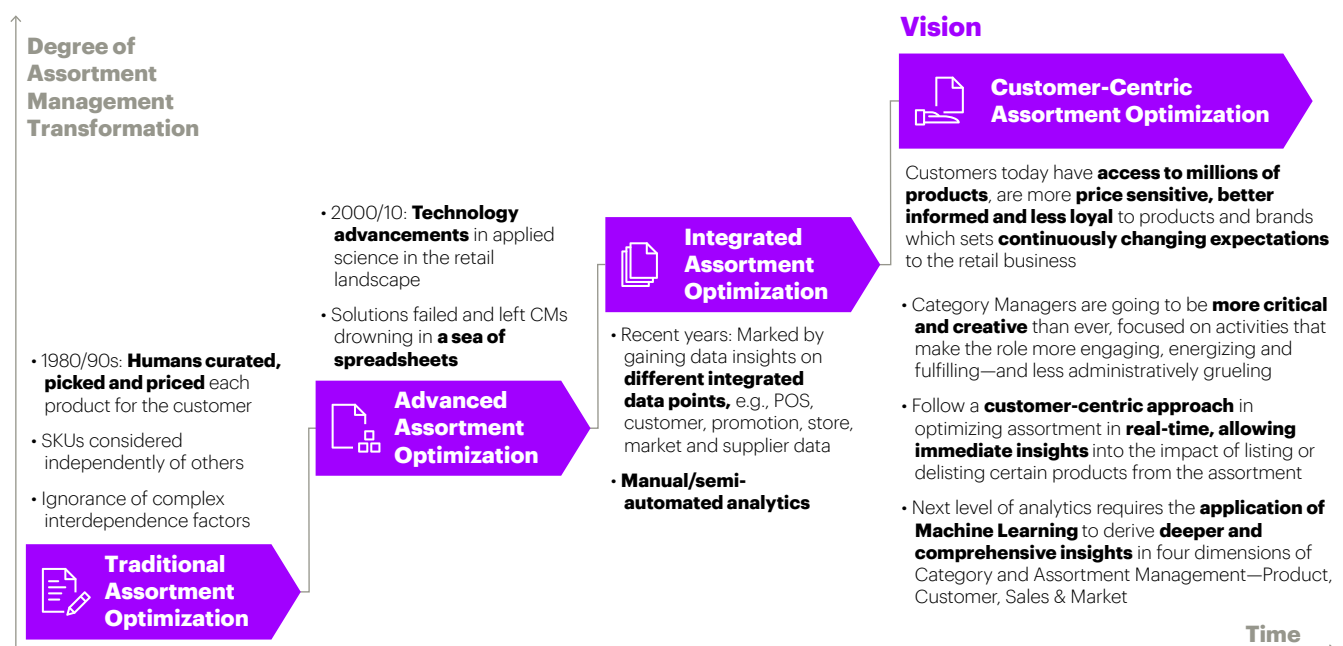
When we are children, our family menus often consist of two choices: take it or leave it. But that is not the reality we are facing as we grow up and are in charge of our own menus and—like it or not—grocery shopping. The number of choices offered in grocery retail today is staggering and growing every year. Grocery retailers in Germany curate and offer articles from over 10,000 manufacturers with an ever-increasing number of new brands and products—we have seen assortment breadth increase by up to 20% over the last 10 years. The proliferation of assortment consumer choices is reflected in growing average floor space per grocery outlet of an average 7% across segments.<sup>1,2</sup>

And today's consumers embrace choice: with a high concentration of grocery outlets, consumers tend to buy from a portfolio of stores rather than being loyal to a specific outlet. On average, consumers visit 2.9 different stores to cover their weekly needs. Consumers who also buy online, will frequent 4.5 stores and web shops. 49% of shoppers choose the outlet based on specific needs and context.

At the same time, requirements of consumers for grocery retailers have been shifting towards accessibility, convenience, and the desire for one-stop-shopping. Consequently, consumers tend to turn to those retailers that can best address these requirements.<sup>3</sup>

The size of the prize is considerable—customer-centric assortments are THE key lever to sustainably grow net sales, profitability, and increase loyalty. Consequently, assortment optimization is experiencing a renaissance. The most beaten truism of retail—the right product at the right time and the right place with the right price—proves its applicability once again. This evolution is fueled by the proliferation of data and advanced analytics and AI. While assortment optimization approaches have significantly evolved, there is still a significant opportunity when it comes to truly mastering customer-centric and hyper-localized assortments (see Figure 1).

**Figure 1: Evolution of Assortment Optimization**



1 HDE IFH Handelsreport Lebensmittel 2018;  
 2 Hahn Retail Real Estate Report Germany 2020/2021;  
 3 HDE IFH Handelsreport Lebensmittel 2020

# Customer-Centric Assortment Optimization – Impact on Category Management

Customer-centric assortment optimization is a defining element of Category Management, which typically covers an eight-step process. While category definition and role identification are typically fixed for a longer time horizon, a circular process of category performance review, strategy definition, development of tactics including assortment optimization, and implementation is performed on a continuous basis (see Figure 2).



**Figure 2: End-to-End Category Management**

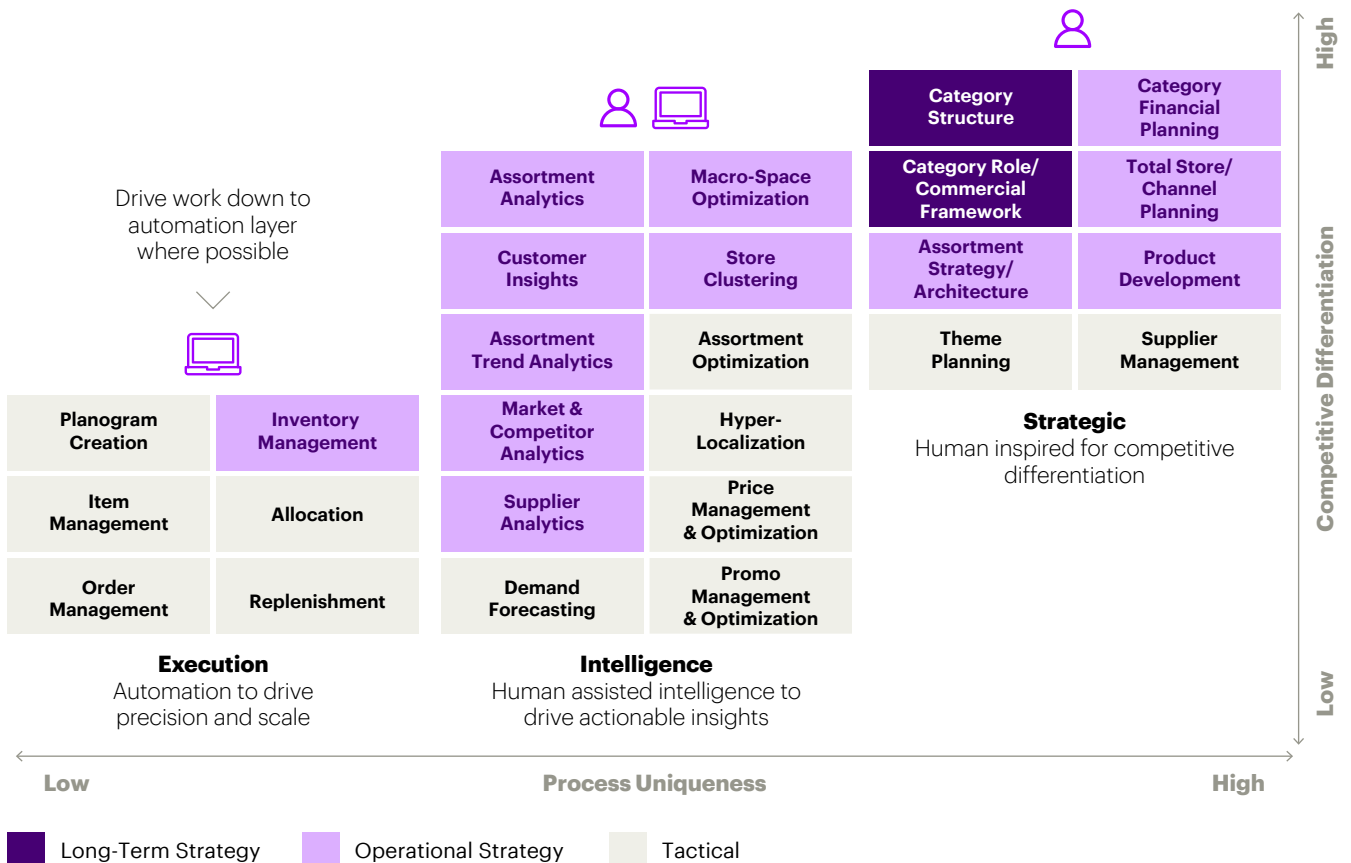


Historically, categories were reworked completely once or twice a year (one-shot remodeling)—now we see a trend towards shorter intervals with a continuous and more granular, hyper-local assortment optimization approach for structured rolling category optimization.

While analytics insights are embedded across all processes, the level of automation that enables continuous category assortment optimization increases. This has a significant impact on the role and day-in-the-life of a Category Manager (see Figure 3). The Category Manager’s role is more critical than ever, focused on innovative, creative, and strategic activities.

This renders the role more engaging, fulfilling and less administratively grueling—but also more demanding. Category Managers will need to focus on the “art” of Merchandising while maintaining a deep understanding and ability to strategically align the underlying “science” driven insights and recommendations. A close collaboration and partnership between Category Managers and Data Analytics teams is key.

**Figure 3: Automate Where Possible, Intervene Where Needed**



# Level Up – Taking Assortment Optimization into Tomorrow

Today there is already a wide array of solutions in the market offering assortment optimization functionality to automate Category Management tactics. Mostly, these rely on attribute analytics-based approaches and restrictive, parametric models which optimize expected net sales and margin, while accounting for cannibalization effects and connecting with planogramming applications for swift implementation. These types of solutions are flexible in terms of location level—i.e., analytics can be performed on a chain, store cluster or even individual store level.

However, very often, they do not support decision making regarding the right level of differentiation vs. commonality. The optimization problem of striking the right balance between hyper-localized and common assortments, weighing benefits of differentiation vs. increasing complexity costs in sourcing, supply chain and Category Management remains at the discretion of Category Managers. Often, a cluster-level localization may be preferable to a store-level localization and allows to strike a reasonable balance.

Leading models and solutions rely on an accurate application of the following key operational dimensions:

## **Reliable Planning Foundations**

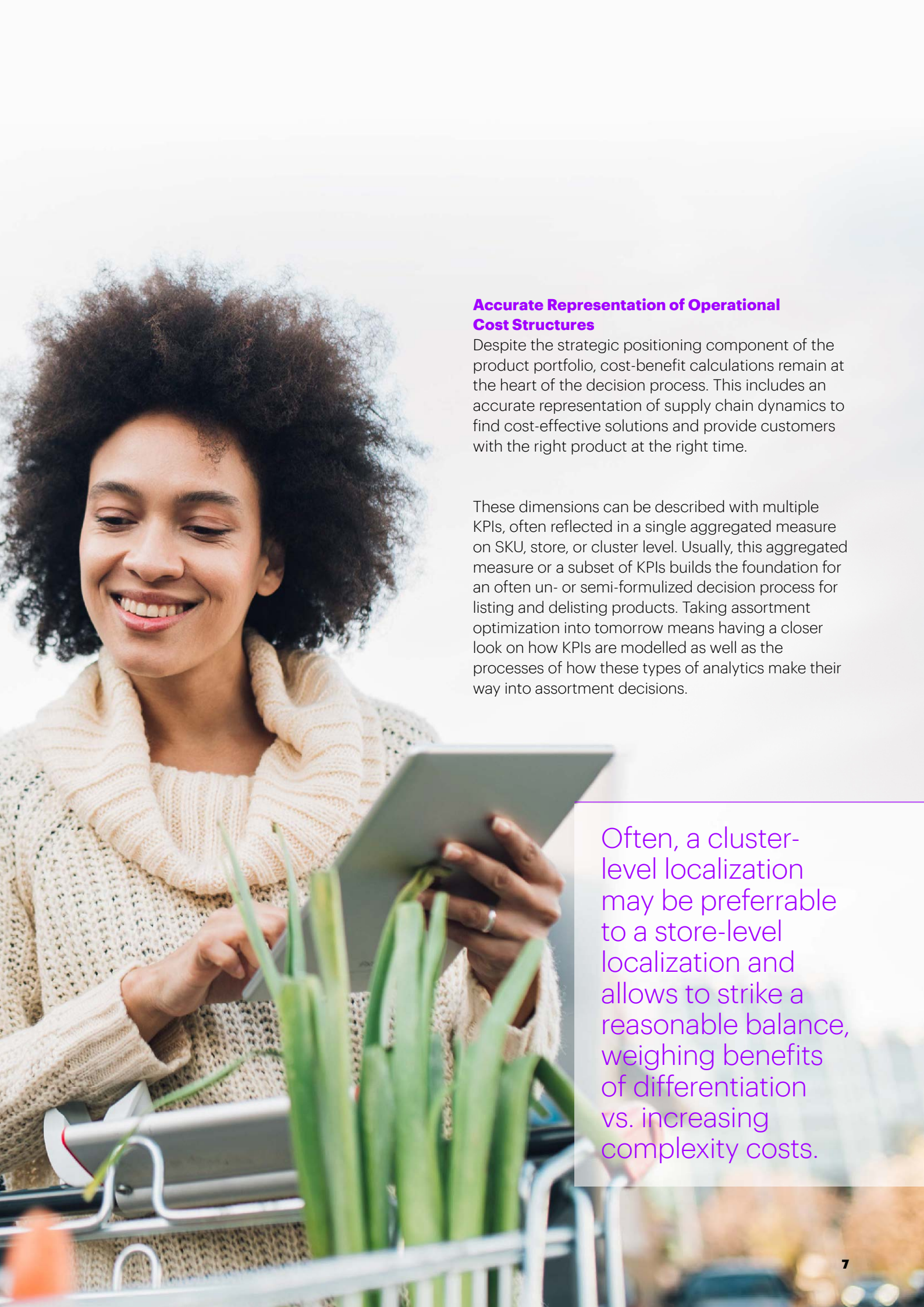
Assortment updates cannot be made based on snapshots of current sales and economic performance measures alone. A detailed understanding of the historical performance is required, and—most importantly—reliable forecasts which reflect a product's expected performance and can be weighed against alternative scenarios.

## **Consideration of Strategic Positioning**

Strategic SKUs play an important role beyond their immediate sales performance. An optimal assortment needs to strike the balance between historically proven high-performing SKUs and those strategic SKUs that allow to steer an assortment as part of a retailer's general business strategy.

## **Understanding of Assortment Dynamics**

True performance of products is often overshadowed by the availability or absence of alternative options for the customer. Substitute products often cannibalize demand leading to lower performances of each product. On the other hand, the absence of complementary or anchor products relevant for the customer, leads to understating the true sales potential of others.



### **Accurate Representation of Operational Cost Structures**

Despite the strategic positioning component of the product portfolio, cost-benefit calculations remain at the heart of the decision process. This includes an accurate representation of supply chain dynamics to find cost-effective solutions and provide customers with the right product at the right time.

These dimensions can be described with multiple KPIs, often reflected in a single aggregated measure on SKU, store, or cluster level. Usually, this aggregated measure or a subset of KPIs builds the foundation for an often un- or semi-formalized decision process for listing and delisting products. Taking assortment optimization into tomorrow means having a closer look on how KPIs are modelled as well as the processes of how these types of analytics make their way into assortment decisions.

Often, a cluster-level localization may be preferable to a store-level localization and allows to strike a reasonable balance, weighing benefits of differentiation vs. increasing complexity costs.

# From Prophet to Profit – Advanced Understanding of Purchase Behavior

Even though assortment planning has evolved from a manual, gut-feel exercise to a data-driven analytical process over the past 40 years, most productive solutions today still rely on considerable simplifications. To stay on top of an evolving customer base, three significant enhancements are necessary to sharpen retailers' understanding of consumers, leading to high performance assortments.

## Figure in Customers' Context Outside the Store

Assortment optimization approaches have primarily focused on what customers see when they step into a store. For today's shoppers, the decision process and development of preferences towards certain products starts much earlier and is heavily influenced by their perception of their environment outside the store. This aspect needs to be reflected in the analytical framework, from considering one-time events and competitive actions to understanding trends on social media before they manifest themselves in transaction data.

Although retailers have acknowledged the relevance of context over the past years, most struggle to pinpoint what exactly they should look at when "considering external data" and fail to create integrated solutions. Insights from external data are often independently considered and impact to assortment decisions is left completely to the discretion of Category Managers. This leads to inconsistencies and ineffective use of valuable data.

Analytical approaches modelling the performance of SKUs and assessing product dynamics in a product portfolio should control for contextual data, such as local events or social media sensing. Decision processes behind purchases can be structurally different even though they might seem the same when looking at the mere receipts. Retailers will need to take their understanding of purchase behavior to the next level, leveraging the broad availability of external data sources to create a central data ecosphere.

## Let the Data Speak for Itself

Traditional analytical approaches rely heavily on presumptions and hypotheses about customers' perception of products and the decision processes behind a purchase. Linear regression models relying on product attributes are still common. While this makes solutions manageable and easy to implement, it inherently limits their potential performance.

The good news is, that with the continuous rise of customer loyalty programs and other customer linked channels, mass retailers are gaining access to personalized data which allows them to understand their customer base on a broader scale. Being able to link purchases to individual customers over time allows a way more detailed level of analysis and additional insights to adapt to customer needs and personalize customer shopping experiences. As of today, this data treasure rests mainly underused in the industry.

Fast forward, the enhanced data foundation and technical advances in the area of deep learning allow to employ more agnostic approaches. The advancements in quantitatively understanding a large, diverse customer base and proactively predicting and influencing their consumption of (semi-)personalized content, offer rich lessons. Retailers can start from a green playing field, allow POS data to govern their understanding of purchasing dynamics and enriching models by contextualizing with external data and business insights.

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Most productive solutions today still rely on considerable simplifications.



### Fully Integrate Analytical Results into Assortment Decisions

As product variety grows, so does Category Managers' need to prioritize their strategic efforts. This requires adopting a general tendency of "automate where possible, intervene where needed", e.g., automating listing decisions where analytical results ensure reliable outcomes and allowing Category Managers to focus on complex product segments and strategic development of product portfolios.

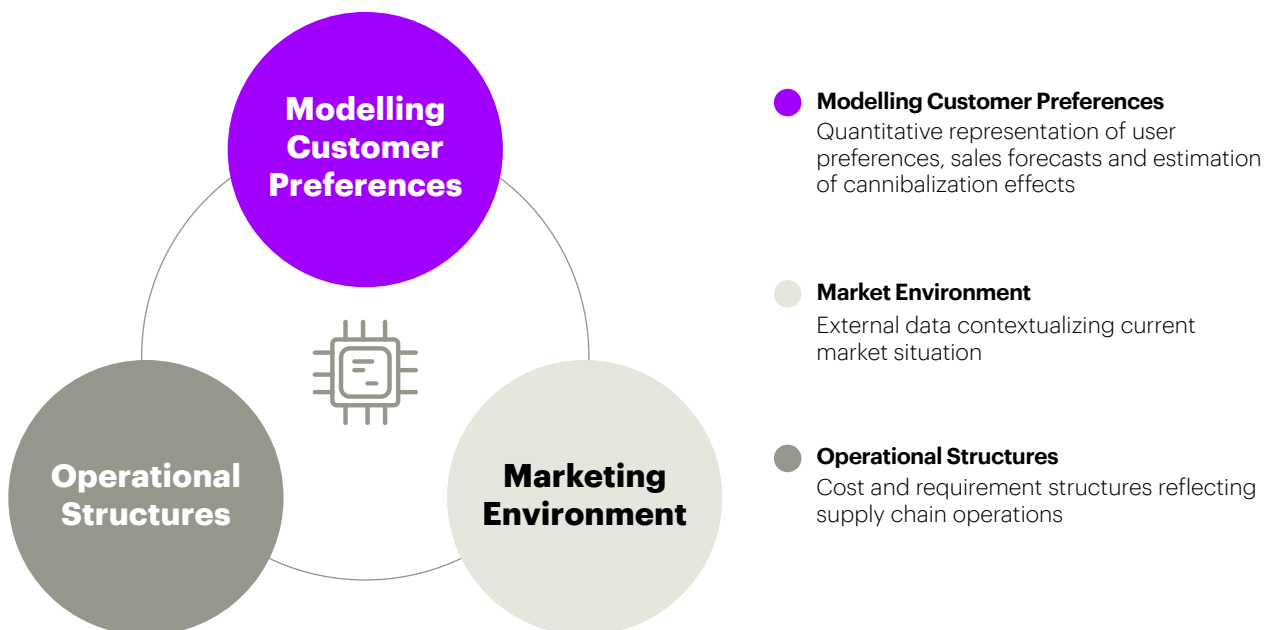
That said, we observe an increasing need for integrated assortment optimization solutions that put the customer at the center of analytical approaches while respecting a company's operational complexity.

Rather than an unstructured collection of KPIs, companies should aim for integrated holistic approaches to assortment optimization.

These solutions accurately mirror consumers' decisions for products while accounting for the cost, operational and strategic structures of retailers to provide insights to automate assortment decisions or empower Category Managers where needed. A SKU's performance is not solely aggregated revenue. Providing insights that help Category Managers to balance the trade-off on a category level, is not a common feature of standard solutions.

Rather than an unstructured collection of KPIs, retailers should aim for integrated holistic approaches to assortment optimization.

Figure 4: Holistic Assortment Optimization



# Assortment Optimization Evolution – Next Generation

Implementation of state-of-the-art assortment optimization solutions is not an overnight process. Analytical and business processes need to evolve over time and in sync with ongoing operations. Furthermore, the change aspect cannot be overestimated in its importance for success: Category Managers' acceptance and adoption of data-driven decision making for assortment optimization is fundamental for AI to unfold its impact on value. This translates to a multi-year transformation effort. Generally, an evolutionary development of existing solutions to the target picture has proven to be very successful. We differentiate three stages of this evolution process.



### Follow in the Footsteps (Traditional Approach)

Traditional approaches rely on product attribute-based analytical models, narrow product clusters and broad intervention from Category Managers. Aggregated POS data is used to model cannibalization effects in manually defined product segments. Solutions are generally easy to implement and maintain but require extensive manual intervention and quality control.

Retailers at this stage acknowledge the need for a holistic view of customers and operations but fail to achieve the required complexity and focus on independent KPIs along the value chain that flow into the decision process in an unstructured manner. The complexity of the complete value chain is only partially reflected in numerical optimizations.

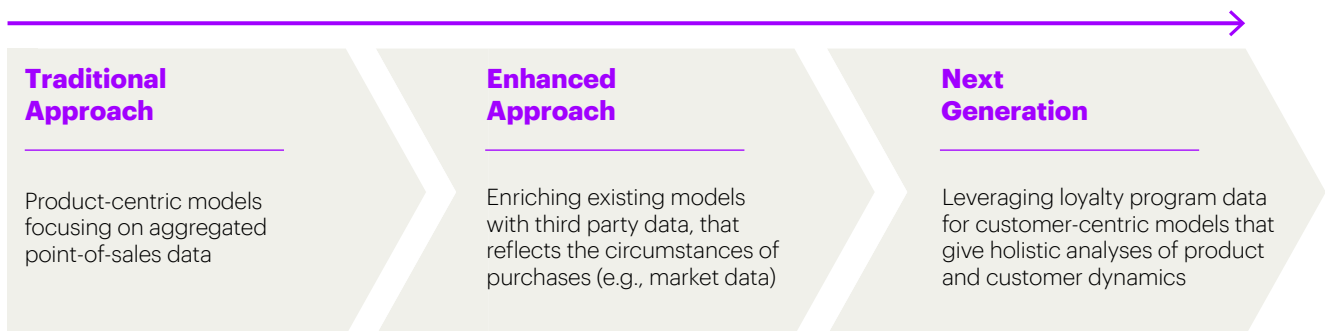
Questions regarding degree of localization are rather guided by business rules than by quantitative reasoning. A large share of industry players finds their productive assortment planning tools somewhere at this stage.

### Raise the Bar (Enhanced Approach)

Enhanced solutions broaden the view on customers' decisions and create integrated decision processes. Additional third-party data is considered to put sales data into context and extend traditional approaches by sharpening understanding of purchase behavior.

The estimation of cannibalization and complementary effects drives an enhanced understanding under which circumstances customers make purchase decisions. More granular POS data gives additional time-sensitive insights into purchasing dynamics.

**Figure 5: Evolutionary Path for Assortment Optimization**



In addition, integrated optimization solutions respect operational cost structures and limitations. Levels of localization and assortment decisions are made based on the current landscape.

Category Managers can automate the process for selected product categories and intervene where they deem necessary—this is a stage to build trust and support business acceptance and adoption through model adaptations. Explainable AI can be deployed to support success at this stage. Improvements can often build on already existing solutions.

Committing to an evolutionary process where incremental additions improve current solutions has proven to be successful and allows to build the governance and business framework AI solutions need to be effective on a broader scale.

### Next Generation

The Next Generation stage moves the needle towards true customer-centricity. Customer loyalty program data builds the foundation to model the most granular dynamics in the product assortment.

Retailers move from assumption based analytical models to more agnostic models. As they build a comprehensive data ecosphere, these models are enriched with the additional external data needed for a holistic view of the customer base and respective purchases.

Deep learning-based solutions often become more and more relevant for modelling purchase decisions as technical capabilities and data foundations of retailers grow. Increased transparency on operational processes reflected in high-quality data increases accuracy and allows for higher complexity of numerical optimizations.

Category Managers can focus on the strategic development of their assortment. Optimizations consider cost structures and limitations at each step of the value chain. Category Managers supplement the optimization engine with additional strategic targets where necessary but can rely on automated reliable results. The in-depth analysis enables retailers to optimize their current assortments and systematically identify gaps that they need to fill.

## Case Study

Accenture worked with a global retail company to further develop the technical capabilities and effectiveness of assortment planning tools.

The goal was to improve Machine Learning based algorithms to model performance and cannibalization effects of product portfolios and integrate into the retailers' assortment planning tool.

In a collaborative approach, Accenture assessed the current tools and technical capabilities of the client. Detailed requirements planning ensured that all aspects of the value chain were accurately reflected in the solution for a seamless integration into operational business processes.

Accenture developed a deep learning-based approach that estimates performance and dependencies among products and includes loyalty aspects of customers towards specific products. The resulting models allow comprehensive simulations for the optimization of assortments.

A comprehensive UI/UX-concept for the integration into assortment planning tools was developed based on detailed insights from business practitioners.

Relying on the clients' current technical infrastructure and capabilities, Accenture laid out a growth plan for a technical architecture that would facilitate industrial scaling of the solution.

Based on the current situation of the client, Accenture created a roadmap for an iterative rollout of the solution across categories and markets.

# What's Next?

Embarking on the journey towards truly customer-centric assortment optimization constitutes a substantial paradigm shift. It means investing in new skill sets and technologies (Data Science, AI, ML, Data Lakes etc.), and a completely new level of analytical insights. Grocery retailers must overcome significant organizational barriers in order to successfully scale these new capabilities, embracing a cultural shift to evolve the role of the Category Manager and hand over a significant portion of value creation to machines. Considering the size of the prize, this journey is nevertheless inevitable to gain and preserve competitive advantage. So, what is next?

**Taking Stock:** Successful journeys typically start with taking honest stock of today's reality—in terms of maturity of people, processes, available data and enabling technology.

**Defining a North Star:** Having achieved a clear understanding of what is already there, the next step is to sync expectations with regard to the final destination.

Alignment on target capabilities is key to focus investment on key priorities which drive business value.

Speaking of which—**Quantifying the Value Opportunity** of assortment optimization with a compelling business case is key to ensure buy-in and track target completion along the journey. With clarity on prioritized capabilities, a targeted roadmap can be installed, that allows to **Test and Tinker with Focus:** building and enhancing analytics models to pilot key capabilities with selected categories/markets provides a proof of concept, allows to reap first hands-on benefits and drives required organizational buy-in.

With that, the finishing line is in sight. **Gaining Breadth and Scale** by using pilot learnings to fine-tune models, drive automation and process integration and gradually extend into additional categories/markets, while piloting additional capabilities.

Setting out on the path towards Next Generation may be daunting, but this agile approach allows cutting the journey into smaller trips, and driving business and consumer value along the way.



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