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The Communication Deviation and Optimization of Brand Image in Social Media Environment: A Case Study of Lululemon

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Abstract:

With the rapid development of social networks, many brands are using the characteristics of social media platforms for brand promotion to attract target audiences, and brands are gradually entering various social media platforms. This study is based on Shannon-Weaver model of communication and explores the message's communication lines on social media platforms. At the same time, explore the influence of the convergence and difference of brand content on the social media platform on noise, and how to improve the publicity effect of the brand. The hypothesis proposed in this paper is that in the current social media environment, brand image communication tends to be consistent across different platforms, and the convergence of social media platforms will reduce the significant differences in brand communication. Using analytical vocabulary identification, Semantic Analysis of Pre-Trained Models, Statistical Methods, and Hypothesis Testing, these research methods were explored to find that the resulting hypotheses were valid and analysed that convergence and divergence between social media platforms is a dialectical unity rather than an opposition.

Keywords: Lululemon; Shannon-Weaver model of communication; social media platforms; UGC; user; brands.

1. Introduction

This study is based on Shannon-Weaver model of communication. As the China social media platforms has rapidly developed, platforms such as Douyin, Little Red Book, and Weibo have gained popularity. Many brands have discovered this potential market and have chosen to advertise on social media platforms to find their target audience. A review of the available data suggests that the global social network user base has reached a figure approaching five billion. It is estimated that there are 1.03 billion Chinese users of social media. According to the Statista, in 2022, there were approximately 1.02 billion social media users in China, with a forecast for 2024. It is anticipated that the number of Chinese social media

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user will be even higher [1]. Based on these data, it is evident that a substantial number of individuals are currently utilizing social media platforms. Consequently, the significance and relevance of studying the dissemination of information on these platforms is heightened due to their vast audience reach.

The concept was first proposed in 1948 by Claude Shannon and Warren Weaver In a paper entitled "A Mathematical Theory of Communication", also known as the "mathematical model of communication process". Its content primarily describes the process of electronic communication, but it further provides significant insights for the study of transmission process [2]. In Shannon-Weaver model of communication, the presence of noise renders it impossible to ignore .it has an adverse effect on the information being conveyed and impairs the propagation process. In the context of social media, the brand's image is disturbed by the influence of noise, this results in a discrepancy between the content received by the original content.

Some scholars have proposed that User produced content (Hereinafter referred to as UGC) generally refers to the text, pictures, videos and other content posted by users on the network in any form. It is emerging and becoming an important role in connecting brands, users, and platforms, an online brand created and shared by consumers that can influence the purchasing decisions of other users [3]. Brands not only achieve more user engagement through UGC, but they also become a channel for user feedback on content. The collection of UGC content provides a research basis for this study to explore the degree of brand image content received by users.

It is not unique for many brands to promote and advertise on social media platforms. To illustrate, in 2020 the market value exceeded 40 billion US dollars, ranking second only to Nike, surpassing Adidas, and jumping to become the world's second largest sports brand Lulumemon [4]. It has succeeded and grown by leaps and bounds without the remotest of communications, so this study has chosen to examine Lululemon as an example. Brand communication strategy is not a simple process of information transmission, but a key link of the emotional connection between brand concept and target audience. This research is of great significance to help brand optimize its communication content, shape its image, deepen its market cognition, and reduce the deviation caused by noise in the communication process under the current era., provide some insights and strategies for brand promotion.

This study mainly analyzes the ideal image that LuLulemon brand wants to convey. The ideal image of LuLulemon conveyed on Chinese social media platforms Douyin, Little Red Book, and Weibo is carried out in detail;Literature analysis method is used to search and read relevant materials and literatures. The advantage of this method is that it can well analyze lexical recognition method and semantic analysis of pre-training model, which is conducive to the research.The ultimate research objective of this study is to explore the communication lines of LuLulemon brand promotion in Chinese social media platforms based on the Shannon-Weaver communication model, at the same time, explore how to optimize the communication effect and reduce noise interference, so that the brand can improve and upgrade the production of communication content, thereby the communication effect is more significant and attract consumers.In order to reach the goal , data collection, analytical calculations,statistical methods and hypothesis testing were carried out.

2. Theoretical Framework

In Shannon-weaver model of communication, there are six basic elements: sender (source), encoder (transmitter), channel, decoder (receiver), receiver (destination), noise. Among them, users, brand, platforms, etc., play different roles. The source produces information, which is encoded and transmitted by a transmitter, received and decoded by a receiver, and sent to a host, during which noise may be received. It is a linear unidirectional process [5].

Based on the rich research results in the past, many scholars have successfully integrated the model and achieved remarkable results. For example, Jing Fang obtained new enlightenment by combining this model with college English [6]. Wenling Liu integrates this model into teaching and explores the process of educational communication [7].

Accordingly, an analogous endeavour was undertaken in the present study. This study is based on Shannon-Weaver model of communication design and draws a pattern diagram to illustrate the process of brand official content dissemination on the social media platform (see figure 1). The purpose is to describe the operation mechanism of this mode on the platform more intuitively.

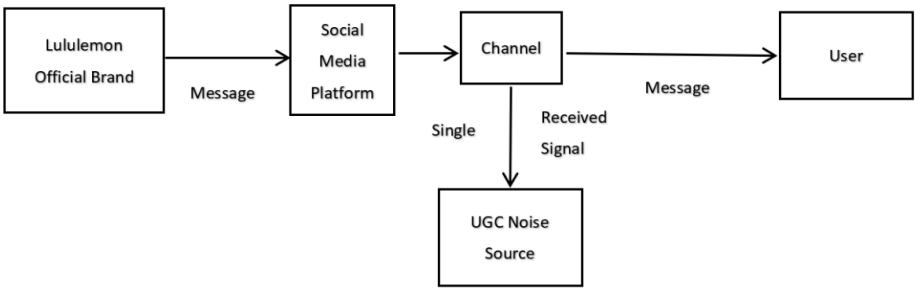

Fig. 1 Patterns of brand information dissemination on social media platforms

This study identifies the relationship between the names and connecting order of the elements in this schema diagram and the direction of information flow. This is based on an analysis of the logical relationship between the elements in the Shannon-Weaver model of communication, as well as between them. In the pattern diagram (see figure 1), the content officially released by the brand is the sender. The brand produces information about the product content for publication, and the brand forms its brand image by shaping the published content, which is the source of communication content. With it as a starting point, information starts from the brand side through the platform. The social media platform is the transmitter, which organizes and codes the content officially provided by the brand and sends it to the user through the channel. The message is sent to the destination again. The user is the receiver and the host, which receives information about the brand party through the platform, but may be affected by noise. The one-way linear transmission process of brand information to users is over. Noise is a factor that interferes with information transmission. UGC comprises feedback from users, these contents may have false information, false statements, irrelevant comments, etc., affecting potential consumers' cognition and decision-making, so UGC may affect users' acceptance and decoding of brand content.

With this schematic diagram, it is clear that the communication process of brand official, platform, UGC noise, user's information production, delivery, and reception. However, the propagation process is complex and requires more complex models to represent it. The unidirectionality of the linear unidirectional process of this study is based on this design only.

3. Research Methods

3.1 Research Hypothesis

The hypothesis proposed in this paper is that in the current social media environment, brand image communication tends to be consistent across different platforms, and the convergence of social media platforms will reduce the significant differences in brand communication.

3.2 Application of Lexical Identification Methods

This study explores the differences in brand image communication effects by analyzing user-generated content (UGC) and official brand content on three social media platforms: Douyin, Weibo, and Little Red Book for the Lululemon brand. Many scholars have proposed methods and frameworks for identifying a brand's core image using lexical analysis, which can more effectively reflect the brand's core image and the consumer's associative network. For example, the Carlson School of Management proposed the Brand Concept Maps [8]. Therefore, in order to better reflect the differences in brand image communication effects, this paper adopts this lexical identification method. This paper collects posts published by Lululemon's official account and posts with Lululemon tags posted by users, filters out adjectives related to brand image, ranks them by frequency of occurrence, and finally selects the top five adjectives. Due to the different total sample sizes of the three platforms, this paper also weighted the frequency of occurrence of the adjectives.

3.3 Semantic Analysis of Pre-Trained Models

The correlation between the vectors of brand terms and user terms of the same ranking was analyzed using the English Wikipedia dump (November 2021) in Word2Vec based on the pre-trained model, and the average correlation of the three platforms was calculated.

The lower the correlation, the higher the noise interference. Word2Vec is about 3 billion words in size, and its language preprocessing functions are rich, including sentence splitting, tagging, etc., which can more accurately capture the semantic relationships between words than Google News Word2Vec, which has only 100 million words.

3.4 Statistical Methods and Hypothesis Testing

To test the hypothesis, this study used ANOVA to test

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whether the difference in correlation between different platforms was significant. If the p-value is less than 0.05 (the usual significance level), the difference between different platforms can be considered significant.

In addition, compared with OLS regression analysis, ANOVA can handle categorical independent variables and is therefore more suitable for the needs of this study. However, some scholars have pointed out that ANOVA has strict requirements for data normality and variance homogeneity. If these assumptions are violated, the analysis results may be distorted or lead to erroneous conclusions [9]. In traditional ANOVA data analysis, F (statistic) can detect whether there are differences between overall means, but it cannot specifically indicate which groups have significant differences. To compensate for this shortcoming, this study innovatively introduces Tukey's HSD (Honestly Significant Difference) method for paired comparisons to identify differences in brand communication effects across platforms. Tukey's HSD provides an effective tool for making significance comparisons between multiple group means and is suitable for detecting the similarity of brand terms across different social media platforms. Although there is some controversy about whether Tukey's HSD should be used when the F statistic does not reach significance (some scholars believe that HSD may not be applicable in this case), this study has carefully applied and cross-checked with other methods in this regard. This multiple analysis framework provides a new perspective for accurately detecting brand communication differences and improves the depth and accuracy of data analysis.

4. Research Results

The selected words show that the adjectives used by users on Douyin, Little Red Book, and Weibo, ranked in order of preference from No. 1 to No. 5, are respectively: inspiring, comfortable, exquisite, simple, slightly chubby; thin, comfortable, convenient, cheap, loose; healthy, comfortable, regrettable, comfortable, happy. The adjectives used by the Lululemon official on Douyin, Little Red Book, and Weibo, ranked in order of preference from No. 1 to No. 5, are respectively: comfortable, inspiring, free, relaxed, and heavy; comfortable, inspiring, loose, free, and soft; healthy, comfortable, thin, comfortable, and happy.

The results of the semantic correlation analysis of the five phrases on the Douyin platform (Phrase 1, Phrase 2, Phrase 3, Phrase 4, and Phrase 5) are (ranked from No. 1 to No. 5 according to the weighted frequency of occurrence): 0.209 0.209 0.140 0.201 0.278 (see Table 1); the results of the semantic correlation analysis of the five phrases on Weibo (Phrase A, Phrase B, Phrase C, Phrase D, Phrase E) are (ranked from No. 1 to No. 5 according to the weighted frequency of occurrence): 0.341, 0.209, 0.310, 0.207, 0.139 (see Table 2); while the results of the semantic correlation analysis of the five phrases on the Little Red Book (Phrase a, Phrase b, Phrase c, Phrase d, Phrase e) are (ranked from No. 1 to No. 5 according to the weighted frequency of occurrence): 0.371, 0.209, 0.143, 0.290 and 0.250 (see Table 3).

Table 1. 5 Word pairs with cosine similarity on Douyin

Word Paris	1	2	3	4	5
Cosine similarity	0.209	0.209	0.140	0.201	0.278

Table 2. 5 Word pairs with cosine similarity on Weibo

Word Paris	A	B	C	D	E
Cosine similarity	0.371	0.209	0.310	0.207	0.139

Table 3. 5 Word pairs with cosine similarity on Little Red Book

Word Paris	a	b	c	d	e
Cosine similarity	0.371	0.209	0.143	0.290	0.250

According to the formula: average relevance=(sum of the relevance values)/(sum of the word pairs), it can be concluded that on Douyin platform, the average relevance of the five keywords conveyed by the brand to users is 0.2074; on Web platform, the average relevance of the five keywords conveyed by the brand to users is 0.2412; and on Little Red Book platform, the average relevance of the five keywords conveyed by the brand to users is 0.2526.

ANOVA analysis was performed (see Table 4 and Table 5), and paired comparisons were made using Tukey's HSD

(Honestly Significant Difference) method, where Treatment 1 represents Douyin, Treatment 2 represents Weibo, and Treatment 3 represents Little Red Book. The test results are as follows (see Table 6).

Table 4. The results of ANOVA variance analysis

Treatments	1	2	3	4	5	Total
N	5	5	5			15
ΣX	1.037	1.206	1.263			3.506
Mean	0.2074	0.2412	0.2526			0.234
ΣX^2	0.2246	0.3182	0.3484			0.8913
Std. Dev.	0.489	0.0827	0.0856			0.0716

Table 5. Result details

Source	SS	df	MS	
Between-treatments	0.0055	2	0.0028	F = 0.5004
Within-treatments	0.0663	12	0.0055	
Total	0.0718	14		

Table 6. Pairwise comparisons result

Pairwise Comparisons		$HSD_{.05}$= 0.1254 $HSD_{.01}$= 0.1677	Q.05=3.7729 Q.01=5.0459
T_1: T_2	M_1=0.21, M_2=0.24	0.03	Q=1.02 (p=.75707)
T_1: T_3	M_1=0.21, M_3=0.25	0.05	Q=1.36 (p=.61353)
T_2: T_3	M_2=0.24, M_3=0.25	0.01	Q=0.34 (p=.96817)

5. Discussion

According to the results of the ANOVA analysis, the f-ratio value is 0.5004. The p-value is 0.618394, and the p-values of the three Treatment groups are 0.75707, 0.61353, and 0.96817, respectively. The results show that there is no significant difference at the significance level of $p < .05$. Therefore, the hypothesis of this paper is established, that is, in the current context of convergence of social media platforms, brand communication does not show significant differences between different platforms. Convergence weakens significant differences in brand communication and promotes the convergence of brand message communication effects on different platforms.

This convergence reflects a certain driving force in the social media environment that can resist noise interference in information communication to a certain extent, although this resistance is relative and does not completely eliminate it. In the Shannon-Weaver model of communication, noise is seen as a disturbance that affects the accuracy of the message and can lead to distortion or misunderstanding. However, in the context of the current convergence of social media, this model of communication has certain limitations. The impact of noise has been reduced. The convergence of platforms not only reduces technical noise (such as network latency or message loss), but also somewhat reduces semantic noise, or misunderstandings in the user's understanding of the brand message. As a result, the impact of brand communication tends to be the same across platforms.

However, the study also shows that despite the overall convergence of platforms, specific unique keywords still reflect the differences between platforms. These differences can be caused by factors such as the platform's algorithmic mechanism, the way content is displayed, and the user's interaction behavior. The specific manifestation of noise in the Shannon-Weaver model in this study is the small interference caused by these platform characteristics. While the overall impact of noise has been reduced, it has not been eliminated. The way different platforms process information, the depth of user participation, and the form of interaction may all affect the specific effect of

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brand communication to some extent.

6. Conclusion

Therefore, this paper argues that convergence and uniqueness in brand communication are dialectically united rather than opposed. Although convergence helps to achieve consistency and reduce noise, the differences brought about by platform characteristics are still in play. This means that in future brand communication strategies, it is necessary not only to use platform convergence to strengthen the consistency of information dissemination but also to respond flexibly to the subtle differences between platforms and to optimize for the specific needs of different platforms to ensure the greatest brand communication effect.

Future research should further explore the reasons for these unique keywords and their correlation with platform characteristics, especially how differences in algorithms and user behavior on different platforms affect noise interference and communication effectiveness. In addition, research should combine a larger sample size to verify the universality of these trends and further understand how platform characteristics, combined with noise theory, affect the communication path and effectiveness of brand messages.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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