



Powering warranty reinvention

*How electronics companies leverage
new technologies to improve warranty management*

Executive Report

Electronics

How IBM can help

As a global electronics company, IBM understands the issues facing the high-tech industry and the continuous transformation required to thrive. Companies are turning their attention to a new generation of technologies that will transform not just the electronics industry, but many others. The IBM Global Electronics practice uniquely combines IBM and partner services, hardware, software and research into integrated solutions that can help you deliver innovation, reduce complexity, create differentiated customer experiences and optimize your global operations. For more information, please visit ibm.com/industries/electronics.

Energizing warranty management

Our recent survey of electronics warranty executives revealed that only one-third of warranty costs are spent on direct repair or defective goods replacement. While warranty management has always been a critical competency for electronics companies, it's also a measure of quality and brand integrity. This report explores how the evolution of analytics to cognitive computing, coupled with a rise of Internet of Things (IoT) technologies and platforms, can provide new and innovative ways for organizations to evaluate and improve warranty operations.

Executive summary

Recalls, as well as day-to-day returns and repairs, are a given in the electronics industry. They can also have a profound effect on company reputation and bottom line. Despite this, many companies don't put enough focus on effective warranty management or treat it as a competitive differentiator. However, its importance should not be underestimated.

Warranties are a critical part of product upgrades and launches, particularly for electronics companies that constantly push the envelope, introducing new features, software or experiences. On average, warranty costs for the electronics companies from our recent survey are close to 3 percent of revenue. Of that 3 percent, less than 1 percent is *actually spent* on direct repair or replacement of defective goods. For a one-billion-dollar company, that's USD 20 million in processing and administration costs across the repair cycle. What's more, in electronics, there is a high instance of NFF – or no fault found – where the originally reported defect cannot be reproduced. Calling this a thorny problem is polite understatement. Warranty management has direct bottom-line impacts.

At the same time, warranty management has the potential to be cost effective and a primary indicator of product quality and brand integrity. As devices and machines become more complex, effective warranty management becomes increasingly important. Advances in predictive analytics, cognitive computing and Internet of Things (IoT) technologies offer an opportunity to transform traditional warranty processes. Tools and solutions powered by these technologies provide innovative ways for organizations to evaluate and improve performance, with benefits that extend beyond warranty operations.



Average warranty costs for top performers are 150 percent lower than those for bottom performers.



Top performers process warranty claims 4 times faster than bottom performers.



Top performers correct issues with products in the field 30 days faster than bottom performers.

We surveyed over 300 electronics companies across the globe to benchmark industry warranty performance and explore how companies are leveraging new technology in warranty and supply chain operations. (For more information, see the *Study approach and methodology* section.) Our research revealed three key competencies common among companies with highly effective warranty management:

1. Standardized *processes* and improved communication across organizations to reduce cost and improve insight.
2. Increased *traceability* back from warranty management into manufacturing and the supply chain.
3. Broadened interactions and information sharing across the *ecosystem*, including support for customers, service providers and the original equipment manufacturer (OEM).

Practices related to these competencies require new capabilities, including significant collaboration and digitization of warranty processes. This digital transition is the central enabler to automation, traceability and broad communication – allowing participants to share analytics and access answers. In this report, we reveal how top performers are already reaping benefits from implementing these competencies (see sidebar: *Top, median and bottom performers*).

Impact: Where new warranty management approaches add value

The IBM Institute for Business Value evaluated the performance of the electronics companies from our survey based on key warranty metrics, highlighting the potential impact of new warranty management practices across four key dimensions: reduced operational costs, improved brand integrity and customer experience, identification of new revenue streams and competitive differentiation.

Reduced operational costs

Average warranty costs for bottom performers are 50 percent higher than costs for those at the median and 150 percent higher than those at the top. That means a bottom performer with USD 1 billion in revenue could expect warranty costs that are USD 27 million (or 150 percent) higher, on average, than a top performer.

To help reduce warranty costs, top-performing electronics companies have sought increased efficiency and insights into operations, customer behaviors and products:

	Top	Median	Bottom
Percentile	80th	50th	20th
Warranty cost as percentage of revenue	1.8%	3.0%	4.5%
Claims as percentage of revenue	0.6%	0.8%	2.2%
Claims process cost as percentage of revenue	0.4%	0.8%	1.3%
Cycle time to process a warranty claim	5 days	10 days	20 days
Detection to correction cycle time	45 days	60 days	75 days
Percentage of total claims that are fraudulent	2.5%	3.8%	5.2%
Supplier recovery rate	30.0%	25.0%	20.0%

Top, median and bottom performers

Data in this report follows this set of definitions:

Top performers are electronics companies performing in the 80th percentile. Eighty percent of the participants perform below and 20 percent perform above this level. The median is the midpoint value in the distribution of responses – half of participants perform below this level and half perform above. Bottom performers are in the 20th percentile – 20 percent of participants perform below this level and 80 percent above.

Improved brand integrity and customer experience

Our research revealed that effective warranty management can have a direct positive impact on customer satisfaction and retention. On average, bottom performers had lower customer satisfaction and retention scores than median or top performers (see Figure 1). For customer satisfaction with the warranty process, the difference between top and bottom performance is 15 percent; for customer retention, it is 10 percent

Figure 1

There is significant potential for warranty performance improvement in the electronics industry

Comparison of bottom (20th percentile), median (50th percentile) and benchmark/top (80th percentile) performance of electronics companies on key metrics



Source: 2016 IBM Institute for Business Value Benchmarking Program.

Identification of new revenue streams

Leveraging the IoT technologies and platforms built into devices can increase the potential for new revenue streams through innovative commerce and data sharing/insight opportunities. We found 65 percent of the companies surveyed are evaluating how IoT technologies or platforms can enable new revenue streams such as warranty extensions or tiered servicing approaches. A further 30 percent are planning to investigate it. Additionally, when instrumented products are connected to the internet, they enable manufacturers to better understand how customers use their products. This in turn allows manufacturers to offer complementary products or services that improve the user experience.

Differentiate from the competition

Eighty percent of organizations are incorporating IoT technology into products and systems to support warranty processes that differentiate them from competitors, such as early warnings and service notifications. However, this is a nascent capability. While electronics companies are actively pursuing IoT adoption, many are in the early stages of investment/strategy development and integration into offerings and services (see Figure 2).

Enabling new competencies in warranty management

Our research revealed three competencies that help enable highly effective warranty management:

- Standardized *processes* and improved communications
- Increased *traceability*
- Information sharing across the *ecosystem*

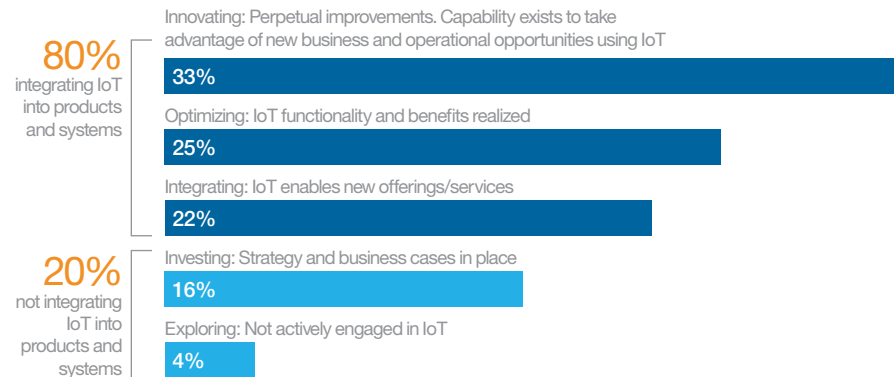
“The advent of cognitive computing means that the large volumes of data generated by IoT devices can now be understood, acted upon and monetized like never before.”

“Internet of Things in the industrial sector.”

IBM Global Business Services White Paper. February 2016

Figure 2

There are five maturity levels for incorporating IoT technologies in products and systems that support warranty management



Source: 2016 IBM Institute for Business Value Benchmarking Program.

To help companies seeking warranty performance improvements, we organized 11 practices into three categories to align with the competencies (see Figure 3). They allow companies to achieve benefits that extend well beyond warranty into other operational areas, where intelligent feedback can be shared across the entire value chain – from product design, development and manufacturing to quality management and after-sales service.

Figure 3*Warranty management practices organized by competency area*

Practice	Product and service development	Customer relationship and aftermarket	Supply chain, manufacturing and distribution	Business administration and risk management
Processes and communication				
Simplify and standardize warranty processes		○		
Increase process automation and integration		○	○	○
Communicate warranty/service information to other functions across the organization	○	○	○	○
Use technology and big data to improve accrual management				○
Use advanced analytics for fraud detection		○		○
Traceability				
Increase quality and availability of warranty data and analysis	○	○	○	○
Incorporate warranty data analysis in product development and manufacturing	○		○	
Improve visibility for customers in the warranty process		○		○
Collect and analyze data from instrumented/connected products	○	○	○	○
Ecosystem				
Standardize early warning information and warranty/service information between OEMs, suppliers and service providers		○	○	
Increase integration and collaboration through data sharing and analytics between the OEM and suppliers			○	

Source: IBM Institute for Business Value analysis.

Process and communication: Start with an inward focus

We suggest electronics companies start by focusing on areas in their direct control:

- Simplify and standardize warranty processes across products, divisions and repair teams.
- Increase process automation.
- Communicate warranty and service information to business functions.
- Use technology and big data to improve accrual management.
- Use advanced analytics for fraud detection.

Because many electronics companies have driven growth through new product launches combined with mergers and acquisitions, it's no surprise that warranty management processes can be inconsistent across a corporation. Only 49 percent of the companies we surveyed have fully simplified and standardized enterprise warranty processes. Almost all of those 49 percent believe they have been highly effective in improving warranty performance.

For the remaining 51 percent, a logical start is mapping the core process, separating the common core from instances where unique warranty situations occur. This will design a process that addresses at least 80 percent of claims and allows specialists to address unique issues while other customers speed through the process. We found top performers process claims 4 times faster than bottom performers (5 versus 20 calendar days) and believe that only standardized processes, *coupled with automation*, can deliver this level of efficiency.

Once a new process is created and automated, most claims should flow through the systems with limited intervention: automated authorizations, ticket assignment and parts management. Automation facilitates integration of additional organizational functions – product development, customer relationship management, supply chain, manufacturing

and business administration – and the communication of warranty and service information between them. This communication is crucial: APQC found that greater communication of warranty and service information to other business functions increases the likelihood of top performance for claims process cost.¹

In addition to improving operational efficiency, effective organizational collaboration can lead to improved product quality, mitigating the risk of future failures and potential recalls. This in turn can help reduce claims while reinforcing brand integrity, customer retention and loyalty. However, *such collaboration requires digitization for full benefit. Digitization is the process of creating minable text and information assets as part of business-as-usual processes.*

Digitization allows all users access to a massive shared company data resource (called a corpus) that provides context-relevant business answers. This 360-degree view across critical functions instantly displays information, remediations and insights. This allows users to make better decisions – even highlighting emerging trends and issues before they become challenging and costly. With visibility now available at an aggregated and detailed level, the shared context can be leveraged by multiple organizational functions.

This 360-degree digitized view also allows companies to forecast warranty costs more accurately. Predictive modeling solutions can project what will need repair, while big data and analytics tools can help warranty professionals understand what is causing issues. Together, they offer a better understanding of the funds necessary to remediate expected issues and point to specific remediations. We found more than 55 percent of respondents have fully implemented the use of technology and big data to improve accrual management, with an average effectiveness rate of 96 percent.

Warranty management resolution rooms bring light to dark data

A resolution room is a virtual space attached to the corpus that enables business users to search dark data – documentation, conversations and intelligence relevant to a specific problem.

The goal in any recall is to quickly get in front of it – determine the pattern, develop a policy for repair and determine the defense strategy. The resolution room illuminates insights that can lead to faster pattern detection and reaction. An industrial automation company faced thousands of high-end machines failing unaccountably. After the company recalled all of them, it took 12 weeks and USD 15 million using paper-based methods to trace the issue to a USD 5 part.

Instead of paper trails or data silos, resolution rooms present a comprehensive, connected historical and organizational context, enabling better human decisions. Warranty management resolution rooms should focus on three key data areas: exception processing, trend insights, and process or outcome changes that are important to highlight for each area.

Electronics company transforms warranty claims process

A leading U.S. electronics company used advanced statistical analysis and predictive modeling to revolutionize its warranty claims processing. The company had an inefficient warranty process characterized by high costs, extensive complexity, and a lengthy cycle to detect defects and fraudulent claims. Its transformation featured sophisticated statistical analysis to understand underlying warranty claims patterns. The company joined claims data, dealer service reports and real-time sensor data on installed components, which trigger failure or performance event notifications.

The company used improved data analysis with powerful predictive models to spot trends and anomalies, improving claim processing cycle times by 20 percent while reducing required support personnel by 5 percent. The supply chain also reaped benefits. Real-time product, customer and claims data analysis helped identify defective parts to pull from the field, while engineering used the data to predict failure rates and root-cause analysis for product improvements.

Twenty-eight percent of the companies surveyed are also using warranty data to predict optimal warranty terms based on cost. Identifying historical patterns and projecting different approaches to warranties for particular products can allow a company to determine whether it is more cost-effective to repair or replace a product, as well as the type of warranty that should be offered, its duration and how much money should be budgeted to cover claims.

Fraud represents another opportunity for cost reduction. On average, 8.1 percent of the claims rejected by the companies in our study are rejected as fraudulent. However, another 3.6 percent of approved claims are later discovered to have been fraudulent. Just over half of our respondents have fully implemented advanced analytics and processes for fraud detection, and 96 percent considered the implementation successful. By defining, applying and refining certain fraud identification rules during claim processing, organizations can quickly identify patterns to reject fraudulent claims and alter processes and policies to prevent similar problems in the future.

Traceability: Expand the focus

The next step involves expanding the focus to the entire organization and driving results into other functions:

- Increase the quality and availability of warranty data and analysis to other functions.
- Start with product development and manufacturing.
- Increase the visibility of warranty data for customers in the process.
- Collect and analyze sensor performance and IoT data from instrumented products.

Warranty data is a mix of structured, well organized data (like part or model numbers, manufacture dates and warranty start dates) and unstructured data (such as problem descriptions, attempted repairs, reported resolutions and images). Bringing that data together in context and mapping interactions and dependencies in the data through advanced analytics and cognitive computing solutions can uncover significant new insights. A cognitive computing system can quickly sort through more data and interactions, increasing the questions that can be answered, as well as the quality of the answers. Cognitive computing solutions can allow product development, customer-facing disciplines, supply chain and administration functions to use one common set of intelligence and tools to mine potential insights.

Seventy-nine percent of companies use advanced and/or predictive analytics to reduce detection to correction cycle time, which can reduce the number of claims and potentially faulty products in the market. By advancing to cognitive approaches, electronics companies can complement advanced analytics results with detailed detection and diagnoses of issues, yielding insights that increase product reliability.

Connected appliance solution saves cost, improves customer experience

A global appliance manufacturer is implementing a connected appliance solution leveraging data from sensors on connected products, combined with historical warranty claims information. This data can help identify and/or predict a specific part or component failure, allowing the company to replace only the defective part. Previously, the company would often replace multiple components in a guessing game that resulted in needless costs.

Funds earmarked for extra replacement parts can be redirected toward design improvements and revenue-generating innovation:

- A “white glove” service option that leverages predictive analytics to preemptively repair/replace machine parts before they fail.
- An automated laundry supply service through retail partners that uses machine data to indicate when supplies are low and a next-best-action engine to initiate an order.
- A monitoring service that sends alerts when the oven or stove is left on for a specified amount of time.

Figure 4
The IoT journey



Source: IBM Institute for Business Value analysis.

For example, reliability engineers in the field can explore past and present performance issues to assess the relationship between early warnings and actual failures. They can collaborate with the product teams and design engineers on root cause and trade-off analyses to determine the optimal solutions. In-context collaboration between representatives from different functions enables full lifecycle traceability – from design and manufacturing to the end product in the field – supporting improved design and production governance.

Finally, improved warranty performance has a direct impact on customer experience. If consumers believe a company treats them fairly when products fail to live up to expectations, they are more likely to buy the company's products in the future, building brand loyalty. Companies can eliminate common questions (and complaints) by providing customers with improved visibility into the warranty process and offering claims status updates, replacement parts tracking information and expected arrival times of technicians. Fifty-one percent of the companies surveyed have fully implemented programs to improve visibility, and 92 percent deem their efforts a success.

Connected products provide immensely valuable data. IoT data can be integrated with existing warranty data to obtain new insights into companies' customers, products and operations. In turn, this can lead to enhanced support processes, optimized product service, and the provision of new and differentiating experiences for customers, all of which can help drive revenue. This can be described in a progression of steps (see Figure 4). Once these steps are complete, the company should leverage the new capabilities holistically and iteratively to optimize the benefits.

Ecosystem: The supply chain and beyond

The final step is enabling an ecosystem that includes the entire supply chain – and beyond (see Figure 5).

- Standardize early warning information and warranty/service information transferred between OEMs, suppliers and service providers.
- Expand integration and collaboration through data sharing and analytics between the OEM and suppliers.

IoT technology coupled with improved predictive quality algorithms can allow earlier detection of problems. Standardizing around early warning systems (EWS) that advise OEMs, suppliers and service providers of potential issues has been implemented fully by just over half of our respondents. The next step is increasing collaboration among the same players through data sharing and analytics, which more than 40 percent of respondents have achieved fully.

Figure 5

Expand the focus to the supply chain and beyond



Source: IBM Institute for Business Value analysis.

Service providers can be notified to coordinate forecasts, parts and trained technicians. At the same time, the company can notify manufacturing plants and supply chain partners to prevent faulty or weak parts from inclusion in future manufacturing. These processes and traceability also allow improvements in OEM reporting.

“Resolution rooms” – digital entities that allow users to search for and access all available information related to a specific problem – can be expanded to broader communities across the supply chain. This data-informed and digitized discussion format enables consistent knowledge among the working parties.

The EWS can also be combined with the enterprise view and shared via the resolution room format. This offers deep end-to-end insight, showing the patterns of devices, parts, claims, repairs and remediations. This practice is virtually the sum total of all the work done to improve warranty management – but demonstrates benefits for the organization, customer experience and entire supply chain clear through distribution. It has lasting value that helps take out cost and prevent brand and reputation risks while aiding overall quality improvement.

Where to start

We recommend six sets of actions to take now. The first three relate to the competencies, while the rest address functional considerations for moving forward.

Start with your processes

To improve process redesign, we recommend five strategies and associated questions (see Figure 6). You may have multiple existing processes to evaluate. Simply accepting and expanding the one with the best warranty performance might not drive benefits for the whole organization. You should also address the potential impact of new or expanded technologies on the process. This requires more evaluation, using the five questions to guide your fact finding and create your new baseline process.

Figure 6

Strategies and questions for process redesign

Identify the drivers of warranty improvement	What are the strategic objectives and pain points for your organization? Example: Improving product quality
Benchmark performance and identify areas on which to focus improvements	What are the key metrics and how is the company performing relative to peers in the electronics industry? Example: Warranty claims rate
Identify the challenges to improving warranty performance	What are the obstacles to improving performance in your organization? Example: Inability to detect early warnings
Select and prioritize strategic and tactical improvement initiatives	What initiatives are required to remove the obstacles and drive improvements? Example: Collect and analyze data from instrumented/connected products
Identify the key enablers of improvement initiatives	What operational and technical capabilities are required to support the prioritized initiatives? Example: Mature analytics capabilities (predictive, prescriptive, cognitive), IoT technologies in products and integrated into systems and processes

Source: IBM Institute for Business Value analysis.

Work with your CIO and internal partners to define places where technology and data can dramatically improve your understanding. Focus on creating a broad data corpus and enabling deep search tools to increase insights significantly. Over time, the system learns to determine whether observed faults are similar to those previously observed or are new, enabling the EWS. Last, recognize that no process is final – expect to make updates – the same way any engineer would manage the optimal performance of complex machinery.

Then tackle your traceability

Warranty professionals clearly understand that customer experience issues are often the result of actions that occurred earlier – whether from a defect in the machine design or difficulty with safety stock. While improving warranty protocols themselves is beneficial, sharing data across the supply chain can further optimize potential savings or revenue. Prioritization is key.

While you could focus on areas with the biggest cost savings first, it might be smarter to focus on those from which data is most readily incorporated. In this case, data drives value – and some functions might need to make their data consumable to the corpus. It is best to tackle one organizational area at a time, harnessing the lessons learned and making minor renovations through an iterative process.

Start to manage the internal, now “digital,” conversation. Drive collaborative conversation around a consistent digital dashboard for managing issues and business as usual. In addition, build in a continuous process review cycle, once a month in earlier stages and then every three months as you add new organizational partners or new functionality.

Finally, share broadly

Within your ecosystem, be attentive to potential contractual issues. Your new processes and traceability provide a competitive advantage, so access should be carefully managed:

- Manage systems permissions and security very closely, making sure your collaboration security software and onboarding/exit processes are state of the art.
- Prevent dirty or low-quality data from entering your systems. Each IoT device represents a point of entry. Make sure that machines and devices have true protection.
- Determine tradeoffs between speed and provision. Evaluate or remediate data security before you onboard external data.
- Design views that are task/role specific and fit for purpose.

Working teams

Include broad representation: Manufacturing, information technology, developers, technical resources, supply chain and procurement experts should be on the team. Consider a “core” and adjunct team member format. Core members move the project forward, while adjunct members confer domain expertise as needed. We also recommend using benchmark performance as a means of tracking progress. As new services and functions are deployed, validate your actual performance against the benchmark to create traceability for the investments.

The impact of data science and new technology

These warranty management practices contain expanded functionality and new technology. They require emerging skills, interactions and expertise. Consider these guiding questions:

- Do you have the right mix of people on your team or accessible to you? What is their level of technical experience? How broad is their expertise?
- Are external resources needed to support the projects and develop your organization's expertise?
- Are you ready to partner with IT on deep search, visualization technologies, the data corpus and security needs collaboratively?
- Do you need a testing and training center of competence focused on data quality? What about answer quality and content? From executive to field technician, do your teams have the education they need to do their jobs effectively?

Be an advocate – and early mover

As part of the process, you'll be advocating for unseen benefits and new approaches. Use data wherever possible to demonstrate your case – especially benchmarks. Focus on creating a new common language for the organization, and use it to track each initiative's progress.

Also realize that capturing improvement early on – especially in IoT and cognitive approaches – is crucial to potential revenue enhancement. These technologies allow dramatically increased insight that can help improve the quality of organizational decisions, prevent missteps and enable continuous improvement. Starting early delivers bottom-line enhancement faster. While warranty management improvement is the starting point, the finish line promises benefits across the entire organization.

Study approach and methodology

Data related to warranty management metrics, tools and practices was collected from 304 organizations in North America, South America, Europe, Asia Pacific and the Middle East and Africa in 2016. The survey was administered to warranty executives and managers, and the data was collected over the phone during two to three scheduled interviews. Respondents were permitted to provide answers for a segment of the business rather than at the enterprise level. APQC, a not-for-profit research organization with more than 30 years of experience with process and performance improvement and a global cross-industry membership base, managed the data collection process and performed logical and statistical validation.

About IBM Institute for Business Value Benchmarking Program

IBM is an international leader in business process performance measurement and optimization. The IBM Institute for Business Value provides business process benchmarking services that help clients measure their current state and compare performance against peers. These benchmarking services can be provided as part of a process transformation initiative or strategic engagement. This is a mature offering supported by robust content and specialized tools. Our patented custom survey method and toolset enable us to provide meaningful and accurate comparisons of performance tailored to the priorities of each client. Through our benchmarking program, organizations can measure their current state using the open standard Process Classification Framework; assess their performance against external peer groups such as industry, region, revenue or other criteria; and learn from leading practices, based on fact-based, data-driven comparisons and recommendations. For more information: <http://www-935.ibm.com/services/us/gbs/thoughtleadership/benchmarking.html>.

For more information

To learn more about this IBM Institute for Business Value study, please contact us at iibv@us.ibm.com. Follow @IBMIBV on Twitter, and for a full catalog of our research or to subscribe to our monthly newsletter, visit: ibm.com/iibv.

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Notes and sources

- 1 APQC analysis of electronics warranty data conducted in 2016: “Electronics Warranty – Data Summary Report.” APQC for IBM. 2016.

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