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From Defect to Redesign: Software Product Management Insights from the Galaxy Note 7 Incident

Declaration

We hereby declare that this report is the original work of our team. All team members have contributed equally to its preparation, ensuring active participation in its research, analysis, and completion.

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Executive Summary

The Samsung Galaxy Note 7 incident serves as a pivotal case study in software product management, highlighting the challenges of managing complex hardware-software integration in high-stakes product launches. The failure, primarily caused by battery defects leading to overheating and fires, resulted in a global recall and a significant blow to Samsung's reputation. The Galaxy Note 7 failure offers invaluable lessons for software product managers, emphasizing the delicate balance between innovation, quality, and customer satisfaction in a competitive market. This report examines the incident from a software product management perspective, emphasizing critical lessons in product development, testing, and crisis management.

Introduction

The Samsung Galaxy Note 7 incident serves as a pivotal case study in software product management, illustrating the profound impact that product failures can have on a company's reputation, consumer trust, and overall market position. Launched in 2016, the Galaxy Note 7 was initially celebrated for its innovative features; however, it quickly became infamous due to reports of battery explosions, leading to a global recall and eventual discontinuation of the device. This incident not only highlighted significant lapses in product safety and quality assurance but also raised critical questions about Samsung's closed innovation strategy and its implications for risk management and crisis communication. The objective of this report is to synthesize insights from various scholarly papers and industry analyses regarding the Galaxy Note 7 failure. By examining the intersection of product management, quality assurance, and crisis response strategies, this report aims to provide a comprehensive understanding of the factors that contributed to the incident and the lessons learned for future product development. To achieve this, we will outline our search terms and selection criteria for relevant literature, summarize key findings from selected studies, and analyze the broader implications for software product management. This report will also discuss how the Galaxy Note 7 incident exemplifies the challenges faced by organizations in balancing innovation with safety and consumer trust in an increasingly competitive market. In summary, this report seeks to provide actionable insights for product managers by exploring how defects can lead to redesigns and improvements in processes, ultimately fostering a culture of continuous improvement within organizations operating in high-pressure environments.

Objective of the Report

The report titled **"From Defect to Redesign: Software Product Management Insights from the Galaxy Note 7 Incident"** aims to analyze how the product management team at Samsung addressed the significant challenges posed by the Galaxy Note 7 battery explosion incident. This study evaluates the strategies implemented to manage the crisis, including the handling of recalls, quality assurance measures, and communication with stakeholders. By examining these strategies, the report seeks to understand the decisions made throughout the product's lifecycle and their impact on mitigating the crisis and restoring customer trust.

The objective of this report is to analyze the multifaceted failure of the Samsung Galaxy Note 7 through the lens of software product management, drawing insights from various scholarly papers and industry analyses. Specifically, it aims to investigate whether Samsung's closed innovation strategy contributed to the Galaxy Note 7's withdrawal from the market and assess the associated costs and benefits of this approach. The report will identify key factors leading to the failure, focusing on quality assurance, risk management, and crisis communication strategies employed during and after the incident. Furthermore, it seeks to provide actionable insights and recommendations for product managers in high-pressure environments, emphasizing the importance of balancing innovation with safety and consumer trust. By synthesizing relevant literature related to the Galaxy Note 7 incident, this report aims to highlight key findings and themes that inform best practices in software product management, ultimately contributing to a deeper understanding of how product failures can occur in complex technological landscapes.

This comprehensive analysis not only sheds light on Samsung's internal processes during a critical period but also serves as a valuable case study for other organizations navigating similar challenges in product management and crisis response.

Search Terms

Date of Search	Search Terms	No. of hits	First level subjective filter	Number of papers	Title of the papers being considered for the report
7 Nov	Samsung note 7 issue case study filetype:pdf	5,89,00,000	17	2	1. Crisis PR Study on Samsung Galaxy Note 7 Explosion Incident 2. A Critical Case Report of Samsung Note 7 Recall
8 Nov	Note 7 Explosion and Withdrawal	20,20,000	12	1	3.Benefits and Costs of Closed Innovation Strategy: Analysis of Samsung's Galaxy Note 7 Explosion and Withdrawal Scandal
8 Nov	Samsung note 7 product management	5,89,00,000	10	1	How Did Samsung Overcome the Galaxy Note 7 Crisis? Pepper Content
8 Nov	note 7 issue Samsung official site	58,00,00,000	15	1	[Infographic] Galaxy Note7: What We Discovered – Samsung Global Newsroom
8 Nov	note 7 battery site: samsung.com	83,000	20	1	[Infographic] Galaxy Note7: 8-Point Battery Check and Multi-layer Safety Measures

Selection Criteria

1. Search Term: Samsung Note 7 Issue Case Study filetype:pdf

Papers Selected:

- **“Crisis PR Study on Samsung Galaxy Note 7 Explosion Incident” by Wen jing Zhang**

This document is available on ResearchGate and published in the International Journal of Business and Management. It offers a comprehensive analysis of the Samsung Galaxy Note 7 crisis, focusing on crisis management, product failures, and effective redesign strategies.

- **"A Critical Case Report of Samsung Note 7 Recall" by Tianlan Lan**

This is an academic research paper that includes content sourced from official Samsung pages, making it a credible resource.

2. Search Term: Note 7 Explosion and Withdrawal

Article Selected: Benefits and Costs of Closed Innovation Strategy: Analysis of Samsung's Galaxy Note 7 Explosion and Withdrawal Scandal

Selection Criteria:

This document is available on ResearchGate, a social networking platform for sharing academic papers. The paper provides in-depth analysis on management strategies, costs, and innovations, specifically focusing on Samsung's closed innovation approach and the consequences of the Galaxy Note 7 explosion and its subsequent withdrawal from the market.

3. Search Term: Samsung Note 7 Product Management

Article Selected:

"How Did Samsung Overcome the Galaxy Note 7 Crisis?" | Pepper Content

Selection Criteria:

The article addresses the crisis from a business and management perspective. It provides a structured analysis and is both informative and relevant to product management strategies.

4. Search Term: Note 7 Issue Samsung Official Site

Article Selected:

"[Infographic] Galaxy Note7: What We Discovered" – Samsung Global Newsroom

Selection Criteria:

The purpose of this search was to find an official response to the issue. This

article, published on Samsung's official website, provides a clear explanation of the incident with detailed content and images.

5. Search Term: Note 7 Battery site: samsung.com

Article Selected:

"[Infographic] Galaxy Note7: 8-Point Battery Check and Multi-layer Safety Measures" – Samsung Global Newsroom

Selection Criteria:

The search aimed to find Samsung's acknowledgment of the issue and their solutions to regain customer trust. This article outlines the quality measures implemented by Samsung, explaining the structured processes they introduced to ensure battery safety after the crisis.

Summary of Selected Literature

1.Literature Name: Crisis PR Study on Samsung Galaxy Note 7 Explosion Incident ^[1]

Summary:

This paper **"Crisis PR Study on Samsung Galaxy Note 7 Explosion Incident"** analyzes Samsung's handling of the Galaxy Note 7 explosion crisis, focusing on its crisis public relations (PR) strategies and their outcomes. The study provides insights into effective crisis management practices and highlights areas where Samsung's response fell short.

Key Findings:

1. The Incident:

- The Note 7 launch in 2016 initially garnered significant attention due to its innovative features but quickly turned disastrous due to reports of overheating and explosions caused by defective batteries.

2. Crisis Timeline and Responses:

- Samsung issued a recall for 2.5 million devices after the initial incidents, promising replacements that were later found to have similar defects.
- A second recall followed, culminating in the discontinuation of the Note 7 production and a public apology.

3. Failures in Crisis PR:

- Delayed Response: Samsung's initial downplaying of incidents caused a loss of public trust.
- Inconsistent Messaging: Changing explanations about the cause of explosions created an image of dishonesty.
- "Double Standards" in Treatment: The Chinese market, initially excluded from recall programs, felt unfairly treated, leading to a loss of brand loyalty.

4. Damage to Reputation:

- Samsung faced significant financial losses, with a decline in sales, reduced market share, and an erased market value of over \$20 billion.
- The company's brand image suffered, especially in critical markets like China.

How Samsung dealt with the situation:

Press Conference (September 2, 2016):

- Samsung apologized publicly and announced a recall of 2.5 million Note 7 devices.
- Sales were temporarily halted, and replacement phones were declared safe.

App Update (September 20, 2016):

- Released an update to limit battery charging to 60% to reduce overheating risks.

Expanded Recall Program:

- Included replacement phones and Chinese market devices after further explosions.

- Offered refunds or alternative devices (Galaxy S7 or S7 Edge) with incentives.

Ceased Sales:

- Following bans from airlines and major U.S. carriers, Samsung halted sales and production of Note 7.

Root Cause Disclosure (January 2017):

- Revealed that battery defects (manufacturing flaws and welding burrs) caused explosions.

Recommendations:

1. **Crisis Awareness:** Organizations should recognize early warning signs to prevent escalation.
2. **Consistent and Transparent Communication:** Providing accurate and timely information is critical to maintaining public trust.
3. **Equal Treatment of Stakeholders:** Fair treatment across markets is essential for sustaining global credibility.
4. **Quality Control Emphasis:** Robust product testing and quality assurance processes are vital to avoid crises.

2.Literature Name: Benefits and Costs of Closed Innovation Strategy: Analysis of Samsung's Galaxy Note 7 Explosion and Withdrawal Scandal ^[6]

Summary:

The paper titled “**Benefits and Costs of Closed Innovation Strategy: Analysis of Samsung's Galaxy Note 7 Explosion and Withdrawal Scandal**” aims to analyze the implications of Samsung's closed innovation strategy in relation to the Galaxy Note 7 crisis. It seeks to answer critical questions regarding whether this approach contributed to the device's withdrawal from the market and to evaluate the associated costs and benefits. By focusing on business administration aspects rather than the technical causes of the explosions, the study aims to provide insights into Samsung's innovation strategies and their impact on the company's reputation and market position.

Key Findings

1. **Closed Innovation Triggered Withdrawal:** The research indicates that Samsung's closed innovation strategy significantly contributed to the Galaxy Note 7's withdrawal from the market.
2. **Costs of Closed Innovation:** The study identifies substantial costs associated with this strategy, including reputational damage, financial losses, and erosion of consumer trust.
3. **Benefits of Closed Innovation:** Despite its drawbacks, closed innovation allowed Samsung to maintain control over technology development in the short term.
4. **Internal Impact:** The explosions had profound internal impacts on Samsung Electronics, affecting employee morale and organizational processes.
5. **Need for Open Innovation Investment:** Successful open innovation strategies require significant investment to yield strong effects, highlighting a need for a balanced approach.

3. Literature Name: A Critical Case Report of Samsung Note 7 Recall ^[2]

Summary:

The Samsung Note 7, launched to compete with Apple's iPhone 7, faced reports of battery explosions shortly after release, leading to two recalls and eventual discontinuation. The recalls caused significant financial losses and damaged Samsung's reputation.

Causes of the Recall:

- **Corporate Strategy:** Samsung's "fast follower" strategy, aimed at rapid product launches, created immense production pressure, leading to compromised quality control.
- **Battery Issues:** Batteries from two suppliers (SDI and ATL) had distinct quality problems, such as internal short circuits and insufficient insulation.
- **Time Pressure:** The rush to release the Note 7 before the iPhone 7 and to replace faulty batteries quickly resulted in insufficient testing of replacements.
- **Crisis Management Failures:** Samsung's selective recall approach in China and dismissive handling of consumer concerns in the region further eroded trust and market share.

Key Findings:

- Samsung's innovation model, combining closed and open practices, wasn't the root cause of the recall.
- The aggressive marketing and production timeline significantly contributed to quality control lapses.
- Poor crisis management, especially in culturally sensitive markets like China, exacerbated the damage.

Recommendations for the Smartphone Industry:

- **Enhance Quality Control:** Implement rigorous checks across the supply chain and improve supplier design awareness.
- **Balance Speed and Quality:** Ensure thorough testing without compromising timelines.
- **Improve Crisis Management:** Establish transparent, culturally sensitive, and effective response mechanisms.
- **Adopt Open Innovation:** Foster external collaboration to enhance competitiveness and differentiation.

The Samsung Note 7 recall serves as a critical reminder of the need for balanced decision-making, robust quality assurance, and effective crisis management to maintain trust and reputation in the competitive tech market.

4. Literature Name: How Did Samsung Overcome the Galaxy Note 7 Crisis? | Pepper Content

Summary:

Introduction

In August 2016, Samsung, a global leader in electronics, faced a major crisis with its Galaxy Note 7 smartphone. Initially launched to high acclaim, the device soon became infamous for severe battery malfunctions that caused overheating and explosions. The crisis escalated further as airlines banned passengers from carrying the device unless it was powered off.

Samsung initially attributed the issue to manufacturing defects in certain units and launched a recall program. However, replacement devices also exhibited similar failures, forcing Samsung to conduct an extensive investigation. The findings revealed the root cause to be critical battery malfunctions, prompting the company to halt production and sales of the Galaxy Note 7. This crisis significantly impacted Samsung's reputation and marked one of the most challenging moments in its history.

Crisis Management Approach

- **Accountability:** Samsung promptly acknowledged the issues publicly, accepting responsibility for the crisis.
- **Proactivity:** The company quickly initiated a recall program and disabled the charging function of the devices through software updates to prioritize consumer safety. The cost of the recall was approximately six billion dollars.
- **Thorough Investigation:** Samsung established a dedicated testing laboratory where extensive assessments of phones and batteries were conducted to understand the failures.
- **Improved Quality Checks:** In response to the crisis, Samsung implemented enhanced quality and safety procedures across all manufacturing processes.
- **Process Enhancements:** The company improved its manufacturing protocols and overall operations to reduce defects in future smartphone launches.

Learnings and Outcomes

From the Galaxy Note 7 crisis, several key lessons emerged:

- Acknowledging problems swiftly helps restore trust.
- Quick and decisive actions, including recalls and halting production, are critical during a crisis.
- Sharing safety learnings can positively influence industry standards.
- Identifying the root cause is essential for effective crisis management.
- Effective communication with customers fosters trust and transparency.
- Applying lessons learned improves future product development.

Despite the significant setback caused by the Galaxy Note 7, Samsung's robust response and commitment to learning from its mistakes allowed the company to recover and strengthen its brand reputation. The crisis highlighted that while failures can challenge a brand, they also provide opportunities for improvement and growth. Samsung's effective management of the crisis reinvigorated customer loyalty and reinforced the brand's commitment to quality and safety.

5.Literature Name: [Infographic] Galaxy Note7: What We Discovered – Samsung Global Newsroom

Summary:

Samsung's Galaxy Note7 faced a significant product failure due to battery-related safety incidents. Samsung conducted an extensive investigation covering hardware, software, and related processes. This was complemented by independent analyses from industry experts, including UL, Exponent, and TUV Rheinland.

Findings

The investigation pinpointed the battery as the root cause of the incidents:

1. **Battery A:** Manufacturing defects, including a deformation in the battery cell's corner, caused the negative electrode to be misaligned, leading to thermal instability.
2. **Battery B:** Welding defects on the internal cell separator caused direct contact between the positive and negative electrodes, resulting in short circuits.

Resolution

Samsung implemented new quality assurance measures, enhancing both design and manufacturing processes. These included:

- **8-Point Battery Safety Check:** A rigorous testing protocol to ensure battery reliability and safety.
- **Product Quality Enhancements:** Improvements in hardware design, including more spacious battery compartments and higher safety margins.

Impact and Lessons Learned

The Note7 incident highlighted critical lessons in product safety, manufacturing oversight, and the importance of quality assurance in product development. Samsung's response focused on restoring consumer trust through transparency and improved safety standards.

6.Literature Name: [Infographic] Galaxy Note7: 8-Point Battery Check and Multi-layer Safety Measures ^[6]

Summary:

The Samsung Galaxy Note 7 crisis led to the implementation of a robust 8-Point Battery Safety Check and multi-layer safety measures to prevent similar incidents in the future. These measures focused on improving quality assurance across the product lifecycle. Here's a summary of the steps Samsung took:

1. 8-Point Battery Safety Check: This comprehensive testing protocol includes:

- Durability tests, X-ray inspections, charge/discharge tests, and accelerated usage tests.
- Manual inspections to detect potential flaws and ensure battery safety at the component level

2. Multi-Layer Safety Measures:

- Enhanced hardware design standards to ensure better battery safety.
- Improved software algorithms to regulate charging temperature and duration.
- Strict material sourcing protocols to maintain high quality

3. Independent Oversight:

- Formation of a Battery Advisory Group consisting of industry experts from top institutions like Stanford and Cambridge. This ensures ongoing innovation and safety improvements in lithium-ion batteries

These initiatives not only restored public confidence but also set new industry benchmarks for battery safety.

Analysis and Discussion

In this section, we present our analysis of Samsung's approach to the Galaxy Note 7 crisis. We examine the product management failures that led to the incident, the crisis communication strategies employed, and the measures introduced to rebuild trust. By discussing key actions, such as the global recall, the introduction of an 8-point battery safety check, and enhanced quality assurance, we assess the effectiveness of Samsung's efforts and the long-term implications for its brand and product strategy.

Why did it happen: The Cause?^[5]

Based on a detailed analysis of the affected batteries, both Battery A from the 1st recall and Battery B from the 2nd recall, Samsung identified separate factors that originated in and were specific to the two different batteries.

Main Cause for **Battery A** (made by **Samsung SDI Co.**): A short circuit within the battery may occur when there is damage to the separator that allows the positive and negative electrodes to meet within the jellyroll. (Figure 1 & 2)

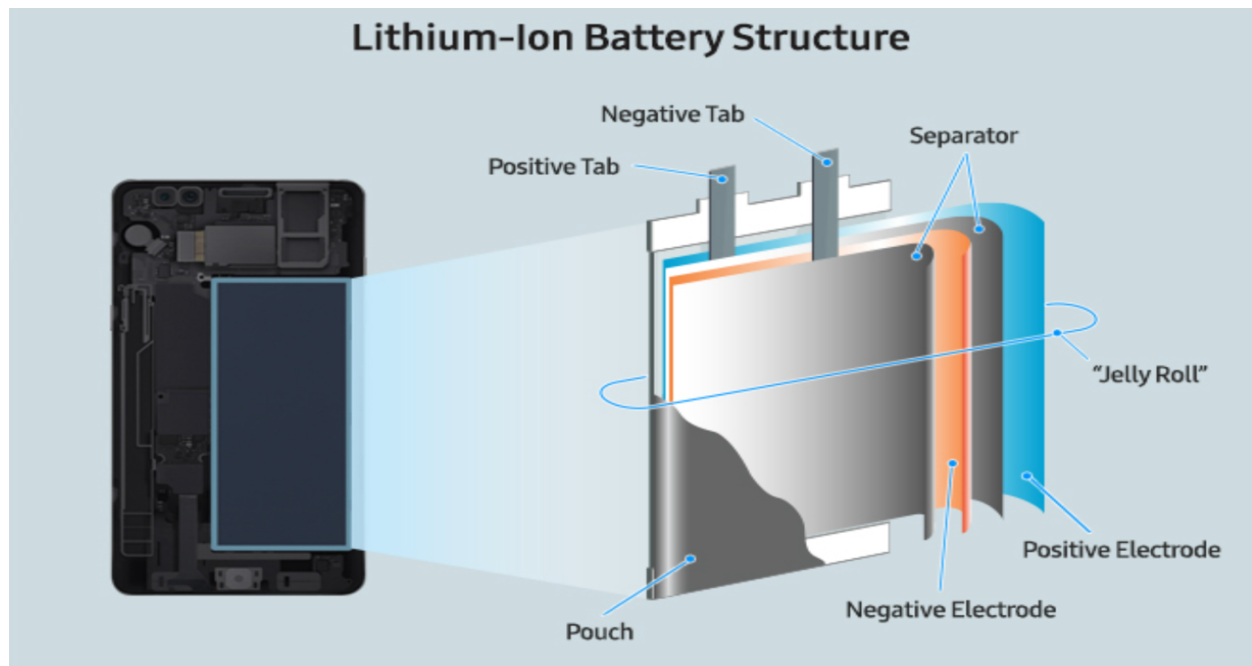


Fig 1: Structure of note 7's battery

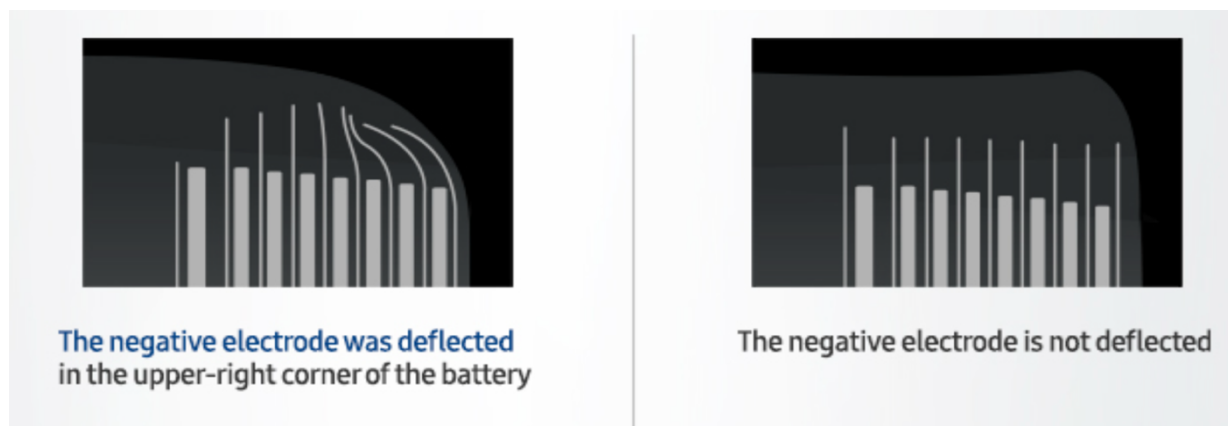


Fig 2: “Battery A” main cause: Deflected negative electrode

The main cause of the defect in **Battery B** (supplied by **Amperex Technology Limited**) was welding burrs—small metal projections left over from the manufacturing process. These burrs were present on the positive electrode tab and caused it to meet the negative electrode. This contact led to internal short circuits, overheating, and, in some cases, fires. (Figure 3)

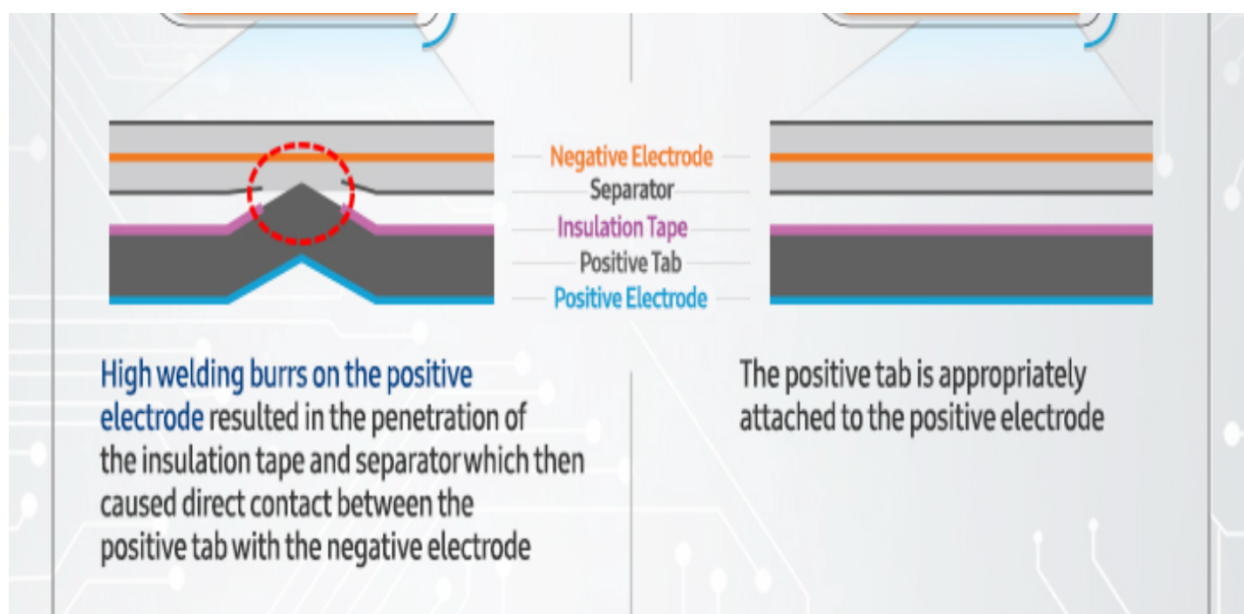


Fig 3: “Battery B” Main cause: Welding burrs

What measures did Samsung implement to prevent the recurrence of such incidents?

After the Galaxy Note 7 failure, Samsung implemented an **8-Point Battery Safety Check**, including tests like durability, X-ray, and charge/discharge monitoring, to enhance battery safety. They also formed a **Battery Advisory Group** of external experts and involved independent third-party evaluations to ensure top-notch safety and quality standards. [6]

8-Point Battery Safety Check

Since the Galaxy Note7 recall, we've re-assessed every step of the smartphone manufacturing process and developed the 8-Point Battery Safety Check. It involves putting our batteries through extreme testing, inside and out, followed by careful inspection by X-ray and the human eye. We are making a stronger commitment to safer devices.

8-Point Battery Safety Check Test

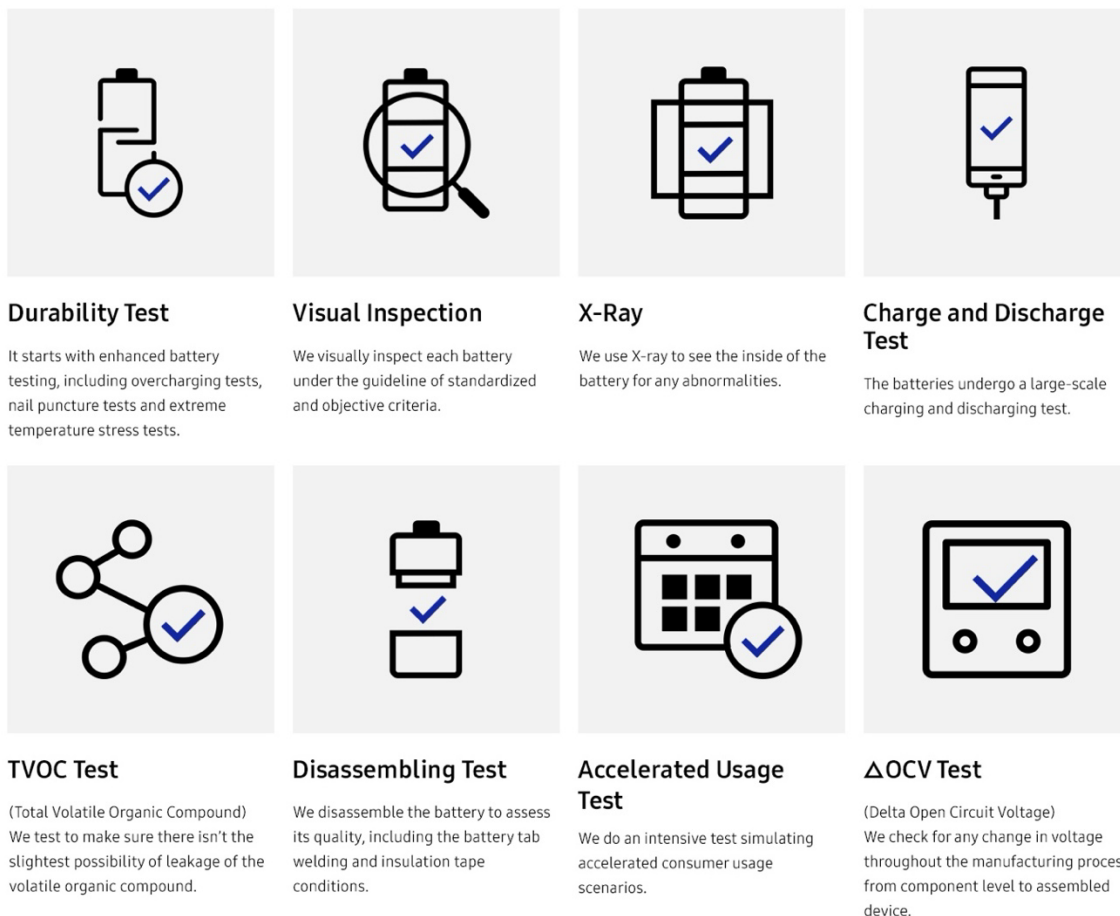


Fig 4: Point Battery Safety Check

Whose mistake, was it?

The Samsung Galaxy Note 7 failure was not the result of a single individual's or department's mistake but rather a combination of systemic issues and organizational decisions across multiple levels.

1. **Design and Manufacturing:** Flawed battery designs (from Samsung SDI and Amperex) and inadequate stress testing led to defects.
2. **Product Management:** Aggressive launch timelines prioritized speed over quality assurance, with poor risk assessment.
3. **Executive Leadership:** Pressure to innovate rapidly overshadowed safety considerations.
4. **Crisis Management:** Delayed, inconsistent communication and unequal treatment of markets worsened public trust.

How did Samsung rebuild trust with its customers?

1. **Accountability:**
 - Samsung quickly acknowledged the issue, held a press conference, and admitted they were investigating the cause of the explosions.
2. **Proactive Measures:**
 - Initiated recalls of both original and replacement phones, sent safety alerts, and collaborated with telecom companies to disable devices, prioritizing user safety.
3. **Thorough Investigation:**
 - Built a lab with 700 researchers to test 200,000 phones and 30,000 batteries, identifying battery flaws as the root cause.
4. **Enhanced Quality Checks:**
 - Introduced a multi-step safety and quality process and made internal changes to prevent future issues.
5. **Process Improvement:**
 - Revamped manufacturing processes, ensuring future smartphones underwent rigorous testing with fewer defects.

These actions helped Samsung restore customer trust and reinforce its commitment to quality and safety.

Product management failed in Samsung's Case?

Here are a few points on how product management team failed:

1. Inadequate Quality Assurance:

- The failure to identify battery defects during the development and testing phases reflects a lack of rigorous quality assurance processes. This oversight allowed faulty batteries to reach consumers, leading to overheating and explosions.

2. Aggressive Time-to-Market Strategy:

- Samsung's push to launch the Note 7 ahead of competitors compromised essential testing and validation processes, prioritizing speed over safety.

3. Poor Risk Management:

- Insufficient contingency planning for potential product failures left Samsung unprepared to manage the crisis effectively from the outset.

4. Inconsistent Communication:

- During the crisis, Samsung provided conflicting explanations for the explosions, damaging its credibility and public trust.

5. Neglect of Market-Specific Concerns:

- The "unequal treatment" of the Chinese market, where Samsung delayed recalls and downplayed risks, alienated customers and caused significant reputational harm.

6. Failure to Address Root Causes Early:

- Despite initial recalls, Samsung failed to thoroughly identify and address the root cause of the battery defects, leading to further explosions in replacement devices.

These shortcomings highlight critical lapses in Samsung's product management approach, which ultimately magnified the scale and impact of the crisis.

Conclusion:

The Samsung Galaxy Note 7 incident underscores the critical role of effective software product management in navigating the complexities of high-stakes product development. The crisis revealed how insufficient quality assurance, a rushed time-to-market strategy, and ineffective communication can lead to catastrophic consequences, including significant financial losses, reputational damage, and loss of consumer trust.

This report highlights how Samsung's closed innovation strategy and its prioritization of rapid innovation over robust risk management contributed to the failure. Despite these challenges, the company's subsequent efforts, such as implementing enhanced safety protocols and restructuring crisis response strategies, demonstrate how organizations can recover and rebuild trust after a failure.

Key lessons from this analysis emphasize the importance of balancing innovation with thorough quality assurance, proactive risk assessment, and transparent stakeholder communication. These insights serve as actionable guidelines for product managers, particularly in industries where technological complexity and competitive pressures demand a careful alignment of product development goals with consumer safety and reliability.

The Galaxy Note 7 case remains a landmark example of how product failures can arise and offers valuable lessons for avoiding similar pitfalls in the future. For organizations operating in dynamic, high-pressure environments, the ability to integrate these learnings into their product management practices is essential for long-term success.

References:

- [1] Crisis PR Study on Samsung Galaxy Note 7 Explosion Incident by Wen ji ng Zhang
- [2] A Critical Case Report of Samsung Note 7 Recall by Tianlan Lan
- [3] How Did Samsung Overcome the Galaxy Note 7 Crisis?
- [4] [Infographic] Galaxy Note7: What We Discovered
- [5] [Infographic] Galaxy Note7: 8-Point Battery Check and Multi-layer Safety Measures
- [6] Benefits and Costs of Closed Innovation Strategy: Analysis of Samsung's Galaxy Note 7 Explosion and withdrawal Scandal

Appendix

Key sentences from [1]

- According to Xinhua Dictionary, crisis refers to “a situation in which the threat and opportunity co-exist”. Specifically, if corporations or individuals can make quick and accurate response to emergency events, the crisis could be turned into an opportunity.

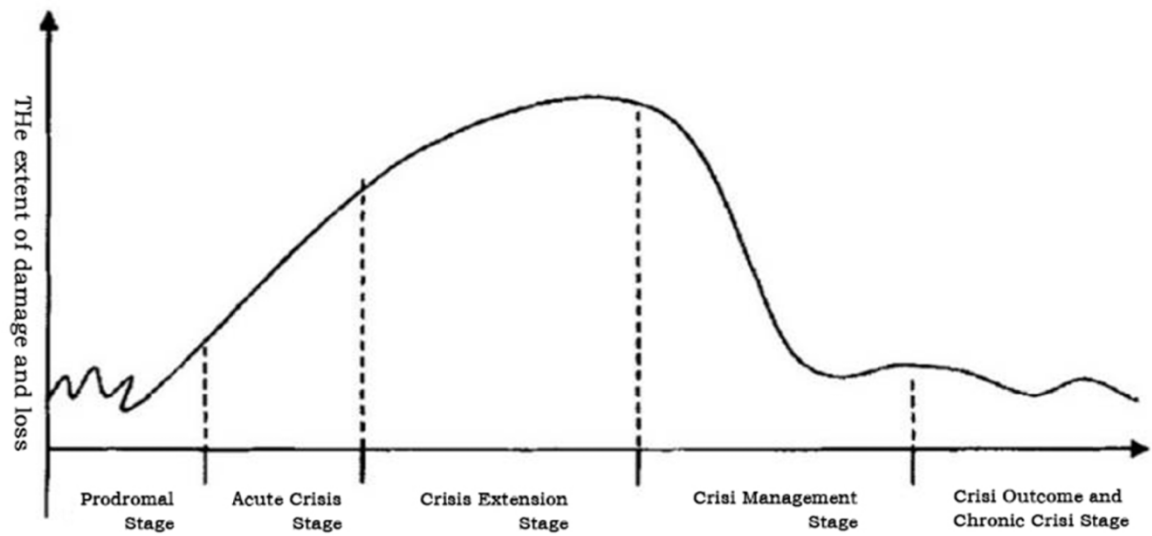


Figure 1. Development stages of crisis

- The Chinese market is not included in the first-round recall plan and the note 7 was still being sold in Chinese market. Samsung claimed that it's the battery deficiency that makes the phone overheat or even explode and the note 7 sold in China have a different battery supplier, therefore are safe from exploding.
- Due to safety concerns, many airlines have banned note 7 from their flights.