aPriori

A Guide to Should Cost Analysis and Negotiation

In this guide, we provide an overview of Should Costing – a methodology for calculating accurate cost targets for purchased products. These cost targets provide benchmarks that are an essential foundation for more effective, fact-based supplier negotiation, smarter design, and faster time to market.

The ability to generate accurate, timely manufacturing cost models is an essential foundation for setting the accurate cost targets needed to maximize the value of Should Costing methodology.

01 What is Should Cost?

A "should cost" is a projection of the total cost of a given component if efficient manufacturing and distribution practices are followed. A robust estimate will need to account for a plethora of factors including labor, materials, overhead, and profit margin.

### WHAT IS SHOULD COST ANALYSIS?

Should cost analysis is the actual process for generating a should cost estimate. We explore this process in more depth below.

WHO TAKES RESPONSIBILITY FOR SHOULD COST ANALYSIS?

Exhaustively analyzing components and negotiating with suppliers is much harder during the tight timelines of a new product development cycle.

For this reason, should cost analysis is typically best managed by dedicated cost engineers rather than design engineers actively tasked with developing a new product.
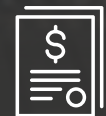
WHAT IS A SHOULD COST MODEL?

A should cost model is a process and toolset for calculating should costs. This can range from a simple estimation spreadsheet that tallies raw material estimates to simulation-driven, physics-based software digital manufacturing simulation software that analyzes cost drivers at a far more granular level.

aPriori

The Real Meaning of Should Cost:
A Strategic Benchmark for the Cost Engineer

For manufacturers, having a quantifiable metric for key components' target procurement price helps:

- Source components more strategically

- Anchor supplier negotiations in quantitative data and manufacturing knowledge

- Estimate model procurement costs for new designs without waiting for supplier quotes

The Meaning of Should Cost Vs. Will Cost

"Will cost" is what components will actually cost to procure—reflecting actual, rather than optimally efficient, production conditions.

Cost engineers almost always expect some sort of margin between the "will" and "should" cost: few if any suppliers have optimized every aspect of their entire cost structure. But the size of the margin provides a valuable point of comparison between potential suppliers. And should costs may constitute a long-term goal for supplier cost reduction when negotiating contracts.

Why Should Cost Targets are Inherently Imprecise

A product's underlying cost drivers can be quite complex, and any should cost model is attempting to calculate projections for market-driven costs that can change by the day. Anything from a change in the price of steel to a new union contract for welders halfway around the globe can suddenly and dramatically alter a product's current cost.

Despite this imprecision, robust should cost models still provide real value as a point of comparison—especially since actual supplier quotes can be wildly imprecise to begin with. If the same part specification is sent to three different suppliers, we often expect a variance in quotes of +/-40%.

When this scale of imprecision abounds, a quality model of efficient cost offers a key anchor for supplier cost optimization efforts.

You can read more about the inherent imprecision of should cost projections in our article here.

Managing Should Cost

To benefit from the value of robust should cost models, engineers must commit real time and resources to supporting rigorous should cost analysis.

Analyzing the myriad cost drivers behind a product is a complicated analytical task that needs to be supported by skilled cost engineers, carefully prioritized to target the most salient component-level cost drivers, and conducted as fast as possible to facilitate the fastest possible time to market for new products.

Below, we dive into some practical details of effectively conducting should cost analysis, leveraging the intelligence it generates, and using this information to collaborate with suppliers to reduce costs.

aPriori

02. Prioritizing Cost Reduction with Spend Analysis

In manufacturing, a spend analysis is the process used to analyze purchases to prioritize cost reduction efforts. By quantifying component and other input costs, outliers can be targeted for negotiation, re-sourcing, and/or re-engineering.

Many engineering organizations are using hundreds of thousands of different components across many different designs. Conducting a thorough should cost analysis of every one of these components and renegotiating their purchase price would never be practical. For parts used only a handful of times, the should cost analysis itself may cost more than any savings achieved.

A spend analysis looks at which functional categories are driving the most spending. In these areas, achieving even a small marginal cost reduction may result in substantial dollar savings.

aPriori

03 How to Conduct a Spend Analysis

The following steps provide a high-level overview of conducting a spend analysis. For a more detailed look, please see our blog on How to Conduct a Spend Analysis.

DETERMINE SCOPE
Segment spending by manufacturing process and material. Analyze total spend on these categories to identify priorities for a deeper spend analysis.

DATA GATHERING
Resources required for a thorough spend analysis include 3D models and 2D drawings of analyzed components, data on production volume, etc.

CONDUCT A SHOULD COST ANALYSIS
This can range from making a few calculations using spreadsheet software to analyzing designs using sophisticated manufacturing cost modeling like aPriori.

A quality should cost estimate is the key to a successful spend analysis—the should cost estimate is the benchmark that is used to identify cost outliers, the components or component categories that are most exceeding should cost.

REVIEW INITIAL OUTLIERS
Before diving into a cost reduction effort, a final review of any outlier is a best practice to check for flawed data.

aPriori

ESTABLISH A PLAN OF ACTION: ROOTING OUT COST OUTLIERS

Several different issues can cause a component to exceed its should cost, and the required corrective action varies accordingly.

In some cases, lack of negotiation or price-shopping simply leads to overpaying; a fact-based supplier negotiation (see below) can help push costs down.

Sometimes, unique features of a component's design specification create production issues causing price to greatly exceed expectations; in these cases, re-design may be necessary, potentially in collaboration with the relevant supplier.

Finally, in some cases a supplier is not over-charging relative to their own costs but is not producing a component efficiently. In these cases, another supplier with the right equipment can be identified, or a supplier can agree to begin implementing an optimized production/distribution process to reduce the margin over should cost.

TAKE ACTION

We look at using should costs to nurture more effective supplier negotiations and relationships below. For a cost-oriented redesign, manufacturing cost modeling software can help pinpoint the precise factors causing a component to exceed cost targets—the ultimate cause could include anything from excess weight driving high transportation cost to manual welding needs pushing up labor costs.

VALIDATE SAVINGS

Analyze results to confirm a successful cost reduction.

04.

Should Cost Negotiation: Leveraging Should Cost Analysis

What is should cost negotiation?

The more detailed, accurate, and actionable a should cost estimate is, the more value it provides in a supplier negotiation.

Should cost negotiations are closely related to the concept of fact-based negotiation. We can think of should costing as an instrumental process for developing the "facts" upon which these negotiations are centered.

We provide an overview of these approaches below. For more detailed information, we recommend our blog on fact-based negotiation here.

What is Fact Based Negotiation?

Fact-based negotiation is the practice of focusing supplier negotiations on mutually beneficial data on cost structure rather than gamesmanship.

aPriori

The Key Role of the Manufacturing Cost Modeling Software in Fact-Based Negotiations

Generating actionable factors on suppliers' product costs requires detailed insight into underlying factors including:

- Material Costs/Manufacturing Process Costs

- Labor Costs

- Overhead

- Tooling/Facilities Investments

Calculating how these factors interact to contribute to a component's ultimate cost structure is a very complex analytical challenge. A tweaked materials selection, for instance, may require a different manufacturing process only available at a different manufacturing facility with far higher rental and transportation costs.

The right manufacturing cost modeling software makes it far easier to generate detailed insight into cost structure that can impactfully inform supplier negotiations.

āPriori

The Role of Digital Manufacturing Simulation

The most effective manufacturing cost modeling software, like aPriori, will employ Digital Manufacturing Simulation to generate should cost models. Ideally, in this approach, this software directly analyzes 3D CAD files to generate a digital twin of the part or product being modeled. It can then simulate production using a Digital Factory to generate in depth insights into manufacturability. These simulated cost models can account for virtually every aspect of a product's cost structure, including materials, tooling, labor, production facilities, and more.

Digital manufacturing simulation is hugely valuable for navigating the complexities discussed above. For more on this software, see the section on manufacturing cost estimation modeling software below.

With this sort of insight in hand, a supplier negotiation can be transformed from "this cost is too high" to, for instance, "could you use a laser for this operation instead of stamping?"

Tips for Framing Your Negotiation

A few sample phrases can be helpful for conceptualizing how to use should cost insight to propel more fruitful negotiations.

- "Our simulation suggests this part could be over 50% cheaper. How close can we get to that target? What aspect of our design is driving this discrepancy?"

- "Our cost model suggests there's a cheaper production method available for this component than the one you're currently utilizing. Can we establish a timeline for shifting production/price to this approach?"

āPriori

05. How to Collaborate with Suppliers to Reduce Product Cost

The long-term goal of the should cost negotiations described above is not just to reduce component cost directly but remove adversarial negotiations in favor of [a cost-reduction collaboration with suppliers](#). Detailed should cost estimates help move away from "accusing" a supplier of having a price that's too high and toward investigating why the price is so high.

By moving away from arbitrary cost reduction targets and toward a collaborative negotiation approach, suppliers are incentivized to work with you to bring down costs over time. As more supplier relationships become integrated with this approach, components can be sourced from the supplier that has the most efficient production capability (as opposed to the supplier who happened to make the most aggressive quote).

aPriori

06. Quality Should Cost Modeling Software Speeds Up Quoting to Accelerate Product Development Timelines

As noted above, the quality of a should cost model is a key enabling factor to identifying and eliminating cost outliers. This type of spend analysis is just one valuable use case for a should cost analysis, however.

Manufacturing Cost Modeling Accelerates Product Development Timelines

Suppliers can take weeks to return quotes. This timeline is often unacceptable when bringing a new product to the market. Digitally simulated should cost models allow design engineers to generate robust projections for what a component should cost to acquire without waiting for suppliers. This dramatic improvement in time efficiency allows engineers to consider and model multiple design alternatives in the time it would take to wait for a single quote.

aPriori

While the final design's supply needs will still ultimately need to be quoted, the capability to compare design alternatives without waiting for supplier quotes can substantially accelerate time to market for product development initiatives.

Similarly, when customers request quotes, should cost models allow for more rapid return of a far more accurate price—often streamlining the quoting timeline from weeks to days.

Finally, when re-designing to eliminate a cost outlier component, engineers no longer have to guess if they've uncovered all the relevant inefficiencies: should cost models provide a handy goalpost for re-engineering cost reduction efforts.

07. What to Look for in Manufacturing Cost Modeling Software

As discussed above, the right technology tools are an essential enabler for a rigorous should cost analysis.

If it is not rooted in quality, consistent, manufacturing cost models, a should cost target becomes just another arbitrary cost cutting goal.

In addition to working far faster than manual, spreadsheet-driven should costing processes, advanced cost modeling tools provide far more detailed insight into the actual factors driving costs within the design itself.

aPriori
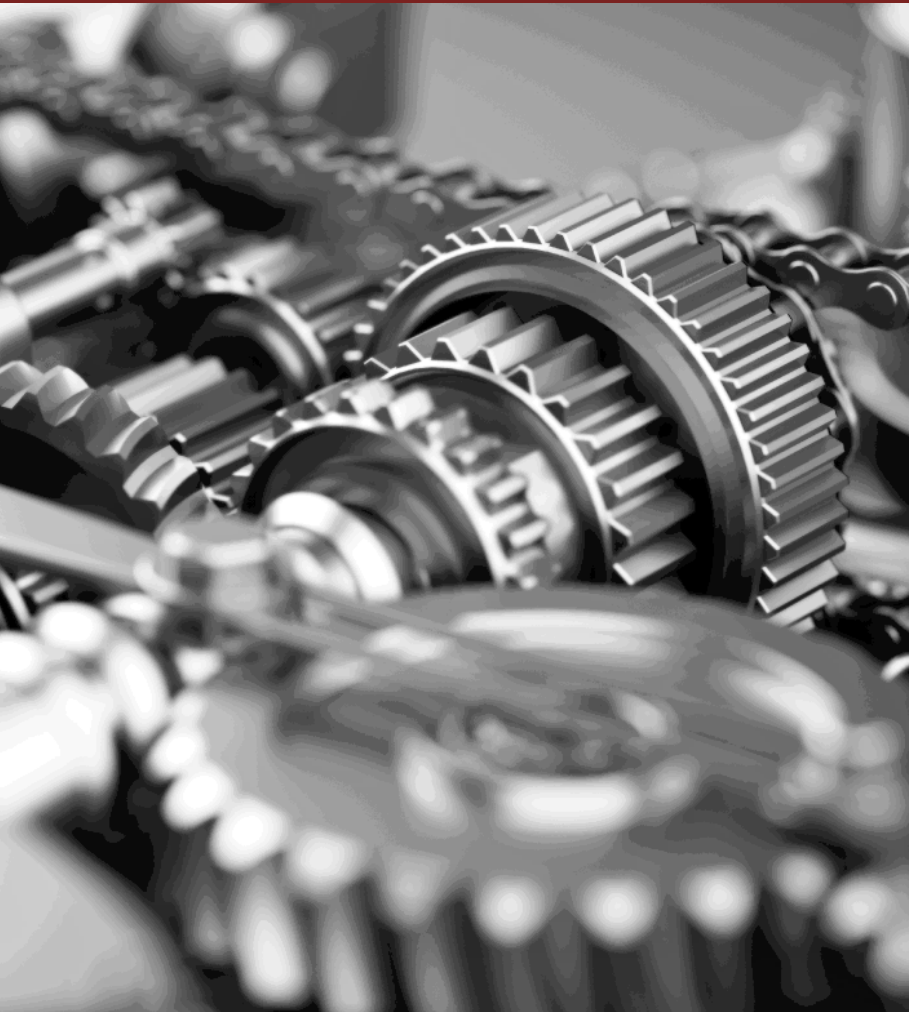
The Value of Should Cost Modeling Software

The most effective Should Cost modeling software offers detailed cost analysis based on digital manufacturing simulations of different manufacturing processes. As discussed above, a robust model needs to account for factors ranging from logistics to materials to labor costs.

These factors can be related in ways that are difficult for even an experienced product engineer to anticipate without a detailed manufacturing simulation. An otherwise inexpensive part may have a cooling requirement that dramatically lengthens the production process. The marginal cost impact of a new routing may hinge on production volumes as capital investment in machinery is averaged over more and more units.

Digital manufacturing simulation software like aPriori can detect these often powerful and unintuitive cost interactions through analyses that can be run in a matter of minutes, quickly highlighting problem areas and even automatically suggesting alternative routings.

Beyond Should Cost: Manufacturing Cost Modeling for Product Design

Digital manufacturing simulation generates actionable Design for Manufacturability (DFM) and Design to Cost (DTC) insights that help product engineers integrate cost modeling directly into the design stage of product development. This integration provides the ability to compare alternative designs on the fly to identify the lowest cost possible to achieve market-driven form, fit, and function demands.

# Manufacturing Cost Modeling Software that Works at the Design Stage

This software needs the right feature set to be effective without bogging down designers or inhibiting innovation.

The most impactful manufacturing cost modeling software needs to:

- Employ digital manufacturing simulation based on direct analysis of 3D CAD files, allowing engineers to quickly cost alternatives as they explore design options.

- Feature digital manufacturing simulation that covers a wide array of specific manufacturing processes.

- Be fully customizable to reflect your production environment/ supplier specifications.

These capabilities are so important because well over half of a product's total cost becomes baked in once its design is set. Should costing negotiations are a great approach for reducing product costs, saving money even on designs that are already finalized—but bringing in the same cost modeling capabilities while a product is still being designed unlocks even more potential savings.

For a deeper look at what to look for in a manufacturing cost estimation software, please see our full article on this topic here.
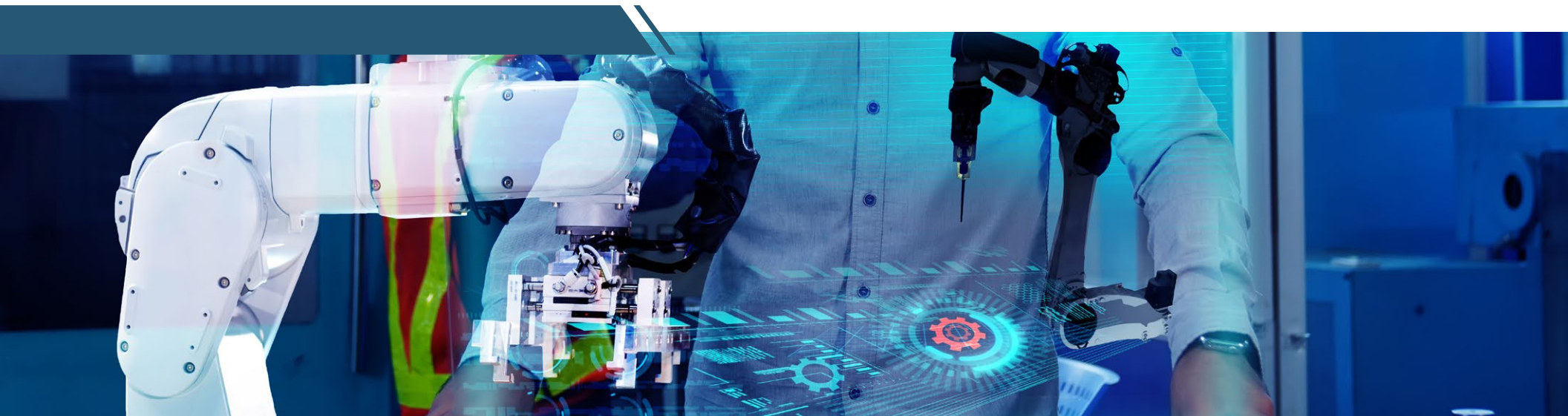
aPriori

08. Real Examples: Should Cost Analysis Has Saved Businesses Thousands

aPriori has been used by all types of manufacturers and procurement leaders to generate cost models that help build better products, anchor collaborative supplier relationships, and accelerate time to market.

We provide links to a few real-life examples below.

Pinpointing Cost Outliers

Axcelis manufactures semiconductor manufacturing equipment. Click here to read about how they used aPriori to "scan through 100 machined and sheet metal parts, all of them sorted by cost, material, volume, complexity, manufacture region and supplier" and successfully pinpoint targets for re-negotiation and cost reduction.

axcelis
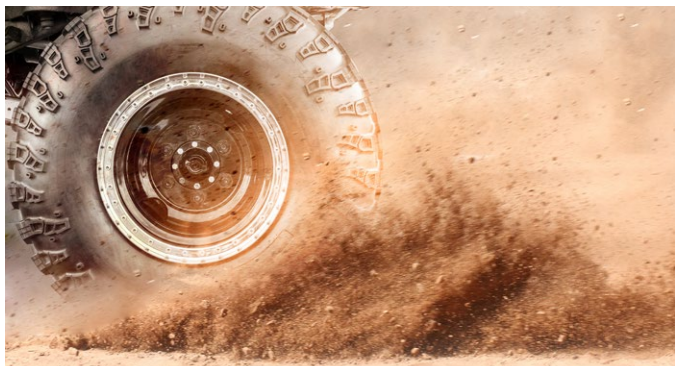
Should Cost Models for Faster Quoting

Soucy manufactures aftermarket parts for power sports equipment. The time it took to receive quotes from Chinese product manufacturers was delaying their ability to innovate in response to market opportunities.

Now Soucy uses aPriori to cut their product costing timeline from 9+ to 2.5 days – click here to learn more.

Should Cost Models for Systematic Cost Management

General Electric uses aPriori to model should costs when purchasing manufactured parts.

In one case, they found a vendor charging over 250% of optimal cost. They were ultimately able to find another vendor offering only a 20% gap.

You can learn more about how General Electric uses aPriori in a video presentation here.

aPriori Provides Actionable Insight for Better Manufacturing

aPriori is the leading provider of digital manufacturing simulation software. By leveraging the digital twin with our digital factories, we automatically generate Design for Manufacturability (DFM) & Design to Cost (DTC) insights, helping manufacturers collaborate across the product development process to make better design, sourcing and manufacturing decisions that create higher value products in less time. aPriori works with manufacturers to bring simulation-driven cost estimation into the design process, empowering organizations to treat cost as a true independent variable in the design process.

VISIT aPRIORI.COM

aPriori