



Indian Market Analysis for Jeans Design Development

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Abstract. Product development is an essential process in producing a marketable product. The study proposes a new product development model incorporating customer requirements and market trends for developing a new jeans range. The data on consumer preference for denim jeans was collected by employing a survey. The consumer survey provided insights into the fit, colour, washing tone and style preference, wearing patterns, buying behaviour and sustainability requirements. Further, a web scraping algorithm was used to collect data on competitive online products. The features of jeans sold in the online market in India were studied. The data analysis provided the basis for feature selection for the denim jeans samples. These features provided the base for developing a new jeans range for men and women. Potential consumers wore the newly designed jeans, and feedback was collected. The method of competition mapping described in this study is economical and effective for forecasting trends. The proposed product development model has practical applications and is affordable for all brands. This study aims to develop jeans designs by analyzing the Indian market to find out which jeans designs are more in demand by Indian people aged 20-25 years. The results show that brand and product durability is of secondary importance. Consumers prefer to buy jeans in the desired colour, size and style regardless of the brands available. The most preferred style is basic 5-pocket jeans, and the most preferred fabric is stretch denim for both men and women category. The new denim jeans design that have been developed based on prices, trends, styles, and customer needs indicate that the new jeans samples are well received by the majority of consumers who wear these jeans.

Keywords: new product development, denim jeans, consumer survey, web scrapping

INTRODUCTION

Denim jeans are a timeless piece of clothing that never seems out of style. Consumers have an unquenchable desire for jeans, especially in the young adult segment. It is worn by around eight out of every ten young people in various forms and sizes (Csanák, 2015). Denim jeans are considered comfortable to wear, cheaper in maintenance, and have increased durability. The driving factors for denim jeans' popularity are the online sector boom, organised retail growth and a young population with higher buying power. The convenience of online purchases, such as a flexible return policy and online viewing of options, allow younger consumers to buy denim jeans easily (Fratto et al., 2006; Yu et al., 2012). Various brands offer many styles and fit options (Csanák, 2015; Upadhyay & Ambavale, 2015; Rahman, 2011). Due to the following challenges, new product development in the jeans category is challenging for the brands operating in the economy segment. This research aims to develop a jeans design based on the needs and interests of the Indian market.

1.1. Denim Jeans Market Dynamics

The global denim jeans market has a projected growth of about 87.4 billion U.S. dollars, with retail sales predicted to be about 71.8 billion U.S. \$ in 2027. Despite the growing global demand in the category, the sales success rate depends on a real-time understanding of customer requirements and market dynamics (Lee & Park, 2003; Yesil et al., 2012). Increased competition among retailers is known to power the discount channels, lowering prices (Kaushik et al., 2020). Brands operating in mass markets achieve competitive success through a cost-reduction strategy for selling standardised products and working with economies of scale. Further, Indian denim jeans brands deal with low possibilities of product differentiation, making them helpless against the competition (Fratto et al., 2006). Understanding channel classification and customer segmentation before setting prices can avoid price wars among competitors. Success depends on understanding customer preferences better and offering a product that puts style, quality, and cost at the forefront (Gupta, 2022). Though cotton denim fabric is used to produce premium jeans, many Indian brands reduce expenses by using polyester-cotton blend denim fabrics to make jeans (Annapoorani, 2017). Forecasting trends and sales numbers nearer to the selling season and applying modern production systems further the chances to cater to customer demand as they arise (Taplin, 2014). Fast fashion brands offer greater variety, each in smaller quantities. They use a complicated replenishment system to cater to changing demand. Working with a small assortment breadth and frequent changes in offerings increases customer footfall (Wei & Zhou, 2011).

1.2 Customer preferences

Customer preferences are critical in developing innovative products (De Silva & Rupasinghe, 2016). According to studies, successful inventions occurred due to close collaboration between the end-user and the inventor. Faster access to information via the internet leads to increased speed in the transition of fashion trend cycles. Intrinsic and extrinsic cues influence consumer behaviour. The intrinsic cues are quality, style, colour, comfort, fit, and fabric. The extrinsic cues are price, brand name, and country of origin (Wong et al., 2016). A study by Rahman (2011) found that intrinsic cues are more influential than extrinsic ones. Regan (2015) found that Indian consumers view fit and country of origin before considering the price. Banerjee and Banerjee (2019) showed that product quality, innovations, style and product availability influence buying behaviour. Buyers also incur a cost for searching for the right product (Kuksov, 2004). Today's online search engines are very efficient in finding the right product, and this speed can influence product adaptations and acquisition. The brands must adopt a competitive pricing strategy and introduce fashionable style features. Through trend forecasting, the brands must track the most preferred styles, fits and other details among competition offerings and customer preferences.

1.3 Traditional Trend Forecast

Trend forecasting is the starting point for creating new product ranges. Trend forecasting requires analyses of the fashion image data collected from various sources and timelines to compile the trending attributes. Fashion experts scan images from fashion shows, blogs, social media, and new experiences and places (Gu et al., 2017). Further, research on politics, literature, art, economics, culture and science inspire trends (Gaimster, 2012). Forecasting service providers employ fashion trend experts to create fashion abstracts on styles, fabrics and colours that the consumer will prefer in a future fashion season (Yu et al., 2012). This abstraction works across design collections and timelines help trace the changing trends. The designer then interprets the macro trend information for a specific product category. The product category-specific trend information helps fashion professionals across design, product buying, and brand management create commercially viable product lines. This method is increasingly becoming time and labour-intensive and thereby costly. Many Indian economy brands are unable to afford professional forecasting services. Further, the manual abstracting of fashion-related data can be skewed based on the forecaster's bias or subjective choices (Shi et al., 2021).

1.4 Application of Technology for Trend Forecast

The influence of technology allows consumers to demand wider choices, make conscious choices between options and understand peer experiences through improved networking media. Fashion brands, on their part, are using technology to build consumer insights and customisation into

product lines, building agile supply chains and brands highly responsive to changes in customer preferences. The application of technology can be a critical driver in the changing trend forecasting methods. Yesil et al. (2012) used fuzzy logic to predict demand. Yu et al. (2012) compared the effectiveness of the three methods for colour forecast- ARIMA (autoregressive integrated moving average), ANN (Artificial Neural Network), and Grey neural network (GNN) models. Colour forecasting using ARIMA has given mixed results. It requires a large number of past data, which may not exist in the case of fast fashion. Combining various forecasting methods gave better results than any one particular method (Clemen, 1989, Armstrong, 2001). Present forecasting solutions are either inconclusive or not accessible to many small brands.

Another forecast done before product development is sales forecasting. Sales forecasting primarily uses moving averages and exponential smoothing. Yesil et al (2012) show that simple moving averages and exponential smoothing worked better than the ARIMA (autoregressive integrated moving average) in fast fashion forecasting. The need for a simple trend forecasting method that is accessible and economically feasible to employ becomes apparent. This study proposes the application of an open-source tool to access the trends of a particular product by ascertaining the product features available on online platforms.

1.5 Proposed Product Development Model

The above reasons indicate that product development should begin with three basics- knowledge of customer preferences, market insights and product innovations (Gupta, 2022). Further, the sheer number of jeans produced has a substantial environmental and worker health impact. A greener strategy is to produce jeans that the market demands. This study explores Indian customer preferences using a consumer survey. It further forecasts the trend, styles, fit and other details of trending competitive products in the Indian market using web scraping. Consumer wear testing confirmed the acceptance of newly developed jeans.

METHODOLOGY

The method used in this study involves collecting data from competing brands and customer preferences (Figure 1). The features offered in competitive products were collected from websites selling jeans online. Customer preferences were collected through a questionnaire. The insights derived from both analyses were incorporated into the samples developed. Potential customers wore the developed samples during wear testing their feedback was collected.

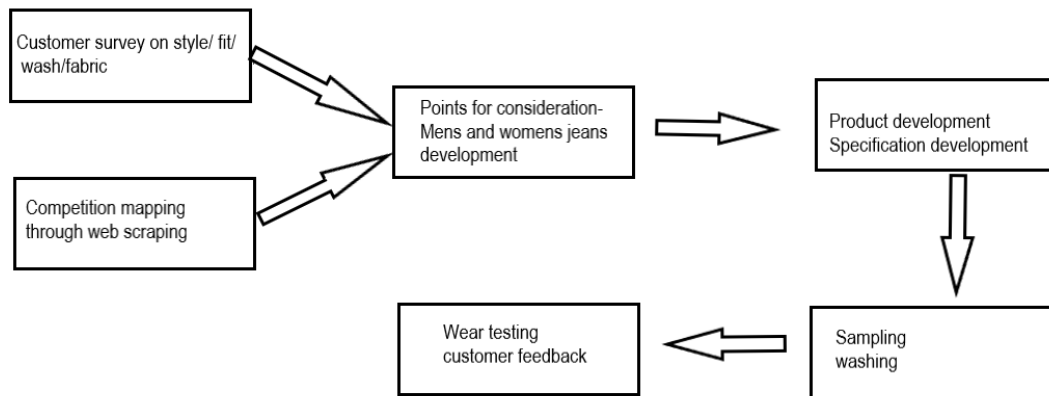


Figure 1. Product development model for developing jeans.

2.1 Customer Insights

The consumer preferences on different types of fit, fabric type (Stretchable/Non-Stretchable), shade & wash tone, styling inputs, sustainability and price were collected through a google survey. The questionnaire had 22 multiple-choice questions, checkboxes, multiple-choice grids and tick-box grids. The data was collected from a target group of persons (20-40 years of age). The age groups used for the study are 20-25, 26-30, 31-35 and 36-40 years. A total of 300 responses were collected.

2.2 Competition analysis

The data relating to products offered by the competition was collected using a Python-based web-scraping algorithm consisting of a crawler and a scraper (Figure 2). Python is open-source software. The crawler is an algorithm that searches the internet for specific material by following links. On the other hand, a scraper is a tool designed to extract information from a website. A code prototyping environment called Jupyter was used in the form of an interactive notebook. The BeautifulSoup module extracted data from markup languages such as HTML, XML, and others. All the source pages were in HTML format. It primarily functions as a parser, assisting in obtaining the information required logically. The Pandas module was used to generate a data frame from the scraped data and save it in the proper format on the local workstation. The page count was set to run as the loop from minimum to maximum. The essential parameters to be scraped, which include the name, brand, price and size, were specified, followed by the while loop. The page then saved all of the web page's contents in text format. The variable names were added, followed by entering the product details. Finally, the details for the item table were specified, as shown in Figure 3. Code ran for fetching the required information in each section. Once the code ran for a specific count, the data was collected in a table format as a CSV file. The data from the survey and the web scraping was analysed using excel based pivot table.

Insights of consumer preferences and competition analysis were used to develop a range of jeans. Potential customers of medium size were identified, and feedback on fit and style features was collected.

```
In [26]: from bs4 import BeautifulSoup
import requests
import pandas as pd

In [27]: page_count = 1
max_count = 1
item_name = []
item_brand = []
item_price = []
item_size = []

item_pattern = []
item_fabric = []
item_fade = []
item_rise = []
item_distress = []
item_color = []
item_fit = []

while(page_count <= max_count):
    print(page_count)
    html_text = requests.get(f'https://www.flipkart.com/clothing-and-accessories/bottomwear/jeans/women-jeans/pr?sid=cl
    soup = BeautifulSoup(html_text, 'lxml')
    items = soup.find_all('div', class_='_2B099V')

In [28]: item_table = pd.DataFrame(
    {'Brand Name': item_brand,
    'Item Name': item_name,
    'Price': item_price,
    'Size': item_size,
    'Pattern': item_pattern,
    'Color': item_color,
    'Distressed': item_distress,
    'Fabric': item_fabric,
    'Fade': item_fade,
    'Rise': item_rise,
    'Fit': item_fit
    }
    #--- ADD LIST TO TABLE ---
    #Example: 'Column_name': variable_name
    })

In [29]: item_table
```

Figure 2. Python code used for web scraping

```
In [29]: item_table
Out[29]:
```

	Brand Name	Item Name	Price	Size	Pattern	Color	Distressed	Fabric	Fade	Rise	Fit
0	HIGHLANDER	Tapered Fit Women Dark Blue Jeans	₹699	30, 32, 34, 36, 38	NA	Dark Blue	Mild Distress	Cotton-Lycra Blend	Light Fade	Mid Rise	NA
1	HIGHLANDER	Tapered Fit Women Light Blue Jeans	₹699	30, 32, 34, 36, 38	NA	Light Blue	Mild Distress	Cotton Blend	Light Fade	Mid Rise	NA
2	HIGHLANDER	Tapered Fit Women Grey Jeans	₹549	30, 32, 34, 36, 38	NA	Grey	Clean Look	Cotton Blend	Clean Look	Mid Rise	NA

```
In [30]: item_table.to_excel('HIGHW.xlsx')
```

Figure 3. Product data collection through code from websites

RESULTS AND DISCUSSION

3.1 Competition mapping

The data was collected using web scraping of major online selling websites. The details of about 7000 SKU (stock keeping units) in jeans categories sold by major brands in men's and women's wear were collected using the web scraping algorithm given in Figure 1. The data thus collected was downloaded as a CSV file, as shown in Figure 2. The data about mens jeans indicates that slim fit and skinny fit are the most offered jeans in the men's category (Figure 3 a). The next highest is the regular and tapered fit. Brands do not offer bootleg and jogger fits for men. Most men's jeans offered are in

Like menswear, the most SKU offered in women’s jeans are skinny fit (558 options), slim fit (433 options) and regular fit (344 options), as seen in Figure 5 a. The women’s jeans are offered in multiple fits (unlike the men’s jeans), namely, bootleg, boyfriend, jogger and tapered fit. The most common colour offered in jeans is blue (991 options), followed by dark blue (274 options) and black (241 options). The colours that are not present in the men’s jeans but those offered in women’s jeans are white (56 options), green (12 options) and yellow (6 options) (Figure 5 b).

Most womenswear jeans have a clean look (without distress/effects), with maximum options having mid-rise (1155 options), followed by high-rise jeans (276 options) and low-rise jeans (145 options). There were 143 options with Mild distress. The most demanded jeans are those with mid-rise (Figure 5.d).

The brand study was undertaken in the Indian market, and the brand positioning is shown in Figure 6. Whiskering, scrapping, mild distress and PP spray are used in many jeans in the market.

BRANDS	PRICE	PRODUCT	STYLING ELEMENTS	TOTAL
People	INR 1699		Whiskers, Scraping, PP Spray, Mild Rags	4
SF Jeans	INR 1799		Scraping, PP Spray, Tagging, Mild Rags	4
Bare Denim	INR 1699		Whiskers, Scraping, PP Spray, Mild Rags, Tagging	5
Max	INR 1799		Whiskers, Scraping, PP Spray, Tagging, Mild Rags, High Distress, Puncture patch, Cloud/Enzyme wash	8

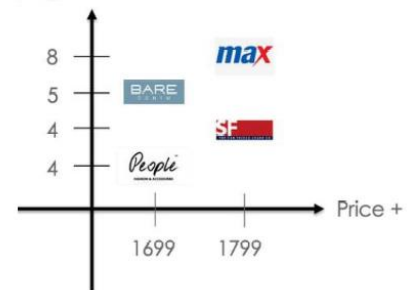


Figure 6. Styling elements and positioning of competition brands

3.2 Consumer Survey

A consumer survey involved 304 respondents, of which 148 (41.7%) were female and 156 (51.3%) were males. Most consumers who were part of the survey were in the age group of 20-25 years (Figure 7 a).

3.2.1 Number of Jeans Purchased

A majority (40.8%) of the respondents like to purchase around 2 to 3 pairs of jeans per year until they get bored of the look & fit. Hundred and four (34.2%) respondents bought none or only one pair of jeans per year. Fifty-six (18.4%) respondents purchased 4-5 pairs, and 20(6.6%) purchased more than five pairs of jeans (Figure 7 b). About 25% of the respondents who are also in the age group of 20-25 years are frequent customers and are conscious of the new arrivals and changes in SKU offerings.

3.2.2 Wearing Pattern

Consumers usually wear jeans several times between each wash. Most respondents (68.2%) wear jeans a maximum of 3 times a week (Figure 7 c). 22.4 % of consumers surveyed wear jeans a maximum of 5 times a week, and 9.6% of respondents wear jeans daily. Figure 7 d shows the difference in wearing patterns between men and women. Sixty-eight men wear jeans only once a week, whereas only 31 women wear jeans once a week. Also, women purchase more jeans yearly than men.

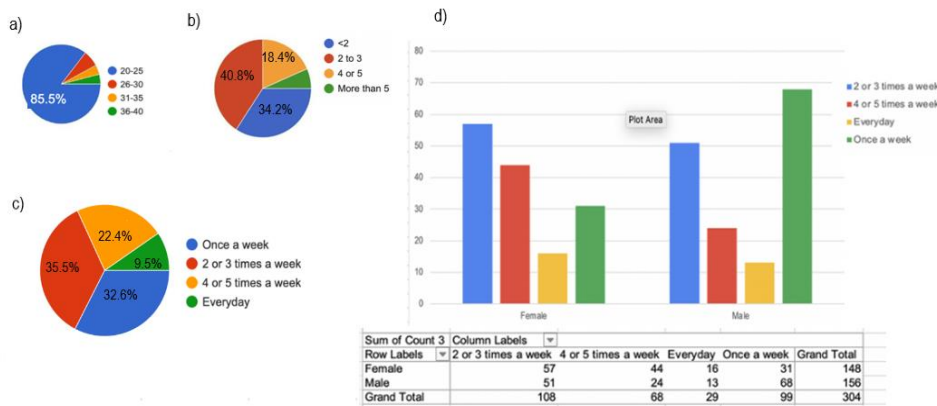


Figure 7. Results of the consumer preferences: a) respondent age in years; b) Number of jeans bought per year; c) Number of times jeans worn in a week; d) difference in wearing pattern between men and women.

3.2.3 Factors affecting buying decision:

The consumers showed varied preferences in the size & fit of jeans. It is essential for comfort, performance, and aesthetic appeal (Csanák, 2015). Colour, style, fabric and price are essential factors in choosing jeans. The results indicate that brand and product durability is of secondary importance. Consumers prefer to buy the sought colour, size and style of jeans irrespective of the available brand. Only 33.6% of respondents indicated that the brand name is the primary factor for buying jeans (Figures 8a and 8b). The most preferred style is basic 5-pocket jeans, and the most preferred fabric is stretch denim in both men’s and women’s categories (Figures 8 c and 8 d).

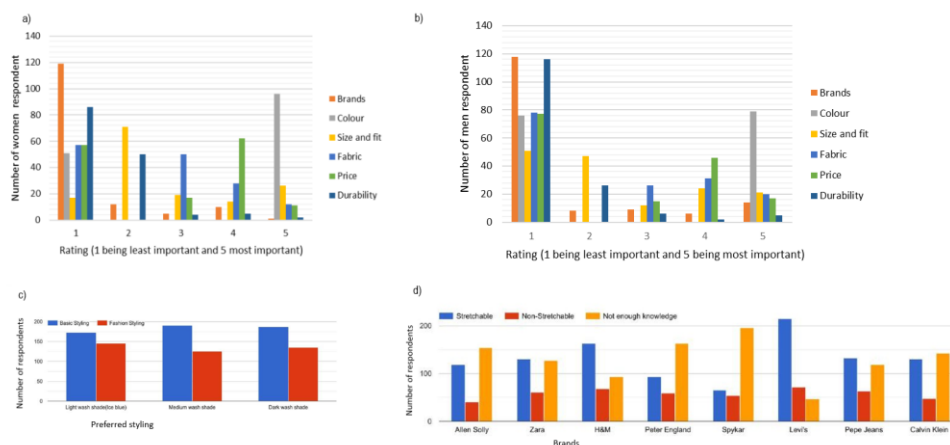


Figure 8. a) factors affecting buying for women, b) factors affecting buying for men, c) preferred styling, d) preferences in fabrics(stretchable/non-stretchable fabric)

3.2.4 Sustainability

Sustainability is an added benefit opted for by the consumers (64.5%), and fewer consumers have opted for the existing range of products (3.3%). Notably, 32.2% of consumers surveyed feel sustainable attributes should be within the same price range as the existing product range (Figure 9 a). Consumers are more comfortable adding 1 to 2 pairs of jeans using recycled materials & treated water to their wardrobe. Awareness of natural dyes & organic products has increased among consumers. The reduced consumption of sustainable jeans indicates that a higher price range of sustainable products leads to lower adoption in mainstream markets. Most respondents preferring sustainable jeans are not keen to buy more than one pair of such jeans.

3.2.5 Fit

The fit preference is widespread, majorly between slim fit, skinny, carrot & regular fits. The slim fit is preferred by most of the consumers (50.3%), followed by skinny fit (35.5%) & carrot fit (24%). Slim and skinny fit jeans are made in stretch denim fabric (Other notable denim fits that women prefer to wear includes the flared leg, wide leg, boot cut, boyfriend fit & straight fit. Around 214 respondents have chosen stretchability as the most desired fabric attribute (Figure 8 b).

3.2.6 Colour

The consumer's fondness for blue shades is evergreen. Jeans are preferred in the dark (54%) and medium (54.6%) blue shades. Lighter-shade jeans are favoured by 46.7% of respondents, and ice blue colour is preferred by 30.6% of consumers surveyed. Low customer preference is in jeans of grey, black, white, and green colour. The count of various shade preferences selected by the consumers is plotted in Figure 9.d.

3.2.7 Washing tone

Customers prefer basic styling jeans (5-pocket jeans) in a medium wash and fashion styling jeans in light washes. The crucial insights regarding fit, fabric, styling & price (MRP) preferences are collected for the selected eight competitor brands (Figure 8 c). Consumers like the fit & quality of the fabric offered by Levi's jeans, the fashion styling offered by Zara's and the pricing of H&M's jeans.

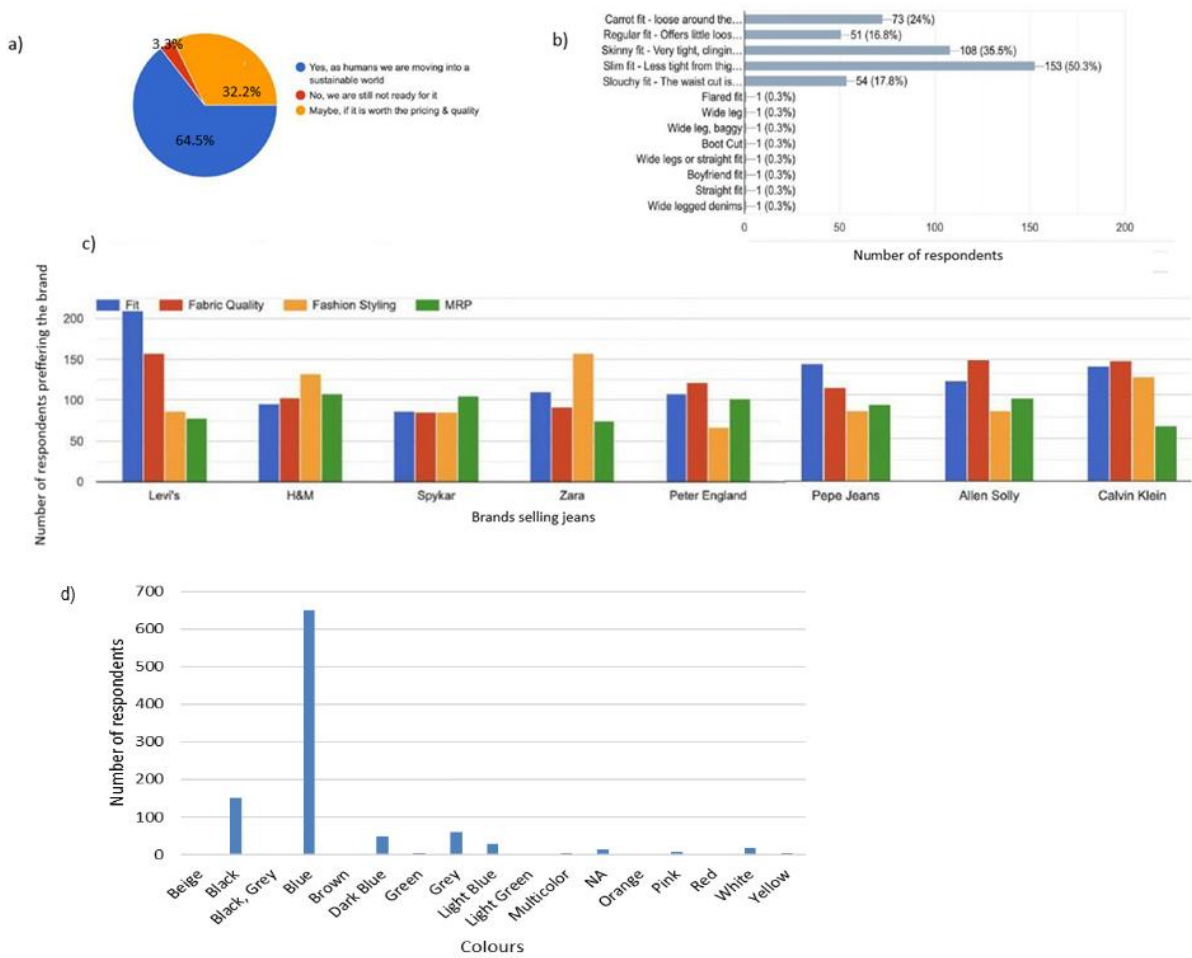


Figure 9. Results of consumer preferences-a) preferences on sustainable products; b) preferences in the fit; c) Preferences on styling, fit, fabric quality, styling and prices in different brands, d) colour preference.

3.3 Product development and customer feedback

Based on the insights from the consumer study and the competition mapping, the new product's features were finalised (Figure 10). The fabric selected was cotton polyester stretch denim fabric. The slim and skinny fit is best achieved in stretch denim fabric (Yasim & Tajuddin, 2020). Features like odour management and an anti-bacterial finish were incorporated into the fabric. Based on the features selected, a sample of men's jeans and two samples of women's jeans in size 'M' were developed. The men's jeans were developed in a slim fit, and the women's jeans were developed in a skinny fit. The specifications of the jeans are given in Figures 11 and 12.

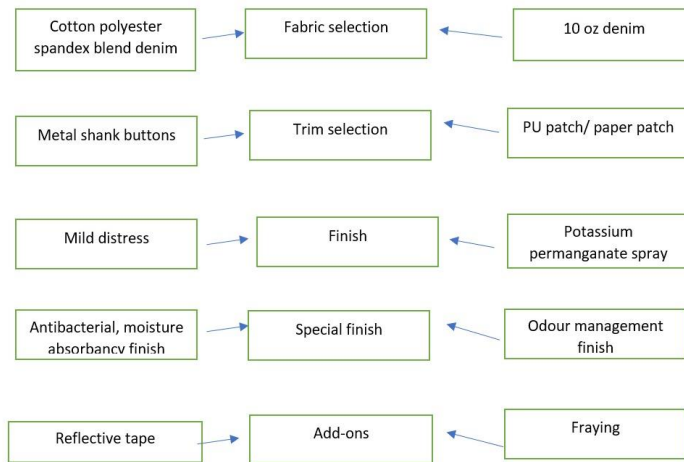


Figure 10. Feature selection for new jeans developed.

FTT: SLIM



DESCRIPTION : DARK BLUE DENIM WITH DTM TRIMS

MRP :1699/-

Figure 11. specification sheet- Men's jeans

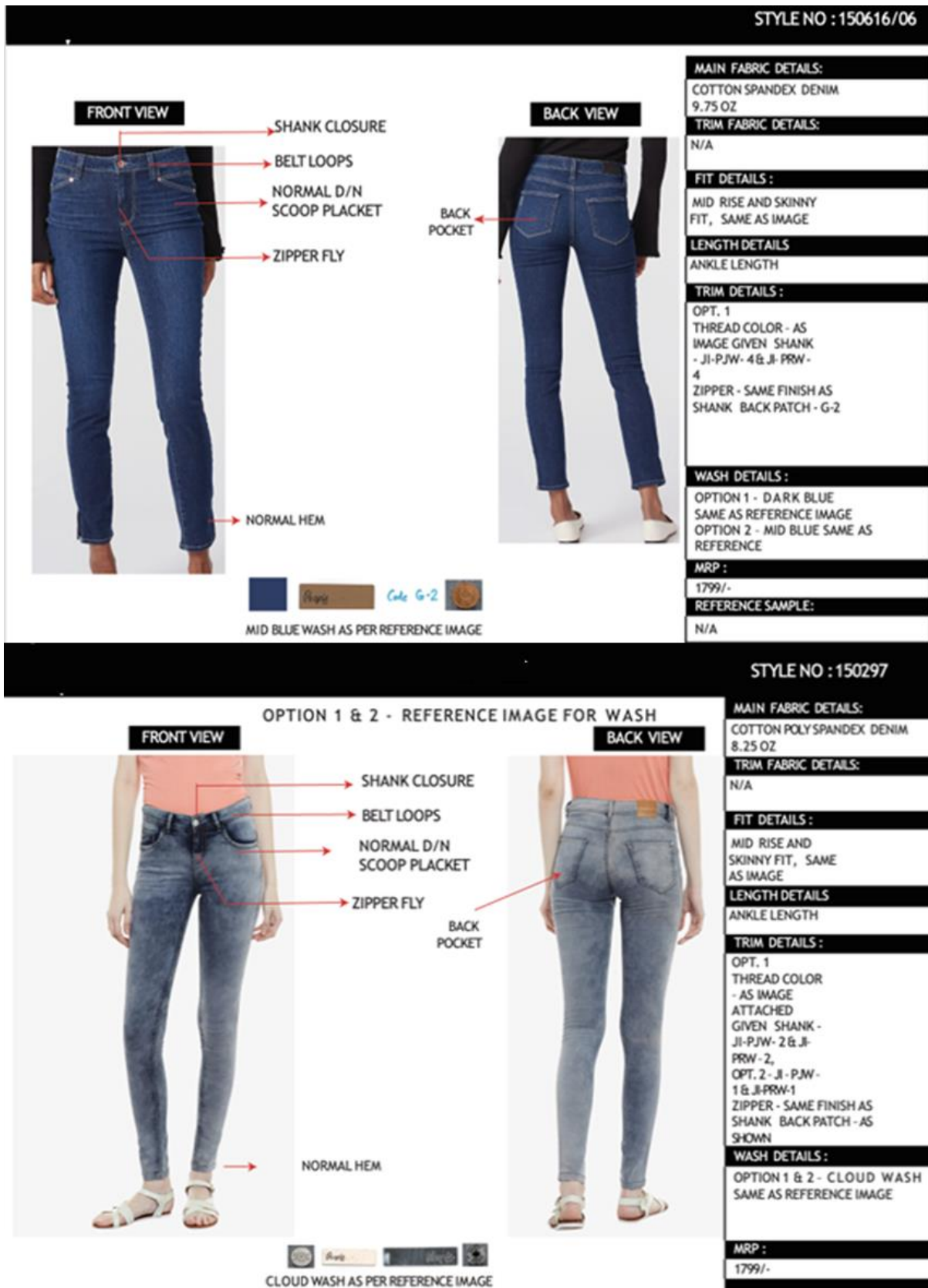


Figure 12. Specification sheet – women's jeans

The jeans samples were worn by 17 men and 18 women (Figure 13). About 77.1% of them felt that the samples look good. Nineteen of the respondents rated the jeans as 4 out of 5. 45.7% of the respondents rated the fit as perfect, 20% felt it was loose, and 28.6% thought they were tight. About 68.6% of the respondent rated the styling of the developed samples as good, and 14.3% of the respondent feel it is better than the products they are wearing. About 77.1% of the respondents think that the price of the developed samples is satisfactory. The data shows that the new jeans samples were favourably accepted by most consumers who wore the jeans.



Men's Jeans - Style A and Style B



Women's Jeans - Style A and Style B

Figure 13 Denim Jeans Fitting

CONCLUSION

The denim jeans market in India is highly competitive, with multiple brands catering to various customer segments, price brackets, styling and customer requirements. The new range of jeans was designed considering the trend, price and styling details. This work proposes a product development model incorporating insights into consumer requirements and competition mapping. The styling details and fit in demand were ascertained by studying the customers and the overall styling followed by competition. A set of men's and women's jeans thus developed was liked by the customer during wear trials and customer response surveys. The design of the new jeans has been developed with color consideration, size, pocket count, fabric type, price, trend, style, and customer needs. The feedback analysis shows that the jeans samples were received well by most of the consumers who wore those jeans. The collection of competitive products in the market can be customised per features required to be analysed. The data collection using web scraping can be used for desired analysis without heavy investment in time and cost. The proposed methodology is very effective for brands in the economy market segment.

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