

Synaptic

Enterprise Cost Reduction

A Case Study



How did a \$25 million electro-mechanical manufacturer cut more than 20% from the cost of their front-running product platform...

...and realize even greater process improvement savings throughout their business?

Synaptic Enterprise Cost Reduction delivers an average of 10% to 15% reduction in Bill of Materials cost -- with savings in the 20% to 25% range not uncommon.

By drawing on all functions across the enterprise, SECRSM breaks down silos to build a value and quality culture.

The Engagement

The Client's Challenge

Synaptic's Client, a manufacturer of residential / commercial municipal water meter telemeters, was faced with the twin challenges of anemic margins and an Annualized Failure Rate (AFR) in excess of 8% for its front-running product platform. Moreover, many of the company's operational processes were recognized to be far afield from best practices.

Combined, these issues led to a vicious cycle of accelerating declines in sales, profitability, and market share -- as well as presenting significant warranty expense and product liability exposure.

A timely resolution was essential to the survival of the business.

The Client's Choice

Our client recognized that a collection of "Band-Aid" remediations was not going to solve a systemic, enterprise-wide set of dysfunctional processes that, in the words of their CEO, "had metastasized over years."

We presented to the client's Management Team a custom-tailored, enterprise-wide package of Training, Consulting, and Business Process Outsourcing services based on our Synaptic Enterprise Cost Reduction (SECRSM) methodology to drive out product cost via Value Analysis techniques, to bring processes into conformance with best practices via Kaizen, and to improve Quality via Root Cause Analysis.

Clinching the deal was Synaptic Consulting's brand promise: we deliver clearly articulated, pre-defined results and form a "teach-by-doing" relationship with every client -- empowering them to repeat the process on their own in all future efforts. We can make this promise because of our lengthy track record of successful engagements with manufacturers ranging from startups to \$100+ million multinationals.

Delivered Results

Reduced Annualized Failure Rate (AFR) to <1%

Because cost-reduction without a high level of Quality is pointless, Synaptic and the Client brought a laser focus to the existing 8% AFR through an intensive Root Cause Analysis. Together we discovered numerous design issues such as components driven beyond their rated specifications, connectors insufficiently rated for applied stresses, and a PCB ground plane providing insufficient protection against Electrostatic Discharge (ESD) from lightning storms and power surges.

After our engineers corrected these issues in the new design, AFR dropped to well under 1% -- providing a powerful four-fold benefit of improved customer satisfaction, greater compliance to the Client's brand promise, reduced warranty expense, and reduced product liability exposure.

Reduced Product Bill of Material (BOM) Cost by >20%

Synaptic's innovative design succeeded in reducing the client's BOM cost from \$76 to \$59.40 -- well exceeding the initially agreed upon 15% goal. Most significantly, chip count was greatly reduced through the use of a Programmable System on a Chip (PSoC). The retrofit of such highly integrated devices is a long-standing capability of Synaptic's Hardware and Firmware Engineering teams. Other elements revealed in the Value Analysis workshop and remediated in redesign included an over-specified housing, an unnecessary battery backup (municipal water authority customers agreed that any water used during a blackout would be insignificant), and the elimination of a costly external antenna by a significantly less expensive increase in transmitter power and an on-PCB "racetrack."

Reduced Manufacturing Labor Costs by >10%

Part of the reduction in manufacturing labor costs was a direct outgrowth of the reduction in parts count described above. Additionally, adding build-in test points eliminated the need for labor intensive end-of-line manual probing with external diagnostic equipment.

Reduced Warranty Expense by >87%

Prior to reengineering, Annualized Failure Rate (AFR) exceeded 8% with a corresponding warranty cost per thousand of approximately \$10K. Reducing AFR to <1% yielded a cost per thousand of less than \$1,200 -- or a reduction of 87%

This reduction was achieved by Synaptic discovering and correcting flaws such as driving I/O components beyond their rated specifications, incorrect solder bath temperatures, connectors insufficiently rated for stresses commonly applied to them, and a PCB ground plane design providing insufficient protection from Electrostatic Discharge (ESD) resulting from events such as lightning storms and electric utility power surges.

Reduced Packaging Cost by >40%

By developing an environmentally responsible, impact-engineered packaging, Synaptic reduced client cost by over 40% while at the same time significantly improving undamaged and unmarred deliverability. Innovative use of molded-in, integral shock absorbing features eliminated the use of inserts, bubble pack, etc, and gave the client a "one step box fill." Testing to strict ASTM standards and conducting extensive field evaluations provided high confidence in the change.

The Synaptic Enterprise Cost Reduction Method

Cost reduction is often thought of as being simply a matter of using fewer and less expensive components and materials in the re-design of a product. However, less obvious --but often greater -- opportunities range from reducing the cost of manufacturing processes, to slashing the cost of non-compliance inherent in quality issues, to driving wasted time and effort from technical support and customer service processes. At Synaptic Consulting, we've learned that these gains can't happen in a vacuum. We help clients break down silos to engage stakeholders from all functions across the enterprise and earn their enthusiastic buy-in. Because when savings ideas come from all business functions, the results come together at the bottom line.

The Synaptic Enterprise Cost Reduction (SECRSM) methodology is customized to each client's individual needs, but generally follows a Stage-Gated chronology. It is broadly applicable across a wide-range of manufactured products, whether electronic, mechanical, or electro-mechanical.

Preliminary Stage

Develop Customized SECRSM Program

Though the (SECRSM —pronounced 'Secure') methodology was developed by Partner and CTO Jeffrey Anthony to be broadly applicable, obviously no two clients and their set of needs are alike. One of the main purposes of Synaptic Consulting's extensive complementary pre-engagement survey is to determine the mix of Consulting, Training, and Business Process Outsourcing services necessary to resolve Client cost and quality issues.

Present Program to all Stakeholders

After extensive consultation throughout the enterprise during the complementary pre-engagement survey, Synaptic partners present the custom-tailored SECRSM package to all stakeholders for review, critique, and fine-tuning.

Go/NoGo Decision

Management reviews proposed package and estimate to determine whether to continue or to halt without incurring further cost.

SECRSM combines elements of Customer Focus Groups, Value Analysis, Lean Kaizen, and Root Cause Analysis to reduce product cost and improve quality across the enterprise.

When Product Cost is reduced, associated indirect costs fall accordingly.

Preparation Stage

Provide SECRSM Training to All Stakeholders and Participants

While consulting guidance is essential for a company's first or even second cost reduction exercise, rigorous training allows all participants to more fully engage during the Synaptic-led exercise. The SECRSM training provides participants with a deep practical understanding of cost reduction essentials such as Manufacturing-oriented Kaizen, Value Methodology, Root Cause Analysis, Design for Manufacture and Assembly / Poka - yoke, and Risk Modulated Project ManagementSM.

Go/NoGo Decision

After a report of the progress of the SECRSM Training, Management determines whether sufficient manpower and expertise exists within the company, whether to retain additional Synaptic resources if necessary, or whether to halt without incurring further cost.

Investigation Stage

Conduct Customer Focus Group

By adapting well-defined focus group methods used by the advertising industry to identify consumer needs/wants/preferences, Synaptic provides the Client with a powerful tool to determine where their product falls short of customer satisfaction. Synaptic and the Client's Sales, Marketing, Engineering and Customer Service groups conduct a focus group with a broad sampling of customers from all of the product platform's market segments. With that detailed output, the Client and Synaptic are well prepared to remedy product failings -- both "hard" (i.e. product failures) and "soft" (installation difficulties, unclear documentation, customer service shortcomings, etc).

Perform Root Cause Analysis for All Known Quality Issues

Since most cost reduction exercises require product redesign to one degree or another, it is the ideal time to solve nagging quality issues. Moreover, eliminating the cost of non-compliance is often one of the biggest single cost savings a business can make.

Perform Manufacturing Kaizen

In the same vein as quality-related design enhancements, a cost reduction exercise is the perfect time to build into the product various Design for Manufacturing (DFM) features to reduce time and motion -- and, thus, cost -- in the manufacturing process. The manufacturing Kaizen Event is the means through which opportunities are discovered. Synaptic consultants and technologists, working closely with our client's manufacturing engineers, lead an in-depth Kaizen Event to discover "pain points" in the manufacturing process that sap productivity, negatively impact quality, and induce unnecessary cost. A Kaizen Event does this by measuring (among many parameters) the variations in cycle time of each step in the manufacturing process, the level of scrap or rework per period, and line downtime. Our findings typically include the need for improved poka-yoke inspired PC board layout geometry to ease hand soldering operations, new component selection to significantly reduce the number of such operations, integrated on-board test points, and quick, built-in, LED-based diagnostic routines requiring no external tools or test instruments.

Perform Value Analysis Workshop

Pre-Workshop Activities

Key among these activities is to assemble one or more customer focus groups representing the Client's product platform's major market segments and its market as a whole. The purpose of the focus groups is to determine quality issues, low value features unnecessarily adding cost, critical unmet needs, and other essential customer input.

Also assembled is a virtual "doc room" housing all documents anticipated to be necessary such as Bills of Material (BOMs), Supplier data such as Cost (Last-Price-Paid, AVG, etc) and Lead Time, Prints, Competitive Analysis, Focus Group Output, etc.

Finally, provisional leadership roles and responsibilities are defined in advance of a more detailed roster developed at the time of formal project planning. Among roles and responsibilities are Program Manager, Product Engineering, Manufacturing / Process Engineering, Quality, Purchasing, Key Suppliers, Representative Customers, Sales and Marketing, Facilitator

Workshop Activities

The meat of the Value Analysis occurs in a two phase process of Brainstorming and Evaluation. While the details of VA are well described in numerous text, it can be summarized as follows.

During the brainstorming phase, the product is deconstructed into a collection of the discrete functions it performs. In highly complex products, this list can run to hundreds or even thousands of entries. For each function or class of functions, the question is asked: "What other materials, components, or standard subassemblies can do the job?" Synaptic leads the brainstorming using advanced techniques such as TRIZ and maintains a meticulous list of the ideas assembled. In many cases we will also include one or more of our highly trained subject matter experts to assist in defining options.

After the conclusion of the brainstorming phase, Synaptic technologists join client team members in vetting and ranking ideas by criteria such as continuity of form/fit/function, quality, cost, and feasibility.

Post Workshop Activities

Following the completion of the workshop, the selected concepts are formally codified into specifications. From those specs, first order estimations of product cost reduction, product lifecycle cost, implementation cost, and project duration vs. staffing levels are derived. Second order results such as Break-Even and Return on Investment are estimated from that data.

Go/NoGo Decision

After a full joint review by senior management, all pertinent stakeholders, Value Analysis Workshop participants, and technical experts from across both the client organization and Synaptic, a decision is taken as to the feasibility of successfully executing on the workshop findings.

Execution Stage

Establish Project Office Using RMPMSM Methodology

No matter how well defined and numerous the cost reduction opportunities discovered in the Kaizen Event and Value Analysis Workshop, making these opportunities a bottom-line reality requires rigorous and effective execution. Synaptic's patented RMPMSM methodology combines the best of Agile and traditional Plan-Driven Project Management methodologies with a central focus on risk management and mitigation. Using this methodology under a Synaptic facilitated Project Office ensures both early warning of unanticipated challenges as well as a means of keeping management informed of up-to-the-minute progress through readily comprehensible dashboard and other monitoring techniques.

Redesign Product and Processes

The Engineering Team

Whenever necessary, Synaptic can quickly provide any necessary Hardware, Software, and Mechanical Engineering resources. In an effort to contain costs for the Client, however, Synaptic makes every effort to utilize existing client resources. This mix of internal and external resources ensures the project has the right resource, at the right levels, at the right time.

Control by Test Driven Design (TDD)

When redesigning for cost reduction, Synaptic primary rule is, "First, Do No Harm." TDD is rigorously employed to ensure that the essentials of form, fit, and function are preserved and that "bugs" are not induced during redesign.

As the final TDD process, a comprehensive Acceptance Test Procedure (ATP) is defined and executed as a side-by-side comparison with the original product to ensure that the new design's functionality and performance are congruent with the original.

Phased Cut-Over Go Live

Continuing in the mode of "First Do No Harm", a carefully conducted Cut-Over is executed prior to the exclusive production of the new design. The distribution is carefully segmented to include all common operating environments. Typically, Cut-Over is rolled-out in increments of 10%.

Now Is the Time

The Case Study recounted here is typical of the methods and results achieved by Synaptic's SECRSM cost reduction methodology. Synaptic Consulting offers a deep review and program specification on a complimentary basis. Contact Synaptic Consulting for a no-fee consultation at www.synapticconsulting.com or at 866.318.3302.

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