Siemens – Renault SCUBE, S3

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Competitive advantage in the automotive industry is a primary objective, and the strategies used to achieve it are highly prized – and closely guarded. So, when Renault chose to share with a technology supplier the inner workings of its manufacturing and assembly processes, the anticipated outcome clearly was high.

To see how competitive advantage is being achieved at Renault, let's examine the legacy situation, management's strategic objectives, the technology solution, and the results achieved.

The Situation

In early 2008, Renault recognized that succeeding in today's fierce markets would require significant improvement of their traditional vehicle-manufacturing paradigm.

That environment was characterized by the existence of operational "islands," which often were quite distant from one-another. Each location executed tens of thousand of discrete operations, which used numerous unique hardware controllers enabled by specialized software. Further, each manufacturing and assembly facility often evolved or adopted their own software capabilities to meet perceived individual needs. It was complex, redundant and inefficient.

This was the traditional automotive manufacturing structure worldwide, and not one unique just to the French company. Renault's senior management, however, recognized shortcomings in the model and committed itself to driving change into the organization.

Management's Objectives

Therefore, the senior team set the company on an improvement course with the aggressive mission of establishing Renault as "the new automation standard for vehicle plants" worldwide.

Three functional work groups – Engineering, OEMs, and Production -- would share major responsibilities for adopting and making successful yet-to-be-developed processes. When implemented, their key metrics would be:

- Improved product quality;
- Increased corporate operating margins; and
- Expanded contribution to Renault's sustainable growth.

While eager to make improvements, Renault's management recognized that their infrastructure was the result of a long evolutionary process that was well entrenched and emblematic of problems in the broader vehicle manufacturing industry.

Ironically, as the company was envisioning a new structure, the global economy and auto industry were rapidly deteriorating. At the same time, business leaders worldwide were beginning to believe that new ways of conducting business must emerge from the global turmoil. Fortunately for Renault, the company was well on its way to developing its own new solutions.

Renault began with a three-step process of identifying and securing a trusted partner that could provide technological insight and assistance, and become an on-going change agent.

The first step was to survey and identify six qualified automotive systems suppliers that demonstrated global expertise in body assembly and mechanics.

Renault executives then winnowed down the half dozen to a short-list of three finalists, which received Requests for Proposal.

By autumn, and after reviewing more than 7,000[1] judging criteria, Renault made its selection: Siemens.

Renault's senior management judged the global technology leader most suitable based on its automotive experience with Mercedes-Benz, BMW, Ford and other manufacturers; their international work from a single platform; the company's commitment to total collaboration; and 24-7-365 availability for guidance and problem solving. (Positive feedback received from field mechanics added a special nod-of-approval to the selection decision.)

Technology Solutions

To achieve the ambitious objective of establishing a new global standard for vehicle manufacturing, Renault charged Siemens with the task of creating a "totally integrated automation" environment.

The project would be called S-CUBE, or S3, and would be developed around a modular, standardized architecture that accommodated standard and failsafe automation requirements.

From the perspective of practical business metrics, S3 would achieve manufacturing and assembly cost reductions, improve product time-to-market, increase product quality, and elevate overall customer satisfaction.

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1 7000 review criteria source: MGA document; file name: bearbeitet_Presentation_20du_20conceptNotizen_PDF.doc

To achieve these goals, Siemens needed to reduce manufacturing complexity, increase the flexible use of technology, and smooth the implementation of production line start-ups and changes.

This was a big order, especially considering that the technology "islands" were created gradually by years of vehicle development and received individualized support and maintenance.

To counter this legacy "need" for unique hardware and software, Siemens developed an innovative "technology building block" approach for all hardware and software and integrated the strategy into the company's Functional Concept of execution.

In developing the building block approach, Siemens identified thousands of work operations executed by all hardware devices and their software programs. It then isolated technology similarities or redundancies. Especially important was determining the frequency of repetition for any single function – regardless of what it may be called locally – throughout all manufacturing processes.

For instance, similar or even identical functions may exist in the hardware and software of the Main Operator Panel, the Remote Operator Panel, and the Lite and Distributed Lite Operator Panels. While incremental functions could be the same in such varying applications, different work groups from stamping to painting perceived, operated, maintained and repaired their own technologies as if they were stand alone, unduplicated functional islands of intelligence.

This segmentation of functional uses and capabilities of hardware and software provided the raw materials for Siemens' creation of individual technology "building blocks." Each block of technology could then be utilized over and over to satisfy the operational requirements of larger disparate hardware and software functions.

From the individual building blocks, Siemens also could create "building block bundles" that would satisfy more robust manufacturing requirements.

As with the software programming, the hardware functionalities could be similarly dissected, segmented by their unique capabilities, and then repeatedly deployed on a more efficient multi-use basis. And, as needed, each hardware element or group assembly could be further tailored to meet highly sophisticated production needs.

The Results

Total Automation Integration was the result of Siemens development of an innovative way to use and reuse technology components in an almost limitless permutation of combinations.

Still in its early stages, this approach is now applied to 58 of Renault's sub-assembly operations and is becoming the standard among new and re-tooled manufacturing processes. Renault expects that this approach will allow 80 percent of its manufacturing installations to be functional before installation.

Leveraging the advantages of the Siemens solution, Engineering, OEM and Production teams have committed to performance improvements never before believed possible.

Because fewer custom specifications are needed in the new Siemens-developed environment, Engineering leaders expect to reduce their commissioning times and increase quality while slashing training from three weeks to one for certain software tools.

Renault's OEMs are committed to reducing their design times and increasing product quality, which will result in lower customer support requirements.

And the Production team is employing dedicated maintenance procedures to increase their reliability rate by 3 percent while extending component life cycles.

Obviously, the building block approach improves operating efficiency, reduces costs of development and deployment, and increases manufacturing productivity.

Having achieved success with initial installations, Renault expects to expand deployment in France and globally – and, indeed, become the new automation standard.

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