At a Glance

- This paper will help High Tech Manufacturers look at industry benchmarks to compare with their own EBITDA performance, along with industry trends that impact EBITDA.

- The document highlights some of the strategies and tactics to help reduce cost of goods sold (COGS) and increase EBITDA.

- It also addresses other non-direct costs that impact EBITDA, such as the cost of poor quality (COPQ) and the importance of quality as a strategic differentiator in the industry.

- The paper will conclude with a high level mapping of the metrics that High Tech Manufacturing companies should consider and evaluate as key drivers in their EBITDA optimization efforts.
The Need for EBITDA Optimization in High Tech Manufacturing

The High Tech Manufacturing* industry is highly competitive and influenced by rapid technological developments and advancements. Companies in this industry need to comply with various standards and regulations such as: DFARS/ FAR Anti-Counterfeiting Rule, SAE AS6496 Anti-Counterfeiting Standard, Conflict Minerals, RoHS & REACH and FASB Revenue Recognition Rules. To further complicate matters, the industry is plagued with copycat products from low-cost competitors, resulting in rapid commoditization and falling prices that cut into Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA). Pricing pressure remains the most critical factor in the industry.

While there are many KPIs and metrics High Tech Manufacturers can use to help monitor and improve business performance, we focused on EBITDA as a basis of comparison within the industry as it is a good measure of core profitability. EBITDA eliminates extraneous factors such as interest and taxes and allows us to compare operational performance on an “apples-to-apples” basis, irrespective of the size of the manufacturing business.

The ability to adapt quickly to changing legislation and laws like Anti-Counterfeiting are tables-stakes for High Tech Manufacturers. The good news is that integrated quality and manufacturing systems assist best-in-class companies in not only meeting these challenges head-on, but to gain a competitive advantage. Manufacturers in this industry have relied on a combination of modern technology adoption, streamlined manufacturing operations and relentless focus on quality to tackle these external factors and directly influence their business performance.

Historically the introduction to new legislation instigated large IT projects, investments and resources to convert or upgrade legacy systems just to stay compliant. With the advent of Software-as-a-Service (SaaS) cloud-based ERP and manufacturing solutions, the ability to reconfigure business processes to adapt to change has been dramatically streamlined. Cloud computing for manufacturing empowers organizations to adopt the necessary capabilities to compete at a lower total cost of ownership (TCO), while sustaining a competitive

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advantage. This lower TCO and associated savings falls right into the bottom line and enhances EBITDA performance.

To help conform to industry legislation and ensure the highest level of quality at the lowest cost, companies need to redefine business process by layering a closed-loop quality management system, intertwined with their manufacturing operations.

**Closed Loop Quality — Using the Scientific/PDCA Method**

**Inspection**
- In-process Checksheets
- Gage Tracking
- SPC

**Validation**
- Auditing
- Compliance/Certifications
- Deviation Tracking

**Documentation**
- Control Plans
- FMEA
- PPAP – APQP

**Learning**
- Problem Control
- Business Intelligence
- Continuous Improvement

This approach provides High Tech Manufacturers with the agility and ability to bring unique and differentiated products to market and at the same time reduce waste, scrap, recalls and returns, thereby lowering costs and achieving competitive differentiation, high compliance and increased profitability.

**Setting an EBITDA Target**

Based on Plex’s own market research of hundreds of manufacturers in the industry, the top five companies in the High Tech Manufacturing industry have an average 3-year EBITDA growth rate of 45.18 percent.

The same five companies have also been reducing their Cash-to-Cash cycle times at an average of 19.8 percent. While an EBITDA growth rate of 45 percent is much above the industry norm (best-in-class manufacturers average just

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under 20 percent EBITDA as a percent of revenue, while developing companies average just over 6 percent), it does demonstrate the correlation between freeing up working capital by improving cash flow to allow for accelerated investment into R&D and EBITDA growth. In general, High Tech Manufacturing companies seem to benefit from a compressed Cash-to-Cash Cycle, to grow EBITDA. Plex has heavily invested in delivering industry insight and benchmarks to our customer community, with the end goal of helping manufacturers remain competitive in the industry.

Leverage Benchmarking to Set Improvement Targets

To start any optimization initiative, you first need to set reasonable improvement targets.

For all manufacturing companies, Cost of Goods Sold (COGS) has the largest impact on EBITDA and of all the COGS line items, inventory is most likely the largest cost. Optimizing inventory is typically a low-hanging fruit and the first place to start when manufacturers are looking to improve EBITDA.
Plex research shows that best-in-class High Tech Manufacturing companies have a COGS / Revenue ratio as low as 47 percent, with the average being about 70 percent.

In order to lower inventory costs, it is helpful to understand the ratio between inventory and revenue or better yet, inventory and forecasted demand. In other words, how much inventory does a High Tech Manufacturer carry to support sales? Simply reducing inventory without a clear picture of forecasted demand will put the company at risk of not meeting its revenue goals, due to short supply. The ultimate goal is to balance or optimize inventory to meet demand with the minimum amount of safety stock while maintaining best-in-class on-time delivery times—easier said than done!

The table below shows each inventory category as a percentage of total inventory. We noticed that both Sustaining and Best-in-Class companies are doing a much better job managing their work-in-process inventory and raw materials as compared to their Developing counterparts. This is driving the overall reduction in inventory and associated carrying costs, which reduces COGS and increases EBITDA. The overall reduction of inventory also compresses cash-to-cash cycle times.

Success in the EMS industry requires tight integration with many component suppliers. Plex Manufacturing Cloud ERP allows Firstronic to smoothly manage hundreds of supply chain communications and transactions each day. For example, new engineering change requests (ECRs) come in rapidly and Plex allows the company to react quickly despite the huge volume. Firstronic is able to handle EDI releasing to suppliers right off the shop floor. Also, suppliers and customers can use Plex’s web-based portals to monitor plans and operations in real time, reducing the need for tedious phone calls and emails.
What do Best-in-Class Companies do differently?

Automate Manufacturing and Supply Chain operations

Automated inventory management systems provide the ability to replace manual systems with sensor–based systems that scan and report inventory consumption in real time. This provides the ability to have real-time demand signals that will instantly track lead and replenishment times, which subsequently helps optimize inventory levels. The by-product of this type of solution is that it also provides more accurate data, which is required for detailed cost management analysis and supplier oversight.

Understand Future Demand and Causal Factors

A company’s demand fluctuates due to seasonality factors, the economic climate and other internal and external business conditions. Understanding these conditions from a forecasting perspective will help balance inventory levels and establish the proper customer service levels (e.g. Inventory / Forecasted Revenue) over time. A solid forecasting capability, combined with customer forecasting and collaboration will help manufacturers better plan inventory and maintain the appropriate inventory levels, avoiding excess inventory or shortages.

In addition, best-in-class High Tech Manufacturing companies are using Sales and Operations Planning (S&OP) as a key process in their overall planning.

** Note that these are industry benchmarks and will not total to 100 percent

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** Inventory**

<table>
<thead>
<tr>
<th></th>
<th>Developing</th>
<th>Sustaining</th>
<th>Best-in-Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finished Goods</td>
<td>45.24%</td>
<td>33.61%</td>
<td>23.23%</td>
</tr>
<tr>
<td>Work-in-Progress (WIP)</td>
<td>48.12%</td>
<td>28.85%</td>
<td>14.48%</td>
</tr>
<tr>
<td>Raw Material</td>
<td>44.71%</td>
<td>24.75%</td>
<td>10.10%</td>
</tr>
</tbody>
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The Plex Manufacturing Cloud helps this Electronics manufacturer accelerate new product introduction by using full and detailed traceability functionality of Plex inventory, making it simple to comply with AS9100 requirements. The Plex traceability tree automatically tracks in real time the complete genealogy of all inventory containers, providing both an upstream and downstream trace.

As a testament to the improved methods, Phoenix Logistics easily passed a quarterly manufacturing process audit recently conducted by Boeing.
process. S&OP is an iterative business management process that determines the optimum level of manufacturing output. The S&OP process is built on stakeholder agreement and an approved consensus plan that the company will operate from. Stakeholders agree on the plan of action based on real-time data. S&OP software solutions provide demand and production data related to equipment, labor, facilities, material and finance. The purpose of these data points is to provide the stakeholders with a single, consolidated view of the business, allowing them to make better inventory and production planning decisions.

Categorize Inventory based on cost and impact to production

Portions of finished goods inventory will move faster than others and also have varying cost impacts on the balance sheet. Best-in-Class High Tech Manufacturing companies leverage automated systems that help manage inventory based on inventory classification and stratification based on gross margin return on inventory investment. For example, fast moving, low cost inventory should not be a huge priority when compared with slower moving, expensive inventory. Understanding how inventory is used and its associated cost requires a different inventory management approach. Manufacturers must make sure that they have a larger safety stock buffer for their fast moving items. Concurrently, slower moving items may call for less scrutiny against stock-outs. This inventory management approach is also referred to as ABC analysis, but evaluating profitability is another way to prioritize.

Focus on Product Quality and Time to Market

Plex's roots in the automotive supply chain industry help High Tech Manufacturing companies ensure product quality is driving their success. Balancing quality, cost and price is an art and requires data and analysis to execute properly. Based on our industry research, some of the most successful companies in the High Technology Manufacturing industry have been using Six Sigma for years achieving the benefits below:

- Bottom line cost savings (5-20 percent of turnover per annum)
- Improved quality of product or service as perceived by the customer (internal and external customers)
- Reduction in process cycle times

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- Development of staff skills
- Use of a common language throughout the organization
- Meet world class quality standards
- Establish a competitive edge
- Improved ROI
- Sales growth

Reduce the Cost of Poor Quality

The Cost of Poor Quality (COPQ) is often the least understood metric as it is comprised of much more than just warranty claims and rework / scrap costs. Most companies fail to understand the financial impact of COPQ which spans:

- Internal costs, such as downtimes
- External costs, like billing adjustments and expedited shipping to replace defective products
- Appraisal costs, such as inspections and quality training
- Prevention costs, like quality improvement projects, costs associated with non-conformance, quality re-engineering and more

To put all this in perspective: a $100M High Tech Manufacturing company with a first-pass quality yield of 94 percent would typically spend about 15 percent of COGS on poor quality. By improving their first-pass quality yield to 99 percent, that percentage will decrease to just about 6 percent of COGS, saving almost $3M in COGS, thereby increasing EBITDA.

To help improve COPQ, High Tech Manufacturing companies should be focusing on all aspects of quality. Quality cannot be an after-thought and its implementation should be a strategic initiative, which is to be planned and executed at every step of the manufacturing process. Companies need to invest in manufacturing operations and execution systems, where quality is intertwined with their production and extended supply chain operations.

From an internal perspective, performing quality testing throughout the production process will address the activities where capital equipment and supply chain processes are maintained. For capital equipment, this means

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scheduling downtime, relocating production as needed to meet production demands during downtime, and coordinating all aspects of the downtime. For supply chain processes, this includes implementing process improvement activities defined during supply chain planning activities.

Externally, best-in-class companies are requiring their suppliers to guarantee that their products meet well-defined quality standards. Failure of a supplier to meet these quality requirements typically results in penalties and charges for non-conformance products.

The adoption of standardized supplier performance management processes and scorecards ensures that key direct, indirect and logistics suppliers understand the quality expectations and meet those requirements.

Conclusion: Optimizing EBITDA

While there are many ways to optimize EBITDA performance, this white paper focused on strategies that are achievable through adopting modern technologies, streamlining manufacturing and supply chain operations and focusing on implementing quality as a competitive differentiator. Like any other measure, EBITDA is only a single indicator, but one that has many levers that can be manipulated to drive improvement. To develop a full picture of the health of any given firm, a multitude of metrics should be taken into consideration and evaluated for their cause and effect on EBITDA. Once that is done, identifying current levels of performance and targets will help drive process improvement and optimize EBITDA performance. The key to success, is being able to capture the necessary data and report and analyze it to make timely decisions. The linkage map below provides a visual of various metrics that can impact EBITDA for a manufacturing company.
About Plex

Plex is the Manufacturing Cloud, delivering industry-leading ERP and manufacturing automation to more than 400 companies across process and discrete industries. Plex pioneered Cloud solutions for the shop floor, connecting suppliers, machines, people, systems and customers with capabilities that are easy to configure, deliver continuous innovation and reduce IT costs. With insight that starts on the production line, Plex helps companies see and understand every aspect of their business ecosystems, enabling them to lead in an ever-changing market.