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WHITEPAPER

STOP REACTING. START PREDICTING. AI FOR EARLY WARNING IN AFTERMARKET SERVICES.

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Most OEMs and suppliers still manage aftermarket quality reactively, scrambling to respond only after customers report failures. Rising warranty costs, increasingly complex products, and heightened customer expectations make this model unsustainable. Warranty claims alone consume 2–5% of revenues in many advanced industries, and McKinsey reports that applying AI and advanced analytics can reduce those costs by as much as 30%, showcasing how much is at stake when companies remain reactive ¹.

AI-powered Early Warning Systems (EWS) change the dynamic. By consolidating diverse data sources and surfacing anomalies earlier, they enable manufacturers to predict and prevent failures before they spread. This shift from reacting to predicting reduces costs, protects margins, and builds lasting customer trust.

THE COST OF STAYING REACTIVE

To understand the value of predictive systems, we first must examine the cost of staying reactive. Issues often arise months after product launch, when customers have already felt the impact. Data is scattered across silos, leaving small teams fighting fires with limited time and resources. Human error compounds the problem, introducing inconsistencies that delay decisions. The consequences are significant: escalating warranty and support costs, recalls, brand damage, and dissatisfied customers. Inconsistent insights mean trends go unnoticed until it is too late, forcing manufacturers into costly reaction mode.

WHAT IS AN EARLY WARNING SYSTEM?

If reactive approaches are so costly, what does a better model look like? An Early Warning System is a structured process to detect and address anomalies before they escalate into costly failures. Instead of reacting to failures, EWS brings order and foresight.

A modern workflow typically follows four stages:

- ▶ **Detect:** Consolidate signals from IoT, call logs, technician notes, warranty claims, and even social media.
- ▶ **Investigate:** Apply enrichment, clustering, and predictive scoring to assess severity and prioritize issues.
- ▶ **Resolve:** Route clusters to the right teams, supported by human-in-the-loop oversight.
- ▶ **Complete:** Validate countermeasures, shorten cycle times, and ensure consistent reporting.

The framework can be illustrated as a progression from reactive to predictive approach:

Stage	Reactive Handling	Predictive EWS/AI Handling	Outcome
Detect	Issues surface late via complaints	Data consolidated & anomalies flagged early	Early visibility into emerging issues
Investigate	Manual, error-prone triage	Automated clustering & scoring	Faster prioritization, reduced bottlenecks
Resolve	Ad-hoc routing, bottlenecks persist	AI-guided routing with human oversight	Streamlined workflows, faster resolution
Complete	Inconsistent reporting, limited feedback	Closed-loop validation & tracking	Continuous improvement, stronger trust

THE ROLE OF AI IN MODERN EWS

Defining EWS sets the stage, but the differentiator comes from AI. Traditional systems can only go so far; AI strengthens each stage of the workflow and makes predictive quality truly achievable.

AI combines data from across IoT, service logs, call transcripts, warranty claims, and even images to create “failure clusters.” These clusters group issues by product type, causal part, or nature of complaint, making it easier to understand severity and prioritize responses. The process flows through Detect, Investigate, Resolve, and Complete, ensuring a systematic approach. Human-in-the-loop oversight keeps the process grounded, ensuring automation accelerates decisions without eliminating expert judgment.

AI strengthens each stage of the workflow through three complementary layers of capability:

- ▶ **AI & Machine Learning (ML):** Clustering, anomaly detection, forecasting, and probability scoring provides earlier, data-driven visibility into potential issues.
- ▶ **Generative AI (GenAI):** Enrichment, contextualization, translation, and transcription extract insight from unstructured data sources such as text, images, and conversations.
- ▶ **Agentic AI:** Root-cause exploration, risk prioritization, and actionable recommendations guide teams from detection to resolution with greater speed and accuracy.

Together, these layers reinforce the Detect, Investigate, Resolve and Complete workflow, ensuring predictive quality is both achievable and repeatable.

BENEFITS OF AI-POWERED EWS

The value of AI becomes clear in the outcomes it delivers. Faster detection reduces claim costs and prevents recalls from spiraling into large-scale brand damage. Root-cause analysis accelerates corrective action, helping manufacturers identify systemic issues before they multiply across product lines. Shared insights improve supplier collaboration, aligning partners around a common view of quality data and risks. Most importantly, customers notice the difference, problems are addressed before they spread, boosting satisfaction and reinforcing trust in the brand.

SUCCESS STORY: KAWASAKI ENGINES USA

Kawasaki Engines USA's journey exemplifies how AI-powered Early Warning Systems (EWS) can transform aftermarket service from reactive firefighting to a proactive foresight. By centralizing over 98,000 claims and integrating AI-driven workflows, the company has replaced manual, fragmented analysis with a unified, intelligent platform that connects insights across warranty, service, and customer data².

The measurable business impact has been significant:

- ▶ >83% of claims auto-approved by rule-based engines.
- ▶ Cycle times cut from weeks to hours, even as volumes increased.
- ▶ Flat headcount maintained, with throughput rising.
- ▶ Customer satisfaction scores improved from 30% to 83%, reinforcing trust.

Apart from these, Kawasaki has already seen several operational "wins" from its EWS implementation, including:

- ▶ Deeper data analysis and understanding, unlocking hidden insights.
- ▶ Significant time savings through reduced manual report building and analysis.
- ▶ Proactive alerting for potential risks, recalls, and service campaigns.
- ▶ Smarter preparation for on-site customer visits through data-backed insights.
- ▶ A foundational AI platform enabling future feature enhancements.
- ▶ More intuitive visualizations for causal parts, issue categorization, and prioritization.

These outcomes were possible because Kawasaki built a unified database and applied automation consistently. Having a single, centralized view gave the team a consistent way to understand what the data was telling them, creating the foundation for both automation and faster decision-making.

"The EWS strengthens our ability to absorb, understand, and visualize the error codes, causal parts, impacted customers, and call sentiment that come in from every customer interaction. It provides us with a new layer of detailed analysis to respond proactively to potential costly issues," as per, Tony Gondick, Senior Manager of IT Business Strategy at Kawasaki Engines USA.

FROM FIREFIGHTING TO FORESIGHT

Reactive quality management leads to spiraling costs, damaged reputation, and lost trust. Predictive, AI-driven Early Warning Systems offer a proven alternative: earlier detection, faster resolution, and measurable improvements in both operational efficiency and customer satisfaction.

The next frontier will go even further, as digital twins and predictive maintenance push foresight beyond early warning into real-time, continuous quality assurance. At the same time, AI governance and responsible use will become essential, since warranty and service decisions directly affect customer trust and fairness.

The question for manufacturers is no longer whether predictive EWS works, but how quickly they can adopt it, and how thoughtfully they can manage the transformation. **Those who act decisively will not only safeguard margins and reputation but also set new standards for customer trust.**

AFTERMARKET SERVICE LIFECYCLE MANAGEMENT SOLUTIONS BY TAVANT

Tavant is a leading provider of AI-powered solutions, and digital engineering services focused on helping enterprises unlock the power of AI and accelerate digital transformation. With deep domain expertise across multiple industries and a commitment to delivering measurable ROI, Tavant specializes in complex data modernization, cloud transformation, AI-driven automation, and insight solutions for global Fortune 500 companies. Tavant also provides a comprehensive suite of AI-powered industry-specific SaaS products, particularly for Service Lifecycle Management and Mortgage Lending. Recognized by IDC MarketScape, Tavant was named a 2025 Major Player in AI-enabled Aftermarket/Service Lifecycle Management (SLM) platforms and Field Service Management, a 2024 Leader in Warranty Service Management, and a 2023–2024 Major Player in SLM and Warranty Service Parts Planning. Tavant is at the forefront of generative AI-enabled applications development and IT management. Founded and headquartered in Silicon Valley in 2000, Tavant operates globally with service locations and development centers in North America, Europe, and India.

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References

1 McKinsey & Company. (2021). Transforming quality and warranty through advanced analytics. Retrieved from <https://www.mckinsey.com/capabilities/operations/our-insights/transforming-quality-and-warranty-through-advanced-analytics>

2 Aftermarket Intelligence Unlocked. (2025, August 29). Episode 6: Agentic AI for Early Warning Anomaly Detection [Video]. YouTube. <https://www.youtube.com/watch?v=qjmYoLFRP8>

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