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**Editor's Note:** This column by [Kozyrkov](#) of Aculocity is the latest in an ongoing series of contributed editorial columns. Readers who are interested in authoring future contributed columns can [here](#) to see the [for Editorial Submissions](#) page.

## Warranty Management:

**Value and price are affected by product quality, which can be measured by fluctuations in warranty cost. But warranty is too often treated as merely a cost that must be reduced, without heeding its link to quality, price, and ultimately profits. And warranty is very different from accounting in that a big part of the job is using probability functions to predict the future.**

by Vadim Kozyrkov

The fundamental purpose of any business is to make a profit. A business makes a profit if the price it can charge for its output is greater than the costs of producing that output.

Thus, the concept of the Value Creation Chain could be introduced. The customer pays for the perceived value of a product. Hence, adding perceived value to the product increase profits.

Another way of increasing profits is by reducing the cost of value creation by performing activities more efficiently. This simple, on the surface, concept becomes enormously complex in almost every manufacturing business case, where the warranty process forms an integral part of the value creation.

### Warranty: An Important and Integral Part of Manufacturing

The concept of warranty and associated cost management is common to every manufacturing business. However, until recently, the importance of effective warranty management was normally neglected by businesses. Warranty was perceived as simply another necessary expense to be controlled, and no value creation was expected from this process. Hence, a reactive rather than pro-active approach was followed when it came to managing warranty processes. And this happens in spite the fact that in 2007, American manufacturers paid over \$28 billion in warranty-associated costs.

The sheer size of warranty costs and its direct influence on the bottom line profit require careful and pro-active management. The typical warranty pay-out for a manufacturing plant could range from 1% to 5%, and even up to 8% of sales.

What makes warranty management effective? Is it the control of warranty expenses? Not at all, since warranty managers are not in control of the size of the legitimate warranty payouts. Warranty expense occurs not because of poor warranty management, but rather because of poor product quality.

What needs to be tightly controlled is product quality and information about product failures. The warranty business

unit is clearly not responsible for product quality. The only costs warranty management is directly responsible for are the administration costs of transferring the warranty payouts to customers.

To have their warranty claims accepted, however, customers usually have to submit a detailed description of the product failure. This makes warranty the main repository of the incoming product problem information. The significance and the effectiveness of warranty management is then enhanced by how well and how quickly product problems could be identified and resolved. The more effective the warranty system is, the faster the process of product problem identification and resolution becomes, closing the loop and resulting in improved quality of the product.

Thus, the effectiveness of a warranty management system is linked to, and is inseparable from, the effectiveness of the overall process of product problem resolution and product quality. Value is added to a product when its quality is improved, since the customer is prepared to pay a premium to the added value.

## **Warranty Process Inhibitors**

A number of things stand in a way of effective warranty management.

1. Despite being an important part of the business, management of the warranty processes is often assigned to the finance department and is often considered to be a part of expense control, rather than an integral part of the value creation chain.
2. The common situation in the manufacturing industry is the absence of a standard off-the-shelf warranty system available for sale on the market. The main reason for this is that every manufacturing plant tends to have unique policies and procedures regarding the management of warranty processes. These policies depend on parameters such as available products, technological processes involved, the distribution network, quality of supplier chain, etc.
3. The absence of a standard approach to warranty management leaves warranty business units without powerful information delivery tools developed by IT industry leaders. The common situation is for a manufacturer to have warranty system that were built in-house, with limited functionality and ad-hoc developed reporting capabilities. Non-standard, homegrown systems are often difficult to integrate into existing production systems, since they require multiple systems and business interfaces with high associated development and maintenance costs.
4. The complexity of warranty data requires special handling, special data analyzing tools and special statistical skills by warranty personnel that are not common requirement in manufacturing environment.

## **Warranty Statistics**

The main feature that sets warranty process apart from most other business processes is that warranty requires a different approach to its data analysis.

In conventional business processes, for example in accounting, the information has a transactional basis and consists of a large number of small simple-logic steps. These transactions either happened or not, and seldom require anything more complex than the ability to add or subtract. All relationships between transactions are linear and could be reversed up to the initial step.

What makes warranty analytics unique and sets it apart from standard business statistics is the fact that warranty analysis uses predictions and requires statistics based on probability functions. This is completely different to the needs of accounting, which require repeatability and traceability above anything else. Imagine the reaction of accountants, auditors, tax collectors, police and, in extreme cases, federal investigators, if one decided to utilize probability functions for General Ledger accounting.

On the other hand, in the case of warranty, one needs to be able to predict the probability of something that might or might not happen, to ascertain its possible impact on the business, and to come up with the solution that will prevent it from happening in the future. Ironically, the majority of manufacturing businesses also employ the same statistics and techniques utilized in accounting for warranty analysis.

The Acu-FAST application developed by is an easily deployed and streamlined analytical tool that allows business managers to cover the process of problem discovery in a few easy steps. It gives the user the feeling of having a master's degree in statistics without requiring it. Acu-FAST based on solid statistical principles, provides four major features:

**1. Warranty drill-downs based entirely on accrual curves (warranty cost view).**

This feature allows a business manager to view and analyze warranty claims by relative comparison of the trends. One could start right at the top by selecting two product lines to compare and quickly drill-down to identify a specific problem area, whether this is a specific defect, a part number, a dealer, or a customer.

**2. Warranty drill-downs based entirely on accrual curves (number of defects view).**

This feature has similar properties to the previous section, but uses the number of defects as a base for building accrual curves, rather than the warranty costs. This provides an alternate investigation path to problem areas.

**3. Provision and Budget calculations**

This feature is designed to accomplish two financial functionalities:

- It calculates the amount that needs to be allocated to the warranty reserve (warranty provision) at any point in time as determined by a user (provision calculation). The warranty reserve is the amount a manufacturer is required to have on hand to make sure the warranty obligations it has made to its customers can be met, even if the company suddenly went out of the business. The provision could be determined at regular intervals and the warranty reserve adjusted accordingly; and
- It calculates future warranty pay-outs (the warranty budget) based on projected sales. This is different from the provision calculations in that it does not assume a manufacturer could go out of business. Instead, it calculates the warranty pay-outs by taking into consideration the change in product numbers under warranty for any future period of time. This could be used as a base for a warranty management performance evaluation.

## **"Bathtub" Function Calculations**

This unique analytical feature constructs the so-called "bathtub" functions for products. Any "bathtub" function has three distinct areas:

- "Infant mortality" – a decreasing failure rate area, characterized by the high number of defects that manifest themselves in the short period of time right after the start of a product's life-cycle. They are mostly attributed to broken manufacturing processes or to wrong or defective parts fitted into the product.
- "As designed" – an almost constant failure rate, where products behave according to their design. These defects are attributed to random factors.
- "Wear-and-tear wall" – an increasing failure rates area, where products approach their end-of-life period. It is very important that a manufacturer has the means to calculate this "wall," because extending the warranty period beyond it could be fatal to the business.

The ability to calculate the "bathtub" function is a unique feature of Acu-FAST product that sets it apart from other vendors in the area of Warranty Analytics.

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## About the Author:

Dr. Vadim Kozyrkov, "[warranty doctor](#)," has published more than 20 science papers cited by researchers from 15 countries; provided project management of ERP implementations (SAP and QAD); designed and implemented multiple IT systems and warranty systems, including early warning modules; Product Configurators; Electronic Parts Catalogs; Sales Order Entries; and electronic commerce applications.

Dr. Kozyrkov has been managing and developing applications for automotive industry since 1995; first with General Motors South Africa and then with the GVW Group of companies, including Workhorse Custom Chassis, Autocar Truck, and Union City Body Company.

After arriving in the United States he created a range of IT systems and applications for a number of manufacturing companies while serving as vice president of IT for GVW Holdings Corp.

He has extensive experience in ERP systems, data warehousing, product configuration and warranty management. His innovative methods of managing automotive warranty resulted in more than a 30% reduction in warranty expenditures at both GMSA and Workhorse, thus earning him the title of "the warranty doctor."

Prior to his tenure in Information Technology, he spent 10 years in physics as a Research Fellow for a number of institutions in the former USSR and South Africa, as well as lecturing advance physics courses at the University of Port Elizabeth, South Africa.

He received his Master's degree in physics and mathematics from Moscow State University in 1987, a Ph.D. in physics from University of Port Elizabeth, South Africa in 1994, his Bachelor of Arts from Port Elizabeth Technikon in 1998, and his Master of Business Administration degree in 2000.

