

Multi-Dimensional Scaling and Brand Image Analysis of Select Consumer Durable Products Based on Consumer Perception in Wilayat of Nizwa, Sultanate of Oman

Radhakrishnan Subramaniam^{1*} Mahanad Mohammed Ali Al Sabahi² and Salah Saleh Al Shaqri²

¹Nizwa College of Technology, Wilayat of Nizwa, Sultanate of Oman

²Marketing, Nizwa College of Technology, Wilayat of Nizwa, Sultanate of Oman

Abstract

Sultanate of Oman is a fast developing country flooded with branded products/services offered by multi-national companies. The performance of any organization system in the complex business world rely heavily on its plans for marketing sub-system. Too many brands in a product/service segment makes it difficult for corporate houses to differentiate their products/services based on their inherent features/attributes. Brand positioning is a vital element of a marketing plan that facilitate organizations to differentiate and occupy a mind space in the customers. Marketers use brand positioning to communicate product attributes prudently to their target market keeping in view the target market needs and constrains in its competitive environment. Effective brand positioning protects the organization through its carefully worded messages to the target consumers. Perceptual mapping is a measuring technique used by marketing community to identify and understand the position of various competing brands on spread of various attributes. Multi-dimensional scaling and Brand image analysis are tools to conduct perceptual mapping of brands on attributes of products. The researchers attempt to study the position of brands of select consumer durables products based on various product attributes ranked on a ranking scale. There has not been any study conducted in this domain in Wilayat of Nizwa, Sultanate of Oman and to that extent this study is considered to be significant.

Keywords: Brand positioning; Perceptual mapping; Multi-dimensional scaling; Brand image analysis

Introduction

Rationale of the study

The purpose of the study is to understand the:

1. Position enjoyed/suffered by consumer-durable products (television and lap top computer) brands in Wilayat of Nizwa, Sultanate of Oman.
2. Identify the most important attributes of the consumer durable products.
3. Recommend marketers of consumer durables to address issues in positioning of their respective products against its respective product attributes.

There was no study conducted in this domain and there was a felt need by the researchers to conduct a study.

Objectives of the study

- To identify the most popular brand of Consumer durable products,
- To identify the position of brands of products,
- To identify the most similar and least similar brands of products,
- Image profile analysis of brands on various attributes,
- Perceptual mapping of brands on two determinants attributes of product brands.

Scope of the study

The study is limited to Al Dakhliya region only. The period of study was from January 2019 to July 2019 only. Time was a constraint and

challenge for the team mates. Title selection for the research was quite challenging as there were over 15 topics at hand before finalizing the topic. Review of literature for the study was very limited and had to be sourced and scaled up to the requirement of this study. Some of the major flaws of published perceptual maps are omission of reference to the techniques that produced the map, non-unit shape parameters for the map, and unclear labelling of the points. The aim of this paper is to provide clear guidelines for producing these maps so that they are indeed useful and simple aids for the reader.

Conceptual Framework - Meaning and Definition of the Terms

Brand positioning

Brand positioning is the sum of all activities that position the brand in the mind of the customer relative to its competition. Positioning is not about creating something new or different, but to manipulate the mind set and to re-tie existing connections [1].

Kotler define brand positioning as an “act of designing the company’s offering and image to occupy a distinct place in the mind of the target market” [2].

***Corresponding author:** Radhakrishnan Subramaniam, Nizwa College of Technology, Wilayat of Nizwa, Sultanate of Oman; E-mail: radhakrishnan.subramaniam@nct.edu.om

Received September 03, 2019; **Accepted** October 01, 2019; **Published** October 07, 2019

Citation: Subramaniam R, Al Sabahi MMA, Al Shaqri SS (2019) Multi-Dimensional Scaling and Brand Image Analysis of Select Consumer Durable Products Based on Consumer Perception in Wilayat of Nizwa, Sultanate of Oman. Arabian J Bus Manag Review 9: 385.

Copyright: © 2019 Subramaniam R, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Perceptual mapping

The term perceptual map refers to plots obtained by a series of different techniques, such as principal component analysis, (multiple) correspondence analysis, and multidimensional scaling, each needing specific requirements for producing the map and interpreting it.

Multi-dimensional scaling

Multidimensional scaling is a visual representation of distances or dissimilarities between sets of objects. “Objects” can be colors, faces, map coordinates, political persuasion, or any kind of real or conceptual stimuli [3].

Objects that are more similar (or have shorter distances) are closer together on the graph than objects that are less similar (or have longer distances). As well as interpreting dissimilarities as distances on a graph, MDS can also serve as a dimension reduction technique for high- dimensional data [4].

Brand image

The impression in the consumers’ mind of a brand’s total personality (real and imaginary qualities and shortcomings). Brand image is developed over time through advertising campaigns with a consistent theme, and is authenticated through the consumers’ direct experience – Business Dictionary [5].

Brand image is a “set of associations, usually organized in some meaningful way” [6]. Brand image is “perceptions about a brand as reflected by the brand associations held in consumer memory” [7].

Brand image is the existing opinion of the consumers about a brand. It can be defined as a distinct package of memories within the minds of target clienteles. It is a set of consumers’ beliefs, perception and emotional value held about a particular brand of product. The organizations logo, captions are considered the focal elements of positive brand image. Consumers often times purchase the image connected alongside the product/service. Therefore, it is imperative that brand images are positive, distinct and instant. Brand image gets stronger with carefully crafted marketing communication.

The brand image consists of attributes and benefits. Attributes can be specific or conceptual and benefits are the justification for the purchase decision. Brand image is automatically formed and it includes: products’ appeal, ease of use, functionality, fame, and overall value (Figure 1).

Review of Literature

Brand image represents the emotional aspects that identify the brand of a company or its products, and has a powerful impact on consumer buying behavior [8].

Laptop

During the second week of February 2019, HP and Microsoft introduced new laptops (HP Spectre Folio and Microsoft Surface Laptop 2 and Surface Pro 6) that are positioned as high end laptops. HP calls its new offering as “reinvention” of PC. The Surface devices, focused on internal updates to be in line with other 2018 flagships. The Surface Laptop 2 is a traditional notebook while the Surface Pro 6 is a 2-in-1 detachable, which means the keyboard can be disconnected from the display. All three laptops are equipped with the latest Intel processors, speedy solid state drives, and a minimum of 8GB of memory. The Spectre Folio and Surface Pro also include built-in LTE, which lets you connect to high-speed cellular networks for an

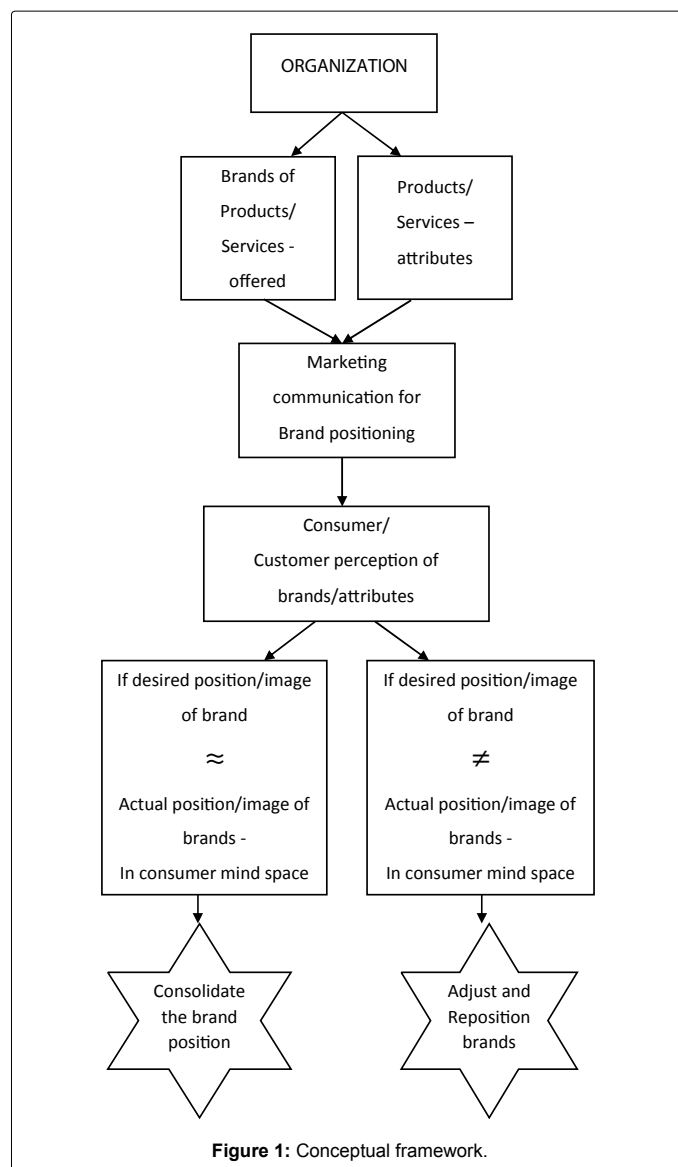


Figure 1: Conceptual framework.

added fee. That’s not only convenient, but potentially more secure than connecting to your local coffee shop’s Wifi network. Consumer Reports tests dozens of new laptops each year, evaluating them on a range of factors, including performance, display quality and battery life. Consumer Reports now incorporates brand reliability and owner satisfaction data into the Overall Scores for laptops. By combining data, it becomes easier for consumers to see how all these different factors measure up Figure 2 [9].

Television

LG brand of home entertainment decided to connect on a “more human level” and communicate how its products would benefit consumers in their everyday life. There will be warmth in its promotional campaigns and more in terms of sugar coating ‘Life’s Good’ positioning alongside messages and logo that make consumers smile with the possibilities of technology [10].

Methodology of the Study

The research was conducted on a freelance basis and was completely

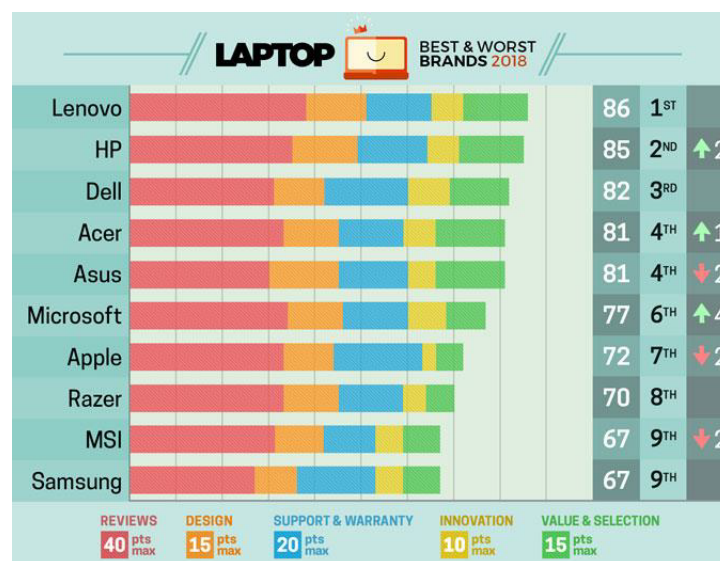


Figure 2: Best and worst brands 2018. **Source:** <https://www.engadget.com/2018/04/28/best-and-worst-laptop-brands-2018/> accessed on 13th February 2019 at 12.06 pm.

at the personal interest of the researchers. Exploratory research is used to conduct this study as the study describes the facts as it exists and helps to uncover new facts and meaning. The study involved the collection of data that provided an account of consumer mind space a brand carries in the Wilayat of Nizwa, Sultanate of Oman. A structured questionnaire was used to obtain primary data. The researchers choose purposive sampling technique to collect data from Omani respondents only. The Omani population in Wilayat of Nizwa is 83,544 in 2017 [11]. According to sample calculator, a sample of 382 respondents are required to conduct the study Krejcie and Morgan Period of study was January 2019 to March 2019 and the place of study was Wilayat of Nizwa in Al Dhakhlia Region of Sultanate of Oman. Primary data had to be collected for the study and hence a well-structured questionnaire was designed and developed for consumer durable products (Television and Laptop) to elicit responses from respondents. A pilot study was conducted to correct errors that were encountered in its preliminary design. The corrected version of the questionnaire will be administrated to a sample of 382 respondents Krejcie and Morgan. However, there could be an error in the responses provided by the respondents. The primary data collected will be tabulated using Microsoft Excel software and a pivot table is planned to be generated to analyze the data. The tool used to analyze the data includes Simple Percentage, Mean and Standard deviation. The data were analyzed using SPSS software and tests of questionnaire reliability (Cronbach's Alpha measure) and sample adequacy (Kaiser-Meyer-Olkin measure) was calculated. As the preliminary tests revealed that the data collected is appropriate to run Multi-Dimensional Scaling, the researchers decided to perceptually map the brands using two determinant attributes. The data collected included the gender wise/age wise/income wise response from the respondents. Ranking scale was an inbuilt feature in the questionnaire helped the researchers to understand the position enjoyed or suffered by a brand in the minds of the respondents.

Results and Discussion

Descriptive statistics – consumer durables

A sample of 300 responses was obtained from form nearly 83,544 Omani Citizens living in Wilayat of Nizwa. The demographic profile

of the sample respondents are briefly explained as follows. 34.7% of respondents are females and remaining 65.3% are males. Comparing the age group of respondents, 36% belong to the age group of <or =20. 58.7% of the respondents are in the age group of 21-30 years. 4.7% of respondents belong to the age group 31-40 etc. Of the total respondents taken up for the study, 36.7% of respondents are undergoing General Diploma Program, 22.6% of respondents are pursuing Advanced Diploma Program and a majority of respondents are pursuing B.Tech program. Only 7.3% of respondents are employed while the remaining 92.7% of the respondents are yet to be gainfully employed (Table 1 and Figure 3).

A total of eight brands of television and ten attributes/features were taken up to study the brand profile. The data collected was analyzed using Microsoft – Excel package. The data collection instrument contained the ranking scale to rank the position of each brand of television on each of the products' attributes. The researchers were particular to include all the attributes of the product as the perception of the respondent with regard to the brand depends on the all attributes of the product and if in case any of the important attributes are missed out in the study, the data collected would not reflect the true perception of the customer, that greatly depends on attributes (Table 2).

Of the eight brands of Television brands taken up for the study, Samsung was perceived to be the most popular brand by the respondents. The scores out of 5400 across eight brands and ten attributes were 282 attaining rank 1 for Samsung followed by a score of 452 and rank 2 for Sony and 541 with a rank of 3 for LG and 565 with a rank of 4 for Toshiba and 729 with a rank of 5 for Panasonic and 902 with a rank of 6 for Hisense and 927 with a rank of 7 for Sharp and 1000 with a rank of 8 for TCL (Table 3).

The brand Samsung ranked number 1 in all attributes viz. popularity, price, Picture quality, Screen size, Curve feature, Smart feature, Ultra HD, Sound quality, 3D feature and HDMI followed by Sony, Toshiba and LG in second, third and fourth position respectively (Figure 4).

Brand profile analysis based on consumer perception across all

Demographic profile of respondents		Number of respondents	%
Gender	Male	98	65.3
	Female	52	34.7
Total number of respondents		150	100.0
Age group	≤20	54	36.0
	21-30	88	58.7
	31-40	7	4.7
	41- 50	1	0.6
	50 +	0	0.0
Total number of respondents		150	100.0
Educational Details	General Diploma	55	36.7
	Advanced Diploma	34	22.6
	B.Tech	60	40.0
	Masters	1	0.6
Total number of respondents		150	100.0
Occupation	Employed	11	7.3
	Unemployed	139	92.7
	Total number of respondents	150	100.0

Table 1: Demographic profile of respondents – Consumer durables.

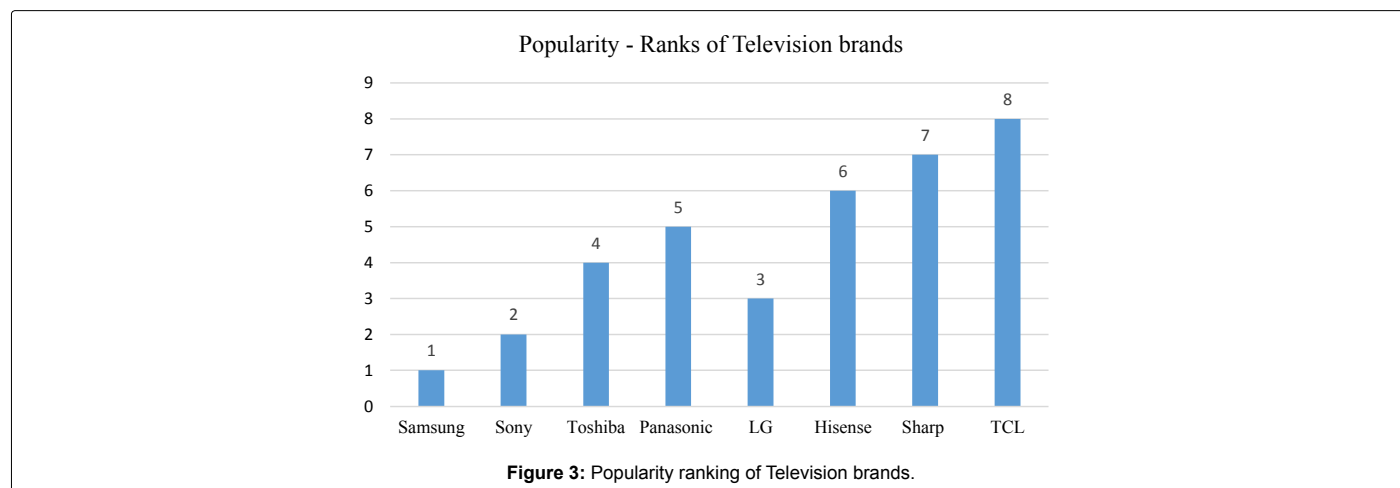


Figure 3: Popularity ranking of Television brands.

Brands	Popularity	Price	Picture quality	Screen size	Curve feature	Smart feature	Ultra HD	Sound quality	3D feature	HDMI	Rank order Position
Samsung	1	1	1	1	1	1	1	1	1	1	1
Sony	2	2	2	2	2	2	2	2	2	2	2
Toshiba	4	3	3	4	3	3	3	3	4	3	3.3
Panasonic	5	5	5	5	5	5	5	5	5	5	5
LG	3	4	4	3	4	4	4	4	3	4	3.7
Hi sense	6	7	6	6	7	6	6	6	6	6	6.2
Sharp	7	6	7	7	6	8	7	7	7	7	6.9
TCL	8	8	8	8	8	7	8	8	8	8	7.9

Consumer durable –Television.

Table 2: Attribute ranking of Television brand.

Television Brands	Popularity score	Rank
Samsung	284	1
Sony	452	2
Toshiba	565	4
Panasonic	729	5
LG	541	3
Hi sense	902	6
Sharp	927	7
TCL	1000	8
Total score	5400	

Table 3: Popularity ranking of Television brands.

attributes of Television brands was arrived at by plotting the ranking scores as in The brand Samsung, Sony and Panasonic was found to occupy first, second and fifth positions in all the attributes studied (Figure 5) [12].

The respondents were required to identify the most similar brand of Television and the least similar(dissimilar) brands of Television. Accordingly, the ranking arrived was laid out in the form required by the SPSS software to arrive at a two dimensional plot, the dimensions being Popularity and Price of the brands under study.

The lower triangular values in the below table shows the diagonal

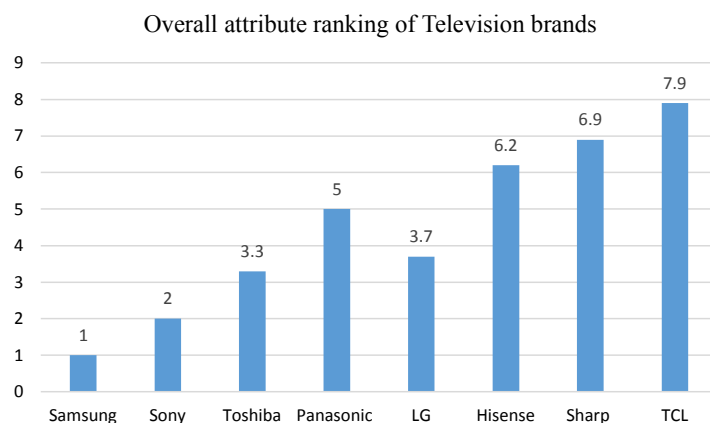


Figure 4: Overall attribute ranking of Television brands.

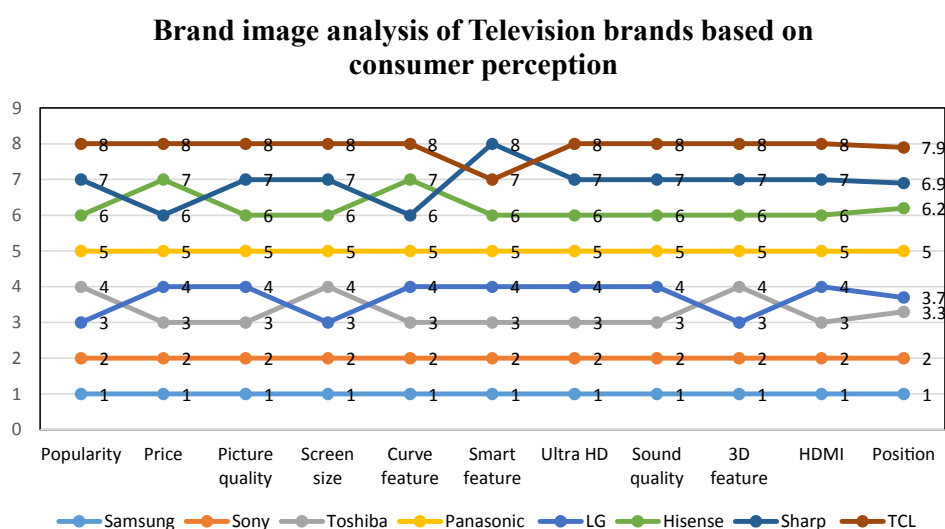


Figure 5: Brand image analysis of Television brands based on consumer perception.

	Samsung	Sony	Toshiba	Panasonic	LG	Hisense	Sharp	TCL
Samsung	0.00							
Sony	1	0.00						
Toshiba	3	7	0.00					
Panasonic	5	9	8	0.00				
LG	2	6	4	10	0.00			
HI sense	15	13	16	17	22	0.00		
Sharp	11	20	18	19	14	23	0.00	
TCL	12	25	21	24	27	26	28	0.00

Table 4: Similarity/dissimilarity ranking of Television brands.

cells gives the ranking of pair of brands on its similarity/dissimilarity. The data was fed into the SPSS package and the following mapping was arrived at. The plot clearly states that brands viz. Samsung and Toshiba are more similar in its position in the market, while Samsung and TCL or Samsung and Sharp or Samsung and Hisense are perceived highly dissimilar by the respondents (Table 4).

Significance of the multidimensional scaling of brands: The organizations understand the position of their respective brands in the market with comparison with other competing brands with respect to two dimensions (Popularity and Price) [13].

This also gives an idea to a new entrant in the market to identify a niche to differentiate themselves from the competing brands and position itself favorably (Figure 6).

A total of eight brands of laptop and eight attributes/features were taken up to study the brand profile. The data collected was analyzed using Microsoft – Excel package. The data collection instrument contained the ranking scale to rank the position of each brand of laptop on each of the products' attributes. The researchers were particular to include all the attributes of the product as the perception of the respondent with regard to the brand depends on the all attributes of

the product and if in case any of the important attributes are missed out in the study, the data collected would not reflect the true perception of the customer, that greatly depends on attributes (Table 5 and Figure 7).

Of the eight brands of Television brands taken up for the

study, Samsung was perceived to be the most popular brand by the respondents. The scores out of 5400 across eight brands and eight attributes were 422 attaining rank 1 for Samsung followed by a score of 540 and rank 2 for Toshiba and 553 with a rank of 3 for HP and 595 with a rank of 4 for Sony and 603 with a rank of 5 for Dell and 836 with a

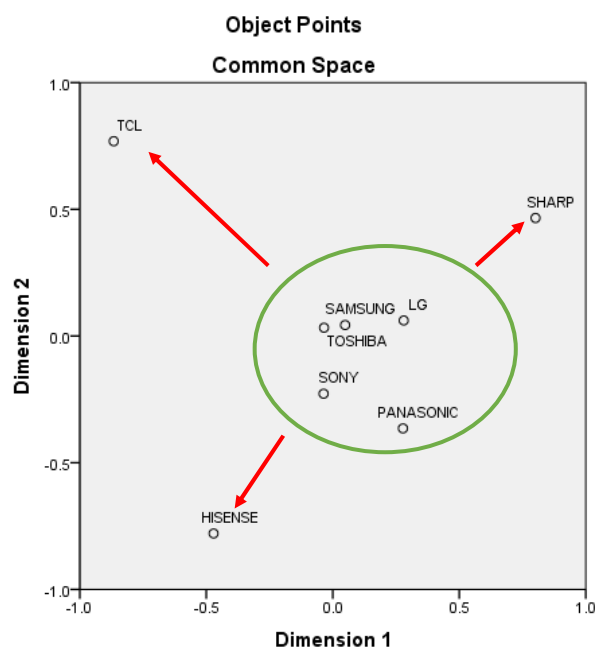


Figure 6: MDS mapping of Television brands.

Brands	Popularity	Price	Screen size	Battery life	CPU	RAM	Portability	Operating System	Rank Order position
Samsung	1	1	1	1	1	1	1	2	1.125
Sony	4	4	4	5	4	2	2	3	3.5
Toshiba	2	2	2	4	2	4	4	4	3
HP	3	3	3	2	3	3	3	1	2.625
Dell	5	5	5	3	5	5	5	5	4.75
Lenovo	7	7	7	7	7	6	7	6	6.75
Huawei	6	6	6	6	6	7	6	7	6.25
Acer	8	8	8	8	8	8	8	8	8

Consumer durable – Laptop

Table 5: Attribute ranking of Laptop brands.

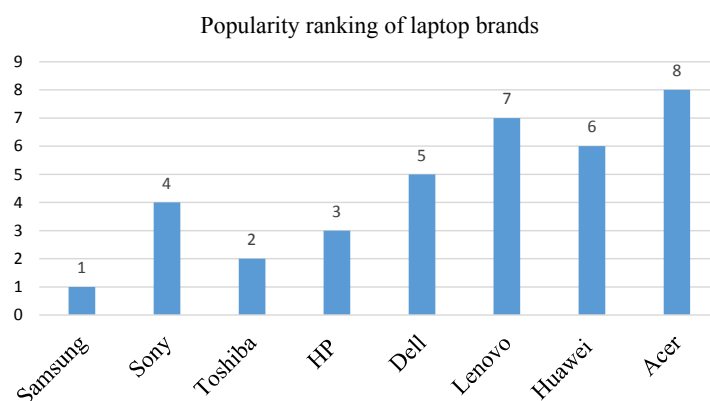


Figure 7: Popularity ranking of Laptop brands.

rank of 6 for Huawei and 869 with a rank of 7 for Lenovo and 982 with a rank of 8 for Acer (Table 6 and Figure 8).

The brand Samsung ranked number 1 in all attributes viz. Popularity, Price, Screen size, Battery life, CPU, RAM, Portability etc. except operating system. The HP is in the second position followed by Toshiba in the third position and Sony in the fourth position [14].

Brand profile analysis based on consumer perception across all attributes of Laptop brands was arrived at by plotting the ranking scores as in The brand Samsung, HP, Toshiba and Sony was found to

occupy first, second, third and fourth positions in the overs all average score of the attributes (Figure 9).

Conclusion

The research attempted to understand multiple (independent variables) attributes/features on multiple brands (dependent variables) that influences the perception of brands by the existing and potential customers. These positions laid out in the MDS maps can be super imposed on the actual/original positioning of the brands on various dimensions taken up for the study.

Suggestions and Finding of the Study

Suggestions for the brand owners/organizations

- If the perceptual maps and original maps synchronize the organizations need to consolidate the positioning in the minds of the existing and potential customers.
- If the perceptual maps and original maps does not synchronize, the organizations need to adjust and reposition the brands on various attributes/features in the minds of the existing and potential customers.

Laptop Brands	Popularity	Rank
Samsung	422	1
Sony	595	4
Toshiba	540	2
HP	553	3
Dell	603	5
Lenovo	869	7
Huawei	836	6
Acer	982	8
Total score	5400	

Table 6: Popularity ranking of Laptop brands.

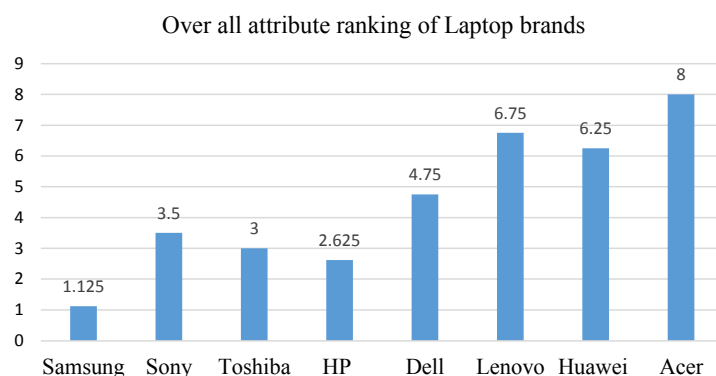


Figure 8: Overall attribute ranking of Laptop brands.

Brand image analysis of Laptop brands based on consumer perception

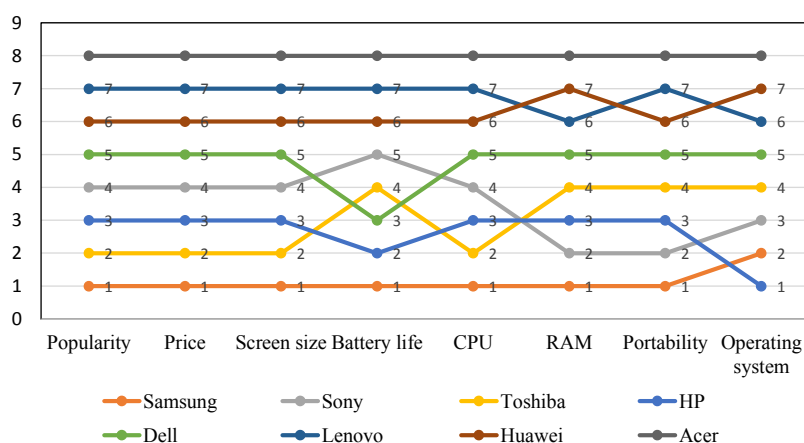


Figure 9: Brand image analysis of Laptop brands based on consumer perception.

Nature of products	Products	Number of brands under study	Popularity	Brands	Rank order position
Consumer durables	Television	8	Most popular	Samsung	1
			Least popular	TCL	8
	Laptops	8	Most popular	Samsung	1
			Least popular	Acer	8

Table 7: Popularity of brands under study.

Nature of products	Products	Number of attributes under study	Perception	Brands	Rank order position
Consumer durables	Television	10	Best	Samsung	1.000
			Wickedest	TCL	7.900
	Laptops	8	Best	Samsung	1.125
			Wickedest	Acer	8.000

Table 8: Perceived position of brands under study on all attributes.

- If the perceptual maps and original maps does not synchronize, the brand owners will be able to measure their brand image and arrive at decisions to ideally position their brands.
- All brands that enjoys a strong and favorable position in the minds of its consumers has the chance of achieving consumer loyalty and sustainability through unique positioning and differentiation strategies.
- The brand owners are recommended to repeat the perceptual mapping/MDS techniques as an ongoing process to understand the dynamics of the markets and with respect to positioning and competition. (Tables 7 and 8).

Suggestions for the prospective/probable new entrants to the business

- If the prospective new entrants love to be amidst competition, these new players may position their brands over various attributes/features in the middle of similar cluster brands (as found in the MDS plots) that are closely competing amidst cut throat competition.
- If the prospective new entrants want to stay away from competition, they may as well drift their brand positioning over various attributes/features that are dissimilar and dispersed brands (as found in the MDS plots) that are safe from competition.

References

1. Ries Al, Trout J (2001) Positioning: The battle for your mind. McGraw Hill Education, 3 edition.
2. Kotler P (2003) Marketing management (11th edn), Englewood Cliffs, NJ: PrenticeHall
3. Kruskal JB, Wish M (1978) Multidimensional Scaling. Sage University Paper Series on Quantitative Applications in the Social Sciences No. 07-011, Sage Publications, Newbury Park.
4. Chen L, Buja A (2006) Local Multidimensional Scaling for Nonlinear Dimension Reduction, Graph Layout and Proximity Analysis.
5. <http://www.businessdictionary.com/definition/brand-image.html>
6. Aaker DA (1991) Managing Brand Equity: Capitalising on the Value of a Brand Name, The Free Press, New York, J Bus Res. 29: 247-248.
7. Keller KL (1993) Conceptualizing, Measuring, and Managing Customer-Based Brand Equity. J Marketing 57: 1-22.
8. Arora R, Stoner Ch (2009) A mixed method approach to understanding brand personality. J Product Brand Manag 18: 272-283.
9. Nicholas De Leon (2019) Best Laptops of 2019.
10. O' Reilly L (2013) Marketingweek.
11. National Centre for Statistics and Information, Statistical Year Book, (2018) Issue 46.
12. Ronald van Haaften (2019) Brand positioning.
13. Best & Worst Laptop Brands (2019).
14. Oral care market strategic brand management (2014).