sagentia
INNOVATION

WHITE PAPER

Value engineering in consumer goods: a toolkit for effective cost reduction

Applying innovation principles to cost reduction activity delivers better product margins without compromising the consumer experience. This whitepaper outlines key aspects of our value engineering process which identifies radical opportunities to reduce costs while keeping consumer, regulatory, technical, and manufacturing requirements in sight.

With many economies engaged in a struggle to bring down inflation and minimise erosion of living standards, strategies to reduce the cost of consumer goods are paramount.

In May last year, McKinsey & Co. identified rising prices and the conflict in Ukraine as top-of-mind concerns for European consumers, replacing Covid-19 as a driver of behavioural change[1]. By September, its European Consumer Pulse Survey indicated that pessimism about the economic downturn and concern about inflation had deepened, with 58% of respondents stating price increases were their "number one worry"[2]. Indeed, market research company IRI reported that food and beverage price inflation was running above 13% in the fourth quarter of 2022[3].

Inflationary pressures are all too evident to consumers since manufacturers are obliged to pass on increasing input costs (raw materials, energy, distribution etc.) via price increases or tactics such as "shrinkflation"[4]. It's also important to note that many companies are still recovering from adapting to the sudden consumer behavioural shifts of 2020 and 2021. Those reliant on shopper footfall had to shrink operations, while e-commerce companies had to invest heavily to scale up their infrastructure.

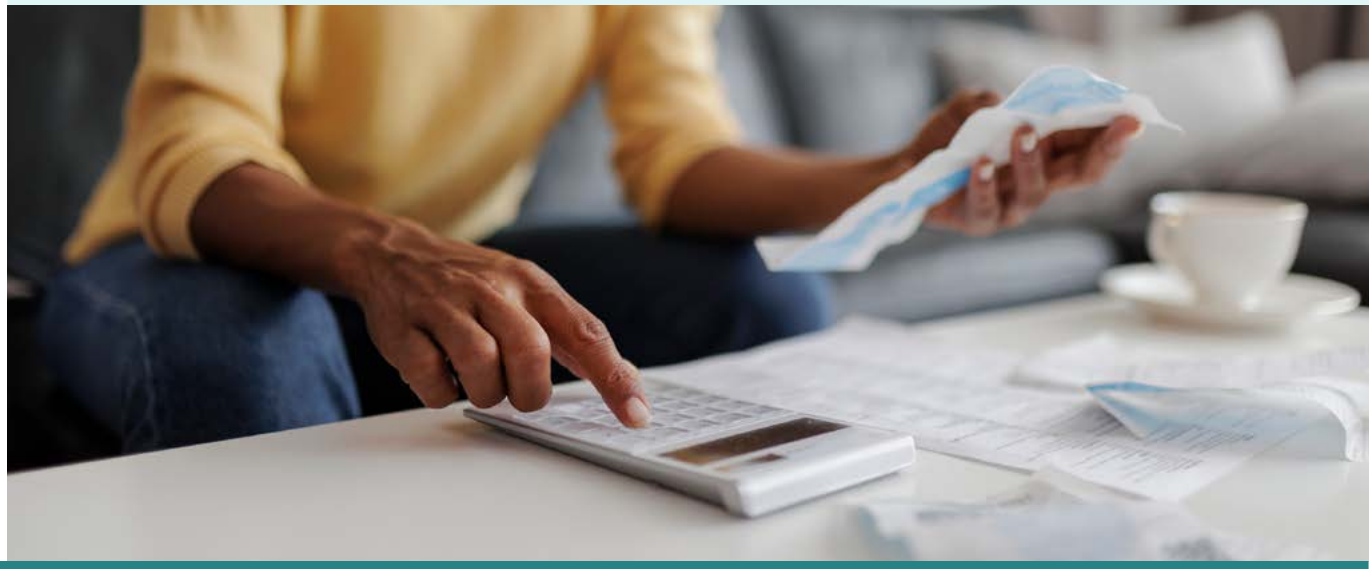
Today, there are some signs that price hikes are starting to abate[5], but the consumer response to higher prices remains clear: buy less, eat out less, opt for private label products[6] and shop at value retailers.

Consumer attitudes are changing

In May 2022, we ran a survey (n = 1256[7]) to gauge how pressures on household budgets are changing consumer attitudes. It revealed that 70% of respondents believed their disposable income would be "somewhat" or "much" lower than in the previous 12 months.

This perception was influencing consumers' intended behaviours, with 69% saying they would turn on the heating less often. The same percentage indicated that they would turn off lights and appliances to reduce energy costs. There were also implications for the food and beverage market, with 49% saying they would change how they cook at home (witness the air fryer trend[8]). What's more, 56% of those polled said they would seek food promotions and 57% agreed that they would be more conscious of food waste. We also noted that a substantial proportion (45%) planned to switch to cheaper brands, with 30% planning to shop in lower-cost supermarkets.

The impacts are not limited to retail as 50% said they planned to eat out less frequently – a sobering finding for the restaurant sector as it fights to recover from extensive closures during the Covid-19 lockdowns.



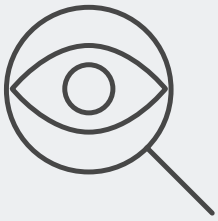
How can manufactures respond?

In the short-term, tactical pricing has abounded, but a more strategic approach to delivering value is required in the medium term. The trend detection platform Exploding Topics recently published a list of nine important CPG trends in this vein, ranging from increased direct-to-consumer activity to a stronger focus on core product attributes[9].

At Sagentia Innovation, we apply a toolkit of approaches to value engineering for consumer products. They are designed to deliver the ideal balance of product cost and functionality whilst keeping sustainability aspects of product design front of mind.

Find out more about our work in sustainability at sustainability.sciencegroup.com

The value engineering toolkit



These measurable health indicators must be collected accurately, then segmented and stored in a way that enables effective analysis.

Our Value Proposition Matrix™ provides a robust framework for value engineering. It establishes consumers' unmet needs, then assesses how product innovation aligns with them and wider market conditions. As such, it supports critical decisions about whether to launch a product (or indeed a service) and ensures the completion of necessary tasks to enable commercial success.

In the following sections, we explore aspects of the Value Proposition Matrix™ via a toolkit of value engineering approaches. These approaches may be applied to CPGs (such as food, beverage, personal care, beauty, and home hygiene products) and to consumer durables (devices and equipment found in the home or in a food outlet). First though, it's important to explore and validate opportunities across the product portfolio.

Taking the portfolio view

While incremental savings can be made through supplier negotiation, offshoring, or part substitution, delivering more radical outcomes after these avenues are exhausted is more challenging (see Figure 1). We believe cost reduction should be positioned as an aspect of portfolio and solution innovation.

Since cost reduction is one of many priorities for product development, a trackable process is required to identify, validate, and maintain a pipeline of opportunities across the portfolio. New solutions need to get to market quickly, with manufacturers adapting to everchanging omnichannel possibilities to engage both new and existing customers.

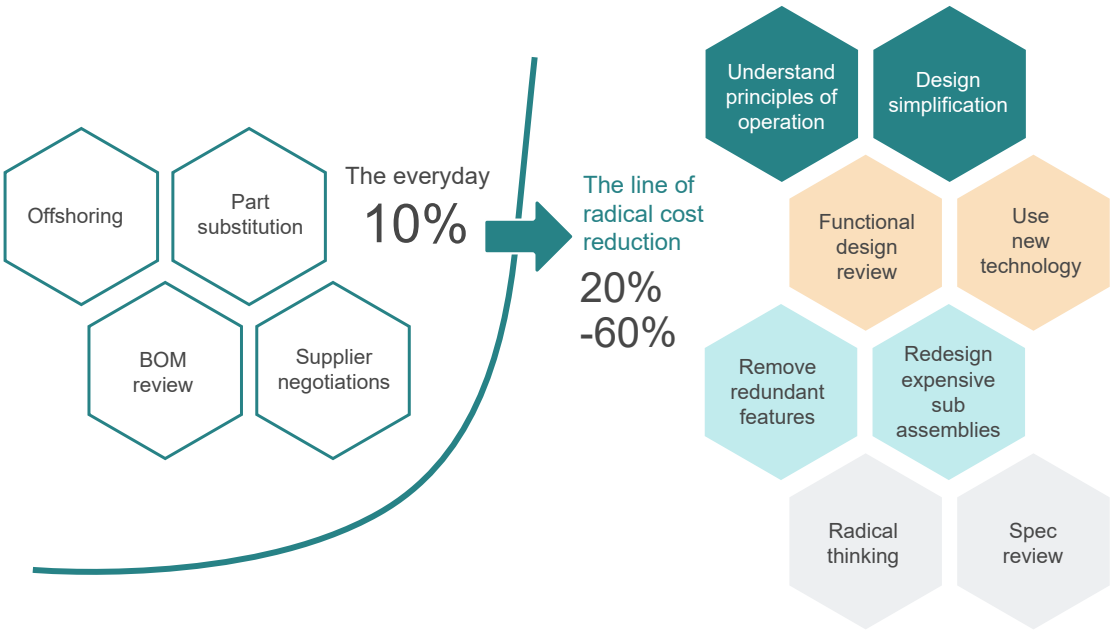


Figure 1: Incremental vs Innovative Value Engineering

Auditing the cost reduction process

It's useful to challenge the current cost reduction process, and inject new possibilities into the pipeline, via a three-stage audit:

1. Review – Assess existing cost reduction ideas, including those that have previously been rejected, and the criteria applied to them.
2. Create – Draw on more radical ideas to augment the cost reduction pipeline.
3. Evaluate – Apply revised criteria to the extended pipeline of cost reduction opportunities, t hen prioritise ideas and build action plans for lead opportunities.

The output is a bigger pipeline of potential cost reduction opportunities and revised criteria for their assessment. This process also generates a sub-set of lead opportunities which can be validated through early-stage market testing and cost modelling before implementation.

Cost modelling

Various drivers impact the feasibility of different approaches to value engineering, so cost modelling is a worthwhile exercise, and it may encompass:

- Commodity cost target setting/benchmarking.
- Estimation of optimal cost for current product specification (e.g., 'should-cost' analysis).
- Identification of alternative suppliers/manufacturing partners and validation through request for quotation (RfQ).
- Exploration of organisational structures required to deliver the product (range)
- Obsolescence prediction (at component level) and alternative sourcing.

Having challenged the current cost reduction process, identified opportunities across the portfolio and performed cost modelling, it is possible to develop a high-level business case for the investment of resources to achieve cost savings. The following sections look at how value engineering approaches can be applied to CPGs and consumer durables.

Consumer packaged goods

Our R&D Acceleration whitepaper discusses how product development can benefit from hypothesis-led experimentation, data science-enabled simulations, and the application of digital technologies. These methods are highly relevant to value engineering as they integrate value proposition with strategic innovation.

If the focus is on product renovation (e.g., exchanging an ingredient for a lower-cost alternative or migrating to one flavour or fragrance across a product portfolio) then defining the product's signature sensory footprint is essential. This vital part of a product's identity should be valued as much as its brand. However, there's a danger that the sensory footprint can be lost or confused due to the cumulative impact of seemingly minor modifications in the name of cost reduction. Over time, this can result in a significant evolution of the product's sensory characteristics. In a world where challenger brands and premium offerings threaten heritage brands, unstructured reformulation can result in a shift of consumer preferences.

Hypothesising commercial and consumer impact

Consider where the impetus for margin optimisation is coming from. Is it led by consumer insight, a desire to maintain product pricing, or a price increase from ingredient suppliers?

If consumer insight is the driver, margin optimisation is more likely to have a favourable reception. When external pressures are driving the activity, the likely impact on product performance requires careful consideration[10]. It's also important to consider the type of margin optimisation proposed because approaches will vary:

Single ingredient change – A 'like for like' ingredient exchange is often driven by a procurement exercise to identify cost-effective ingredient suppliers. Small changes may have minimal impact on the product, but the impact can be significant if it involves a key ingredient which contributes to the product's sensory signature.

Ingredient change across an entire product range – Savings can sometimes be achieved by moving to a single supplier for an ingredient used across a range of products. However, it cannot be assumed that the ingredient will behave in a uniform way. Any differences may be more prominent in some products than others.

Reformulating to reduce or remove an ingredient – When an ingredient is taken out of a product or its quantity is reduced, the impact on the sensory experience can be significant. Ingredients interact with each other in different ways, so any reformulation exercise requires an understanding of this.

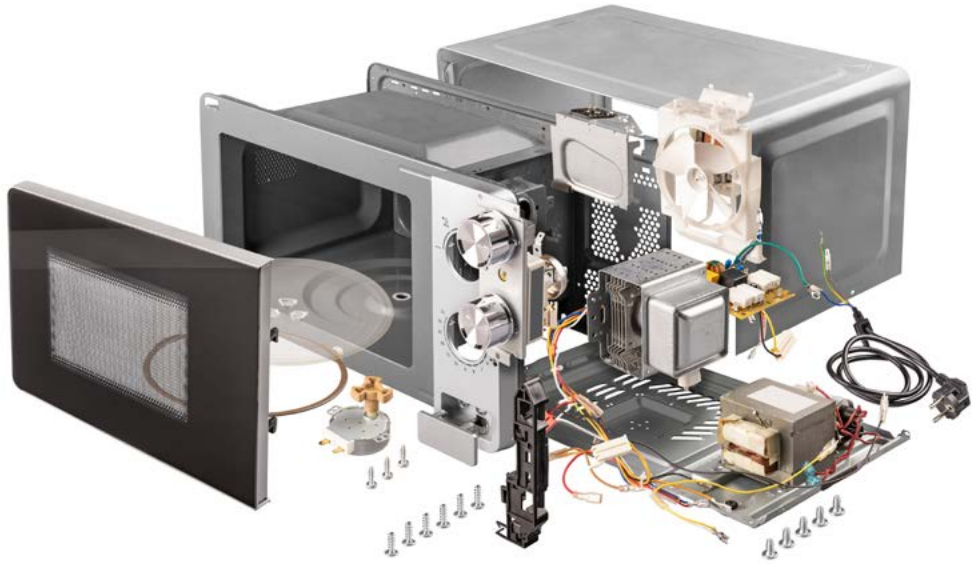
Process optimisation – Innovating around the manufacturing process can improve the margin on a product (or indeed a product range with a common manufacturing footprint) without impacting the sensory signature. This might include cutting energy costs (for example, by replacing an energy-intensive process step), reducing or upcycling waste, or implementing 'smart' processing (for example introducing enhanced agility to production lines).

To assess the potential ramifications of change, the first step is to hypothesise the likely scale of commercial impact (the cost-saving opportunity) and repercussions for consumer satisfaction. This enables the business decision to be classified as low, medium, or high impact. Framing the discussion around commercial and consumer impact indicates whether consumer research is necessary and how robust that research needs to be. Higher-impact business decisions require more in-depth validation than lower-impact decisions.

For high-impact decisions, we recommend an alienation test to predict how the margin optimisation exercise could affect product performance and sales. This identifies the percentage of consumers who detect the change, those that prefer the existing product over the new one, and those that would not buy the new one. Results are expressed in a reaction profile (see Table 1) classifying the risk associated with the change.

Reaction profile	Interpretation
Unaware	Members of this group fail to detect the change
Content	These consumers detect the change, but are indifferent or, indeed prefer the change
Vulnerable	These consumers prefer the current product but remain loyal despite the change
Alienated	These consumers detect the change, prefer the current product, and will discontinue use of the product because of the change

Table 1: An example of a reaction profile associated with a product reformulation



A framework for margin optimisation

Once overall impact has been established, the next step is to set out strategies for consumer, technical and regulatory evaluation using a strategic framework:

1. Product selection – Segment the portfolio then select products which offer significant wins based on shopper data, price point and relevant consumer benchmarking data. Review technical and regulatory impacts to ensure products which pose greater risk (e.g. changes to regulatory status or complex technical implications) are excluded.

2. Establish sensory footprint – Ensure the sensory footprint of target products is understood and consider how this compares with competitive products. This can be expressed through appropriate sensory language to describe the product.

3. Consumer expectation – Conduct research to understand key characteristics that shape consumer preference, and how this may change if specific characteristics are modified. Apply various methods to rank the characteristics and ascertain which are fundamental or just 'nice to have'. Ascertain whether changes should be communicated to consumers and, if so, how to convey them.

4. Regulatory environment – Assess the permissibility of new ingredients in the relevant category for all target markets. Consider any necessary changes to labelling and implications for product claims before embarking on reformulation.

5. Reformulation – Once the above factors have been accounted for, the technical challenge of reformulation can begin.

This framework empowers R&D professionals with a firm understanding of products' sensory footprints and knowledge of what consumers hold dear. It considers the consumer, the product, technicalities, and regulatory matters, meaning any decisions on margin optimisation are less likely to harm sales.

Consumer durables

Let's move on to durable products. For this paper, we're focusing on domestic appliances and equipment used in food service outlets such as dispensers. Again, the Value Proposition Matrix™ provides a critical framework to assess the consumer, the product, and the conditions for successful commercialisation. Value engineering builds on this foundation. It underscores value as a key criterion through the application of product cost challenges and cost reduction process auditing tools.

Product cost challenge

As discussed previously, incremental margin improvements can be achieved via part substitution, offshoring, or procurement negotiations. However, more radical cost reduction strategies require the application of 'product cost challenge' methodology. This can happen at any time during the product lifecycle:

Early stage – Optimise the product for manufacture, optimise the supply chain, improve manufacturing yield, or reduce the rate of product returns.

Mid-life – Respond to economic pressures by optimising bill of materials (BoM)/design; enhance competitive positioning with improved specification or a new product variant.

End-of-life – Respond to component obsolescence or apply radical change to extend life in the market.

Typically, a product cost challenge initiative precedes design and development activity. Outputs include cost reduction recommendations and options which inform the development process. The process involves four steps as outlined in Figure 2:

Analysis – Challenging the specification, performing cost/ function analysis and design for assembly (DFA) exercises.

Divergence – Structured ideation, analysis, and research to generate a range of cost-reduction concepts.

Filtering – Workshop-driven review of cost reduction concepts to rank and select preferred approaches.

Convergence – Analysis and work-up of preferred approaches, development of a cost model and development/ implementation planning.

Each step of the process has scope for flexibility and variation according to product and manufacturer requirements.

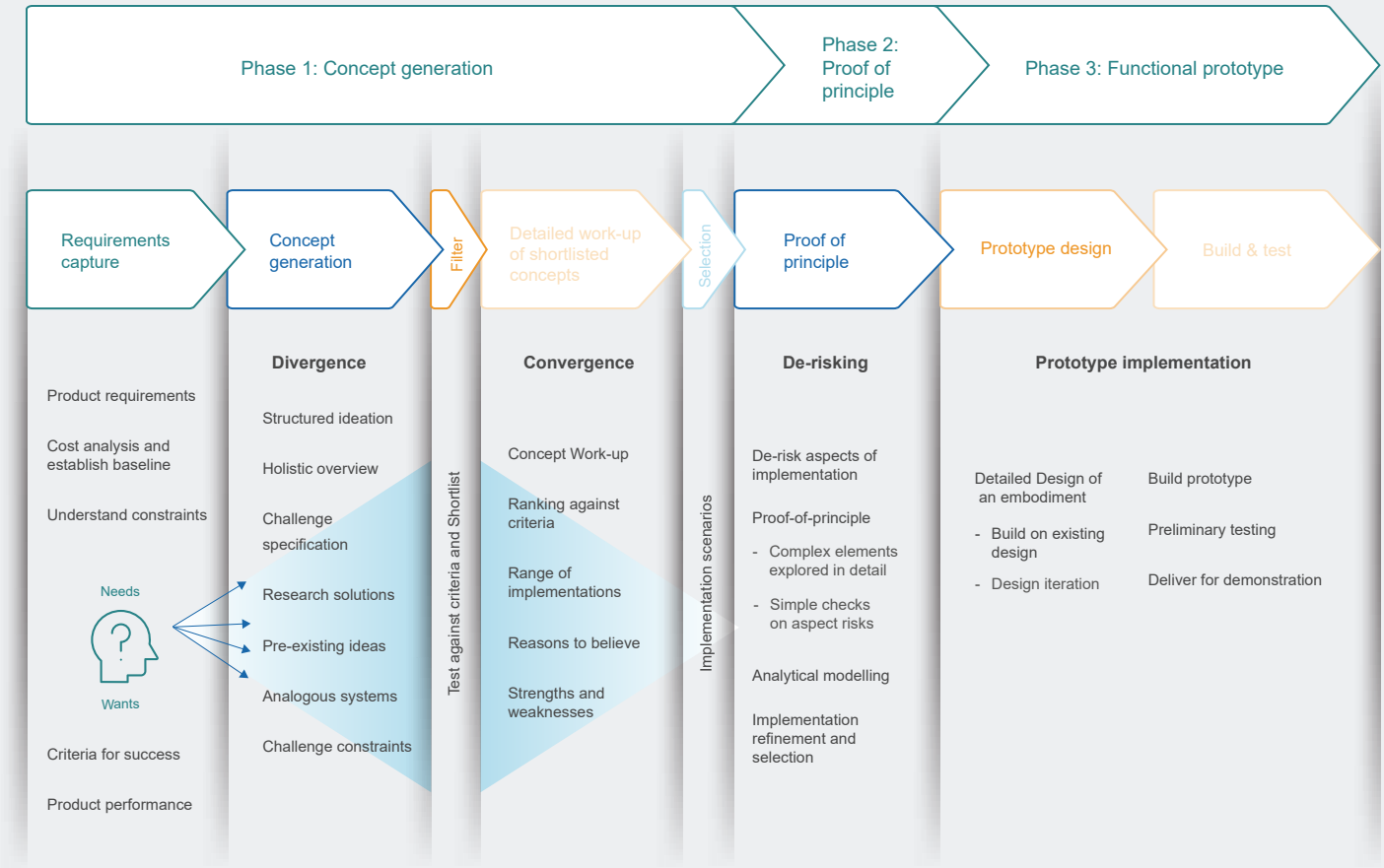


Figure 2: Overview of the product cost challenge methodology.

Analysis typically begins with a detailed briefing from the product owner. This may include CAD, BoM, assembly and manufacturing data and a discussion on the purpose and requirements of the product cost challenge. Inputs from consumers, the manufacturer, and other stakeholders are beneficial to immerse the cost challenge team in the product experience. Initial steps will likely include a cost/function evaluation known as a 'product teardown'. This determines the cost of key product functions via functional decomposition and analysis of the BoM to determine which parts deliver each function. Techniques such as failure modes and effects analysis (FMEA) determine areas for potential improvement and DFA is used to reduce the overall number of parts and the time required for assembly.

Divergence is a creative stage involving structured ideation which builds on outputs from the analysis. A wide range of cost reduction ideas are developed and assessed at 'first pass level' in terms of cost, risk, investment, and development effort. A visual representation of ideas and concepts is frequently used to aid communication with key stakeholders.

Filtering is typically a workshop-driven exercise. Cost reduction ideas generated in the divergence stage are reviewed and ranked according to potential for cost saving, risk, and development effort. This process frequently highlights trade-offs between cost and product performance or features. As such it represents a critical decision point in the cost challenge process. The outcome from this stage is a shortlist of preferred concepts for further analysis.

Finally, in the convergence stage, ideas from the filtering shortlist are developed and their feasibility explored. This involves the identification of required technology, parts, materials, and suppliers, the build of CAD models, and development of an implementation plan along with more detailed cost modeling. The cost model is particularly useful for fine-tuning the relative benefits of different cost reduction options, enabling dynamic assessment of different scenarios in terms of costs vs savings, payback period and development lead time.

Outputs from this exercise are a valuable aid to business decision-making and a key input for product development.

Let's move on to durable products. For this paper, we're focusing on domestic appliances and equipment used in food service outlets such as dispensers. Again, the Value Proposition Matrix™ provides a critical framework to assess the consumer, the product, and the conditions for successful commercialisation. Value engineering builds on this foundation. It underscores value as a key criterion through the application of product cost challenges and cost reduction process auditing tools.

Cost reduction as an innovation exercise

Value engineering is a practical and effective technique that manufacturers can use to maintain market share in the current economic climate. This paper lays out a structure to enable the identification and implementation of opportunities that deliver meaningful rather than incremental outcomes, with full consideration of consumer, regulatory, technical, and manufacturing matters.

At heart, value engineering is an innovation activity. Innovation tools and processes can be applied to enhance margin in the same way as they might be used to drive product differentiation or premiumisation. Processes described in this paper are action-oriented, from hypothesising commercial and consumer impacts for CPGs to product cost challenge exercises for durables. They are designed to operate as part of an integrated cost-reduction program alongside reformulation activities and design thinking. Both product archetypes – CPGs and durables – benefit from a full consideration of the Value Proposition Matrix™, which provides a critical framework for the assessment of consumer, product, and market conditions for successful commercialisation.

How Sagentia Innovation can help

Sagentia Innovation brings technical expertise and experience in value engineering approaches for the consumer, medical and industrial sectors coupled with capabilities for the assessment of market opportunity and strategic partnerships. This puts us in a strong position to illuminate the path towards innovative technical solutions that deliver value, consider the consumer experience, ensure confidence in claims made and carefully de-risk applications for users and the environment.

In recent years we have worked with various partners to identify solutions for product challenges where value, end-user convenience and simplicity are essential for success. This may encompass core product performance or a consideration of how a consumable and durable work best together. Beyond our advisory research and product development services, direct access to regulatory expertise within our sister Science Group consultancies enables us to consider any challenges to commercialisation upfront.

References

1. McKinsey: How inflation and the conflict in Ukraine are impacting European consumers, Textile Future, June 2, 2022 https://textile-future.com/archives/90888
2. European consumer pessimism intensifies in the face of rising prices, McKinsey & Co, October 27, 2022 https://www.mckinsey.com/capabilities/growth-marketing-and-sales/our-insights/survey-european-consumer-sentiment-during-the-coronavirus-crisis
3. IRI Research Reveals Food and Beverage Prices Remain Elevated in September, but Price Inflation Slowed for First Time in 2022, IRI, October 12, 2022 https://www.iriworldwide.com/en-us/news/press-releases/food-and-beverage-prices-elevated-inflation
4. Shrinkflation: is the tactic a necessary evil as suppliers battle to keep costs low?, Grocery Gazette, August 12, 2022 https://www.grocerygazette.co.uk/2022/08/12/shrinkflation-suppliers-costs/
5. US inflation subsiding as consumer prices rise moderately in boost to economy, Reuters, December 13, 2022 https://www.reuters.com/markets/us/us-consumer-prices-increase-moderately-november-2022-12-13/
6. Private label makes small gains in food & beverage, driven by Boomers, Gen Z, Millennials, Food Navigator USA, December 1, 2022 https://www.foodnavigator-usa.com/Article/2022/12/01/Private-label-makes-small-gains-in-food-beverage-driven-by-Boomers-Gen-Z-Millennials#
7. Sagentia Innovation consumer survey run in May 2022. 1256 respondents. 79% identify as female, 21% male. 68% respondents aged 36-65, 8% below 35, 25% over 65.
8. Lifting the hood on the UK's air fryer trend, Leatherhead Food Research, November 18, 2022 https://www.leatherheadfood.com/news-detail/lifting-the-hood-on-the-uk-air-fryer-trend/
9. 9 important CPG industry trends 2022-2025, Exploding Topics, January 4, 2023 https://explodingtopics.com/blog/cpg-industry-trends
10. Holding on to product identity while boosting margins, Leatherhead Food Research, March, 2020 https://www.leatherheadfood.com/white-paper/holding-on-to-product-identity-while-boosting-margins/

About Sagentia Innovation

Sagentia Innovation provides independent advisory and leading-edge product development services focused on science and technology initiatives. Working across industrial, chemical, energy, food and beverage, and consumer markets, Sagentia Innovation works with start-up disruptors through to world leading brands to extract maximum value from R&D and innovation investments.

sagentia.com/innovation

For further information visit us at:
sagentia.com/innovation or
email info@sagentiainnovation.com

Sagentia Ltd
Harston Mill
Harston
Cambridge
CB22 7GG
UK

Sagentia Ltd
First Floor
17 Waterloo Place
London
SW1Y 4AR
UK

Sagentia Inc
1150 18th Street
Suite 475
Washington
D.C. 20036
USA

sagentia
INNOVATION