The Value of Lifecycle Analysis in Minimizing Cost over the Life of Medical Products

By Jeffrey Ocker

Lifecycle analysis helps identify sustainability issues early in the product development process. This can be particularly important with medical products, which often have longer lifecycles. Every product has two lifecycles: product and component.

The product lifecycle is primarily overseen by sales and marketing. Customer and industry requirements dictate:

- Features
- Technology
- Cost
- Regulatory compliance requirements.

The component lifecycle is overseen by engineering and program management. Component manufacturers dictate the overall life of a component and characteristics such as:

- Technology
- Capabilities (which may impact footprint or package size)
- Regulatory compliance focus.

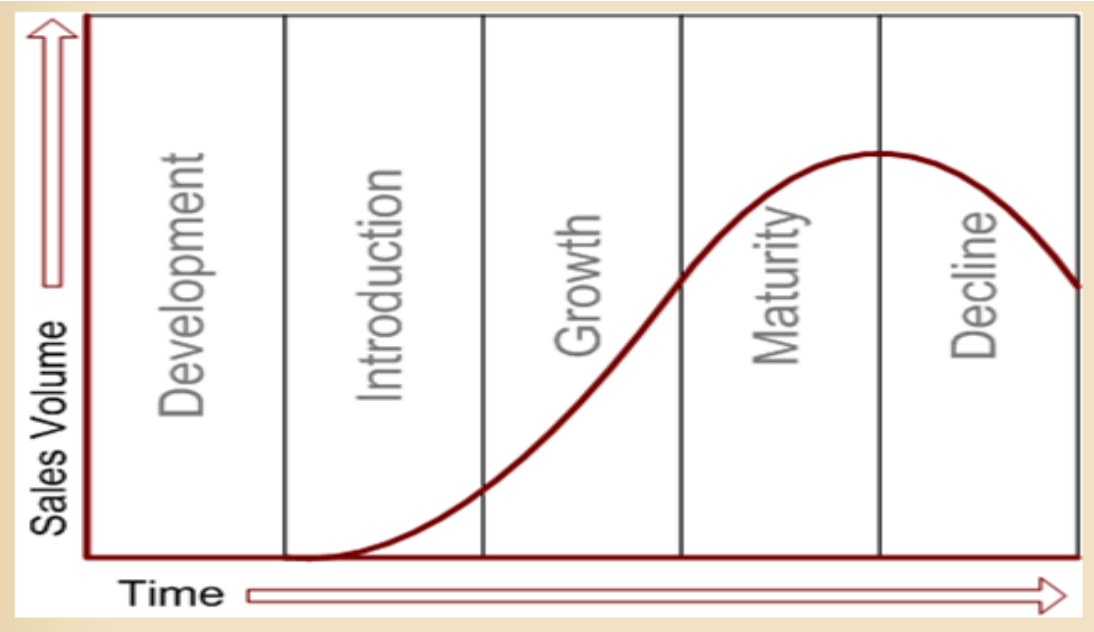

Figure 1. Product/Component Lifecycle graph

Figure 1 depicts a typical product/component lifecycle. Sales volume is at its peak in the growth and maturity phases, but drops off in the decline phase. Component lifecycles tend to be built around high volume customer products, so the time of growth, maturity and decline phases is normally much shorter than longer lifecycle products used in industrial and medical applications. From a design perspective, understanding component lifecycle implications is critical to developing a sustainable product. It has both implications on overall product cost and the ability to support that product over the lifecycle desired by the market.

If building in-house, purchasing resources should stay closely involved in the development effort. If outsourcing, the expertise of the selected electronics manufacturing services (EMS) partner should be tapped.

Product Lifecycle Management Overview

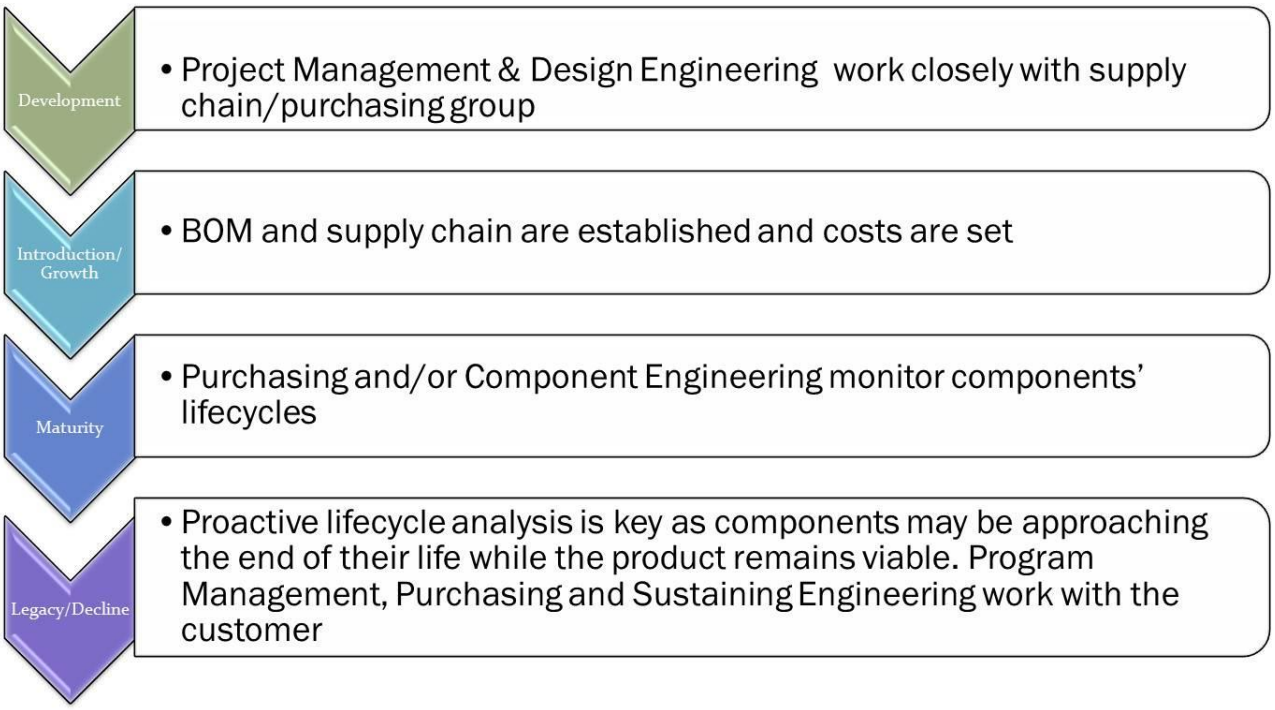

Figure 2. Product Lifecycle Stages of Support

Figure 2 shows typical activities during various stages in the product lifecycle. Since the bill of materials (BOM) typically represents 60-75 percent of product cost, controlling the overall product cost requires successful management of component availability and cost throughout the product lifecycle.

The product development team must often contend with competing product requirements.

- The customer wants a "super widget"
- Engineers want to design the "super widget"
- Production feels the "super widget" is impossible to build at marketing's target price.

Neither side is wrong. Innovative products increase market share. But, both cost and quality targets must be achievable. Good compromises can lead to competitively priced, sustainable products. Failure to compromise ultimately leads to loss of market share.

So how can these compromises be achieved? The first step is developing a common framework of understanding by educating the design team. For many engineers, supply chain management is a foreign concept. Holding joint meetings between design engineering and purchasing can be helpful. Additionally, when an integrated team performs the analysis, both sides can learn from each other's points of view and expertise. When outsourcing, ask the EMS provider for input.

The next step in good product lifecycle analysis is understanding the difference between leading edge and bleeding edge technology. As shown in the lifecycle curve in Figure 1, components in the introduction phase also have limited availability. Component account executives will always push the latest technology, but where is that technology relative to lifecycle stages? Is it released or still in development? What major customers/applications are adopting it?

Custom components should be another area of focus. Most products have some custom components. The most obvious is the printed circuit board. Keeping custom component costs under control is not difficult. Rules of thumb include:

- Avoid sole sourcing, if possible
- Tap supplier expertise to determine ways to reduce component cost
- Don't over specify tolerances or finishing processes
- Use standard technology.

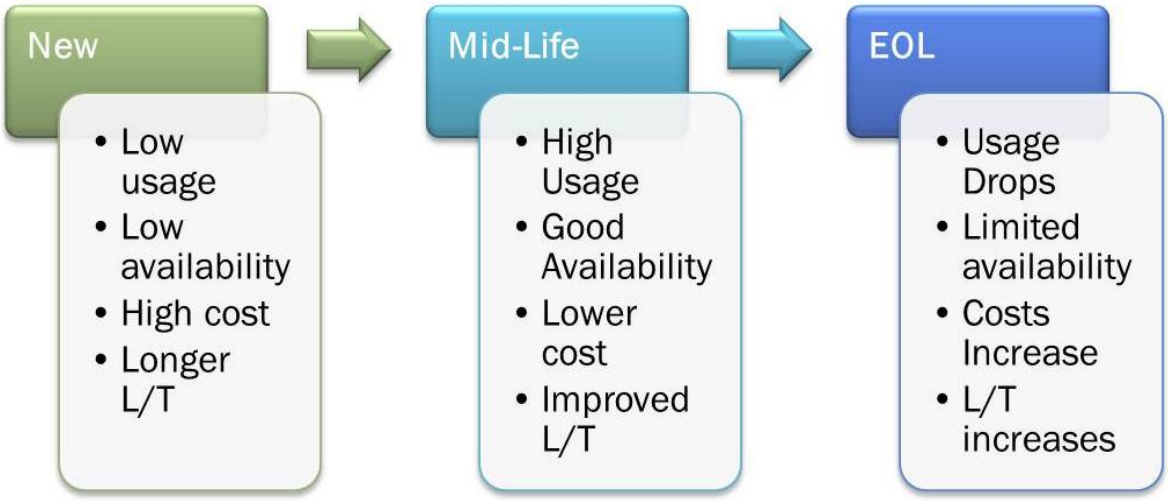

Figure 3. Cost Drivers by Lifecycle Stage

As depicted in Figure 3, cost drivers are determined by lifecycle stage. When usage is high and availability is good, price drops and leadtime (L/T) improves. Early and late in the component lifecycle, costs and L/T increases.

Ensuring Sustainability over Time

The older the design, the more frequently it should be evaluated. Most product should be evaluated for obsolescence issues at least every six months. Options for addressing obsolescence issues without redesign include:

- Developing a stocking/bonded inventory arrangement with distribution
- Making a last time buy
- Utilizing identified drop-in replacements.

This proactive approach also helps in the event of unanticipated component supply disruptions driven by natural disasters or the popularity of specific components in high volume products.

Automate the Process

There are a number of tools available to automate component lifecycle analysis. Popular tools include:

- PurchasingPro (Digi-Key)
- SILICONEXPERT Technologies
- Avnet
- IC Master
- Findchips
- CAPs (Part Miner Worldwide).

In selecting the right tool look for:

- Part finders vs. part lifecycle manager
- Software that uses parametric technology
- Large database
- Features that are dependent on individual needs.

Systems are normally focused on one of two areas:

- BOM scrub – algorithm developed to determine correct part number
- EOL forecast – algorithm developed to predict obsolescence.

The typical report outputs will be:

- Supplier Data – count of known and unknown suppliers
- Lifecycle Stage – Introduction, Growth, Maturity, Decline
- Status – Active/Obsolete/NRND (not recommended for new designs)
- Inventory – parts with and without inventory
- Price – depending on tool
- Multi-Sourcing – Parts with and without crosses
- ROHS – Parts with and without compliant crosses
- PCN – number of part change notices.

Custom components will usually be flagged as suppliers are unknown or lifecycle stage is unknown.

Outsourcing Also Provides This Solution

As mentioned earlier, product lifecycle analysis and routine product sustainability evaluation can be value-added services performed by an EMS supplier. The value of teaming with an EMS provider in this area can be access to a wider range of knowledge and expertise, since the EMS engineering team works

over a variety of industries and product applications. Analysis systems can also be more robust, since analysis and sustaining engineering are set up as information sharing processes tied to improving production efficiency and quality.

For example, one of Burton Industries' medical customers had a product which had entered its legacy or decline phase. Burton Industries' team performed risk analysis and discovered that a critical component showed reduced availability and was about to go EOL. They worked with the customer to define a planned product phase-out, which lessened excess raw and finished goods inventory.

Jeffrey Ocker is Burton Industries, Inc.'s director of manufacturing. He can be reached at jdocker@burtonindustries.com.

About Burton
Founded in 1978, Burton Industries, Inc. has a long tradition of providing customized manufacturing solutions to OEMs in the medical, industrial, motor control, specialized consumer, security, building controls, defense and professional tool markets. Production is done in a facility in Ironwood, MI and administrative activities and sales are done in a facility in Hazelhurst, WI. Both locations are Hub Zone-certified.

The Company specializes in high mix, variable demand projects and supports the full product lifecycle from product development through end market support services. Production facilities are certified to ISO 9001, and lead-free processes and the Electrostatic Discharge (ESD) Control program have been certified by outside agencies. Burton was also awarded a Wisconsin "Business Friend of the Environment" Award for its early implementation of lead-free soldering processes.

For more information visit: www.burtonindustries.com.