

CHAPTER **1**

# Overview

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Warranty costs are a significant burden for manufacturing companies. Traditionally, companies have seen warranty costs driven primarily by product quality and secondarily by repair network efficiency. However, there is another factor to be taken into account: As with many other fields of life, if there is a lot of money involved and an opportunity to get a part of that through fraudulent behavior, there will always be a small number of people or companies trying to take advantage of that. In our own client experience and in the news, we have seen the whole spectrum of warranty fraud, starting from a bit of sloppy procedures and occasional overcharging and ending with organized criminal activities in companies whose main business logic includes generating revenues through warranty fraud in addition to doing some real repair service activities.

Various parties can be involved with conducting warranty fraud: customers, sales channel, extended warranty or insurance policy brokers, service agents, warranty administrators, and even the manufacturer or warranty provider themselves.

The fraud done by the service network varies from opportunistic small-scale overbilling to fraud done by organized crime in industrial scale. Sources estimate that 3 to 15 percent of warranty billing is fraudulent (Arnum, 2015, AGMA and CompTIA, 2013, AGMA and PWC, 2009). Consequently, the overall amount of warranty fraud can be estimated to be at least US\$1 billion in the United States alone.

During the past 20 years, we have seen a lot of investment in warranty control with improved validation and analytics capabilities—with some companies. However, it looks like the overall picture hasn't changed that much. Although some companies recognize the problem and have taken prompt actions, many company representatives we talked with either have said they think it is a problem but they don't really know for sure or think that this is not an issue in their companies. And every now and then we read about well-known companies (e.g., Apple, Cisco, HP, IBM, Jaguar, Nissan, Nortel, and Nokia) engaging in lawsuits against companies or individuals for warranty fraud.

The devil is often in the details—at the higher levels, everything seems to be in place: validation rules, claim process, statistical data analysis, consumer entitlement—you name it. However, when you dig

a bit deeper, you notice big holes that some individuals or companies are ruthlessly taking advantage of.

In this book, we will focus on the different elements of warranty fraud and the fraud detection and prevention mechanisms that have worked with our clients. Where do you need rules-based claim validation? What is the role of statistical data analysis? What are the hurdles we have seen and the ways to overcome them?

## WARRANTIES

We often talk quite loosely about warranty without defining which type of warranty is in question. Is a certain product still under warranty? Does the warranty cover a certain type of service activity?

From the customer's perspective, warranty provides assurance and protection against early product failures—I am investing in buying this product and I haven't lost my investment, even if it breaks down shortly after the acquisition. For customers, the warranty promise sets certain expectations of what they are getting if they ever need to fix or return the products.

From the manufacturer's perspective, it can be a market tool to signal reliability and quality—the customer can be confident with our products performing as designed and not breaking prematurely. In the 1980s, Lee Iacocca and the Chrysler Corporation started their recovery largely through improved quality and stating that Chrysler had the best warranty in the industry, with the famous slogan, “If you can find a better car, buy it.” In a similar way, currently many automotive manufacturers are increasing the mileage coverage of their warranties. For instance, GM is advertising “a new level of confidence” and “all warranties are not equal” with its 100,000-mile warranty advertisement. However, especially with established producers, warranty is not a strong signal of quality. Many companies are offering different lengths of warranties for products with similar quality attributes to attract different customers with different risk profiles, where the more risk-averse customers may be ready to pay a premium for the longer warranty coverage (Chu and Chintagunta, 2009).

*Oxford Dictionary* defines *warranty* as: “A written guarantee, issued to the purchaser of an article by its manufacturer, promising to repair or replace it if necessary within a specified period of time.” Product warranty is a contractual agreement between the

provider and the customer. Thus, the idea is to protect both parties. Customers know that if there are problems with the product, they can turn to the provider for support. Providers spell out what they cover under warranty and also the limitations—that is, what is not covered.

There are several types and classifications of warranties, with different types of obligations for the warranty provider and rights for the warranty holder. The main types are the limited manufacturer warranty (base warranty), extended warranty, and maintenance service contract. The base warranty is usually provided by the manufacturer and is an inherent part of the product—that is, it can't be purchased separately and the product can't be purchased without it. Typically, the price of the base warranty can't be separated from the price of the product. Extended warranties and maintenance service contracts are optional and are always purchased separately from the manufacturer, retailer, maintenance service provider, or other third party.

All of these warranty types require service. The different types of warranty determine both if a certain service event is covered by warranty and who should ultimately carry the cost of the event. A solid warranty management system needs to be able to handle all of the different warranty and service contract types.

From the societal perspective, product liability laws and consumer protection laws have a significant impact on warranty providers. The minimum coverage for consumer products may be longer than, equal to, or in some cases shorter than the base warranty provided by the manufacturer. Statutory warranty and consumer protection legislation is mainly focusing on compliance, while limited manufacturer's warranty is an opportunity to differentiate if the warranty service is managed and delivered properly.

In general, warranty periods have become longer. For instance, in the automotive sector the base warranty was 90 days in the 1930s, whereas nowadays 3 years/100,000 kilometers is very common and we see warranties up to 7 or 10 years coverage.

## WARRANTY SERVICING

When a customer has an issue with a product under warranty, the warranty provider needs to restore the product to a working condition, replace the product with a working one, or provide a refund. In addition to rectifying the failures, warranty servicing may include preventive maintenance activities.

These activities involve several players carrying out different tasks, including service agents, customer service, part manufacturers, sales channel, and warranty administrators. Some of the players are internal to the warranty provider and others external.

Depending on the product and the selected servicing approach, warranty servicing can be executed through several channels and in several locations, potentially including reverse logistics for the defective products and parts and forward logistics for the repaired/replacement items. The main warranty servicing channels are:

- On-device diagnostics and customer self-service
- Remote service
- On-site service
- Return to a physical service front-end location
- Return to a physical service back-end location

## WARRANTY COSTS

Providing warranty coverage doesn't come free for the manufacturer. Offering warranty always implies additional costs associated with warranty service, typically ranging between 1 and 2 percent of product sales for manufacturing companies.

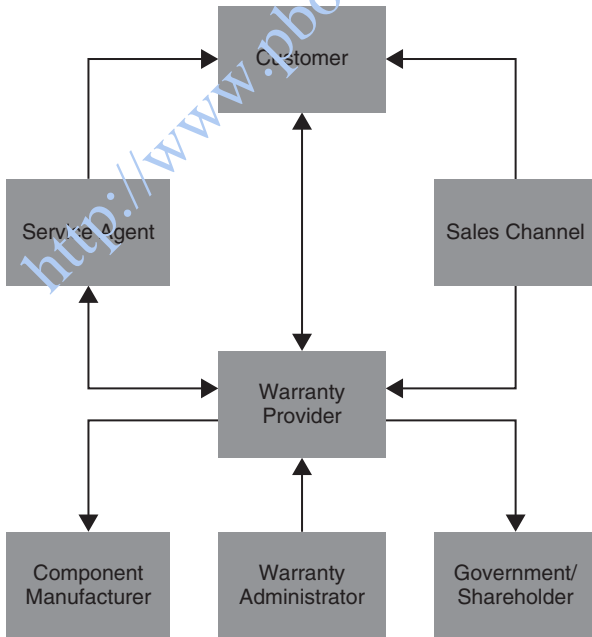
So how big is the warranty cost? It is impossible to say exactly how big, but the scale can be estimated. In the United States, the Securities and Exchange Commission (SEC) requires listed manufacturers to report their warranty costs and the reserves they have made for the future costs. However, these reported figures are not entirely comparable, since different companies calculate their warranty cost in different ways. What share of contact center, training, spare parts, online support, and so on is allocated to the warranty cost may vary across companies. In other countries outside the United States, companies don't necessarily need to report their warranty costs, so we haven't seen any global statistics. According to the SEC, US companies spent US\$29 billion on warranty claims in 2014. The worldwide warranty industry is approximately three times the US figure, about US\$90 billion (Arnum 2015).

Some companies take warranty as a cost of doing business and unavoidable. Others are managing their warranty costs to the detail and diligently working through every opportunity for warranty cost reduction.

## WARRANTY FRAUD

We don't believe that people in the warranty context would be any more honest or dishonest than other people in general. Unfortunately, this does mean that there are different parties in the field of warranty who are taking advantage of the loopholes in the practices and controls others have. They see the financial benefits to be gained and weigh that against the likelihood and consequences of getting caught. Both in our own client experience and in the discussions with industry experts we have had, we have seen the whole range of fraud and overbilling, starting from sloppy procedures and occasional, opportunistic small-scale overbilling to fraud done by organized crime on an industrial scale.

Warranty fraud can involve one or more fraudulent actors (fraudsters or perpetrators) and one or more victims. The main potential actors and victims are shown in Figure 1.1. The link between the two is shown by an arrow pointing in the direction of the victim.



**Figure 1.1** Fraudulent actors and victims of warranty fraud

The actors involved in warranty fraud have different motivations and reasons:

- Service agents may conduct fraud to stay profitable if warranty compensation is too low, terms and conditions are too tight, or requirements and preinvestments from service agents are too high. Fraud may also be opportunistic: earning of extra revenues if control mechanisms are perceived to be loose.
- Customers conduct fraud to get a free-of-charge repair and save money or grasp an opportunity to get replacement parts or products for free, which they can then use or sell further and get additional income.
- Sales channel may also be looking for extra revenue and improved profitability. It may also want to improve customer satisfaction at warranty provider's expense.
- Warranty administrators and warranty provider employees may conduct fraud to earn additional income.
- Warranty providers may see their warranty costs as excessive and try to limit warranty coverage or reclaim costs from their vendors to save costs resulting from warranty servicing. This can be the case especially when a major product issue is about to cause significant unexpected costs.

### Customer Fraud

Customer fraud may vary from an individual case to systematic generation of a large amount of cases. In the individual case, the customer typically doesn't want to make money, but rather wants to get out-of-warranty service to be done free of charge. Service may be needed as a result of an accident (the customer has dropped a mobile device on the floor or in water) or intentional actions (the customer is hacking the software parameters to get more horsepower in his/her car, resulting in physical problems and then restoring the factory settings once the problems occur). The customer may not even consider himself or herself as doing anything fraudulent, just trying to get the product fixed and avoid paying for it. In some more systematic cases, the customer may try to upgrade the product to a newer model by having so many warranty repairs that the product is

ultimately replaced with a new one. At the other end of the spectrum there are cases where the customer issues a large number of claims for replacement spare parts to be delivered as warranty service. The customer then sells them to others. These cases are not directed to getting anything fixed, but purely a mechanism for additional income, where the actors are typically fully aware of being engaged in criminal activities.

### **Sales Channel and Service Agent Fraud**

Sales channel and service agents can cheat the customer by selling unnecessary or uncovered extended warranties, or refreshing own inventory by giving used products or products of old model as replacement for unrepairable products and getting products of new model from the manufacturer.

Sales channel (when also acting as a service agent) and service agents may do goodwill service and additional product refurbishment to their own customers, and charge the cost of the service back to the manufacturer as warranty service. Again, in this case, the sales channel may think they are just providing good customer service, and don't see themselves doing anything wrong.

Service agents can also add cost elements to existing warranty service claims or invent totally new warranty service events, which actually never took place. In this category we have seen systematic, large-scale ruthless actions with a clear intent to generate as much unjustified billings as possible.

### **Warranty Provider Fraud**

In some extended warranty schemes, the customers are very aggressively sold extended warranty contracts, where the coverage of the manufacturer base warranty is already covering essentially the same that the extended warranty covers. So the customer pays for something already included in the product purchase. The majority of the potential problems are covered by the manufacturer's warranty service, so the extended warranty provider has revenues, but only limited additional costs.



## Producers of Fake/Fraudulent Products or Parts

Typically, the manufacturer warranty covers the products sold by the manufacturer and the parts used in warranty repair. The customer may have bought a fake product or spare part and may then be hit twice:

- The fake product typically has lower quality and breaks earlier.
- Once it breaks, it may come as a surprise that the genuine product manufacturer's warranty is not valid for that product. The seller and the manufacturer of the counterfeit product do still have their warranty obligations, but getting the related service may in practice turn out to be really difficult for the customer.

In some cases, the customer might intentionally claim warranty service from the manufacturer. Especially for noncritical parts, the customer may purchase counterfeit parts and then try to get them replaced or fixed under warranty when they fail.

## IMPACT OF WARRANTY FRAUD

What is the impact of warranty fraud to the industry? By its nature, fraud is hidden and only unsuccessful fraud is uncovered. We don't know what we don't know, and it is difficult to give exact figures of the impact of warranty fraud. Certainly in some industries there are more opportunities in the warranty chain (typically when sales volumes are high, service network is distributed and/or outsourced, end-customers interact with the external parties, there is limited traceability of products) than in others (when sales volumes are low, service is done in-house, there is high traceability). Thus, the impact of warranty fraud varies. It is estimated that 3 to 15 percent of the warranty costs are fraudulent (Arnum, 2015, AGMA and CompTIA, 2013, AGMA and PWC, 2009). With individual companies we have seen much higher figures. The total scale of warranty fraud is significant (billions of dollars) and is clearly having a direct negative consequence on the bottom line of the impacted companies.

## WARRANTY FRAUD MANAGEMENT

As there are many potential actors with many potential motivations and many potential fraudulent schemes, a one-size-fits-all warranty fraud control and avoidance mechanism doesn't exist. The warranty provider needs a combination of approaches, tools, and methods to detect and prevent fraud. We call this combination the warranty control framework. It includes four categories:

1. *Contracts* set the rights and duties between the warranty provider and the customer, the service agent, and other parties in the warranty chain. They form the basis for customer warranty claim entitlement and service agents' warranty service claim validation.
2. *Transaction controls* include the process and controls from the customer issue through servicing and financial settlement of the claim, the main elements being customer warranty entitlement, service agent claim validation, and material returns (part returns) control for defective materials.
3. *Analytics* identify customer warranty claims and warranty service claims with high likelihood of being incorrect, whether through fraud, abuse, or sloppy processes and identify service agents or customers with high deviations from expected performance.
4. *Service network* management supports fraud avoidance, sets the right network structure to minimize fraud opportunities, incentivizes service agents to right behavior, sets the rules of operation, drives performance, empowers the right people, audits service agents, and provides clear procedures in terms of what happens when a service agent gets caught.

## STUDY OF WARRANTY

There is a wide spectrum of angles toward warranty and a vast number of books and articles written on warranty-related topics:

- Legislation, legal issue, liability, and consumer protection
- Warranty cost management
- Warranty, quality, and reliability
- Warranty and marketing, influence on buying decisions

- Engineering
- Operations improvement

Some often-cited references worth mentioning include the following:

- Warranty overall: (Blischke and Murthy, 1996), (Brennan, 1994), (Murthy and Blischke, 2005)
- Warranty cost management: (Blischke and Murthy, 1994) and (Thomas and Rao 1999)
- Warranty, quality, and reliability (Thomas, 2006) and (Sahin and Polatogu, 1998)
- Extended warranties and maintenance service contracts: (Murthy and Jack, 2014)
- Warranty data and analysis: (Blischke et al., 2011), (Rai and Singh, 2009)
- Review and survey articles: (Djameludin, et al., 1996), (Thomas and Rao, 1999), and (Murthy and Djameludin, 2003)

However, there are a very limited amount of publications on warranty fraud—a few articles primarily from industry consortia, consulting companies, warranty software providers, and academia. As the subject is very sensitive, the articles in the newspapers and magazines are mainly about cases settled in court or cases that are big enough to force publicly listed companies to disclose them.

Some studies on warranty fraud include the following:

- “IT Industry Warranty and Service Abuse: Stealing Profitability! Core Issues, New Solutions and Emerging Threats” (AGMA and CompTia, 2013)
- “Service Blues: Effectively Managing the Multibillion-Dollar Threat from Product Warranty and Support Abuse” (AGMA and PWC, 2009)

Research papers on analyzing specific methods of warranty fraud include:

- “A Data Warehouse Design for the Detection of Fraud in the Supply Chain Using the Benford’s Law” (Kraus and Valverde, 2014)
- “Spare Parts Dispatch Fraud Detection Analysis” (Verma and Rajendran, 2015)

## GOALS OF THE BOOK

This book has three primary goals:

1. Increase the awareness and understanding of warranty fraud.
2. Provide concrete and practical methods for warranty fraud management.
3. Describe a holistic approach for how to improve or implement methods for warranty fraud management.

We want to increase the general awareness of the different actors executing warranty fraud, their motivations, and fraud schemes. We also want to raise awareness of the scale and impact of fraud.

Warranty fraud is not a mandatory cost of doing business, but something worth taking determined action to avoid, detect, and manage. In the interviews for this book and in our discussions with companies we have heard too often:

- “There may be something peculiar happening, but we really don’t know what it is.”
- “This is not an issue for us. We trust our partners, and they would never cheat us.”

For those who have the awareness, we want to provide concrete examples and ways to identify, to avoid, and to deal with warranty fraud. Although we try to cover all main fraudulent parties and all main victims of fraud, our main focus is on the manufacturers/warranty providers as victims and on the ways they can manage the situation.

This book is primarily targeted for warranty practitioners. Since there is a total whitespace in the literature on this topic, we hope it will be of relevance in the academic world and bridge the gap between industry and academia.

## STRUCTURE OF THE BOOK

The chapters can be divided into two groups:

- Chapters 2–5 introduce the basic concepts of warranty and warranty management, providing the foundation for the rest of the book.
- Chapters 6–13 deal with warranty fraud, the main focus of the book.

Chapter 2 discusses products and warranty as concepts. The correlations between product performance, failures, and reliability are discussed, followed by the role of warranty, and different types and classification of warranties.

The products under warranty need servicing. Chapter 3 describes the warranty servicing process, as well as channels and parties in a warranty service network. Contracts are an important element of and enabler for effective warranty management and also discussed here.

Warranty servicing incurs costs for the warranty provider. Chapter 4 discusses the underlying factors of warranty costs, warranty cost metrics, and warranty cost forecasting and management.

Chapter 5 looks at warranty management from the product life-cycle perspective: What are the key decisions to be made at different stages of product life cycle, and from the service life-cycle perspective, how to manage the warranty process from the issue with the customer product to providing warranty service, managing the claims process, and related invoicing and payments.

Chapter 6 introduces the different methods to conduct warranty fraud and classifies fraud methods by actors, victims, and motivation.

Chapter 7 introduces a generic framework for a manufacturing company to manage warranty fraud.

Chapter 8 deals with specific methods that warranty providers can use for avoidance, detection, and management of fraud by customers.

Chapter 9 deals with specific methods that warranty providers can use for avoidance, detection, and management of fraud by service agents.

Chapter 10 deals with specific methods that warranty providers can use for avoidance, detection, and management of fraud by other parties (sales channel, warranty administrator, warranty provider internal fraud).

Chapter 11 takes a holistic view of the customer service process and service organization and looks at warranty provider strategies to influence warranty management in general and warranty fraud management in particular.

Chapter 12 outlines an initiative to improve warranty fraud management capabilities. It describes the key considerations from understanding the as-is situation through defining warranty policies and rules, building the capability, and implementing the changes needed.

Chapter 13 is an epilogue that concludes the book and looks at various issues such as new approaches, potential impact of new technologies, and ideas for future research.

## NOTE

1. Service front-end refers to service locations, which are in direct contact with the customer (field-service onsite at the customer location, a service center, where the customer can return the product for service), online or remote service. Service back-end refers to service locations, which are typically only in contact with the service front end, not with the customer.

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