

# Remanufactured Products: A New Business Model For Light-Vehicle OEMs

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The light-vehicle (automobiles and Class 1-3 trucks) US-based OEMs, and their suppliers, are currently in a state of malaise due to:

- Massive financial losses for their investors.
- Dislocations of hourly and professional workers due to downsizing.
- Accelerated governmental intrusions into future product design due to aggressive energy efficiency standards.
- Market share losses to foreign-based OEMs.
- Shrinking market size.
- Perceived irrelevancy by the financial investment community.

As a result of the above elements, the combined market value of GM, Ford and Chrysler (the estimated value that is part of Fiat) is less than that of combined value of Deere, PACCAR and Caterpillar, which have only 25% of the annual sales volume of the "Big-3." GM, nor Ford, which for decades were ranked within the top 25 largest US-based corporations, measured by market capitalization (stock price times number of outstanding common shares), do not currently even rank within the top 100 corporations.

But there is hope, if the Big-3 OEMs, working with their suppliers, create a new business model that will deliver a different value proposition to a selective segment of the light-vehicle market. This paper will recommend that the Big-3 carve-out a new business unit that focuses upon the delivery of light-vehicles which are classified as "remanufactured".

The remanufacturing process, as applied to this paper, assures that a not-new product has "like-new" condition characteristics of reliability levels, energy efficiencies, operational capabilities, maintainability, safety and others. Note that the US military has

## Remanufactured Products: A New Business Model For Light-Vehicle OEMs

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operated vehicle remanufacturing programs for decades for many of their weapon system platforms.

This new remanufacturing business model is foreseen to:

- Materially increase the profit margin of the light vehicle fleet market segment  
Remanufactured products typically have profit margins that are 50-100% higher than new products. This data is obtained from the author's management consulting engagements of durable goods OEMs remanufacturing operations (i.e. United Technologies, Oshkosh, Textron, BAE, General Dynamics, Navistar, Timken and others) over a 20 year span. Note there is less than half a dozen known publically-held "pure play" remanufacturers in which financial records are available to the public (i.e. LKQ and Remy International). The 4-6% Profit Before Taxes [PBT], as a percentage of revenues, currently experienced by the Big-3 would be transformed into a PBT of 8-12% for their fleet sales, which is aligned with that of the average "healthy" U.S.-based durable goods manufacturer (i.e. Eaton, Parker-Hannifin, Navistar and Dresser-Rand) . Note that the PBT of the Big-3 is currently difficult to truly ascertain due to the massive write-offs they incurred during their recent corporate restructuring; many of their liabilities that would presently be negatively impacting their bottom line, as well as into the foreseeable future, have been eliminated.
- Decrease the market share of imported designed-for-manufacturing components employed in the vehicle production process  
Currently many foreign suppliers have penetrated the US market by designing their parts for manufacturing efficiency. There is little consideration by these suppliers for ease of repair/remanufacturing; it's all about providing the lowest purchase price. With a new business model focused on remanufactured vehicles, parts designed-for-repair/remanufacturing would become of greater value to the owner of the vehicle because they could be employed in the remanufacturing

## Remanufactured Products: A New Business Model For Light-Vehicle OEMs

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process, versus the designed-for-manufacturing foreign part that would have to be discarded. Also it is this author's belief that imported aftermarket parts would also be decreased as a result of this initiative.

- Reduce the manufacturing impact of light-vehicles upon industrial energy consumption and waste generation

The new-condition manufacturing process has large amounts of materials and energy inputs, while that of the remanufacturing process has large amounts of labor employed in disassembly and reassembly activities. A 1996 study by Boston University professors estimated that a remanufactured item employs only 15-20% of the energy required to produce a like-kind new condition product.

- Mitigate the loss of control of the design of a vehicle to the Federal Government

A robust remanufacturing process would enable the Big-3 to partially circumvent the EPA requirements that new-condition light vehicles meet the average fuel economies of 54.5 average mpg by 2025. Extending the life of a model by employing a remanufacturing process will decrease the overall new light vehicle production rate, which in turn would reduce the amount of vehicles subjected to the new EPA fuel economy standards. It is the author's belief that the remanufacturing initiative would also save lives due to the retention of a "robustly" designed vehicle; heavier vehicles are presumed to be "safer" than the lighter vehicles required to meet future fuel economy standards.

- Other areas of favorable impact

- Intellectual Property [IP] issues would be minimized regarding aftermarket parts.
- Dealer networks would retain a closer relationship with their fleet operators.

## Remanufactured Products: A New Business Model For Light-Vehicle OEMs

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- Product Support End Of Life [EOL] challenges for components with rapidly changing technologies would be mitigated by keeping their supply chains “hot”
- Financial markets would change their “image” of the Big-3 to that of an innovative solution provider; this would open the door for greater financial investment over the long-term.

This article will provide an overview of the following nine elements of this new business model:

1. Who is the customer?
2. What is the value proposition for the customer?
3. What are the channels employed to deliver the value proposition to the customer?
4. How are customer relationships established and maintained with the customer?
5. What are the revenue streams?
6. What are the key processes that deliver a value proposition?
7. What key resources are required to be employed in the processes?
8. What are the key sources-of-resources employed in the process?
9. What is the cost structure?

How the above 9 elements are established and managed will drive the profitability of the new business model.

### **1. Who is the customer?**

The target market for this new business model is light-vehicle fleet operators. Currently this segment acquires an estimated 10-15% of all newly manufactured light-vehicles (Figure 1) or an estimated 1-2 million vehicles per year.

# Remanufactured Products: A New Business Model For Light-Vehicle OEMs

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## Light Vehicle Market Share

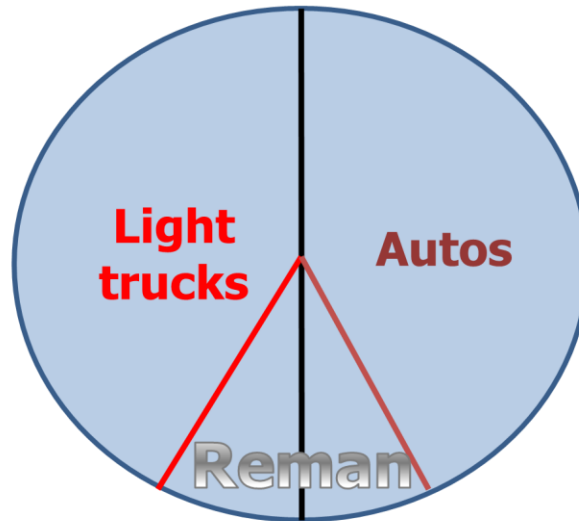


Figure 1

The fleet operators are hourly rental subscription service providers (i.e. Zip cars), daily-rental enterprises (i.e. Enterprise), utilities (i.e. Verizon), governmental agencies (i.e. GSA), leasing operators (i.e. Penske), multi-location corporations (i.e. GEICO) and others. The Big-3 often sell directly to the larger operators, but their dealer networks sell directly to the smaller fleet operators. One point in common for all fleet operators is that the value of their acquisition is reflected upon a balance sheet, with a depreciation schedule.

### **2. What is the value proposition for the customer?**

The objective of a fleet operator is to minimize Total Ownership Cost [TOC], which is driven by the [(acquisition cost minus residual value) + (operating costs) + (product support costs)]. It is estimated that a remanufactured light-vehicle could decrease TOC by a weighted 10% to 15% by reducing the [acquisition minus residual] value by 20% to 30%; operating and maintenance costs would be marginally impacted.

The two processes that create remanufactured vehicles would be the following:

## Remanufactured Products: A New Business Model For Light-Vehicle OEMs

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- Previously employed vehicles by a fleet operator would be inducted into a production line and would be returned in a remanufactured condition. The product retains its original identity/serial number. Note this model was employed by the Checker Cab Mfg. Co. for over 40 years.
- Vehicles in a new product manufacturing assembly line would employ remanufactured components comingled with new components. The product has a new identity/serial number.

The fleet operators would also be provided with a warranty that is the same as a new-condition vehicle.

Fleet owners, who provide short-term rentals or operating leases to the end-users, would be best positioned to obtain the highest value from this new business model; they are accustomed to aggressively managing TOC. This is especially true of daily rental fleets where the primary profit driver is managing the residual value of vehicles; rental income is primarily a means for them to cover their depreciation costs.

Note that fleet operators could tout the fact that their remanufactured vehicles are “green”; this can often create a positive image for their organizations.

### **3. What are the channels employed to deliver the value proposition to the customer?**

A new dealer network for fleet operators would be established, both large and small, under a marquee such as “OEM-Reman”. OEM dealers would be invited to join, but participation would be limited. The driver for this exclusivity would be the importance of focusing on the management of the forward and reverse supply chain of the remanufactured vehicle; too many dealer participants will increase the complexity of this effort. For example, Caterpillar has been very successful in segmenting their markets for remanufactured products.

# Remanufactured Products: A New Business Model For Light-Vehicle OEMs

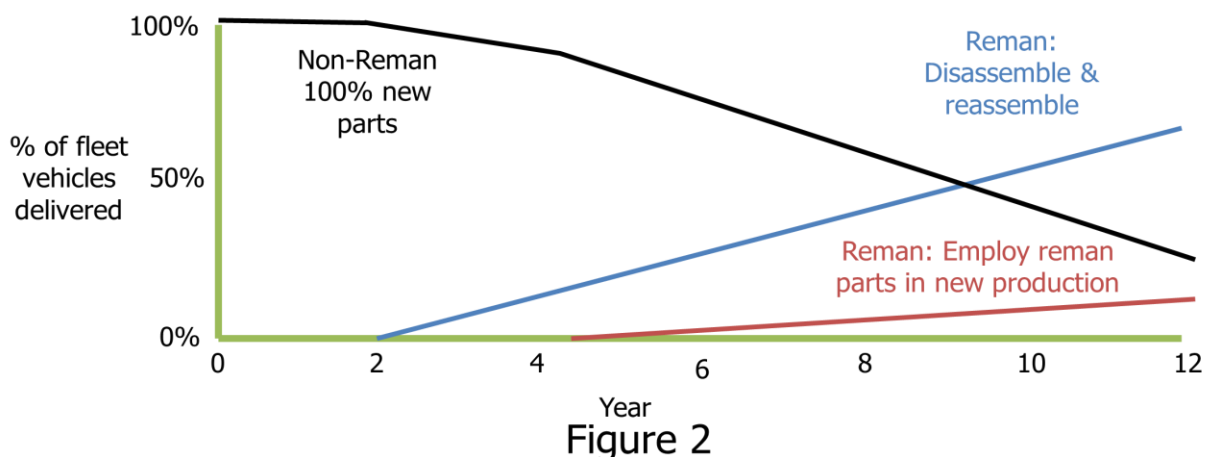
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## **4. How are relationships established and maintained with the customer?**

Rather than employing the mass consumer marketing approach so common with the Big-3, a highly focused program would be established, geared to the Business-to-Business [B2B] environment of a fleet operator. Reduced TOC will be the primary value proposed to the customer, but other value propositions could also be delivered. For example, a sophisticated internet portal interface for the delivery of a series of enhanced fleet monitoring tools could be exclusively provided to the remanufactured vehicle fleet operators.

## **5. What are the revenue streams?**

The new business model revenue would begin slowly and require a 10 to 12 year time frame to be fully implemented (Figure 2). Driving the timeframe would be setting-up the dealer net work, re-engineering production lines, delivering a compelling story to the fleet operators and obtaining “cores” (components inducted into the remanufacturing process) to drive the component remanufacturing process. Below is a graph of the revenue interrelationships between new product deliveries and remanufactured product deliveries.



## **6. What are the key processes that deliver a value proposition?**

## Remanufactured Products: A New Business Model For Light-Vehicle OEMs

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There are three critical processes required for this business model:

- The process of sourcing “cores”

This source of cores can be obtained from the following:

- Permanently impaired vehicles.
- Warranty component pools.
- Like-Kind Exchange [LKE] component pools.
- Surplus assets.

- The remanufacturing process

The efficiency and effectiveness of the process is driven by the following:

- What tasks are to be performed that provide the value expected by the customer.
- What is the configuration of the remanufactured product delivered that will provide a “like-new” product.
- What design-for-remanufacturing elements have been incorporated into the item for optimizing the cost of material recovery and labor,

- Managerial cost accounting

This process is multiple folds more complex than the managerial accounting required for new product manufacturing. This is caused by:

- Multiple conditions of the same part number employed in the remanufacturing process, each with their own cost: new, used, repaired and remanufactured.
- Multiple configurations of the same part number, each with their own cost
- Multiple transactions for a part number, each with their own cost: sale, exchange, loaner and renew-and-return.
- Multiple ownership of the same part number throughout the Remanufacturing Enterprise requiring a robust management of the



## Remanufactured Products: A New Business Model For Light-Vehicle OEMs

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accuracy of the balance sheet: end-user owned, lessor-owned, OEM owned, dealer-owned and OEM-supplier owned.

### **7. What key resources are required to be employed in the processes?**

The following are three key resources to be employed in order to be successful in managing the remanufacturing process:

- Forward and Reverse Supply Chain Management [SCM] professionals  
These individuals are very hard to find. Few professionals have been formally trained in Forward SCM and virtually none have formal training in Reverse SCM. Highly honed planning and acquisition skills are absolutely critical to assure the management of the business model.
- Process engineers  
There is no professional degree such as "Remanufacturing Engineer." The skill sets required to creatively design the tasks for employing a remanufacturing process are only obtained through "real world" experience. Again, there are few individuals who have obtained the experience to truly optimize the efficiency and effectiveness of the remanufacturing process. The author has found it more advantageous to employ a non-degreed individual with remanufacturing experience, than an inexperienced degreed individual.
- IT infrastructure  
As a result of the complexity of the operational transactional activity, coupled with the managerial cost accounting postings, a large scale Remanufacturing Enterprise could not function without a robust IT infrastructure, with a specific emphasis on application/backroom software. Again, because remanufacturing is a nascent discipline, little Commercial-Off-The-Shelf [COTS] application software is available from suppliers.

## Remanufactured Products: A New Business Model For Light-Vehicle OEMs

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### **8. What are the key sources-of-resources employed in the process?**

Because the remanufacturing business model is so different than the current build-new-and-sell business model, OEMs should create a Remanufacturing Enterprise which employs many sources-of-resources other than their internal capabilities. The key sources-of-resources would be:

- The organization that disassembles and reassembles vehicles; this could be done by a low volume production organization, such as Magna International.
- The organization that remanufactures repairable components; this could be performed by the largest vehicle dealers or OEM-suppliers who currently perform remanufacturing processes such as Caterpillar's remanufacturing division.
- The physical movement of cores; this could be performed by UPS or FedEx.

The alternatives are many, but a detailed Business Case Analysis [BCA] for selecting the sources-of-resources employed in the business model must be developed.

### **9. What is the cost structure?**

The cost structure is focused upon maximizing the retention of the value-added content of materials employed in the remanufacturing process and minimizing the direct labor content employed in the process. Direct labor costs will be reasonably predictable, but the cost structure of materials will be a highly variable one; prices of cores and the residual values of vehicles could vary dramatically from year to year due to multiple supply and demand issues. As a result of this volatility, a robust accrual accounting system will be required to "smooth" the impact of fluctuating material costs upon the income statement and balance sheet. Revenue recognition issues will be extremely important in the construct of financial statements.

In conclusion, the business model described above is a framework that could be employed to evolve a light-vehicle OEM into a limited provider of remanufactured

## Remanufactured Products: A New Business Model For Light-Vehicle OEMs

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vehicles. The time has come for the Big-3 to think out-of-the-box regarding how they do business. The transition will not be easy, but the anticipated rewards of delivering remanufactured products will be one piece of the puzzle that will be employed to reinvigorate the domestic auto industry.