

Exploring Consumer Reviews for Men's Fashion Accessories in Online Purchase Platforms Using Sentiment Analysis

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Abstract

The recent trend in the Indian menswear market has witnessed the infusion of western styles. Result of this is a promising market in India for men's fashion accessories like caps, sunglasses, bracelets, rings etc. One among the accessories is earrings for man. This product category has got line extensions like studs, hoops, non-piercing magnetic type and piercing studs etc. Keeping in consideration the whooping growth of the men's earrings market in the online purchase platforms, this study is done with an objective to explore the reviews for this product category to arrive at some insights. For this study descriptive research design has been adopted. Using the scraper tool in Python software, the data (user's reviews for men's earrings) was collected from the top two online vendors in India (Amazon and Flipkart). Sentiment analysis is done with R software using the text analytical package "sentiment". Then the sentiment scores was deployed in ANOVA to test for any significant differences in star ratings and the product variant purchased by the customer taking the Comment Sentiment Scores and Title Sentiment Score. The results have shown that there is a significant difference between the star ratings and Comment Sentiment Scores, Title Sentiment Score. Bivariate correlation is applied to test the relationship between Comment Sentiment Score, Title Sentiment Score and star ratings. The result revealed that star ratings, Comment Sentiment Scores and Title Sentiment Score have a significant relationship with each other.

Key-words: Men's Fashion Accessories, Men's Earrings, Sentiment Analysis, Comment Sentiment Scores, Title Sentiment Scores.

1. Introduction

Purchase of Men's' fashion accessories in India has shifted to expression of fashion statement rather than a need based purchase. The young urban based customers in India are instrumental in

surging the growth of this market which has paved way for even international companies entering in to this segment. The inclination of Indian men towards adopting global fashion styles has restated the notion that fashion accessories are meant only for women. Thanks to the internet connectivity, access to contents like movies, television shows and fashion channels which has exposed the Indian consumers to the western style of dressing and embrace them. These has made the Indian men more fashion conscious and break the rules in defining of what is supposed to be a formal attire. Most of the Indian men now have the practice of dressing based on occasions and this has led to segregating their apparel choice like formals, business casuals, party wear etc. which was earlier only formals and casuals.

Added to this is the men's interest and adoption to fashion accessories. To this market even leading brand like Raymond which is predominantly known for its formal wear is now expanding the fashion accessory market. Many studies and reports suggest that the men's accessories market is upsurging and is very promising in India. Accessories of various types are expected to be important fashion elements in men's dressing.

When we speak of fashion accessories for men it includes an assortment of product categories like belts, wallets, glasses, neckties, bows, cufflinks, lapel pins and bracelets etc. Yet one of the overlooked but growing market is the earring for men. This product category earring for men include earring types like magnetic, hoops, studs, novelty earrings, flesh tunnels & plugs, clip on earrings, gemstones & pearls, tapers and barbells. As far as a country like India is concerned earring worn by men are not yet considered as a formal accessory and hence there is no classification of formal earrings and casual earrings in the types of earrings mentioned above. Yet the habit of wearing a suitable earring according to the apparel is growing in India. Very few of the corporates too don't mind their employees at the top level wearing earrings.

Here we take into consideration only the casual earrings which are not made of gold. Earrings for men made of gold; platinum is a separate market which is also growing a steadfast rate. Notably men's earrings made of gold have witnessed a good welcome in the western markets like United States.

The leading online sale platform in India like Flipkart and Amazon has a separate section for the earring in discussion here. An attempt is made to analyze the comments for this product category because it is an established fact that in online sales platforms peer purchaser's comments and reviews replaces the role of a salesperson and advertisements.

The comments are categorized using sentiment analysis and correlated to the star ratings and the ratings on the product category. This is discussed in detail under the section, research methodology.

2. Literature Reviewed

Few of the past studies related to this study were reviewed to gain a broad support to the idea proposed by the authors. The papers referred and the inputs taken from those papers for support in this study are presented in this section.

There are several methods and algorithms used to arrive at sentiment scores from the reviews Omar Alqaryouti, Nur Siyam, Azza Abdel Monem, Khaled Shaalan [1] and various digital sources. Approaches that can be adopted to arrive at sentiment scores based on the reviews can be language processing techniques, rules, and lexicons language processing techniques, rules, and lexicons.

This sentiment analysis is in fact a breakthrough in marketing research Meena Rambocas, Barney G. Pacheco [2] and marketers can leverage on this for better marketing intelligence. This sentiment analysis will help the marketers better understand the customer attitudes and brand opinions towards their market offerings.

The length of the reviews that online customers give will vary depending on the product category. The sentiment scores would also vary when we compare two products within a product category B. Rajeswari, S. Madhavan, Ramakrishnan Venkatesakumar and S. Riasudeen [3]. We can also correlate the length of the review and the star ratings given by the reviewers Maryam Ghasemaghaei, Seyed Pouyan Eslami, Ken Deal, Khaled Hassanein [4] and also arrive at the key words that determine the emotions of the reviewers.

A conceptual model can also be developed using the sentiment scores arrived at based on the reviews by customers. By arriving such new models based on sentiment scores even well-established models can also be challenged Somnath Chakrabarti, Deepak Trehan, Mayank Makhija [5].

Sentiment scores along with emotion scores will yield better understanding and validation of the proposed hypotheses. Sentiment scores need not necessarily be arrived at from consumer reviews alone. Once an appropriate algorithm is used sentiment scores can be arrived at from reviews in social media like twitter, Facebook etc and tweets on various businesses can be analysed and compared Arghya Ray, Pradip Kumar Bala, Rashmi Jain[6]. The application of sentiment analysis is not limited to products but also can be applied to services Ree Chan Ho, Madusha Sandamali Withanage, Kok

Wei Khong [7]. Using structured predictive analysis sentiment drivers can be arrived at from unstructured online reviews for services.

A marketer need to understand that reviews by the customers and their satisfaction level are always based on their perception Amit Singh, Mamata Jenamani, Jitesh Thakkar [8] of what value they have received but not the real value they have derived out of a purchase. Though sentiment analysis marketers would also be able to understand their perceived weakness form the customer point-of-view and tailor strategies to address the same.

The marketers need not have pricey products and services to get positive reviews Yee Liao, B. and Pei Tan, P. [9] and they can get measured their customer satisfaction even they are offering low cost products or services. This is so because what matters to the customers is the value they get for the price they pay.

When a comprehensive study is undertaken sentiment scores can be used to predict sales Alain Yee Loong Chong, Boying Li, Eric W.T. Ngai, Eugene Ch'ng, Filbert Lee [10] and identify the which of the variable among the variable are key in predicting the sales.

Other similar works are also referred to serve as a base for this study and those are mentioned in the list of references.

3. Objectives

The prime objectives of this study are to:

- Analyze the reviews on men's earrings in the online sales platforms and arrive at sentiment scores for the comments, the titles given for the comments.
- Identify the underlying relationship between the comment sentiment scores and title sentiment scores
- Identify whether there is a difference in the sentiment scores (comment and title) based on the star ratings and product category.

4. Methodology

The steps involved in this study right from the collection of data to arriving at results and the way the dataset is analyzed using various tools are discussed in this section.

Ratings, title and text reviews on men’s earrings has been collected from leading online sales platforms like Flipkart and Amazon using Google Chrome plugin. A dataset comprising of 966 reviews were collected.

Using plugins like ‘tm’ and ‘sentiment r’ in R Studio the dataset is pre-processed to arrive at comment sentiment scores and title sentiment scores.

SPSS was used to test the hypotheses proposed by the authors.

Comment sentiment score is the sentiment score of the comments (reviews) on earrings by the online purchasers. Title sentiment score is the sentiment score for the title given for the reviews. Star rating is rating on a scale of 1 star to 5 stars given by the reviewers who post their opinion on the said product. Product category here refers to the men’s earrings which compiles of various line extensions and different types of earrings discussed in the introduction.

5. Discussion of Results

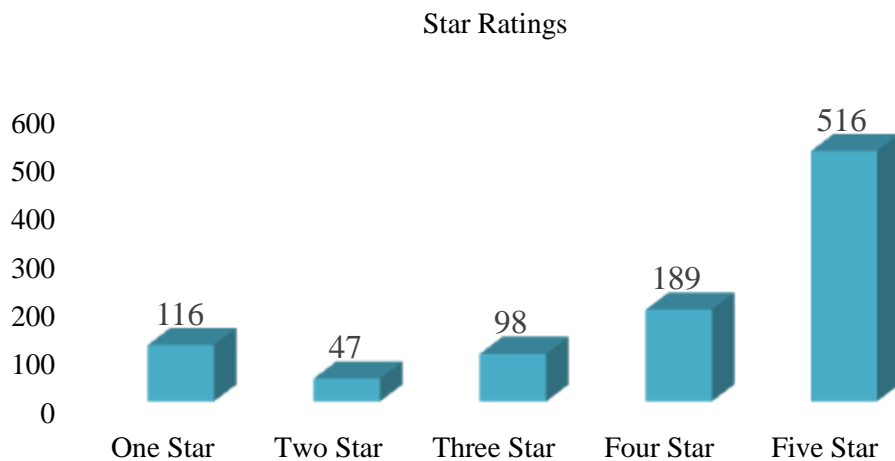
The analysis done and the results arrived at as a part of this study are discussed in this section.

Table 1 – Descriptive Statistics on Star Ratings given by Commenters

		Frequency	Percentage	Cumulative Percentage
Ratings	One Star	116	12.0	12.0
	Two Star	47	4.9	16.9
	Three Star	98	10.1	27.0
	Four Star	189	19.6	46.6
	Five Star	516	53.4	100.0
	Total	966	100.0	

It can be inferred from the above table that the ratings of the reviews range from 1 star to 5 star as normal in the reviews in online. It is observed that 5 star ratings on the earrings account for more than 50%. The results of the Table 1 are presented in the chart format in Figure 1 which is given below.

Fig. 1 – Chart for Descriptive Statistics on Star Ratings



As stated in the methodology the comment sentiment scores and the title sentiment scores are arrived at using plugins in R studio. In Table 2 the comment the frequencies of comment sentiment scores are presented.

Here the interval taken for segregating the comment scores is in the range from -1.0 to 1.0. In Table 2 quartile distribution of the comment scores are presented. So each quartile has a 25 percentage of the total reviews. But it is to be noted that the range from -1.0 to 1.0 is not equally divided.

Table 2 - Descriptive Statistics (Quartile Distribution) for Comment Sentiment Scores

Sentiment Score	Frequency	Percentage
From -1.0 to 0.185824566	242	25
From 0.1858245661 to 0.5000000000	242	25
From 0.5000000001 to 0.7500000000	241	25
From 0.7500000001 to 1.0	241	25
Total	966	100

The range from -1.0 to 1.0 is divided into four sections. The first section being -1.0 to 0.185 which can be rounded off to 0.19. The range of this section is wide compared to the other sections. Yet only 25 of the comment scores fall in this wide category. This means the negative comments on the product is less compared to the positive comments. In other words we can approximate take that 25% of the total reviews are negative and 75% of the reviews are positive based on the sentiment scores for the reviews which we mention here as comment score.

The descriptive analysis of the title sentiment scores are not presented because some of the titles for the comments are symbols like thumbs up, smileys and emoticons.

Application of Carl Pearson’s bivariate correlation is applied to test for relationship between the Comment Sentiment Score, and Title Sentiment Score and the Star Rating

Hypothesis: There is a significant relationship between Comment Sentiment Score, Title Sentiment Score and Star Rating.

Table 3 - Mean and Std. Deviation for Comment Sentiment Score and Title Sentiment Score

	Mean	Std. Deviation	N
Comment sentiment Score	.443	.407	966
Title sentiment Score	.365	.417	966
Star Rating	3.975	1.382	966

Table 4 - Correlation – Comment Sentiment Score, Title Sentiment Score and Star Rating

		Comment sentiment Score	Title sentiment Score
Title sentiment Score	Pearson Correlation	.436**	-
	Sig. (2-tailed)	0.000	
Star Rating	Pearson Correlation	.528**	.474**
	Sig. (2-tailed)	0.000	0
**. Correlation is significant at the 0.01 level (2-tailed).			

The above table explains the relationship between Title sentiment Score, Star Rating and Comment sentiment Score. The result reveals that there is correlation among the variables at the significance level 0.0 (2-tailed). Hence the hypothesis, there is a significant relationship between Comment Sentiment Score, Title Sentiment Score and Star Rating is accepted and to conclude these are correlated with each other.

Using Levene Statistic attempt is made to find out the significant difference between the Comment Sentiment Scores and Title Sentiment Scores by Star rating and product category.

Hypothesis: There is a significant difference between Comments Sentiment Scores and Title Sentiment Score by customer star rating

Table 5 - Homogeneity of Variances between Comment Sentiment Scores and Title Sentiment Scores
(Based on Star Ratings)

	Levene Statistic	df1	df2	Sig.
Comment Sentiment Score	.762	4	961	0.550
Title Sentiment Score	.642	4	961	0.630

Table 6 - Variance between Comment Score and Title Score based on Star Rating

ANOVA – Star Rating			
	df	F	p.
Comment Sentiment Score	4	79.464	.000**
Title Sentiment Score	4	70.952	.000**
** level of significance is 1%			

The first step in one way ANOVA is testing the Homogeneity of Variances through Levene's test. Table 5 shows that the sig. value is not significant at 95% level of confidence for all the factors. It reveals that the variance of sample for each group of the factors is approximately equal. Hence one way ANOVA test is proceeded with.

The one way ANOVA results presented in table 6 explains that the F-value of Comment Sentiment Score is 79.464 with degrees of freedom of four is significant at $p < 0.01$ level. The F value of Title Sentiment Score is 70.952 and it is significant at $p < 0.01$ level. The significant values reveal that there is significant difference in Comment Sentiment Score and Title Sentiment Score. Hence the hypothesis, there is a significant difference between Comments Sentiment Scores and Title Sentiment Score by customer star rating is supported.

Hypothesis: There is a significant difference between Comment Sentiment Score and Title Sentiment Score by product category.

Table 7 - Homogeneity of Variances between Comment Sentiment Scores and Title Sentiment Scores
(Based on Product Category)

	Levene Statistic	df1	df2	Sig.
Comment Sentiment Score	.484	7	958	.847
Title Sentiment Score	1.693	7	958	.107

Table 8 - Variance between Comment Score and Title Score based on Product Category

ANOVA – Product Category			
	df	F	p.
Comment Sentiment Score	7	.904	.502
Title Sentiment Score	7	1.119	.349

Similar to the steps following in testing the previous hypothesis, the first step in one way ANOVA is testing the Homogeneity of Variances through Levene's test. Table 7 shows that the sig. value is not significant at 95% level of confidence for all the factors. It reveals that the variance of sample for each group of the factors is approximately equal and hence one way ANOVA test is proceeded with.

One way ANOVA result also presented in table 8 reveal that the F-value of Comment Sentiment Score is 0.904 with degrees of freedom of seven is not significant ($p=0.502$) at $p<0.05$ level. The F value of Title Sentiment Score is 1.119 and it is not significant (0.349) at $p<0.05$ level. The significant values reveal that there is no significant difference in Comment Sentiment Score and Title Sentiment Score by product category. Hence the hypothesis, there is a significant difference between Comments Sentiment Scores and Title Sentiment Score by product category is not supported.

6. Concluding Remarks

This study has given certain insights about the online reviews with regard to men's earrings. Review of literature in the inception stage of this study has provided new dimensions which can be adopted and incorporated in the future studies. As an extension of this study attempt can be made to predict the sales to measure the intensity of influence the reviews have on purchases. Demographic details such as age, tenure of association with the online sales platform and whether the reviewer is a first time buyer or a repeat buyer are details which are not available and hence these are not used in the study. Had these details are available a more vivid analysis can be made which will be of use to marketers of these products. Overall this study will be providing a basic of sentiment analysis and how this can be applied to measure customer attitudes and perceptions. Segregating the reviews based on brand and doing a comparative analysis would also provide depth insights to marketers.

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