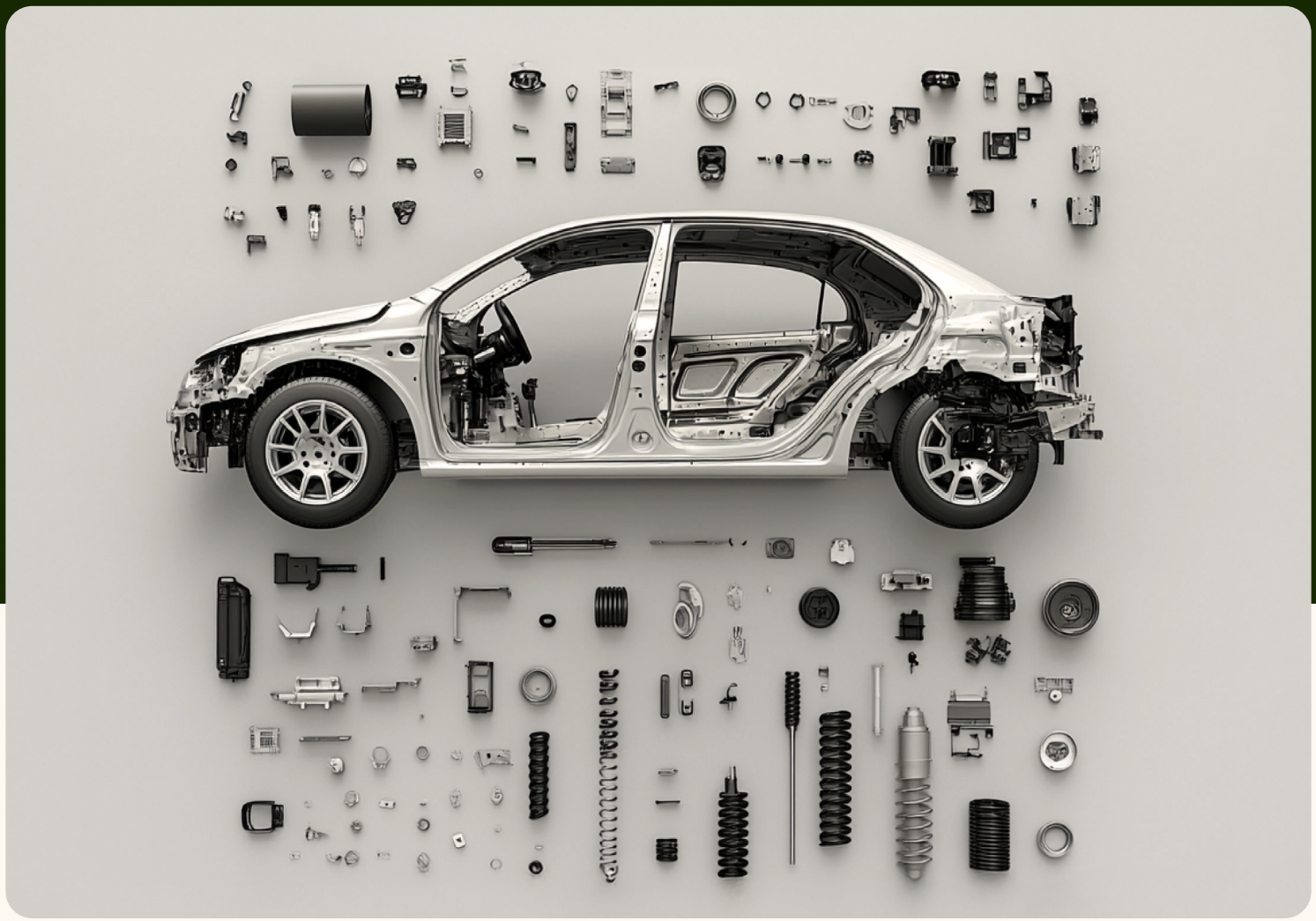
tset

A Practical Guide to Cost
& Competitive Positioning

Product Cost Benchmarking in Action



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01 Introduction

When people hear "benchmarking," they often think of cost-cutting—finding ways to make a product cheaper, reducing material expenses, or optimizing production. But benchmarking is about much more than just saving money. It's a strategic tool that helps companies position their products effectively in the market, ensuring they meet customer expectations, compete with industry leaders, and make informed design, sourcing, and pricing decisions.

In this whitepaper, we will explore the full power of product cost benchmarking to show how it influences everything from product development and procurement to sales and business strategy. You will:

- **Understand what product cost benchmarking is** and why it is relevant beyond cost optimization.
- **Learn a structured step-by-step approach to benchmarking**, from defining project targets to teardown analysis, cost calculation, and final decision-making.
- **Explore a real-world benchmarking case study**, demonstrating how Tset's product cost calculation software enables accurate cost modeling, component breakdowns, and optimization insights.

Whether you're an engineer optimizing product design, a procurement professional refining sourcing strategies, or a business leader shaping market positioning, this guide will equip you with the tools and insights to drive cost transparency, improve competitiveness, and create real value in manufacturing.

02 What is Benchmarking?

2.1 Understanding Product Cost Benchmarking

Product cost benchmarking is a structured method for analyzing and comparing product costs against competitors or industry standards.

It enables manufacturers to gain data-driven insights into cost structures, material usage, and production cost factors, helping to identify competitive advantages and cost optimization opportunities.

Effective product cost benchmarking goes beyond simple cost comparisons by systematically breaking down cost components, assessing production processes, and identifying inefficiencies. This approach ensures that manufacturers not only understand where they stand in the market but also develop clear, actionable strategies for cost reduction and performance improvement.

By leveraging cost engineering methodologies, organizations can:

- Define the optimal market position by analyzing competitor pricing, technical features, and overall value propositions.
- Ensure strategic product fit by assessing customer expectations and aligning cost structures with market demands.
- Enhance cost transparency by breaking down manufacturing expenses into granular cost drivers.
- Develop a "best in class" product by integrating cost-efficient design and production decisions.
- Explore cost-saving opportunities through alternative materials, sourcing strategies, and production techniques.

2.2 Benchmarking for Market Positioning

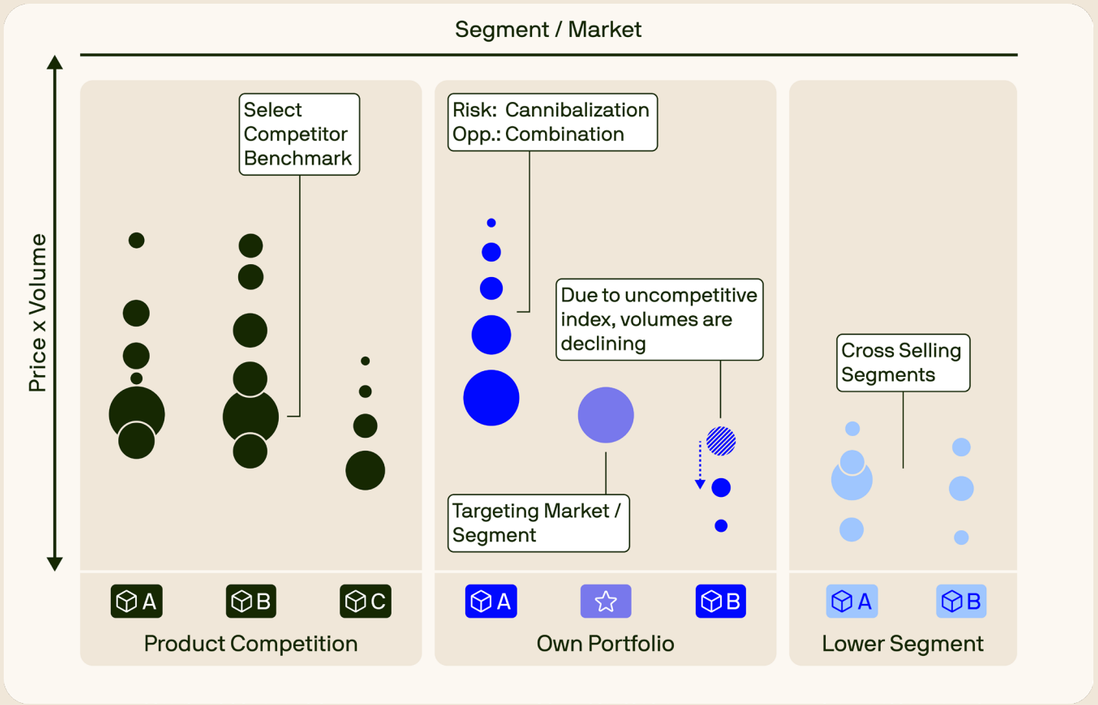
As we've established, benchmarking is far more than just a tool for cost optimization—it is a strategic instrument that helps businesses define where their products fit in the market.

By systematically analyzing both external competition and internal product portfolios, benchmarking enables companies to make informed decisions on market positioning, product development, and even sales and marketing strategies. Instead of designing products in isolation, manufacturers must understand how their offerings compare and what strategic adjustments are needed to stay competitive.

Successful benchmarking takes into account:

- **External factors:** Competitor pricing, technical features, performance benchmarks, and overall value proposition.
- **Internal factors:** Existing product portfolio, historical market performance, and cost structures.

This analysis helps businesses define their optimal market fit, thereby balancing technical features with customer expectations to avoid overengineering while maintaining competitive differentiation.



2.3 Why Benchmarking Matters for the Entire Organization

Benchmarking doesn't happen in isolation—it's a process that connects the dots between different departments. While cost engineers may lead the analysis, the insights gained impact product development, sales, procurement, and even corporate strategy.

Here's how different departments benefit from the benchmarking process:

- **Product Development & Engineering:** Ensures technical specifications align with market demands while optimizing cost and performance.
- **Sales & Marketing:** Helps define unique selling points (USPs) by identifying where the product fits in the competitive landscape and what differentiates it from alternatives.
- **Procurement & Supply Chain:** Assesses material and production costs against industry standards, identifying supplier and sourcing efficiencies.
- **Corporate Strategy & Business Development:** Supports long-term portfolio decisions, ensuring the next product aligns with market needs and business goals.

04 How Benchmarking Works: Step-by-step Approach

01 Define

Assess & Establish the Project Target

- Outline the goals and objectives of the benchmarking project.
- Identify current progress and completed milestones to understand the baseline.
- Highlight gaps, limitations, and challenges in the existing setup.
- Review technical, financial, and operational constraints that may impact cost or feasibility.
- Establish key performance indicators (KPIs) to measure success.

A well-defined target ensures the benchmarking process is aligned with business goals and technical realities.

02 Develop

Identify Must-Have Solutions

- Define essential functionalities and features required for the project.
- Conduct a market analysis to identify best-fit technologies and solutions.
- Break down each potential solution into detailed product requirements.
- Translate requirements into technical specifications (materials, performance, cost, sourcing).
- Ensure compliance with industry standards and regulations to mitigate risk.

Establishing clear solution requirements ensures that benchmarking focuses on relevant cost, performance, and feasibility aspects.

03 Compare

Evaluate & Select the Best-Fit Solution

- Assess each solution based on cost, performance, and technical feasibility.
- Conduct a trade-off analysis (e.g., cost vs. quality, efficiency vs. complexity).
- Identify and mitigate risks and constraints (supply chain disruptions, scalability, material availability).
- Benchmark findings against industry standards and competitor solutions.
- Make a final recommendation based on overall value, cost-effectiveness, and strategic fit.

A structured evaluation ensures that the selected solution aligns with both cost and performance expectations.

04 Disassemble

Teardown for Cost & Functional Analysis

- Perform a physical teardown of the benchmarked product.
- Document each (sub)assembly, component and material.
- Identify critical cost drivers and functional dependencies.

A detailed teardown reveals the true cost structure of the product and allows for accurate cost modeling.

05 Analyze

Cost Calculation & Functional Prioritization Using Tset

- Use Tset's cost engineering software to model and calculate detailed cost structures.
- Analyze different functional groups (e.g., electronics, mechanics, assembly processes).
- Prioritize the most impactful cost drivers for deeper evaluation.

A standardized cost calculation ensures transparency, traceability, and accuracy in benchmarking insights.

06 Workshop

Validate & Refine Cost Analysis

- Conduct a benchmarking workshop to review initial findings.
- Allow stakeholders to ask questions and challenge cost calculations.
- Ensure that the cost models are standardized and traceable using Tset.

Workshops provide a collaborative environment to validate cost structures, ensuring reliability in decision-making.

07 Present

Final Benchmarking Results & Recommendations

- Deliver a structured final presentation of benchmark findings.
- Summarize cost-saving opportunities, optimization strategies, and trade-off decisions.
- Provide actionable insights for tendering, negotiation, or design improvements.

A structured final review and presentation ensures that benchmarking results translate into actionable cost optimizations.

In the next chapter, we will apply this benchmarking approach to a real-world case study, analyzing power supply modules to illustrate how cost and market positioning insights drive strategic decision-making.

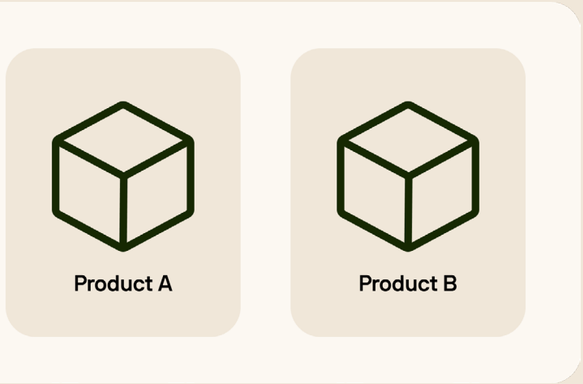
03 Case Study: Benchmarking Power Supply Modules

3.1 Benchmarking Scope & Market Analysis

To illustrate the practical application of benchmarking, this whitepaper examines a side-by-side comparison of two leading power supply modules

- Product A and Product B
- 24V, 10A powerw supply units
- Designed for ISO Clip Rail Mounting in electrical cabinets

These modules were selected due to their very similar technical specifications and market positioning, making them ideal candidates for a direct benchmarking analysis. The only major functional difference is Phoenix's Boost function, which will be evaluated as part of the cost-performance trade-off.



3.2 Benchmarking Objectives & Methodology

The objective of this study is to perform a structured product cost benchmarking analysis to:

- Compare functionality, design, material use, and cost structures between the two modules
- Identify differences in technical execution and manufacturing efficiencies
- Uncover cost reduction opportunities and optimization potential

To conduct the benchmarking study, we will implement a detailed methodology that ensures transparency and consistency in our analysis. The key steps are as follows:

1. **Product Teardown & Documentation:** Disassembly, photo documentation, and identification of key functional blocks
2. **Bill of Materials (BoM) Creation:** Mapping components to their respective cost structures
3. **Material Identification & Measurement:** Analyzing material compositions and weight distributions
4. **Manufacturing Cost Calculation:** Assessing cost implications of production processes and component sourcing
5. **Findings & Documentation:** Summarizing cost structures and identifying cost drivers

3.3 Product Architecture & Functional Cost Segmentation

To properly evaluate a product's cost structure, we first assess the external market landscape. This involves analyzing competing products, their technical specifications, and pricing trends across suppliers. By mapping market offerings based on key parameters such as voltage, current, efficiency, dimensions, weight, and price, we can identify performance trends, technical differentiators, and cost positioning.

Model	[illegible]	[illegible]	[illegible]	[illegible]
Voltage	24V DC	24V DC	24V DC	24V DC
Current	10A	10A	10A	10A
Weight	810 g	700 g	750 g	810 g
Price	[illegible]	[illegible]	[illegible]	[illegible]

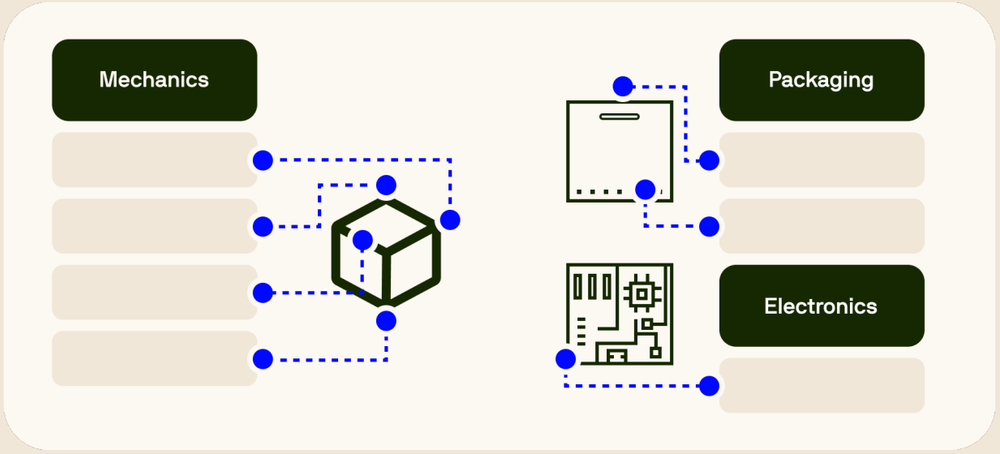
Once the external market landscape has been assessed, the next step is to break down the product's internal structure. A benchmark must go beyond total costs and identify how costs are distributed across different functional areas. This involves:

- Clustering components into functional groups based on design and purpose
- Analyzing materials, machine usage, and production processes to identify cost drivers
- Comparing cost distributions across competing products to highlight cost-saving opportunities

In our case, the first step in this process is the segmentation of the product into three core cost categories:

1. **Mechanical** – Housing, enclosures, structural components
2. **Electronics** – PCBAs with PCBs, Electronic Components and peripheral Mechanics
3. **Packaging** – Protective materials, labeling, shipping configuration

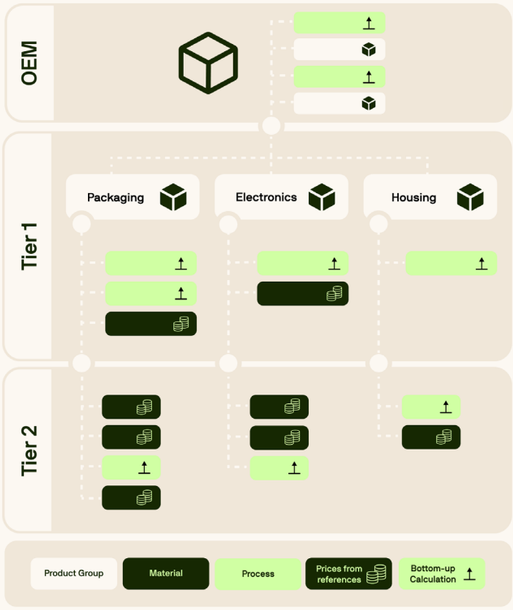
Each of these categories has distinct production methods, material costs, and assembly processes, all of which influence overall cost efficiency. By segmenting cost categories, we ensure that benchmarking is not just a total price comparison but a detailed functional analysis of where cost differences occur.



In addition to functional clustering, the machines and materials used in production were analyzed to assess:

- Processing requirements for each functional category (e.g., electronics requiring soldering, mechanical parts needing CNC machining)
- Material types and their impact on cost and manufacturability
- Production complexity and automation levels

A **vertical line analysis** was also conducted to evaluate the level of vertical integration, determining whether components are manufactured in-house or sourced externally. This plays a crucial role in understanding whether cost advantages come from in-house efficiencies or strategic outsourcing.



3.4 Manufacturing Flow

As the next step, we have identified the key stages in the manufacturing flow, including supplier setup, make-or-buy decisions, and assembly process architecture. These elements directly impact cost efficiency, production flexibility, and supply chain resilience.
At this stage, manufacturers must decide:

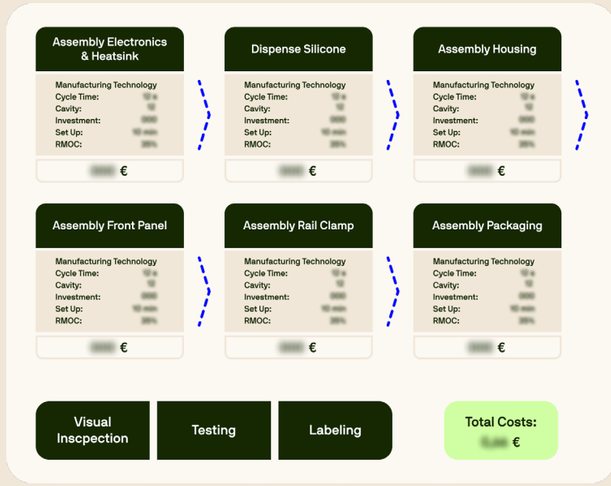
- What level of vertical integration is optimal? (What should be produced in-house vs. sourced externally?)
- How do different supplier setups impact cost? (Are competitors leveraging supplier advantages?)
- What are the efficiency trade-offs in assembly? (Manual vs. automated processes)

To answer these questions, the assembly process was mapped out, analyzing:

- Which systems and machines are required for production
- Cycle times and workforce involvement in assembly
- Material flow and processing steps to optimize efficiency

Using Tset's Software, each process step was simulated, providing a detailed and accurate cost breakdown. By structuring the cost model at the component level, we gain visibility into potential cost-saving opportunities through alternative sourcing strategies or manufacturing process improvements.

Product A



Product B

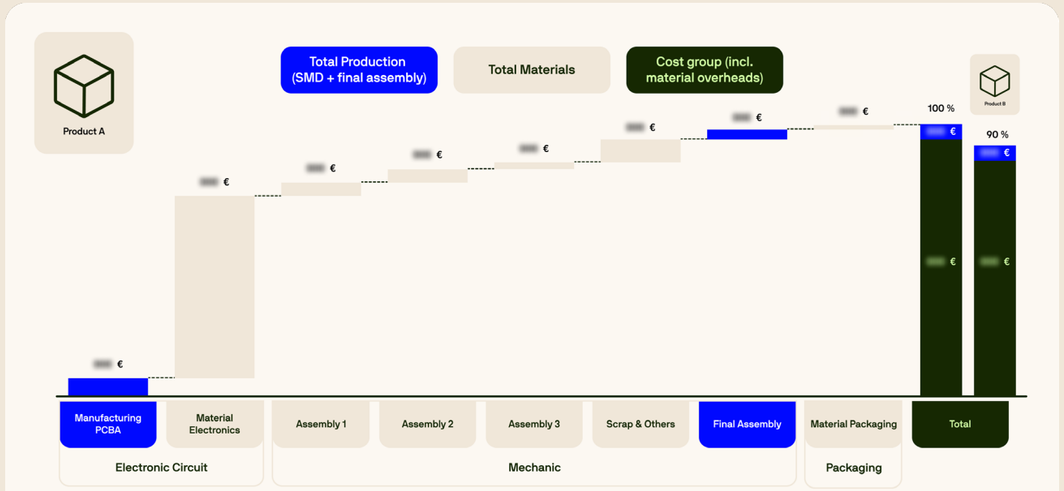
In our benchmarking case study, Manufacturer A and Manufacturer B adopted different approaches to assembly and supplier setup. By analyzing their vertical integration strategies and process architectures, the study identifies where cost efficiencies were gained and how alternative setups could impact total production costs.

3.5 Product Cost Breakdown

The comparison of Product A vs. Product B illustrates how both power supply units contain mechanical enclosures, circuit boards, and packaging elements, but their cost structures differ based on design complexity, material choices, and assembly strategies.

By clustering these elements into functional blocks, a more precise feature-based cost comparison can be conducted, highlighting where each company is investing more functional effort to fulfill requirements.

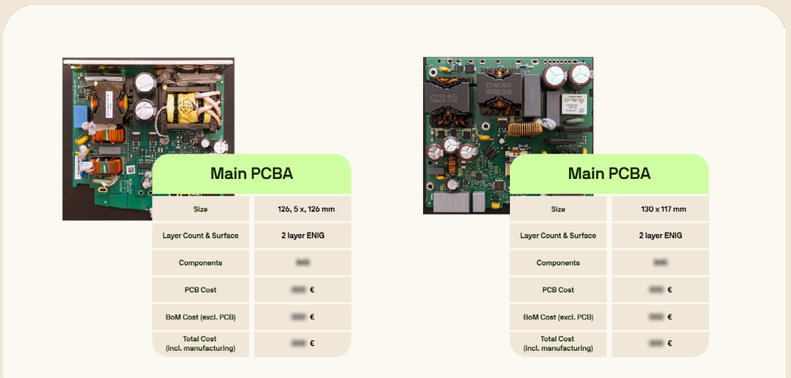
The electronics category accounts for the largest portion of the total cost structure, making it the primary focus of the next stage of benchmarking.



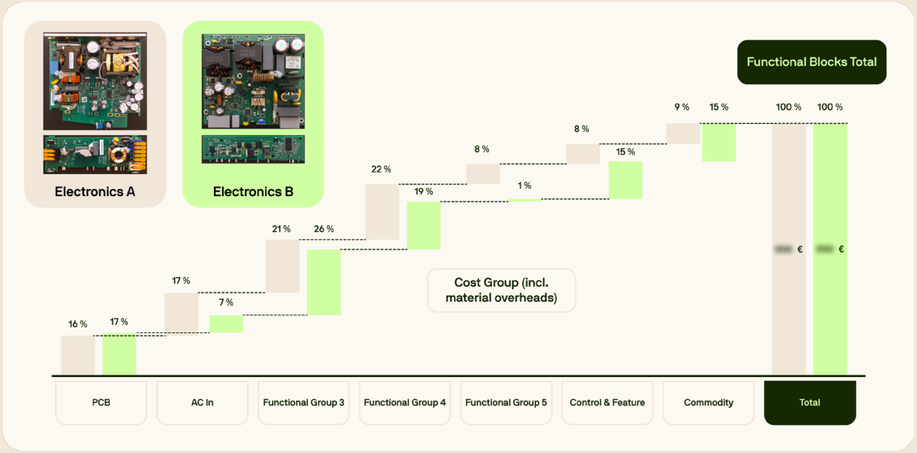
3.6 Electronics: Component Cost Analysis & Functional Cost Breakdown

Since our previous analysis indicated that electronics account for the largest share of the total cost structure, this section will focus on benchmarking electronic components to identify cost drivers and optimization opportunities.

A detailed examination of the electronics helps to understand the material composition, manufacturing processes, and assembly methods used in competing products.



To achieve a precise cost breakdown, the electronics were disassembled and categorized into functional clusters. Each component was analyzed to determine its role within the system, its material composition, and its associated cost fraction.
The extracted data was structured within Tset's cost calculation system, enabling a detailed breakdown of cost allocation across functional blocks. This structured cost analysis allows manufacturers to precisely assess cost contributions and identify potential inefficiencies in component selection, manufacturing processes, and assembly strategies.

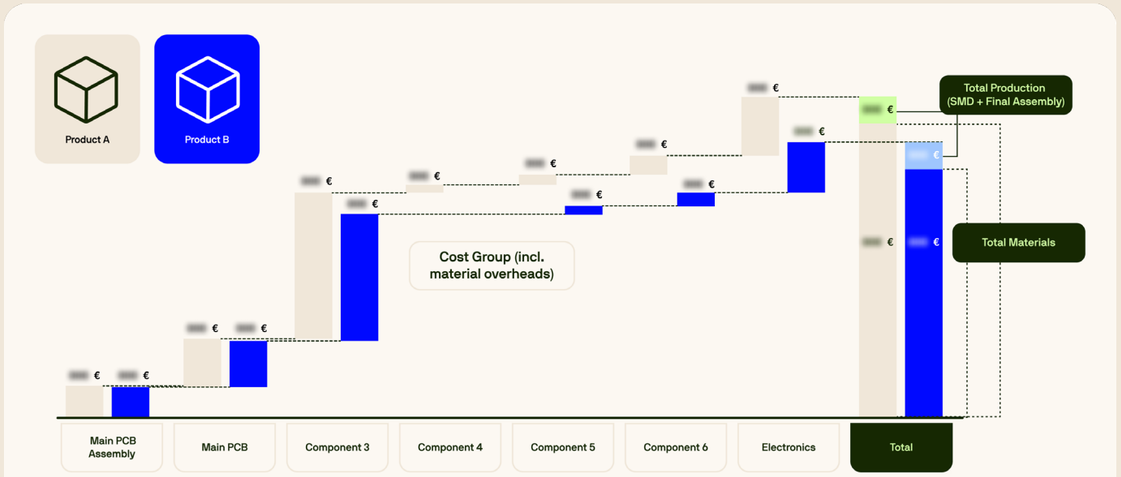


3.7 Electronics: Cost Distribution

Following the component-level and functional group analysis, this section provides an overview of the cost distribution within the electronics category.

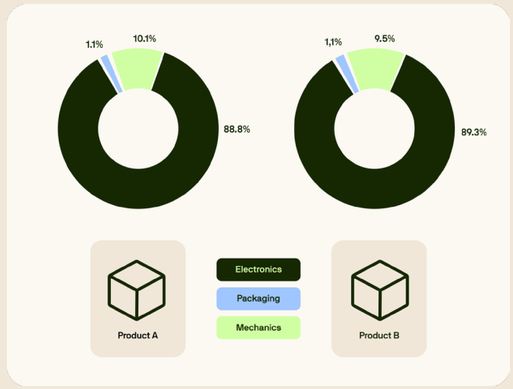
The waterfall diagram below visualizes how costs accumulate across different functional areas, illustrating the breakdown from PCB assembly to total electronics cost.

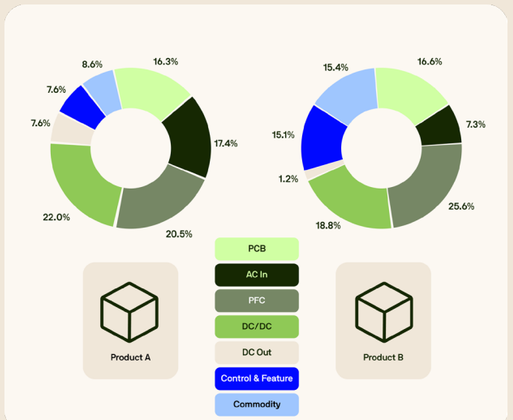
While the exact cost values are not displayed, this visualization effectively demonstrates the depth of detail achievable in the benchmark study, offering a structured view of cost distribution across electronic subsystems.



3.8. Final Benchmarking Results

This benchmark study provided a structured cost comparison between the Product A and Product B power supply units, focusing on packaging, housing, and electronics.





By breaking down the functional groups and their relative cost shares, we identified key technical and cost-driving factors that influence overall product efficiency and competitiveness.

A cost share analysis of the electronics segment revealed significant differences in design choices and filtering strategies:

- Comparison by cost shares shows a significantly higher cost share of both AC input and DC output functional groups for Manufacturer A compared to Manufacturer B
- Main driver for this is the higher filtering effort done on both Input and Output (2x Common Mode Choke, higher total output filter capacitance, etc.)
- Cost shares for combined PFC and DC/DC in similar range of around 45% for both units
- Significantly increased Control & Feature cost share at Product B partly explained by the included inrush current limiting via Relay and associated auxiliary power supply
- Higher Commodity cost share at Product B as total costs are lower

04 Tset for Benchmarking

Tset’s product cost calculation software streamlines the product cost benchmarking process by providing advanced data integration, automated cost calculations, and structured analysis tools.

How Tset optimizes the benchmarking process:

- **Seamless Import of Excel-Based BOM:** Easily import BoM data, both for mechanical assemblies and PCBAs with electronic components.
- **EBOM Import for PCB Assembly:** Directly import EBOMs containing electronic wcomponents and price them automatically using a standard API interface or a customer-specific master data system based on material numbers.
- **Bottom-Up Calculation from 3D Data:** Perform direct bottom-up cost calculations using 3D data.
- **Master Data Availability:** Ensure access to master data records for building accurate bottom-up calculations.
- **Customizable Process Time Allocation:** Individually allocate process times for sub-process sequences within manufacturing steps, such as assembly sequences.

About Tset Cost/Carbon

Tset Software GmbH - Tset for short - is a leading solution for product cost and CO_2 analysis and was founded in 2018 by Andreas Tsetinis and Sasan Hashemi. With its holistic cost and carbon management software, Tset enables the manufacturing industry to maximize cost- and CO_2-efficient product development, production, and procurement.

As costs and CO_2 emissions are always calculated together, customers can showcase the benefits of their own products and CO_2 avoidance strategies with high precision. In contrast to standard market assessments, Tset's software provides very comprehensive and accurate analyses based on a large amount of secondary data already available, with minimal additional primary data required. In addition, the solution is cloud-based and offered as a SaaS product, making the system ready to use and eliminating internal IT costs for customers.

Tset's customers come mainly from the automotive, medical, electrical, and aerospace industries, including well-known companies such as Brose, ZF, BMW Group, and Stabilus. The team of over 80 internationally experienced mathematicians, software developers, and manufacturing experts is growing steadily, doubling every year since its foundation.

About Tset Services

Tset Services offer the optimal combination of software and cost consulting services. Clients who have chosen Tset Cost Software can access, review, and modify detailed cost calculations made by Tset consultants directly within defined external workspaces in their tenant.

With a team of experienced cross-technology experts in managing cost engineering projects, we support established cost engineering organizations with high-quality cost analysis across the complete product life cycle, including the transformation of results, e.g., at the supplier side.
For customers without dedicated cost engineering departments, we assist in planning and executing cost reduction programs, as well as building and implementing cost engineering organizations from the ground up.

Your Next Steps: From Insight to Action

Product cost benchmarking provides a structured approach to evaluating product costs, understanding market positioning, and making informed decisions across engineering, procurement, and business strategy. By following a data-driven methodology, companies can identify cost drivers, assess competitive advantages, and optimize product development.

With Tset's cost engineering software, organizations can enhance transparency, standardize cost calculations, and gain deeper insights into cost structures and optimization potential.

Book a demo today and transform your cost engineering process.

Explore more industry insights, sustainability trends, and Tset expertise in our full whitepaper collection.

Call us at +43 676 4487761 (we offer support in DE, EN, FR, IT, and NL).

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