Generating analytics impact for a leading aircraft component manufacturer

Client
A global aviation OEM and services major with a multi-billion-dollar aftermarket services business

Industry
Aviation

Business need addressed
Better visibility needed on aftermarket service contracts revenues and profitability; better prediction of cost of new contracts; better controllership and auditability of revenue recognition

Genpact solution
Reimagined the data-to-insight-to-action service contract management process to amplify the power of big data analytics

Business impact
- Improved accuracy and real-time availability of revenue, cost, and parts data to derive more granular and timely strategic and tactical insight
- More reliable failure and cost forecast allowing better pricing and higher win rates
- Complete auditability of information enabling superior controllership and compliance
Business challenge

High revenue and profit volatility, increased service costs, and poor controllership

Like many industrial manufacturing companies, this world leader in aircraft component manufacturing’s financial success relies on aftermarket services contracts for up to 40% of revenue and an even higher share of profits. Aftermarket services are a perfect example of the challenges caused by the lack of integrated financial processes, strong analytics driven by advances in technology and big data, and global field operations alignment and hold lessons for many other industries.

Modern pay-per-use contract pricing typically relies on accurate and timely capture of complex historical information to assess failure probability. The aftermarket service provider (manufacturer or third party) then bills equipment (aircraft in this case) operators for the usage (number of flight hours) at rates fixed under long-term maintenance contracts. Service revenue for each period is forecasted based on the initial contract planning, but the actual revenue recognized depends on parts and services costs incurred during that period, which in turn depends on the amount of downtime incurred. The resulting variability in revenue and profit recognized exposes companies to controllership risks such as deferred balances.

In this case, higher-than-estimated (and more erratic) downtime, labor or parts costs, or more failures than originally planned for during a specific period not only led to reduced revenue due to fewer flight hours operated but also severely affected the future profitability and revenue recognizable during the remaining years of the contract.

Because of the fluctuations in actual cost and revenue, the company was struggling to maintain predictable earnings (which could have financial audit consequences such as restated revenue and profits), and the CEO’s ability to understand the health of the business and the profitability of large clients was constrained. Additionally, and importantly, difficulties in pricing future contracts accurately impacts sales success or future profitability.

The key to solving these structural issues—whose impact can be in the hundreds of millions of dollars—is the quality of scheduling maintenance and related cost. This data-intensive process relies on accurate and granular measurements and insights, as well as serving up those insights to the right people throughout the value chain—at the

Service contract revenues, costs and profitability

![Service contract revenues, costs and profitability graph]
right time. Advances in technology offer an array of opportunities, from sourcing of sensor data to sophisticated predictive analytics, but are powerless if they aren’t fully leveraged in an appropriately reimagined planning and maintenance process.

In this case, insufficient visibility into actual labor and parts costs incurred during contract performance severely limited company forecasters’ ability to perform historical failure trend analysis, root cause identification for repeat failures, benchmark contract profitability with peers, and forecast optimal pricing for future contracts.

Poor quality of data wasn’t a straightforward technology problem for the global operations of this leader. Multiple repair shops are involved in each repair job, and the respective heterogeneous systems and processes across shops create complexity and inaccuracy. Inaccurate bill of materials (BOM) along with frequent mistakes in recording part numbers, labor hours, and contract-specific expenses required considerable time and effort in manually scrubbing and consolidating the data for analysis. Although roughly 70% of these errors were visibly systematic and thus more easily preventable, the remaining 30% required experiential judgment and detailed follow-up with different stakeholders across business units, adding significant complexity and time. Finally and crucially, this process lacked auditability as the changes to data could not be traced back, which could generate significant financial audit issues.

The solution

Genpact’s solution took a holistic approach across the value and supply chain, as described in the figure opposite.

The advantage of designing and optimizing the full data-to-insight-to-action arc is significant especially when considering that the continuous learning from the feedback loop can now be crystallized into powerful analytical tools (a leading one being GE Predix). The resulting ability to collect and use more meaningful data leads to increased revenue and cost forecasting accuracy across multiple asset utilization scenarios. This can be a significant competitive weapon for manufacturers with a significant installed base, or for those who are able to source more data from the machinery their clients deploy.

As it is often the case, narrow technology-led efforts to automate the scrubbing of cost data had yielded poor results. Limited understanding of interdependencies between business lines and functions (e.g., finance, procurement, operations, and supply chain) and how data would be consumed for insights across the various stakeholders of the chain had resulted in suboptimal solutions.

The data-to-insight and insight-to-action arc was enabled by looking at the three clusters of analytical and related operational processes that exist in virtually any business process.

Figure 1 - Data to insight to action arc
Real-time visibility into critical contract performance metrics such as billing and revenue accrued, parts and services costs incurred, planned and unplanned downtime required timely and accurate data capture. Accurate master data for critical spare parts, engine modules, and others was sustainably enabled. Robust controls were established to ensure timely aggregation of cleaner information from multiple data sources like parts MRP\(^1\) and repair shop ERPs. Data redundancies and mistakes—and their patterns and consequences—were identified, and on that basis, business rules to prevent those mistakes were designed, documented, and rolled out globally. As a result, analysts with granular, operator-level understanding of the underlying processes now perform rule-based data cleanup and follow up on a more finite set of critical exceptions that make accurate data available for granular cost analysis. Contract performance was regularly monitored to determine discrepancies between planned and actual costs. A similar process assessed downtime. Analysis of service events and costs was used to internally benchmark the performance of repair shops and service procedures.

(i) Provide visibility (data to insight)

Run data-to-insight
- Master data preparation
- Analysis of deviation
- Domain driven identification of contextual root causes (e.g. material lagging)
- Formalize hundreds of business rules to prevent incorrect inputs

Figure 2 - Provide visibility

(ii) Steer effectiveness and execute at scale (insight to action)

Improve execution practices
- Determine data entry error patterns
- Implement GE Predix to flag future issues and enable continuous learning
- Change management reduces systematic issues

Figure 3 - Steer effectiveness
The new process resulted in cost elimination opportunities through new standard operating procedures on repair vs. replacement of parts, parts procurement from cheaper sources, optimal spare parts inventory levels, preventive maintenance of emerging failures, and updates to the master data. The related, effective technology enablement not only enhanced data-to-action but also made the analytical processes much more efficient. Functional experts worked alongside the technology and analytics teams to identify the most material metrics to drive business outcomes and to define the technology, analytics, process, and organizational structure that influence those metrics. A holistic view across data-to-insight and insight-to-action helped design effective analytics solutions and enable targeted change management to embed them into business processes. As a result, 95% automation of manual data aggregation freed up more than 20 analysts to focus on insights rather than focusing on manual scrubbing of data, enabling materially improved operational scalability for the manufacturer and their clients.

GE Predix analytical software platform was harnessed to enable industrial-scale analytics for asset and operations optimization. The core platform extracts cost from multiple data sources. An application then processes this data and stores it in a central data hub after validating it by applying predefined (and periodically evolving, thanks to feedback loops) business rules. A secure interface allows globally located business users to manage the exception flagged. Role-based access control and automated reports ensure complete auditability of changes to the data. The process solution reimagined around GE Predix lays the foundation for more scalable, extensible, customizable, and secure applications of the data through distributed computing and big data analytics, asset management, and mobile devices.

The resulting operations are clearly different from traditional ones. Genpact calls them “intelligent” because they leverage analytics as an integral component of the business process. As a result, they are able to better sense and react to operational conditions (such as asset usage patterns or new field operations constraints) and learn from those data sets, enabling continuously more effective running of those important business processes.

The business impact is millions of dollars of enterprise value for the manufacturer and their clients, as well as radically superior controllership and auditability of complex, global operations.

**Impact**

- Lower cost of maintenance, and asset downtime reduction resulting in multi-million-dollar higher revenue and profitability from existing contracts
- Timely availability of accurate information for finance, supply chain, after-market services, engineering, and sales stakeholders enabling short- and long-term enhancements to the entire value chain
- Robust auditability of information
- More reliable failure and cost forecast enabling better pricing and higher win rates for new contracts

**Conclusion**

Aftermarket services can enhance manufacturers’ competitiveness significantly if data to insights and insight to action processes are reimagined with technology and analytics solutions at their core. Focusing the transformation on the material drivers of business outcomes can help companies achieve results faster and more practically. The final outcome ranges from pricing contracts more intelligently and winning more profitable contracts while enhancing asset availability and delighting the client, ensuring sustainable profit margins by predicting and limiting factors contributing driving cost variance—to engineering better, more reliable products in the future. Intelligent operations can indeed be a cornerstone of industrial manufacturers’ competitiveness and yield portable lessons for many other industries.

1. Material requirements planning (MRP) is a production planning, scheduling, and inventory control system used to manage manufacturing processes
About Genpact

Genpact (NYSE: G) stands for “generating business impact.” We design, transform, and run intelligent business operations including those that are complex and specific to a set of chosen industries. The result is advanced operating models that support growth and manage cost, risk, and compliance across a range of functions such as finance and procurement, financial services account servicing, claims management, regulatory affairs, and industrial asset optimization. Our Smart Enterprise Processes (SEPSM) proprietary framework helps companies reimagine how they operate by integrating effective Systems of EngagementTM, core IT, and Data-to-Action AnalyticsSM. Our hundreds of long-term clients include more than one-fourth of the Fortune Global 500. We have grown to over 68,000 people in 25 countries with key management and a corporate office in New York City. Behind our passion for process and operational excellence is the Lean and Six Sigma heritage of a former General Electric division that has served GE businesses for more than 16 years.

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