

The Lure of ‘Like New’

Remanufacturing Arrives

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Remanufacturing is a series of steps that return a product to “like new” performance, with a similar or extended warranty to match. Remanufacturing can provide consumers with products that are up to 40 percent less costly than new products while significantly lessening the environmental impact of their production. Remanufacturing is where good business and good corporate citizenship meet. However, remanufacturing processes cannot simply be bolted onto existing manufacturing systems. Remanufacturing requires a dedicated return-management process and different financial and demand-planning models. This makes remanufacturing adoption challenging for many companies in a variety of sectors. This article describes those challenges, discusses how to meet them and explains ways to use remanufacturing to gain competitive advantage.

The **take** (raw materials from the earth) — **make** (add energy to the raw materials) — **dispose** (*in toto* or piecemeal) linear business model of most traditional global manufacturing is becoming ever more unsustainable as the world comes to understand that the earth’s resources are finite and rapidly becoming depleted.

Some 65 billion tons of raw materials entered the world’s economic system in 2010, and that figure is expected to grow to about 82 billion tons by 2020. At the same time, solid waste in OECD (Organisation for Economic Co-operation and Development) countries, which rose 40 percent from 1980 to 1997, is projected to increase another 40 percent

by 2020. That waste exacts a price in disposal and in environmental impact. And no matter how efficient energy usage can become through advanced technologies, mere gains in efficiency cannot reasonably be expected to keep pace with the world’s growing population (forecast to rise from today’s 7 billion to more than 9.2 billion by 2050) and the concomitant expanded demand for manufactured goods.

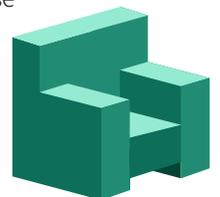
In short, a linear economy dependent upon finite resources to support a growing global population simply cannot be sustained. There is little, if any, argument about this.

Remanufacturing is the process of returning products to the system in “like new” condition. This changes the linear take-make-dispose model to a circular process, replacing the end-of-life product concept — that leads to disposal — with restoration. This can mitigate the environmental impact of

traditional manufacturing, lower the costs for manufacturers and customers, and conserve the earth’s resources by designing out waste.

Benefits of the remanufacturing model and process include delivering products at lower cost, promoting a continuous learning environment by deriving design and manufacturing lessons from returned products, conserving energy and materials while protecting companies from volatile raw material price swings, reducing the use of toxic chemicals that impair reuse potential and complying with environmental regulations, among many others.

However, to reap the full benefits of remanufacturing, products need to be designed for



reuse, disassembly and refurbishment. Redesigning the manufacturing process in this fashion presents a significant — but not insurmountable — barrier to the adoption of remanufacturing in many industries.

Who's Afraid of Remanufacturing?

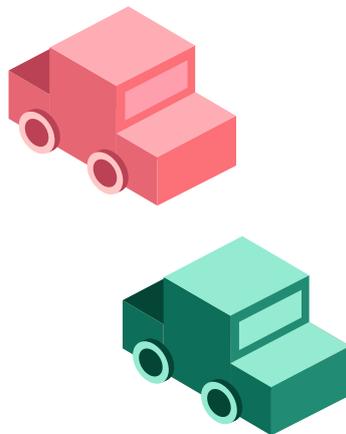
One major Tier 1 automotive company was looking to reduce its warranty expense through implementing a remanufacturing program, as the cost of a remanufactured part generally is 30 percent to 50 percent lower than the cost of manufacturing a new part since remanufacturing doesn't include development and tooling expenditures. However, the company was meeting resistance from its engineering team. Specifically, the engineering manager feared that remanufacturing would cannibalize new sales. But recent reports confirm that returns processing not only will not negatively affect sales of new products but potentially could boost volume due to improved design knowledge and innovation gained from manufacturing.

And although determining the full impact of remanufacturing on new sales is difficult, the manufacturer saved \$1.4 million through increased throughput of products in the first year of its remanufacturing effort.

Other challenges confronted the company in adopting a holistic remanufacturing model. As is the case with most major high-volume mass production industries, the company's mindset was not focused on lower-volume replacement parts. Combined with a lack of a returns forecasting model, that attitude resulted in treating service — critical to any remanufacturing initiative — as an afterthought. And, as was the case with the automotive company's engineering manager, not having a business model for remanufacturing made decision making even harder. Nor were metrics collected to establish remanufacturing's value or investments made in designing a reverse supply chain.

However, resistance to putting in the work to develop a remanufacturing culture and required systems is waning in the face of mounting evidence of the benefits. The value of the overall remanufacturing industry in the United Kingdom [already is £2.4 billion](#), and recent reports suggest that the potential is there to spike that number to £5.6 billion and to create thousands of skilled jobs.

This is a global trend. In the United States, remanufacturing is a \$50 billion industry, supporting 180,000 jobs and growing at 15 percent a year.



Generating a Remanufacturing Culture and the Processes to Support It

In the telecommunications industry, the landscape is continuously changing as innovative technologies come online. In this environment, customer retention is a serious challenge. The need to keep customers supplied with more sophisticated products spirals inventory carrying costs. And as consumers adopt the latest and greatest gadgets and technologies, manufacturers that fail to recover these products and parts from the field must write off the value of those assets.

One of the largest wireless companies in the United States was having difficulty keeping its customers satisfied and replacing their damaged mobile devices quickly. However, the data collected from the returns — the types of defect,

the percentage of returns lost, among other information — helped the company develop a better planning tool to boost the availability of remanufactured products for future shipments without overburdening inventory.

Point-of-sale (“POS”) systems collected return data at retail stores, allowing the service provider to schedule manufacturing runs *before* the returned product reached the return plant's dock. An informative feedback mechanism from the returns plant to the design and manufacturing team added value for improved future designs. For instance, some returned phones exhibited water traces during disassembly. Moving the phone's open ports from the top (where they were exposed to rain) to the bottom reduced returns and thereby decreased warranty costs while escalating customer satisfaction. And to encourage returns and discourage disposal, the company provided incentives for the customer such as credits for future purchases and postage paid return packaging.

Bolstered by these results, the telecom provider continued to add best practices to its remanufacturing efforts. It conducted an audit of its existing clients' devices to better understand customer needs, allowing the company to optimize its inventory and reducing costs by lowering its stock of low-demand devices.

The company, working closely with the device manufacturer, also began designing for remanufacture by building devices around cores (the primary component for remanufactured goods) with standardized materials that were readily available and with specs that allowed materials to be disassembled easily. Individual components were labeled for replacement, and cores and other production materials were selected with an eye to their percentage of recycled content.

In this way, the telecom company began to enter the circular economy. For more on how to build a robust approach to remanufacturing, see “Product Life Cycle Strategies for Remanufacturing” on page 4.

Product Life Cycle Strategies for Remanufacturing

Remanufacturing cannot be an afterthought



Making remanufacturing a profitable endeavor for any business requires that it implement financial models with a product life cycle perspective. That means:

1. Recognizing the need for cores.
2. Determining the costs involved in the warranty and out-of-warranty phases of the service model.
3. Understanding the financial benefits of using remanufactured parts instead of new ones

To focus the business pursuit, companies embarking on remanufacturing initiatives first must:

1. Review their product portfolio to decide which products are best suited for remanufacturing (delaying this strategic decision-making process can lead to lost opportunities or wasted investments).
2. Describe target key performance indicators ("KPI") from the conceptual stage (number of products with remanufacturing requirements; percentage of profit margin share for remanufactured products within the original equipment unit; percentage of remanufacturing projects started on time), with all KPIs driving increased volume, improved process quality and reduced cost.
3. Develop dedicated channels for remanufactured product sales.
4. Implement systems to provide immediate visibility into products sold and products returned within all sales channels.
5. Emphasize online sales channels as they provide the data needed to optimize the remanufacturing initiative.

To develop products and processes designed for remanufacturing:

1. Coordinate Design for Remanufacturing workshops to integrate remanufacturing design early in the product life cycle.
2. Analyze and follow the guidelines that will result in a remanufacturable product.
3. Implement lean engineering processes to improve remanufacturing throughput.
4. Build a returns process into the product development strategy.
5. Develop low-cost purchasing strategies for test equipment and other components needed for remanufacturing; attempt to keep costs down in every phase of the production cycle even in the prototype stage.

To manage aftersales:

1. Identify tools and techniques to better forecast and manage returns.
2. Have the capability to manage demand for remanufactured products for both original equipment service and the independent aftermarket.
3. Integrate POS information systems for returns. Returns contain tacit information that can make remanufacturing more efficient; too often, companies do a poor job of collecting data on the reason why a product was returned, when it was returned and incidents of customer abuse, thus missing out on valuable return information.
4. Track and evaluate returns upon receipt rather than storing them for later processing; value begins eroding for a returned product as soon as it reaches the inbound dock.

Successes and Challenges: Nothing Comes Easy

Nextant Aerospace [recently announced the delivery of its first remanufactured jet](#) to the United Kingdom, the Nextant 400XTi. The plane sells for, literally, half the price of comparable charter jets, which Nextant credits to a factory production process that captures the best practices built into modern aircraft without expending the hundreds of millions of funds required to develop and certify a clean-sheet design.

The aerospace industry is well-suited to remanufacturing, as, according to a [2012 U.S. International Trade Commission report](#), are other sectors, including electrical apparatus, heavy-duty and off-road equipment, information technology products, locomotives, machinery, medical devices, motor vehicle parts, office furniture and restaurant equipment. Some other industries — whether because of manufacturing costs or product recovery issues — are not good candidates for remanufacturing. But even in the industries that are (such as office furniture), challenges persist.

In the office furniture industry, for instance, when adhesives rather than knockdown fittings (which usually can be put together using only a

screwdriver, drill, mallet or other basic tool) are employed, disassembly and remanufacture become complicated and costly, especially if the intent is to restore the piece to “like new” condition. In other words, unless the piece of furniture is designed for disassembly, remanufacturing costs (especially labor) can impair remanufacturing’s basic value proposition. Unfortunately, much imported furniture (especially from emerging economies) uses inferior components that both shorten the lifetime of the product and make remanufacture unaffordable.

According to [SENATOR INTERNATIONAL’S model for office furniture remanufacturing](#), in order for office furniture to be remanufactured successfully:

1. It must be technically feasible to disassemble and reassemble the piece.
2. Logistics must be in place to prevent the product from entering the waste stream.
3. Components need to be standardized and available.
4. Materials and components must be easily identifiable.

The kinds of investments necessary to meet these conditions tend to go against the original equipment manufacturer grain, but they are investments that have proved to produce impressive returns.

Another challenge to the adoption of remanufacturing is consumer resistance. Remanufactured products often are not considered to be as good as new products are. A recent report from the Penn State University Smeal College of Business said, [“The perception that remanufactured products are somehow dirty and disgusting due to their prior ownership adds a ... powerful predictor of remanufactured product attractiveness.”](#)

This, obviously, is a greater problem for office furniture upon which people will sit than, say, motor vehicle parts. But the study’s authors, while indicating that changing consumer attitudes “may prove difficult,” suggested that emphasizing the environmentally friendly nature of remanufactured products might mitigate that negative reaction.

Another complementary approach to this problem is to establish new sales channels dedicated to remanufactured products, thereby highlighting their lower cost while providing an opportunity for marketing to promote other benefits such as lower carbon footprint and inherent “good-as-new” quality.

Why Remanufacturing Matters

Our modern industrial world was built on the concept of easy access to large quantities of raw materials and energy. Wars were fought to secure access to those materials and to the sources of that energy. The cost in human misery has been high — when we look around the world today, we see, in part, the aftermath of those adventures. We also see that the picture of a world in which raw materials and energy (primarily oil, gas and coal) are readily available and relatively cheap no longer is the case.

The take-make-dispose linear business model based on that outmoded picture of the world is similarly outdated.

By contrast, the circular economy — with remanufacturing at its center — characterized by materials recovery and energy conservation is far more attuned to the requirements of an increasingly resource-constrained world. Remanufacturing should be approached as a strategy designed to deliver great products to a world that needs them in a way that’s up to 40 percent more economical than new products and, therefore, are more profitable even at a lower cost to the consumer. According to a 2014 report, [“Towards the Circular Economy,”](#) sponsored by the Ellen MacArthur Foundation, recycling, reuse and remanufacture could generate more than \$1 trillion for the global economy by 2025 and create 100,000 jobs in the next five years.

And that is an opportunity that businesses cannot afford to miss. ■

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