Executive Summary

“The service parts business can be very profitable. Yet few companies even come close to tapping its full potential. For many, the aftermarket business is just an afterthought.” (Aschkenase et. al, 2003)

Realizing the potential of a company’s aftermarket division is still an issue for some firms. Other firms have evolved their business to make their aftermarket business the key differentiator of the whole company. In order to realize the potential of the aftermarket it is necessary to understand how big this function is in terms of sales, profits and revenues. In 2003, the total spending for service parts was estimated to exceed $700 billion, an amount close to 8% of the U.S. Gross Domestic Product. (Poole, 2003)

This research, begins by defining the area of aftermarket logistics, and continues by examining the structure and behavior of aftermarket supply chains in four industries: computer industry, the telecommunications equipment industry, the automotive industry, and the aerospace industry. Similarities and differences among these industries are found. Finally, underlying
principles across industries and macro-factors that affect the aftermarket are specified. All the research findings are based on research of academic and professional literature, as well as interviews with industry experts.

As foundation for analyzing the structure of these four industries, I define the area of aftermarket logistics: Aftermarket logistics includes all the services provided by a company after the actual sale of a durable product. This includes the management of services parts as well as other services provided by the seller: warranty management, sale of accessories and upgrades, repairs and product recalls, help desks, online and telephone assistance, and field technicians. All these operations are managed as an integrated business unit (Association for Operations Management, 2005, Reverse Logistics Association, 2005, Vitasek, 2005).

**The Four Industries**

One part of this research concerns the examination and analysis of the four industries with respect to the aftermarket area in each industry. Four functions are examined in each industry: the procurement of service parts, the structure of aftermarket supply chain networks, the management of inventory, and the customer service.

The products of the computer industry are characterized by short lifecycles, large installed bases, and rapid new product introduction. The number of spare parts in this industry is relatively low, their price range is low, and these parts are interchangeable. The computer aftermarket is characterized by a complex procurement system, a two or three tier network, many points of service and an increase in outsourcing. The personal computer segment has centralized inventory, while servers have their inventory placed locally.

In the telecommunications networking equipment industry the lifecycle of the product is longer, the network is simpler than in the computer industry, and new products are rapidly
introduced. Spare parts are critical to the customer in this industry, and parts are not interchangeable. The telecom aftermarket is characterized by 3 tier networks, many service points with proximity to the customer, same day service requirement and the localization of inventory. The existing trends are increase in outsourcing and a decrease in expected response time.

In the automotive industry the lifecycle of the product is medium (10-15 years). The industry is dominated by large manufacturing companies and a vast network of dealers. Some parts are interchangeable, but most parts are not. The importance of slow-movers and fast-movers are very important in this industry. In the automotive aftermarket the service requirements are lower. A three tier network with many service points usually exists. Fast-movers are localized, while slow-movers are pooled in one location.

The aerospace industry is characterized by products with very long lifecycle. Few major competitors, primarily Boeing and Airbus, drive this industry. Spare parts are categorized in slow-movers and fast-movers, have a wide range of prices, and huge number of SKUs. Parts are interchangeable between airlines, but not between manufacturers. The aerospace aftermarket is dominated by the presence of regulations. Techniques of preventive maintenance are widely used. Airlines usually have one global hub for scheduled maintenance operations. As in other industries, fast-movers are localized and slow-movers are pooled in one location. The trends in the industry are the competition between OEMs and airlines for providing service, and techniques such as “Power-by-the-Hour”.

**Similarities and Differences**

A three-category framework is used to explore similarities and difference of the aftermarket supply chains of the four industries. These three categories are product complexity,
criticality of product to the customer, and criticality of the aftermarket function to the company.

Each of these categories has a variety of factors that affect them. For this comparison, in order to
categorize each of the industries by each category we will use three distinct levels: Low, Medium, and High. These levels are viewed relatively to the other three industries each time.

The findings of the comparison framework are displayed below (Table 1).

<table>
<thead>
<tr>
<th>Category</th>
<th>Dimensions</th>
<th>INDUSTRIES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Computer</td>
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<tr>
<td>Product Complexity</td>
<td>Durability</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Number of Parts</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Price Range</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Part Cost</td>
<td>Low</td>
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<tr>
<td></td>
<td>Interchangeability</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Product Lifecycle</td>
<td>Low/Medium</td>
</tr>
<tr>
<td></td>
<td>Dispersion of Customers</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Number of Customers</td>
<td>Medium/High</td>
</tr>
<tr>
<td>Criticality to Customer</td>
<td>Penalty for Downtime</td>
<td>Low/Medium</td>
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<tr>
<td></td>
<td>Safety vs. Wait Time</td>
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<tr>
<td>Criticality of Aftermarket</td>
<td>Aftermarket Profitability</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Relative Profitability</td>
<td>Low</td>
</tr>
</tbody>
</table>

Table 1: Comparison Framework

Based on the findings of the comparison framework, several similarities and differences across the four industries were identified. The first similarity in all the four industries is of course the existence of durable products, and therefore the existence of an aftermarket in each industry.

In terms of the complexity of products, similarities exist between pairs of industries or segments of industries, such as the networking equipment and the server segments. However, significant differences exist overall as can be seen in Table 1.

In the area of the structure of the aftermarket network, the dispersed customer base in all industries creates dispersed and multi-tiered networks in all industries. Slow-moving parts are
centralized, while fast-moving are stocked locally. The main difference is in what percentage of parts is stocked where, a decision that is affected by the complexity of the product, its criticality to the customer and other factors. Also, the existence of regulations in some industries creates differences. Another important difference in this area is the importance of reverse logistics for each aftermarket. This factor is mainly influenced by the complexity of the product, and especially by the tradeoff between the cost for servicing versus the cost of replacing.

Procurement in the four industries is usually different, because of the major differences that exist in the types of products that are supported by each aftermarket. However, practices such as last-time-buy options exist in all industries.

In the area of inventory management, the extensive use of sophisticated software and the trend towards global optimization solutions is seen in all industries. There are however, different levels of penetration of these solutions across the industries. The criticality of the product does not seem to affect the location of parts, but instead the shipping methods by which the products are sent to customers.

**Conclusion**

My conclusions are articulated in recommendations for underlying principles of the aftermarket division and macro-factors involved in doing this.

*Four Underlying Principles*

Four principles are considered as a basis for providing improved aftermarket services in the four industries. The principles are the same across industries, but their implementation requires different strategies and tactics.

The first principle for a company which wishes to succeed in aftermarket logistics is the realization of the potential of the aftermarket and the incorporation of this realization into its
business strategy and model. Another important principle is the alignment of customer needs and the design of the aftermarket service. Despite the differences or similarities in the four industries, companies that excel in their aftermarket operations design and operate their aftermarket supply chain in such a way that serves the needs of their customers and the specific needs of the industry. The third underlying principle is the alignment of service and profitability. Different pricing strategies for different types of customers in order to maximize profit and satisfy customers at the same time is a typical principle found in the servicing strategies of such companies. Finally, the companies that excel in the aftermarket are usually innovative companies. Companies that are on the edge of technology, that use modern IT systems for all their supply chain functions, usually also use the most innovative software solutions for service parts management, a necessary factor for a company’s success in the area.

**Macro-Factors**

All across the four industries products, supply chains and especially the aftermarket sector have been affected in the last 10-15 years by different macro-factors, which have shaped and will continue to shape the structure of the market, their supply chains and their aftermarket operations.

The first macro-factor identified in the research is the advancement of technology. Technological advancements that have occurred in the last two decades have changed all the four industries in a variety of ways. The computer and telecommunications equipment industries were almost non existent, whereas automotive and aerospace had products that were less safe, less environmentally friendly, and cost more. Also the standardization of parts is affecting and will
continue to affect the profitability of companies, since it helps them improve their supply chains, simplify their production, and increase the resilience of their company as a whole.

Other macro-factors that will affect both the product of the four industries and their supply chains in particular are the price of oil and the “Green Laws” that have started from Europe and have started to be adopted by different U.S. states.
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