

Effectiveness of Trust Repair Strategies in the Crisis of Corporate Internet Public Opinion

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Abstract: In the Internet environment, the network public opinion of corporate quality defects will cause enterprises to fall into the crisis of consumer trust. Enterprises often choose to issue announcements to deal with public opinion. Can an announcement release effectively restore trust? Are there differences in the effectiveness of different strategies in the announcement? It has become an urgent problem to be explored in the management of corporate public opinion crisis. This study takes the three corporate defect events exposed at the March 15th Evening Party as cases, and crawls the online comments and corporate response announcements on the microblogs about defect events. First, the sentiment analysis is used to calculate the emotional strength of the defect events. Secondly, the content analysis method is used to classify the trust repair strategies of the enterprise announcements. Finally, by constructing the trust repair strategy effectiveness model, the effectiveness of the trust repair strategy adopted by enterprises in different evolution stages is analyzed. The results show that in different stages of public opinion evolution, the release of response announcements can effectively enhance the emotional intensity of consumers. Moreover, in the emergency period, the relationship repair strategy is more effective; in the sustained period, the informational repair strategy is more effective; in the regression period, the functional repair strategy is more effective. Through practical cases, the research explores the effectiveness of enterprise trust repair strategy under the network public opinion crisis, expands the research content of enterprise network public opinion field, and provides strategic advice for enterprise public opinion crisis management.

Keywords: Trust Crisis, Internet Public Opinion, Sentiment Analysis, Trust Repair Strategy

1. Introduction

New online social media is gradually becoming the mainstream platform for the public to comment and express emotions. These new social media have the characteristics of large number of users and fast information dissemination, and their social influence far exceeds that of traditional media [1]. In this context, when a company's product quality or service defect occurs, the consumer's communication and interaction on social media quickly disseminates the defect information, thereby forming corporate public opinion, which greatly destroys consumer trust and puts the company into a crisis of trust [2]. For example, in the "Xi'an Benz Customer Rights Defender Incident" in 2019, the company's delay in responding caused the incident's public opinion to ferment over and

over again, causing serious damage to the corporate image. In the case of public opinion crisis, companies often use public announcements to respond to public opinion in an attempt to repair consumer trust and restore the losses caused by public opinion. The real question that needs to be addressed is: Can the company's announcement effectively repair trust? What response strategies do companies use in announcements to be more effective?

In order to control the "butterfly effect" of corporate public opinion and restore consumer trust, the issue of trust repair is receiving more and more scholars' attention. Some scholars are devoted to discussing various factors that affect trust repair, such as the spread of information, time delay, and the type of repair strategy, so that companies can manage the corresponding controllable factors to achieve the purpose of repairing consumer trust [3]. From the

perspective of Internet public opinion, other scholars have grasped the changes in public emotional trends and concerns by digging the topics and emotions of Weibo texts to provide a basis for public opinion monitoring. They suggest strategies for companies to respond effectively at various stages of public opinion evolution, including apologizing, focusing on the transparency of information release [4], and summarizing experiences and communicating in a timely manner [5]. These studies have provided a wealth of preliminary results for the study of consumer trust repair issues.

However, most of the current studies are based on the research of the characteristics and influencing factors of trust repair, few scholars have discussed the effectiveness of trust repair strategies adopted by enterprises. Research on corporate strategy recommendations remains at the level of qualitative discussions. This article focuses on the three typical car defect events exposed by the "315 Evening Party", and takes the trust repair strategy adopted in the corporate announcement as the research object. Based on the consumer sentiment intensity of the public opinion of the defect event, the article builds a validity model of trust repair strategy, and analyzes the effectiveness of the trust repair strategy in different life cycles of the public opinion. The research conclusions expand the research content in the field of corporate public opinion and provide strategic suggestions for crisis management of corporate public opinion.

2. Literature Review

2.1. Corporate Internet Public Opinion

With the development of social media, the formation and dissemination of internet public opinion has brought new challenges to corporate management. On the one hand, corporate internet public opinion affects the production and operation of enterprises by affecting consumers' attitudes and behaviors; on the other hand, new media on the internet provides a platform and conditions for corporate public opinion monitoring, guidance and management [6]. The existing literature in the field of Internet public opinion mainly focuses on the theoretical model and application cases to study the corporate internet public opinion.

In the theoretical research of corporate crisis network public opinion, scholars mostly carry out research from the perspective of the characteristics of internet public opinion itself or the index system. Zhu Xi et al. screened fifteen indicators used to evaluate the public opinion of corporate defect events, established an index system based on popularity, danger and dispersion, analyzed the impact and relationship between indicators, and established an efficient internet public opinion analysis model. Qu Qixing et al. [8] put forward a trend analysis model of public opinion heat based on Markov chain, aiming at the large fluctuation range of public opinion heat of enterprise network, which will show some missing characteristics, and provide theoretical basis for enterprise to

carry out internet public opinion management and internet crisis public relations activities. Xiao Liyan et al. [9] based on the concept of corporate internet public opinion and social influence, combined with traditional information dissemination influence evaluation methods, established an index system from the three dimensions of influence breadth, influence strength and influence speed to provide decision-making support for corporate managers to conduct corporate internet public opinion management.

In the case application of corporate internet public opinion, scholars discuss the impact of internet public opinion on enterprises around specific cases and put forward suggestions for public opinion management. Eleonora [10] proposed an intelligent public opinion monitoring system to automatically infer trends of opinion on the topic of vaccination. Zhang Dongkai et al. [11] took the WeiQian "Bone Soup Gate" incident as an example, and adopted methods such as vector autoregression (VAR) and impulse response analysis to divide the internet public opinion influence of corporate emergency crisis events on Weibo platform into opinion leader public opinion impact, media user public opinion influence, ordinary user public opinion influence, empirically analyzed the impact of group public opinion on corporate stock prices. Jiang Kan et al. [12] used the social internet analysis method to analyze the "Rusty door" incident of the JAC automobile, analyzed the internet structure characteristics of the corporate public opinion from three levels, and explored the relationship between the changes in the public opinion structure and the evolution of the public opinion. Based on the results of the study, suggestions for the management of corporate public opinion on incidents of defect events are put forward. Xu Yuan et al. [13] analyzed the influence of each role on the process of corporate public opinion from the perspectives of the government, netizens, and enterprises through the two public opinion cases of the Wei Zexi and Lei Yang events coupled in time series.

From the literature, most of the existing researches are devoted to the establishment of an enterprise public opinion index system and analysis model, or to discuss the characteristics of public opinion structure and the impact of public opinion on enterprises from specific cases, so as to provide suggestions for the management of public opinion. Few scholars analyze corporate crisis management from the perspective of the emotional evolution of public opinion on corporate defect events. This article attempts to explore the evolutionary characteristics of public sentiment through emotion analysis technology to specifically analyze the process of corporate public opinion management.

2.2. Consumer Trust and Trust Repair

Among the definitions of trust by scholars so far, the most influential one is proposed by Moorman et al. [14] Trust is the trust of the client in the reliability and integrity of the trading partner. For enterprises, consumer trust is consumer trust in the reliability and integrity of the company's products, services, and the company's own brand. This trust is the foundation of consumer behavior. Due to the fragility of trust

[15], once a company's products or services are defective, the dissemination of defect information will make consumers doubt and feel uneasy about the company, reducing the consumer's intentions for the company [16], thus plunging companies into a crisis of consumer trust. After the crisis of trust, it is particularly urgent for enterprises to repair trust.

At present, the research on trust repair issues mainly focuses on the two aspects of trust repair influencing factors and repair strategies. As for the influencing factors, Han Yapin et al. [3] established an SInlpR model for consumer trust repair under the product injury crisis from the perspective of information dissemination, and programmed the system with Matlab to simulate the impact of initial values, parameter changes, and time delay on consumer trust repair. Wang Feng et al. [17] built a comprehensive crisis response management model that can analyze the crisis evolution process and formulate effective crisis response plans based on the life cycle process of corporate crisis, aiming to repair the damaged reputation of the organization.

In addition to the factors affecting trust repair, research on repair strategies is also more common. Zhang Zhenglin et al. [18] used the scenario simulation method, using analysis of variance and multiple regression analysis, to conduct empirical research on consumers' initial trust repair methods and subsequent trust repair methods, providing enterprises with better trust repair methods. Feng Jiao et al. [19] applied the theory of trust source, aiming at the industrial multi brand crisis caused by the product injury crisis, from the perspective of the trusted party, based on the empirical analysis of consumer trust repair strategy, put forward the corresponding industry repair strategy. Zhao Yanni et al. [20] combined the two dimensions of the attribution theory (external attribution dimension and contextual attribution dimension) with the company's repair strategy from the perspective of consumer attribution to repair the consumer's ability trust and goodwill trust and explore the differences between different remediation strategies. Hegner et al. [21] tested the correlation between crisis response strategies and types of crisis, as well as consumer trust and willingness to buy by experiments.

From the existing research results of trust repair, the research content is rich and innovative. However, from the perspective of research data, most of them focus on psychological experiments or questionnaires. Few studies use actual corporate data to test the effect of trust repair. The actual application effect of the enterprise has not been verified. This article uses the actual internet public opinion of the enterprise as the data source and consumer emotion as the research index to measure the effectiveness of the enterprise's trust repair strategy, to test the application effect in the real situation.

3. Research Design

From the perspective of public opinion evolution, this study compares and analyzes the effect of multi-case trust repair strategy.

First, multiple defect events of different companies in the

same industry are selected as the research cases. Data was collected on multiple Sina Weibo platforms for each defect event, and a corpus of microblogs was obtained through preprocessing. The public opinion evolution cycle was divided according to the number of microblogs. Collect the response announcements issued by the enterprise on the company's official website and official media platform after the defect incident.

Second, the sentiment analysis method based on sentiment dictionary is used to analyze the sentiment evolution of public opinion data, and the content analysis method is used to code and classify the enterprise response announcement, so as to obtain the trust repair strategy type of the enterprise.

Finally, the effectiveness model of trust repair strategy is built to compare and analyze the effect of trust repair strategy.

3.1. Data Acquisition and Preprocessing

Use the advanced search function of Weibo to accurately retrieve all Weibo content of a certain keyword in a certain period of time, and use Python to write programs to crawl the retrieved Weibo data, including Weibo username, user ID, Weibo Content, release time, etc. The original data is mixed with heterogeneous data that affects the results. The data is preprocessed first, including data deduplication, deleting missing data, irrelevant data and abnormal data, and then uniformly converting it to a standardized data format for storage.

3.2. Analysis of Public Opinion Evolution of Defect Events

3.2.1. Life Cycle Division of Public Opinion

After many scholars deduced the crisis life cycle theory, a variety of division rules have emerged. For example, a three-phase model of "pre-crisis, crisis, and post-crisis" [22], a four-phase model of "symptom period, sudden period, duration, and fade period" [23], five-phase model of "signal detection, detection and prevention, loss control, Recovery, learning" [24], six-phase model of "avoidance, management preparation, confirmation, control, solution, utilization" [25] and so on. In the field of Internet public opinion, the widely used model is the four-stage model proposed by Fink [23] [26] [27]. He believes that crisis is like the life cycle of a person, and it is different from birth, growth, maturity, and death. Based on the characteristics of Internet public opinion, this article divides the life cycle of public events of defect events into four phases: Prodromal, Breakout, Chronic, and Resolution.

3.2.2. Sentiment Analysis Based on Sentiment Dictionary

Sentiment analysis methods are designed to determine whether a passage is positive, negative, or neutral, or to determine the opinion of the publisher [28]. A sentiment dictionary-based sentiment analysis is to identify sentiment feature words with subjective emotions in the built-in sentiment dictionary, and then calculate the sentiment intensity value of the text according to a specific formula. At present, Chinese sentiment analysis dictionaries include HowNet Chinese and English sentiment dictionary, NTUSD of

Taiwan University, and Chinese sentiment vocabulary ontology library of Dalian University of Technology. This study selected Dalian University of Technology's Chinese Affective Vocabulary Ontology Library as the basic sentiment dictionary for this research. Emotions were divided into 7 categories and 21 sub-categories, and emotion intensity was divided into five levels of 1, 3, 5, 7, and 9. Based on the basic sentiment dictionary, the sentiment words in the automotive field and the weight of sentiment words are determined manually. Calculate the sentiment intensity value of each Weibo text through three aspects: emotional words, degree words and negative words. The calculation formula is as follows:

$$s = \sum s_q \times w_j \times (-1)^m \quad (1)$$

Where $s_q, q = \{1, 2, \dots\}$ is the sentimental intensity value of sentimental words in the microblog; $w_j, j = \{1, 2, 3, 4, 5\}$ is the weight of degree words in front of sentimental words, and the weight is 1, 3, 5, 7, 9; m is the number of negative words in front of sentimental words. The value S reflects the sentimental intensity of the consumer. When the value is greater than zero, it indicates that the consumer sentiment belongs to a positive attitude. The higher the value, the more positive the sentiment. If the value is less than zero, it means that the sentiment of this microblog belongs to a negative attitude, and the smaller the value, the more negative the sentiment will be.

3.3. Research on Multi-Case Trust Repair Strategy

3.3.1. Classification of Trust Repair Strategies Based on Content Analysis

After the crisis of public opinion, in order to get rid of the crisis of public opinion and restore consumer trust, companies usually respond by issuing response announcements. The content of the announcement reflects the trust restoration strategy of the enterprise, and even some enterprises adopt a non-response strategy to allow public opinion to die on its own. Research in the field of trust repair divides repair strategies into various types. Based on the characteristics of trust repair strategies in the announcement, this research uses the classification system proposed by Xie and Peng [29] to divide trust repair strategies into: informational, relational, and functional.

The research uses content analysis to classify the response strategies of multiple companies. First, establish analysis categories. The first category is: informational repair strategy, relational repair strategy, and functional repair strategy. The second category of information repair strategy is to explain the reasons, clarify the facts, and issue announcements. The secondary categories of the relational repair strategy are: apology, commitment, and concern. The secondary categories of the functional repair strategy are compensation, refunds, and offers. Develop a preliminary coding framework and coding table to form a sample trust repair strategy type coding table (Table 1). Second, by

analyzing the announcement sample repeatedly, define the analysis unit of the announcement. The coders are then trained to ensure the inherent consistency of the coders' coding. The encoders review each other's encoding results, summarize the content of inconsistent encoding opinions, discuss them, and repeat the above encoding work multiple times until all encoding work is completed. Finally, a clear category of trust repair strategy types is formed, and the frequency and percentage of each trust repair strategy type are calculated, based on which to analyze the effectiveness of the strategy.

Table 1. Trust repair policy type encoding table.

The Primary Categories	The Secondary Category	Coding
Informational repair strategy (A)	Explain reasons	A1
	Clarify the facts	A2
	Issue announcements	A3
Relational repair strategy (B)	Apology	B1
	Commitment	B2
	Concern	B3
Functional repair strategy (C)	Compensation	C1
	Refund	C2
	Offer	C3

3.3.2. Establishment of Effectiveness Model of Trust Repair Strategy

This study takes the repair strategy of public opinion crisis events of multiple enterprises as the research object, and sets the enterprise defect crisis events as $i, i \in \{1, 2, \dots, l\}$, where l is the number of events. According to the four-stage crisis life cycle theory of Fink [23], set the research stage as $k, k \in \{1, 2, 3, 4\}$. According to the informational repair strategy, relational repair strategy and functional repair strategy proposed by Xie and Peng [29], let's assume that the type of trust repair strategy adopted by the enterprise is $t, t \in \{A, B, C, O\}$, where O represents that the enterprise has not adopted any repair strategy. For different events i , the sentimental intensity value of each tweet in different cycle stages is denoted as s_k^i , and the mean value of sentimental intensity is denoted as \bar{s}_k^i .

This article considers that at different stages of the public opinion cycle, consumer sentiment intensity to the company has both the continuous impact of the previous stage of information and the role of trust repair strategies in this stage, which is a comprehensive response of consumers to the two stages of information. Therefore, sentiment intensity can be regarded as the combination of two parts of emotion intensity, the formula is as follows:

$$s_k^i = s_{k-1}^i + s_k^{it} \quad (2)$$

Where, s_{k-1}^i represents the sentimental intensity of the previous stage ($k-1$), s_k^{it} represents the sentimental intensity of consumers towards the enterprise announcement at the stage of the event, reflects the effect of the trust repair strategy, and s_k^{it} is the final indicator to be compared and analyzed in this paper, calculated by the following formula:

$$s_k^{it} = s_k^i - s_{k-1}^i \quad (3)$$

It should be noted that, for the symptom period ($k=1$) stage, consumers have responded to the defect event, but the enterprise has not yet intervened in the defect event. Therefore, it can be considered that the sentimental intensity (s_1^i) of consumers during the symptom period is completely affected by the defect event.

As the sentiment intensity of each Weibo at different stages cannot be directly calculated by subtracting from formula (3), this article uses the sentiment intensity of each Weibo at this stage minus the average sentiment intensity of the previous stage, the formula is as follows:

$$s_k^{it} = s_k^i - \overline{s_{k-1}^{it}} \quad (4)$$

Through the test of the mean value ($\overline{s_k^{it}}$) of each stage of the same enterprise, the effectiveness of the enterprise information repair strategy can be verified. By comparing the mean value ($\overline{s_k^{it}}$) of each stage of different enterprises, we can verify the effect difference of different information repair strategies.

4. Experiments

4.1. Data Collection and Preprocessing

In this study, Volkswagen DSG defect event, JAC Tongyue body rust event and Land Rover aurora gearbox fault event exposed by "3.15 Evening Party" were selected as the case studies. The study collects data on three defect events on the Sina Weibo platform. The collection time is set for the entire March in which each event was exposed by "3.15 Evening Party". The "3.15 Evening Party" is a show that exposes events that violate consumer rights. The data collection content includes: username, user ID, Weibo ID, Weibo content, publishing time, etc. Data is pre-processed by using Python language, including data deduplication, deletion of missing data, irrelevant data and abnormal data, and unified conversion to standardized data format storage. In the end, 10058 pieces of effective public opinion Weibo data were collected, including 7,380 pieces on Volkswagen DSG defect events, 1812 pieces on JAC Tongyue body rust events, and 1,866 pieces on Land Rover Aurora nine-speed transmission failure events.

This study collected the announcements published on the official websites and official media platforms of Volkswagen China, JAC, and Land Rover China, after the defect occurred. Among them, Volkswagen China issued four announcements on March 15, 16, 18, and 20, JAC issued two announcements on March 15 and 16, and Land Rover China issued two announcements on March 15 and 19. All 8 announcements are processed in clauses and stored in a unified format.

4.2. Life Cycle of Public Opinion

This study uses one day as a time unit to perform time

series statistics on the daily number of Weibos for the three defect events during the collection time (Figure 2). According to the four-stage model of the life cycle proposed by Fink, the life cycle of three defect events on Weibo public opinion data is divided (Table 2): during the Prodromal period of the three cases, the defect event has occurred, and Weibo users began to express their views on related events; In the Breakout period, after the events were exposed by the "3.15 Evening Party", the discussion volume of Weibo users experienced a sudden and large-scale increase; during the Chronic period, the incident had not been resolved well, and the discussion volume was in a gentle and stable state; receding In the Resolution period, the defect incident has basically ended, the discussion volume of the incident has gradually decreased, and the impact caused has gradually subsided.

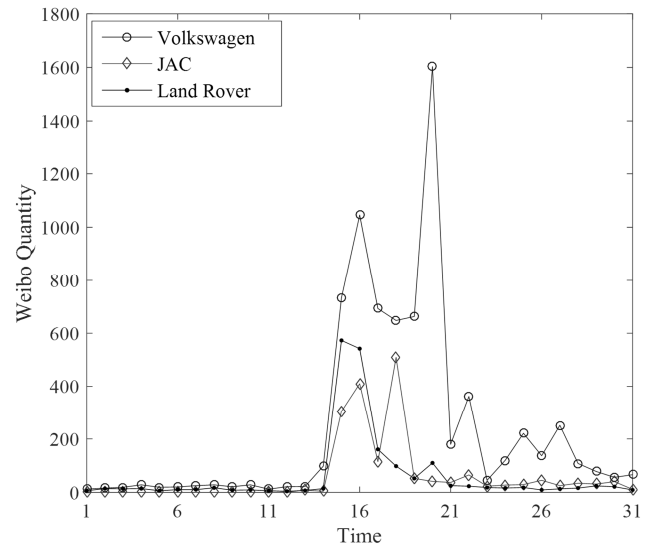


Figure 1. Timing chart of Weibo quantity.

Table 2. Life cycle of public opinion of each case.

Defect event	$k=1$	$k=2$	$k=3$	$k=4$
$i=1$	1-14	15-16	17-20	21-31
$i=2$	1-14	15,	16-18	19-31
$i=3$	1-14	15,	16-17	18-31

4.3. Sentimental Intensity of Defect Events

Based on the sentiment dictionary of the automobile field constructed in this paper, the Weibo texts of the three defect events are sentimentally analyzed to obtain a time series diagram of the average daily sentimental intensity value (Figure 2). Occurs on a date in March. This paper calculates the sentiment intensity (s_k^i) of three defect events, and its descriptive statistical analysis in each stage of the life cycle is shown in Table 3.

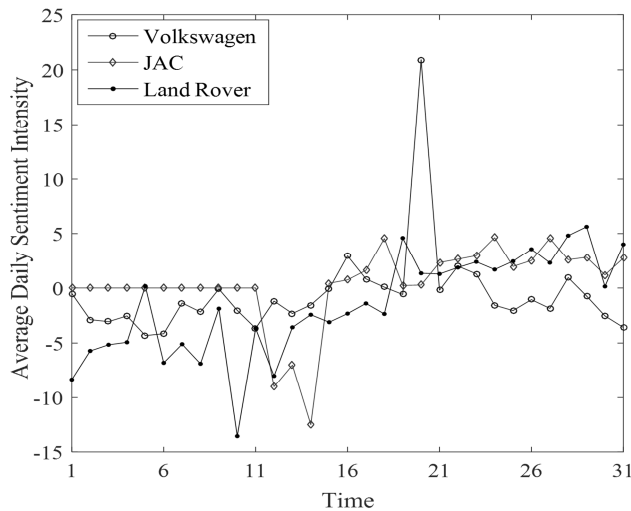


Figure 2. Average daily sentimental intensity value.

Table 3. Descriptive statistics of sentimental intensity.

Cycle	Events	N	\bar{s}_k^i	Max	Min	Median	Variance
$k=1$	1	369	2.089	24	-10	-3	35.022
	2	13	8.846	4	-15	-8	14.974
	3	138	3.993	20	-52	-3	113.788
$k=2$	1	1782	1.675	39	-45	0	50.159
	2	714	0.444	52	-40	0	87.055
	3	573	3.483	13	-30	0	47.533
$k=3$	1	3604	9.345	86	-56	0	446.604
	2	624	3.817	60	-24	3	118.323
	3	703	2.028	40	-36	0	85.783
$k=4$	1	1623	0.469	48	-49	0	75.527
	2	460	2.196	41	-49	3	34.476
	3	452	2.912	32	-22	0	50.759

4.4. Classification of Trust Repair Policies

The classification coding result of corporate response announcements by content analysis method is shown in table 4.

Table 4. Results of encoding trust repair policy types.

The Event	The Primary Categories	Coding	$k=2$		$k=3$		$k=4$	
			Frequency	The Percentage	Frequency	The Percentage	Frequency	The Percentage
(I = 1)	A	A1	0		3			
		A2	0	37.5%	5	65%		
		A3	3		5			
	B	B1	0		0			
		B2	2	50%	4	20%	O	
		B3	2		0			
	C	C1	1		3			
		C2	0	12.5%	0	15%		
		C3	0		0			
(I = 2)	A	A1	0		1			
		A2	0	0%	3	50%		
		A3	0		1			
	B	B1	1		1			
		B2	1	100%	1	30%	O	
		B3	1		1			
	C	C1	0		2			
		C2	0	0%	0	20%		
		C3	0		0			
(I = 3)	A	A1			0		1	
		A2			2	25%	0	25%
		A3			0		1	
	B	B1			1		2	
		B2	O		3	62.5%	0	25%
		B3			1		0	
	C	C1			1		2	
		C2			0	12.5%	0	50%
		C3			0		2	

According to the coding results in Table 4, we classify the trust repair strategies of different enterprises at each stage. In the DSG defect incident, Volkswagen issued a total of four announcements during the emergency period and duration. In the Breakout period, two Weibo announcements were issued on March 15th and 16th respectively. In the announcement content, the highest proportion of relationship repair strategies (50%) concerned with customers and commitment to take this incident seriously, we classify it as relational repair strategy (B). In the Chronic period, the announcement was made twice on March 18th and 20th respectively. In the announcement content, the proportion of responding to the cause of the failure and explaining the various concerns of consumers was

the highest (65%), which was classified as an informational repair strategy (A). There is no information announcement during the Resolution period, which is classified as a non-response strategy (O).

During the JAC Tongyue body rust event, JAC Automobile issued two announcements during the Breakout and Chronic periods. During the Breakout period, JAC issued an announcement on Weibo immediately, expressing great importance and concern for the incident, apologizing to the owner, and promising to provide solutions for the owner as quickly as possible, and fully adopted the relationship repair strategy (B). During the Chronic period, JAC Automobile issued an announcement explaining the technical reasons for

the rust of the car body and clarifying that the new product cars do not have similar problems such as rust. The information repair strategy has the highest proportion (50%), which is classified as an information repair strategy. (A). There is no information announcement during the Resolution period, which is classified as a non-response strategy (O).

In the event of a Land Rover Aurora gearbox failure, Land Rover China issued two announcements during the Chronic period and the Resolution period. Among them, no information announcement was issued during the Breakout period, which was classified as a non-response strategy (O). During the Breakout period, Land Rover China issued an announcement saying it attached great importance to the exposure, apologized to consumers and promised to solve the problem as soon as possible. At the same time, it had applied to the ACSIQ to recall the vehicles involved. The proportion of relational repair strategies was the highest (62.5%). It is classified as a relational repair strategy (B). During the Resolution period, Land Rover China issued a recall notice, apologized again and explained the cause of the failure. At the same time, different types of compensation and maintenance benefits were provided for the involved and non-involved owners. The functional repair strategy had the highest proportion (50%). Classified as a functional repair strategy (C).

Based on the above analysis, we obtained the types of trust repair strategies adopted by enterprises in different life cycle stages of public opinion in the three events, as shown in table 5.

Table 5. Trust repair policy types.

Events	$k=2$	$k=3$	$k=4$
1	B	A	O
2	B	A	O
3	O	B	C

4.5. Effectiveness Analysis of Trust Repair Strategy

4.5.1. Effectiveness Test of Enterprise Trust Repair Strategy

According to the effectiveness analysis model of the trust repair strategy constructed in this paper, the effect of the trust repair strategy of each enterprise at different stages is calculated by formula (4). In order to test whether the repair is significantly effective, a single sample T test is performed on s_k^{it} . The results are shown in Table 6.

Table 6. Single sample T test of the effectiveness of enterprise trust repair strategy.

Cycle	Events	Strategy	Average (s_k^{it})	T value	P values
$k=1$	1	O	2.089	6.782	0.000
	2	O	8.846	8.242	0.000
	3	O	3.993	4.397	0.000
$k=2$	1	B	3.764	22.435	0.000
	2	B	9.290	26.606	0.000

Cycle	Events	Strategy	Average (s_k^{it})	T value	P values
$k=3$	3	O	0.509	1.769	0.078
	1	A	7.670	21.789	0.000
	2	A	3.156	7.248	0.000
	3	B	1.455	4.165	0.000
$k=4$	1	O	9.840	45.616	0.000
	2	O	1.622	5.923	0.000
	3	C	4.940	14.741	0.000

The results of the one-sample T-test showed that, in the symptom period, without the enterprise response, the average sentimental intensity of consumers for the three defect events was -2.089, -8.846, and -3.993, all of which were significantly negative ($p < 0.001$). It shows that all three companies were affected by the defect events during the warning period, which triggered a crisis of public opinion on the Internet.

The average effectiveness of the trust repair strategy during the Breakout period was 3.764, 9.290, and 0.509 respectively. Volkswagen and JAC issued response announcements, and the effectiveness of their trust repair strategy was significantly positive ($p < 0.001$). The non-response repair effect was not significant ($p = 0.078$). This shows that the repair strategy adopted by the company in the Breakout period is effective, and keeping silent is not conducive to trust repair.

The mean values of the trust repair strategy in the Chronic was 7.670, 3.156 and 1.455, respectively, and the effect of the trust repair strategy was significantly positive ($p < 0.001$). At this stage, all three companies issued response announcements and adopted repair strategies that were conducive to trust repair.

The average effectiveness of the trust repair strategy in the Resolution period was -9.940, -1.622, and 4.940 respectively. Neither Volkswagen nor JAC issued a response announcement, and the response effects of no response were significantly negative ($p < 0.001$). Land Rover issued an announcement at this stage, and its trust repair strategy has a significant positive effect ($p < 0.001$). This shows that in this period, enterprises still need to take measures to repair trust.

4.5.2. Comparison of Effectiveness of Enterprise Trust Repair Strategies

The one-sample T-test analyzes the effectiveness of the repair strategy adopted by the same company at different stages. To test the difference in the effectiveness of different trust repair strategies, it is necessary to compare the average effectiveness of trust repair strategies in different stages of different enterprises. We use Games-Howell test to compare two different repair strategies adopted at the same stage, and test whether there is a significant difference in the average effectiveness of the trust repair strategies adopted by the three companies at each stage. The analysis results are shown in Table 7.

Table 7. Games-Howell tests for differences in the effectiveness of trust repair policies.

Events	$k=1$		$k=2$		$k=3$		$k=4$	
	\bar{s}_1^{it} Differences	P Values	\bar{s}_2^{it} Differences	P Values	\bar{s}_3^{it} Differences	P Values	\bar{s}_4^{it} Differences	P Values
1-2	6.756	0.000	5.526	0.000	4.514	0.000	8.219	0.000
1-3	1.904	0.001	3.255	0.000	6.215	0.000	14.780	0.000
2-3	4.853	0.047	8.781	0.000	1.701	0.007	6.562	0.000
F values	15.189		179.496		41.558		680.362	
P values	0.000		0.000		0.000		0.000	

According to the results of the Games-Howell test, during the Prodromal period, there were significant differences in the impact of different public opinion events on the three companies. JAC was the most affected, and the Volkswagen was the least affected. In the Breakout period, Volkswagen and JAC adopted the relational repair strategy (B), and Land Rover adopted the non-response strategy (O). Comparisons of Volkswagen-Land Rover (3.255, $p < 0.001$) and JAC-Land Rover (8.781, $p < 0.001$) shows that the effectiveness of the relational repair strategy is significantly higher than that of the non-response strategy. We found that there are significant differences in the effectiveness of Volkswagen and JAC using the relational repair strategy (-5.526, $p < 0.001$). The reason is that Volkswagen adopted 50% relational repair strategy and JAC adopted 100% relational repair strategy. This shows that the full relational repair strategy is more effective. In the Chronic period, Volkswagen and JAC adopted the informational repair strategy (A), and Land Rover adopted the relational repair strategy (B). Comparisons of Volkswagen-Land Rover (6.215, $p < 0.001$) and JAC-Land Rover (1.701, $p < 0.01$) shows that the effectiveness of the informational repair strategy is significantly higher than that of the relational repair strategy. Similarly, we believe that, because the ratio of relational repair strategies adopted by the public (65%) is greater than the rate of JAC (50%), the effectiveness of relational repair strategies is much higher (4.514, $p < 0.001$). During the Resolution period, Land Rover adopted a functional repair strategy (C), and Volkswagen and JAC both adopted a non-response strategy (O). Comparisons of Volkswagen-Land Rover (-14.780, $p < 0.001$) and JAC-Land Rover (-6.562, $p < 0.001$) shows that the effectiveness of functional strategies is significantly higher than that of non-response strategies.

5. Conclusion

This article uses three typical auto defect incidents exposed at the "3.15 Evening Party" as the research cases, crawling online comments and corporate response announcements about the defect incident on Weibo. First, apply sentiment analysis technology to sentiment analysis of corporate public opinion caused by defect events. Second, the content response method is used to code and classify the company's response strategy. Finally, a effectiveness model of trust repair strategy is constructed, statistical methods are used to test the effectiveness of the company's trust repair strategy and to compare the differences in the effectiveness of trust repair strategies at different evolutionary stages.

The research conclusions are as follows: First, after the formation of online public opinion, the coping strategies

adopted by companies to issue response announcements are effective at all stages of the public opinion life cycle, which can significantly increase the consumer's sentiment intensity. This result also confirms the research conclusions of related psychological experiments [29]. The efforts of enterprises in information, relationships, and functions all help to rebuild the integrity of the enterprise and win the trust of consumers. Second, a comparative analysis of partial trust repair strategies shows that there are some differences in the effectiveness of repair strategies in different stages: 1) Relational repair strategies are more effective during Breakout periods. 2) In the Chronic, the informational repair strategy is more effective. 3) During the Resolution period, the functional restoration strategy is more effective.

The research conclusions try to answer the practical question of "Can an enterprise issue a response announcement to effectively restore trust? What response strategy does the enterprise use in the announcement to be more effective?" It has certain management implications. In the Breakout period, in order to alleviate the spread of negative consumer sentiment and the spread of negative public opinion, companies should adopt a relational repair strategy, express their concern and attention to the incident in a timely manner, and promise to actively solve the problem. In the Chronic, in order to eliminate the anxiety caused by the lack of consumer information, companies should adopt informational repair strategies, issue announcements to explain the facts and reasons, and actively interact with consumers. During the Resolution period, enterprises should adopt functional repair strategies, release solutions to incidents, restore consumer economic losses to restore consumer trust, and finally resolve the crisis of online public opinion.

From the perspective of the evolution of public sentiment and the actual data of the enterprise, this study explores the effectiveness of the trust repair strategy in the crisis public opinion of the enterprise. This research makes up for the shortcomings of the current research in the measurement of public opinion indicators and data sources. It also expands the theoretical content in the field of corporate Internet public opinion management. In addition, We put forward specific countermeasures for enterprises: adopting a relational strategy in the emergency period, an information strategy in the continuation period, and a functional strategy in the recession period, which have certain practical guiding significance for the management of corporate public opinion in the Internet environment. There are still some limitations in the study. Due to the limited number of comparable announcements, this article only compares some strategies adopted by enterprises, and fails to analyze all repair strategies systematically. Future research can collect more abundant enterprise announcement

data., Carry out a comprehensive assessment of the effectiveness of the three types of "informational, relational, and functional" repair strategies.

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