

# Optimal Lifecycle Costing is a Team Sport

## *CIMdata Commentary*

### *Key takeaways:*

- *In most companies, product cost and manufacturing knowledge and requirements are spread across different functions and information systems*
- *Competitive pressures to win business are forcing companies to make decisions earlier in the lifecycle, making it more difficult to get disconnected functions to bid to win and to make money*
- *The most successful companies take a team approach to product costing, fostering collaboration among design engineers, cost engineers, manufacturing, and supply chain management*
- *aPriori designed their solutions to support the deep subject matter expertise needed to simulate manufacturing processes cost effectively within a collaboration environment that helps teams meet their market requirements and costing objectives*

In today's economy manufacturing companies are facing competition from all sides. While global competition makes the headlines, these same companies increasingly face new competitors at home using new approaches, new materials, and new value chains. Competing on price or delivery, or even features, are not enough when taken alone. Manufacturers have to excel at all of these product aspects in their chosen markets, with time compression an ever-present fact of life.

Companies are looking at different ways to optimize design. At one time it was “design for assembly” or “design for maintenance.” Now companies need to optimize their product designs and manufacturing processes across a range of needs, which CIMdata often refers to as DFX. Some companies are looking to systems thinking and systems engineering to help them consider all of these constraints more simultaneously. Some of our recent consulting work with leading manufacturers focused on how to model and simulate earlier in the product lifecycle. This makes sense, because many decisions that commit program costs are made early in the lifecycle. Studies have shown that this can be as much as 85% of the total costs, as shown in Figure 1. Clearly any optimization processes must consider the costs incurred during the product lifecycle. Taking a systems view also means determining the best way to design and manufacture products at an optimal cost.

Unfortunately, many companies struggle to develop accurate cost estimates. Companies can lack understanding of the manufacturing processes necessary to make specific components. Information can be siloed in different functions and systems. Companies in engineer-to-order (ETO) and configure-to-order (CTO) businesses achieve some level of costing success mostly by configuring well-understood components. In fact, a recent trend finds companies adopting Configure-Price-Quote (CPQ) systems to provide more consistency in their project definition and quoting processes. Adopting these solutions makes understanding costs even more crucial to success.

What will it take for companies to act? In CIMdata's global consulting with industrial firms, symptoms or pains—really negative outcomes—can drive a company to act. For engineering processes, it may be issues in engineering change, intellectual property management, or configuration management, and companies may implement point solutions to address these. While companies may implement point solutions to address single issues, they really need to

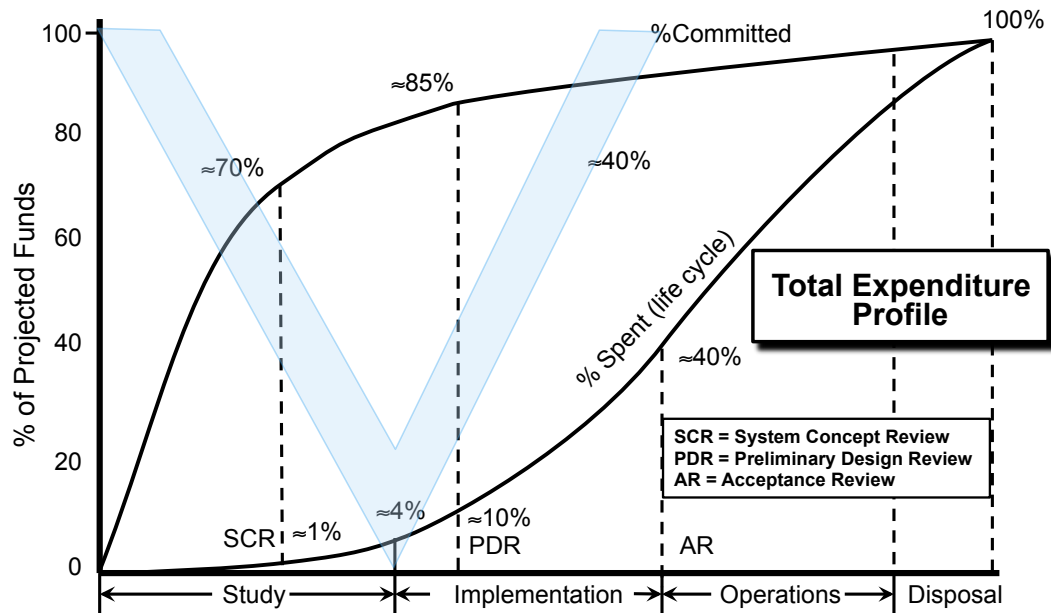


Figure 1—Most Product Costs are Determined Early in the Lifecycle

be more strategic and systemic to maximize their success. For sourcing, it may be changes in manufacturing and sourcing strategy, supplier transitions, or aggressive cost reduction goals that drive an organization to action. Similarly, costing issues can show up in several different areas and for different reasons:

- Designers are focused on meeting product specifications within their deadlines, with costs and manufacturability being secondary considerations. Many designers do not understand manufacturing and manufacturing processes well enough to accurately cost their designs.
- Suppliers are increasingly more deeply involved in product ideation, design, manufacturing, and even lifecycle deployment. Picking the lowest cost supplier often results in more scheduling and cost/price issues, not fewer.
- Companies that compete in supply chains have to bid more, and more effectively, to ensure all bids will be profitable. Lack of early cost visibility makes this problematic and delays bids.

Whatever the impetus, CIMdata usually counsels such firms to think strategically about addressing their problems, even if they choose to act tactically in the short term. This helps ensure that their initial decisions leave room to tackle other problems they also face today, as well as supporting growth and change to promote the company's evolution. Within this strategic framework, the focus turns to solving the immediate pain as an important first step. Point solutions are available to attack these problems individually. For example, cost engineers often have specialized tools, some commercial, many homegrown. These tools generally require significant cost and manufacturing expertise to operate, limiting their utility to support costing by design engineers, team leads, commodity managers, or buyers. There are also solutions focused on managing supply chains, mainly to set cost targets and capture costing information provided by suppliers.

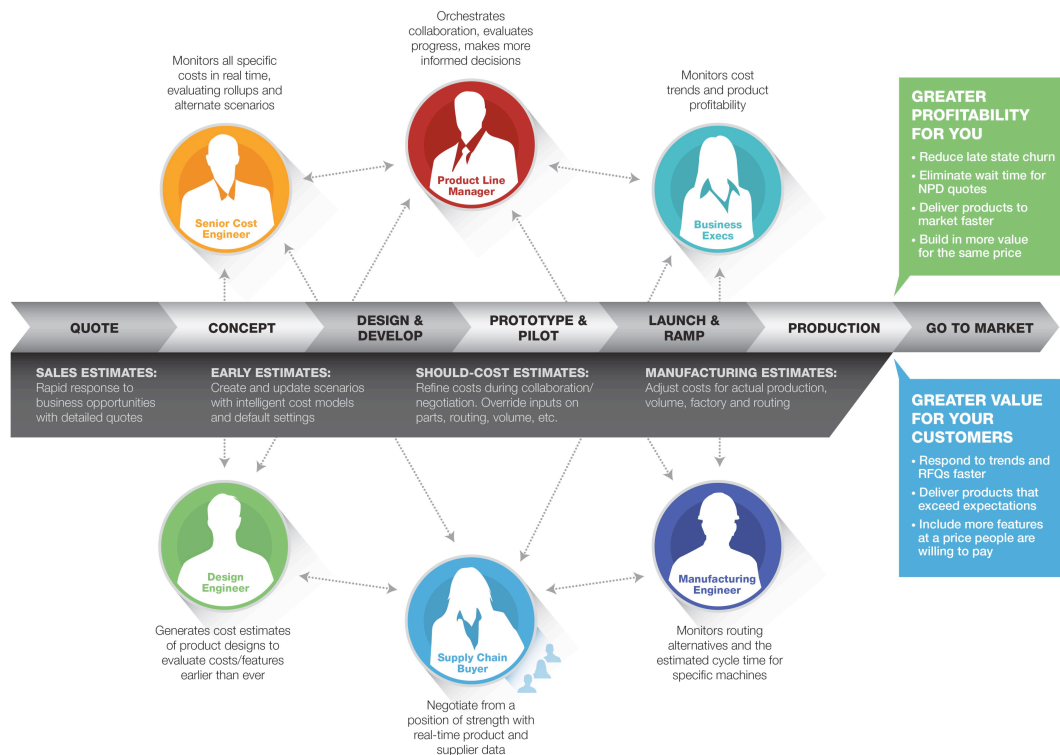
The leading PLM solution and service providers are working to address these costing needs. For example, Oracle and SAP are leveraging their existing ERP solutions, and augmenting

them with new functionality. Siemens PLM Software expanded their costing functionality through acquisition of Perfect Costing in 2012. While there are a number of commercial tools available, adoption is still a challenge. Based on a recent CIMdata study on product costing, most companies still rely on custom solutions, often based on Microsoft Excel.<sup>1</sup> Looking at the offerings in the market, most available solutions focus more on capturing and tabulating known costs, not supporting cost determination or helping to collaboratively evaluate more cost effective approaches to making parts.

Among the independent firms offering costing solutions, aPriori's offerings focuses on providing a more systemic approach, helping companies collaborate across functions and throughout the lifecycle. Their portfolio can support a range of functions and uses across the enterprise. For example, to analyze current designs aPriori can support use cases in:

- New Product Development (NPD)
- Value Analysis/Value Engineering
- Engineering Change Orders (ECOs)

As shown in Figure 2, the aPriori solution offers role-specific functionality to the actors in different functions and parts of the lifecycle. Most engineers focus more on design or performance than cost. However, aPriori's intelligent tools embody manufacturing process knowledge to help them make more accurate cost estimates. Getting the cost estimate even mostly right can help avoid late state changes. Engineers can develop cost estimates in multiple ways. They can work directly with their geometry in the CAD system's user interface (UI) and within the aPriori UI to study cost drivers and detailed manufacturing simulation outputs (e.g., cycle time, material utilization, overhead costs, etc.). They can also work in batch



<sup>1</sup> "Product Cost Management in Discrete Manufacturing," Hiller Associates and CIMdata, "<http://www.cimdata.com/en/online-store/plm-reports/product/64-product-cost-management-in-discrete-manufacturing>"

mode, putting the parts in question in a folder and entering the necessary parameters in the UI. Finally, costing using aPriori can run in an automated fashion, where users can schedule runs on parts at specified times, or linked with a data management solution to cost parts on check-in. Managers get UIs that provide aggregated, dashboard information like “where are we with respect to the target cost?” They can use this information in conjunction with project management information. For example, a given project may only be 50% complete but at 90% of the cost target. The aPriori solution can also support a number of use cases for sourcing professionals around “should cost.” This is vital to exploring sourcing alternatives and benchmarking potential suppliers. The estimates provided using the aPriori solution could help identify outliers in cost reduction efforts and make it easier to check quotes. Backed by this information, sourcing discussions can focus on facts, facilitating negotiations.

One of the unique aspects of the aPriori solution is its ability to deeply simulate manufacturing processes to develop more accurate cost estimates. In some ways, this is functionality more typical of the digital manufacturing segment of the PLM market, not just product costing. Another important aspect of their implementations is their focused services. Cost management solutions are not really plug and play. Every deployment is different and aPriori combines consulting, training, packaged offerings for specific problems (e.g., spend analytics), part consolidation, and the necessary technical support. Their solution suite is designed to support trade studies that are the lifeblood of a system approach, such as “What are the cost impacts of choosing different design alternatives, or in using a different material or manufacturing process for a given application?” Tools like those offered by aPriori can play an essential role in the multi-disciplinary optimization sought by leading manufacturing companies today.

How are customers doing using the aPriori offerings? A global producer of products and services for refrigeration and air conditioning, controls for electric motors, heating systems for buildings and cities (including solar and wind power), hydraulic solutions for agricultural, and construction machinery saw Product Cost Management (PCM) as a strategic necessity, and chose to start applying it in one business unit. To test their PCM approach, the company created teams focused on reducing cost for existing products and saw solid double digit benefits from their efforts. Combining this experience with inputs from across the Group they developed a single company program to be deployed across the Group, with support from a newly created PCM organization. This new group has a role in all new product development programs, as well as in supporting on-going cost reduction and “should cost” initiatives. Going forward, they want to integrate their PCM processes with ERP and PLM solutions, and to improve workflow and automation.

Another useful example comes from a leading provider of networking equipment. While this company also sees PCM as strategic today, its beginnings were more humble. Their central group responsible for pushing new technologies into their development teams, identified the need but lacked funding. To justify an investment in PCM, the team built models using spreadsheets to capture knowledge and demonstrate the concept. Once they were ready to invest, this company evaluated several commercial offerings and chose aPriori. They worked with aPriori services to implement the necessary business processes. Since the company outsources much of its manufacturing, getting costs right is essential to success. Their central team spends most of its time supporting new product introduction, with the rest split between value engineering and sustaining items. For new products they are involved in the capital approval cycle, with a focus on tooling, a critical cost driver. Using aPriori’s solution they can

save 5% per quarter on tooling costs. Beyond these examples, some aPriori-commissioned research highlights a range of customer benefits from customers using their solutions<sup>2</sup>.

In conclusion, initiatives to address product costing issues can range from implementation of point solutions to full blown corporate initiatives. Since in most companies product cost and manufacturing knowledge and requirements are spread across different functions and information systems, planning strategically even if starting tactically is the preferred approach. PCM solutions should ideally support this range of possible use cases, and experts and non-experts alike as part of the costing process. The most successful companies take a team approach to product costing, fostering collaboration among design engineers, cost engineers, manufacturing, and supply chain management. aPriori designed their solutions to support the deep subject matter expertise needed to simulate manufacturing processes cost effectively within a collaboration environment that helps teams meet their market requirements and costing objectives. The aPriori solutions facilitate collaboration among functions, helping refine costs as design and sourcing decisions are made. The successes at customers like those profiled in this report highlight the different approaches companies can take to address this important business need.

The pressure will just continue to build. To win business, companies must make decisions earlier in the lifecycle, making it more difficult to get disconnected functions to bid to win **and** to make money. Using product costing across the lifecycle and the many contributing functions supported by solutions like aPriori's will increasingly become essential to launching products at the right cost.

## About CIMdata

CIMdata, an independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM). CIMdata provides world-class knowledge, expertise, and best-practice methods on PLM. CIMdata also offers research, subscription services, publications, and education through international conferences. To learn more about CIMdata's services, visit our website at <http://www.CIMdata.com> or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA. Tel: +1 734.668.9922. Fax: +1 734.668.1957; or at Oogststraat 20, 6004 CV Weert, The Netherlands. Tel: +31 (0) 495.533.666.

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<sup>2</sup> aPriori commissioned an external study of their clients and the benefits they obtained, which is summarized here: <https://www.apriori.com/articles/strategic-product-cost-management-challenges-and-benefits/>