

Product Kansei Assessment of Huawei Headphones Based on Consumer Reviews Online

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Abstract

With the development of technology and the acceleration of the pace of life, online shopping has gradually penetrated thousands of households. In order to understand the different factors that consumers consider when purchasing a product and whether there are differences in the kansei assessment of the product after purchase, this paper takes the Huawei brand headphone products on the Jingdong platform as an example, crawls the data of different product reviews under the type and extracts the feature words, and analyzes whether there are differences in the feature words in the consumer reviews between different products. The study found that consumers generally pay more attention to product quality, product workmanship and the use of feeling, and as the price rises, the product, the purchase will have a significant positive impact on the price of the relationship, satisfaction will have a significant negative impact on the price of the relationship. The study helps companies to rationally position their consumer audience for different products, and adopt differentiated design and marketing methods for high, medium and low-end products in order to achieve higher satisfaction and commercial success.

Keywords

User survey; online product reviews; kansei engineering.

1. Introduction

The rise of online shopping allows people to meet shopping needs without leaving home, e-commerce platforms and branded online stores competing to make consumers more diversified choices when buying products, a slide of the finger will be able to access information, cross-platform, cross-brand comparisons. For merchants, the traditional way of offline sales often rely on the guide's explanation, while on the network, consumers have more choices, and the existence of product reviews is a bridge between different consumers. Under the background of big data, online user assessment data contains a large amount of user demand information, which can effectively solve the problems of traditional Kansei assessment, such as strong subjectivity, poor real-time feedback[1], and less data[2]. Compared with traditional methods such as questionnaires and interviews, crawling commodity reviews using technical means can directly obtain consumer reviews under real use scenarios, which has incomparable advantages such as strong authenticity, convenience and efficiency. This paper takes the Huawei brand headphone products on the Jingdong platform as the research object, and by crawling the consumer reviews data of different products and extracting the feature words, explores whether there are differences in the different factors that consumers consider when purchasing Huawei brand headphone products as well as in the kansei assessment after purchase.

2. Online Kansei Assessment and Kansei Engineering

In this era of information explosion, consumers' product selection and purchase decisions are often influenced by various factors. Online Kansei assessment, which is an important part of User-Generated Content (UGC), is also the main form of Electronic Word-of-mouth (EWOM) [3]. Studies have shown that online Kansei assessments are more real-time and persuasive than product promotions by merchants [4], and IWOM affects users' purchase intention, which in turn has an impact on product sales [5]. Providing an important way for enterprises to influence consumer purchasing behaviors and increase product sales[6]. Therefore, identifying the multidimensional attributes of online kansei assessments will help in the accurate prediction of product sales [7]. Attributes such as the number of product reviews, objectivity, readability, consistency, usefulness, timeliness, and credibility all have an impact on purchase intentions [8]. In addition, the user's emotional tendency expressed in the evaluation itself has a greater impact on the potential user's consumption psychology as well as purchase decision. Understanding the real consumer experience through others' reviews can greatly promote consumers' understanding and trust of products. At the same time, merchants can also obtain a large amount of real consumer feedback from evaluations, which can be used to upgrade product features and optimize marketing strategies, thus forming a positive feedback loop.

Kansei engineering includes three aspects: kansei word collection, kansei word selection and kansei assessment [9]. Traditional kansei engineering usually collects kansei words from magazines, literature, manuals, experts, experienced users, catalogs, and emails [10], etc. Although the kansei words collected in this way come from various fields, they are not targeted, and the selected kansei words may not necessarily be applicable to the corresponding fields. For kansei assessment, most of the studies used semantic differential method and Lee's scale method to design questionnaires, and then obtained kansei assessment based on the results of the questionnaires. The questionnaire survey is characterized by its susceptibility to time, environment, investigator interference and centralized distribution of the surveyed population, which reduces the authenticity and objectivity of the survey results. The online Kansei assessment data of online commodities, as an emerging source of user demand information in the context of the Internet, contains a large amount of real and accurate user demand data. With the help of Internet technology mining, we can quickly obtain the perceptual imagery appeal of network users, greatly shorten the user demand research cycle, improve the efficiency of user demand acquisition, and meet the needs of user demand research in the design field.

3. Research Methods

This study uses the following methods to analyze the consumer reviews of Huawei brand headphone products on the Jingdong platform:

Data collection. The consumer reviews data of Huawei brand headphone products on the Jingdong platform were collected through web crawler technology, including raw information such as ratings, evaluation content and purchase time. The acquired data samples cover different models and types of Huawei headphone products.

Data processing. The collected evaluation data are cleaned and preprocessed, including the removal of invalid data and duplicate evaluations, and are subjected to lexical processing for subsequent feature word extraction and analysis.

Feature word extraction. Feature word extraction is performed on the pre-processed evaluation data through text mining technology. Feature words are words or phrases that appear frequently in consumer reviews, which can reflect consumers' concerns about the product and the content of the reviews.

Analysis of consumer reviews differences. Through the statistics and analysis of feature words, the differences in consumer reviews between different Huawei headset products are compared. Explore whether there are differences in consumers' focus on different products and the content of their reviews when purchasing Huawei-branded headphones, in order to draw conclusions about the demand for products at different price points and marketing strategies.

4. Data Collection

4.1. Source of data

Table 1. Basic information of headphone products

No.	Design	Name	Price (RMB)	Color	Wearing Style	Link
1		Am115	49	White	Semi-in-ear	https://item.jd.com/1683960.html
2		Am116	89	White, golden, black	Semi-in-ear	https://item.jd.com/1552925.html
3		Classic headphone(usb type-c version)	99	White, black	Semi-in-ear	https://item.jd.com/5779012.html
4		Freelace	199	Obsidian black, kingfisher, russet orange, midsummer purple, moon silver	Neck-hanging	https://item.jd.com/100014769724.html
5		Freelace vitality version	269	Spruce green, obsidian black, mint blue	Neck-hanging	https://item.jd.com/100014769724.html
6		Freebuds se	369	White blue	Shallow in-ear	https://item.jd.com/100039335959.html
7		Freelace pro	599	Obsidian black, spruce green, morningside white, sakura pink	Neck-hanging	https://item.jd.com/100014769724.html
8		Freebuds 5i	599	Ceramic white, intergalactic black, island blue	In-ear	https://item.jd.com/100024473109.html
9		Freebuds 4e	699	Ceramic white, frosty silver, codeword red	Semi-in-ear	https://item.jd.com/100034387834.html
10		Freebuds 5	999	Ceramic white, frosty silver, coral orange	Semi-in-ear	https://item.jd.com/100046781472.html
11		B7	999	Obsidian black, sky gray	In-ear	https://item.jd.com/100055210503.html
12		Freebuds pro 2	1299	Ceramic white, frosty silver, star river blue, muslin white	In-ear	https://item.jd.com/100030171727.html
13		Freebuds pro 2 +	1499	Muslin white	In-ear	https://item.jd.com/100056307823.html
14		Smart glasses	1699	Bright black, translucent gray, mirror silver	/	https://item.jd.com/100017131579.html
15		Freebuds lipstick	1699	Frosty silver, codeword red	Semi-in-ear	https://item.jd.com/100029293048.html
16		Freebuds studio	1999	Morning gold, obsidian black	Headset	https://item.jd.com/100016213194.html
17		Watch buds	2988	Black, khaki	In-ear	https://item.jd.com/100048212283.html

Jingdong Group completed the construction of online shopping platform for online 3C products in 2008, and Jingdong Mall has the strongest specialization and widest scale coverage among all B2C markets [11]. As the starting point of the Jingdong Group, Jingdong has a high channel share in the digital 3C industry, and leads the share of e-commerce channel choices for consumers to purchase electronic products. Huawei is one of the most popular local Chinese brands among consumers, while its market share in China's mainland is at the top of the list [12]. Therefore, this paper chooses the data source for collecting evaluations as Jingdong Mall, the store is Huawei Jingdong official flagship store, the collection time is June 13, 2023, and the evaluation sorting is the default sorting. On the day of collection, the number of people concerned about Huawei's Jingdong official flagship store was 69,515,000, far more than other e-commerce platforms, and it can be speculated that more consumers tend to use the Jingdong platform to buy Huawei products, and the amount of data is larger and more secure.

Organized Jingdong Mall Huawei Jingdong official flagship store all in the sale of 17 headset products of the basic information shown in the table 1.

4.2. Collection process

In this paper, the use of octopus collector were collected in the table 17 product links in the evaluation of the basic information and evaluation content.

5. Data Processing

5.1. Data screening

Collecting process found that due to the insufficient amount of data numbered 4, 5, 7, 13, rounded off. Eventually, the evaluation text data of 13 products were retained for subsequent analysis, renumbered according to price sorting, as shown in the table, and the evaluation data were summarized in the same order for subsequent comparative analysis.

Table 2. List of selected products

No.	Name	Price (RMB)
1	Am115	49
2	Am116	89
3	Classic headphone(usb type-c version)	99
4	Freebuds se	369
5	Freelace pro	599
6	Freebuds 5i	599
7	Freebuds 4e	699
8	Freebuds 5	999
9	B7	999
10	Freebuds pro 2	1299
11	Smart glasses	1699
12	Freebuds lipstick	1699
13	Watch buds	2988

5.2. Word splitting

Unlike English words separated by spaces, Chinese content needs to be processed by word segmentation. Micro Word Cloud, which supports online word segmentation and word frequency statistics, is used for segmentation and word frequency statistics. The aggregated

evaluation data is 6500 entries, of which 6397 are valid, with 6231 feature words. According to the distribution chart of feature words, we can initially judge the user evaluation trend of products with different price levels.



Figure 1. Comparison of feature word distribution

6. Feature Word Extraction

6.1. Statistics

The summarized evaluation and the feature word list of 13 product evaluations are exported respectively, and the data are merged and sorted through excel to get the overall feature word distribution of 13 product evaluations compared with the number of feature words of each product. According to the order of the number of feature words appearing in the summary evaluation, the top 10 feature words are: sound quality, headphones, very, very good, Huawei, not bad, workmanship, texture, sound effect and like, as shown in the table.

6.2. Clustering

Sorted by the number of articles appearing in the summarized evaluation feature words, the data with the number of articles over 100 and the number of missing values not more than half are screened out, after which the data are manually cleaned according to the opinion of the professional group discussion, meaning-less words are removed and clustering is carried out, resulting in 5 groups and 17 classes of consumer reviews feature words, totaling 90, as shown in the figure.

The data were summarized by class to get the number of evaluation articles of the 13 products in the class, and the total number of articles on each feature word class of the 13 products was obtained by summing, as shown in the table below.

Table 3. Statistics on summarized feature words

NO.		1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Price		49	89	99	369	599	599	699	999	999	1299	1699	1699	2988	
Product	Quality	592	631	506	418	571	553	586	551	143	613	345	282	110	5901
	Workmanship	247	359	107	168	358	368	412	414	154	431	206	230	94	3548
	Appearance	125	227	166	101	229	273	206	336	235	299	93	294	184	2768
	Function	78	87	54	133	572	473	406	447	125	497	168	123	160	3323
Purchase	Price	212	205	163	104	154	182	177	78	26	142	54	42	40	1579
	Express	196	150	209	90	121	128	123	118	87	124	72	66	107	1591
	Service	61	61	98	20	52	64	58	56	40	102	54	45	59	770
	Brand	220	249	254	104	217	263	260	222	139	201	108	96	73	2406
Usage	Feelings	262	277	205	194	360	273	376	386	201	344	255	117	170	3420
	Behaviour	103	107	102	66	230	185	234	338	104	180	128	47	62	1886
Emotion	Evaluation	72	102	103	54	90	104	82	78	55	94	61	52	60	1007
	Psychology	95	85	101	45	86	86	95	102	90	79	53	38	72	1027
	Relationship	14	12	18	17	34	33	23	11	28	28	29	30	40	317
Satisfaction	Excellent	30	42	32	24	36	37	37	34	25	43	31	22	36	429
	Very good	243	279	235	207	238	247	252	231	144	233	171	178	149	2807
	Good	323	299	309	234	329	348	330	301	232	331	238	277	250	3801
	Mediocre	9	10	11	9	24	22	19	23	7	24	18	10	8	194

7. Analysis of The Differences in Consumer Reviews

According to the data of feature words derived in the previous period, SPSS was used to carry out descriptive statistical analysis, correlation analysis and linear regression analysis to find out whether there is a relationship between the product price and various types of feature words directly and what kind of relationship exists, so as to provide support for the conclusions of the product marketing strategy drawn in the latter part of the paper.

7.1. Descriptive statistical analysis

According to the results of the descriptive statistical analysis of the five sets of data of consumer reviews feature words, it is concluded that the 13 products selected in this paper have a large range of fluctuations in product prices, a high degree of discrete, and a more comprehensive coverage of the demand for the middle, high, and low-end markets; the number of product category feature words has the highest mean value and the greatest change, while the mean value of emotion category feature words is generally low, indicating that consumers pay more attention to the product itself rather than their personal subjective emotions in their reviews. The average value of the product category feature words is the highest, while the average value of the emotion category feature words is generally lower, indicating that consumers pay more attention to the product itself rather than their personal subjective emotions when evaluating the product, which is consistent with the actual situation.

7.2. Correlation analysis

Pearson Correlation Coefficient (Pearson Correlation Coefficient) analysis is a statistical measure reflecting the degree of linear correlation between two variables, this paper through the Pearson correlation analysis, the correlation coefficient value between the price and the product, purchase, satisfaction, a total of three items show significance, with the price and the product has a significant positive correlation, price and purchase has a significant negative correlation, price and satisfaction has a significant negative correlation between the price and the product. There is a significant positive correlation between price and product, a significant negative correlation between price and purchase, and a significant negative correlation

between price and satisfaction. Other than that, it means that there is no correlation between price, usage and emotion.

7.3. Multiple linear regression analysis

Multiple linear regression is a statistical analysis method used for forecasting and modeling that explores the linear relationship between the independent and dependent variables. Multiple linear regression analysis using SPSS yielded that product, purchase, and satisfaction explained 96.6% of the variation in price and the model fit was very good. The results of the multiple linear regression analysis are as follows: the regression coefficient value of product is 0.967 ($t=10.837$, $p=0.000<0.01$), which means that product will have a significant positive effect on price; the regression coefficient value of purchase is 2.266 ($t=2.563$, $p=0.031<0.05$), which means that purchase will have a significant positive effect on price; the regression coefficient value of satisfaction is -8.596 ($t=-5.221$, $p=0.001<0.01$), which means that satisfaction will have a significant negative impact on the price relationship. To summarize the analysis, it can be seen that product and purchase will have a significant positive influence relationship on price. As well as satisfaction will have a significant negative impact relationship on price.

8. Conclusion

This paper analyzes the consumer reviews data of Huawei brand headphone products on the Jingdong platform, revealing that there are differences in focus and emotional tendencies in consumer reviews between different products, and the results of the study provide a certain reference basis for the design and marketing of Huawei brand headphone products to help enterprises better meet the needs of consumers, and to enhance the competitiveness of their products and market share, with specific conclusions as follows.

In terms of categories, there are large differences in the consumer reviews of different products in terms of characteristic words, and some of the evaluations of headphone products pay more attention to sound quality and sound effects, wearing comfort and convenience of use, while the evaluations of another part of the products pay more attention to the appearance of the design, the brand effect and the price of the product, which indicates that all aspects should be fully considered before the product is launched, and focus on it according to the research data in order to achieve the maximization of the economic benefits.

In terms of quantity, the most frequent words in product reviews are product quality, product workmanship and usage feeling, reflecting that consumers care most about the product itself when purchasing the product, and also pay attention to the personal feeling in the process of using the product, which indicates that when analyzing the Kansei assessment of the product, we should combine the product appearance with the experience of using the product and simulate the real usage scenario as much as possible in order to obtain more effective evaluation data.

From the correlation, the product, purchase will have a significant positive impact on the price of the relationship, satisfaction will have a significant negative impact on the price of the relationship, reflecting that as the price of the product rises, consumers are more inclined to pay attention to the product itself and the purchase experience, and less on the satisfaction of the product to make evaluations, which indicates that the pricing of the product should be focused on improving the quality of the product, in order to get a higher level of satisfaction reviews. This paper analyzes the consumer reviews data of Huawei brand headphone products on the Jingdong platform, revealing that there are differences in focus and emotional tendencies in consumer reviews between different products, and the results of the study provide a certain

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