



A STUDY ON CONSUMER SATISFACTION OF INVERTER USERS IN MADURAI CITY

Dr. V.Kamarasan

Associate Professor & Head, PG & Research Department of Commerce, Saraswathi Narayanan College, Madurai.

Abstract

The availability and stability of electrical energy is necessary for domestic and industrial use. However, due to its insufficiency, the need for alternative sources of electricity supply has been felt seriously and hence, the inverter. In the event of power failure from public utility, motor generating sets and inverters could be used to power appliances and machines in homes, offices and industries. Inverters are preferred to motor generating sets because it is noiseless, relatively small size and pollution-free operating mode. This study highlights the trend of inverter usage, analyses the attitude of people towards inverters, the brand preference of consumers towards various brands sold in madurai city and also the various factors influencing the satisfaction of the consumers.

INTRODUCTION

An inverter is an electrical device that converts direct current (DC) to alternating current (AC). The resulting AC can be at any required voltage and frequency with the use of appropriate transformers, switching, and control units. Stability of power systems is also important as it has an adverse effect on both domestic user and industrial production. Instability in power systems comes in form of either voltage surge caused by switching, power frequency and lightning or voltage dips caused by overloading. One solution to this is an Automatic Voltage Regulator (AVR), which monitors the input voltage constantly to deal with both surges and dips, unlike some surge protectors that only ground excess voltages.

The power electronics device which converts DC power to AC power at required output voltage and frequency level is known as inverter. Inverters can be broadly classified into single level inverter and multilevel inverter. Multilevel inverter as compared to single level inverter have advantages like minimum harmonic distortion, reduced EMI/RFI generation and can operate on several voltage levels.

STATEMENT OF THE PROBLE

The effect of long term power outages will be very severe to our modern way of life. Fortunately, most life-support facilities have a source of back-up power that is ready to automatically take over should the main power grid fails. In order to protect themselves and their business from devastating effects of power outage and blackouts, people use inverters. Inverter is an electronic device or circuitry that changes direct current (DC) to alternative current (AC). The input voltage, output voltage and frequency, and overall power handling are dependent on the design of the specific device or circuitry. Different models of power inverter vary in how many watts of power they can supply. The capacity of an inverter should equal the total number of watts required by each device, plus at least a 50 per cent addition to account for peaks or spikes in the power draw. There are many brands of inverters available in the market at present days with varying capacities, qualities and durability. Due to globalization various imported brands are also marketed in India apart from our home products. The selection of good and suitable brand requires thorough knowledge of inverters and their various brands. A consumer should take into consideration many factors before going in for an inverter. Hence, the researcher has chosen to study the consumer satisfaction of inverter users in Madurai city.

OBJECTIVES OF THE STUDY

The following are the general objectives of the present study.

1. To trace the growth and evolution of inverters.
2. To explore factors influencing purchase of inverters.
3. To analyze satisfaction level of inverters in Madurai city.
4. To examine socio economic conditions of inverter users in Madurai city and their impact.
5. To study the problems faced by the consumers, and offer suggestions to solve such problems.

SAMPLING PROCEDURE

A simple Random Sampling technique is adopted to select respondents. A sample of two hundred inverter users has been selected on random basis for interview. The proper care has been taken to see that the respondents cover all types of ordinary and business people.

AGE AND SATISFACTION SCORE

In order to explore the significance between age and satisfaction score, Kruskal-Wallis test was applied. The result is given in the following table.

Mean rank of age and satisfaction score

Age of The Respondents	Numbers (N)	Mean Rank
Up to 35 years	46	58.17
36 Years to 45 Years	110	42.05
46 years to 60 years	30	48.00
Above 60 years	14	97.00
TOTAL	200	-

Test statistics of age and satisfaction score

Test Statistics	
Chi-square	25.087
Degrees of freedom	3
Assumption of significance	0.000

GENDER AND SATISFACTION SCORE

In order to explore the significance between gender and satisfaction score, Kruskal-Wallis test was applied. The result was given in the following table.

Mean Rank of Gender and satisfaction score

Family Size	Numbers (N)	Mean Rank
Male	112	46.64
Female	88	55.41
TOTAL	200	-

Test statistics of Gender and satisfaction score

Test Statistics	
Chi-square	2.316
Degrees of freedom	1
Assumption of significance	0.125

MARITAL STATUS AND SATISFACTION SCORE

In order to explore the significance between marital status and satisfaction score, Kruskal-Wallis test was applied. The result is given in the following table.

Mean rank of marital status and satisfaction score

Marital Status	Numbers (N)	Mean Rank
Married	144	44.67
Un married	56	65.50
TOTAL	200	-

Test statistics of marital status and satisfaction score

Test Statistics	
Chi-square	10.704
Degrees of freedom	1
Assumption of significance	0.001

FAMILY SIZE AND SATISFACTION SCORE

In order to explore the significance between age and opinion score, Kruskal-Wallis test was applied. The result is given in the following table.

Mean rank of Family size and Opinion score

Family Size	Numbers (N)	Mean Rank
Up to 3 members	28	62.50
4 members	110	54.75
5 members	32	12.50
Above 5 members	30	64.27
TOTAL	200	-

Test statistics of Family size and satisfaction score

Test Statistics	
Chi-square	35.421
Degrees of freedom	3
Assumption of significance	0.000

EDUCATION LEVEL AND SATISFACTION SCORE

In order to explore the significance between education level and satisfaction score, Kruskal-Wallis test was applied. The result was given in the following table.

Mean rank of education level and satisfaction score

Education Level	Numbers (N)	Mean Rank
School level	92	49.41
Under Graduate	78	57.72
Post Graduate	16	4.50
Others	14	70.00
TOTAL	200	-

Test statistics of education level and satisfaction score

Test Statistics	
Chi-square	26.517
Degrees of freedom	3
Assumption of significance	0.000

MONTHLY INCOME AND SATISFACTION SCORE

In order to explore the significance between monthly income and satisfaction score, Kruskal-Wallis test was applied. The result was given in the following table.

Mean rank of monthly income and satisfaction score

Monthly Income	Numbers (N)	Mean Rank
Up to Rs.10000	32	55.00
Rs.10000 to Rs.20000	90	65.73
Rs.20000 to Rs.30000	46	26.43
Above Rs.30000	32	37.75
TOTAL	200	-

Test statistics of monthly income and satisfaction score

Test Statistics	
Chi-square	32.648
Degrees of freedom	3
Assumption of significance	0.000

OCCUPATION AND SATISFACTION SCORE

In order to explore the significance between occupation and satisfaction score, Kruskal-Wallis test was applied. The result is given in the following table.

Mean rank of occupation and satisfaction score

OCCUPATION	NUMBERS (N)	MEAN RANK
STUDENTS	30	36.60
GOVERNMENT EMPLOYEE	32	12.50
PRIVATE EMPLOYEE	32	77.50
BUSINESS	60	51.00
PROFESSION	46	66.39
TOTAL	200	-

Test statistics of occupation and satisfaction score

Test Statistics	
Chi-square	53.459
Degrees of freedom	4
Assumption of significance	0.000

FINDINGS, SUGGESTIONS AND CONCLUSION

FINDINGS

1. Out of 200 respondents, A majority of 110 (55 per cent) of the Inverter users are having single phase connection.
2. Out of 200 respondents, 94 (47 per cent) of the respondents are aware of Inverter brands through advertisement.
3. Out of 200 respondents, A majority. Out of 200 of 108 (54 per cent) of the respondents decisions are not influenced by Advertisement.
4. Out of 200 respondents, 64 (32 per cent) of the respondents are using microtek inverter.
5. Out of 200 respondents, 92 (46 per cent) of the respondents bought the Inverter through ordinary shop.
6. Out of 200 respondents, A majority of 140 (70 per cent) of the respondents bought Inverter at the price of Rs.16000 to 21000.
7. Out of 200 respondents, A majority of 106 (53 per cent) of the respondents using Voltage-Alternative Current (V-AC) power in 240+/- 12V-AC.
8. Out of 200 respondents, A majority of 130 (65 per cent) of the respondents are using Voltage-Direct Current (V-DC) power in 450V-DC.
9. Out of 200 respondents, A majority of 122 (61 per cent) of the respondents paid EB bill of Rs.500 to 1000 before installing inverter.
10. Out of 100 respondents, 94 (47 per cent) of the respondents paid EB bill of Rs.1000 to 1500 after installing inverter.
11. Out of 200 respondents, A majority of 124 (62 per cent) of the respondents are filling distilled water in Inverter in time gap of once in three months.
12. Out of 200 respondents, A majority of 140 (70 per cent) of the respondents are using Inverter for home purpose.
13. Out of 200 respondents, A majority of 140 (70 per cent) of the respondents face only up to 10 hours power cut in a week.
14. Out of 200 respondents, A majority of 106 (53 per cent) of the respondents are using the Inverter in 3 to 5 years.
15. Out of 200 respondents, A majority of 138 (69 per cent) of the respondents are not for brand changes.
16. 18. Out of 200 respondents, A majority of 110 (55 per cent) of the respondents had inverter for the reason of easy handling.
17. Out of 200 respondents, A majority of 138 (69 per cent) of the respondents faced some problem.
18. Out of 138 respondents having had problems, 78 (43.48 per cent) of the respondents have had the problems occurred after 6 months.
19. Out of 138 respondents, A majority of 97 (70 per cent) of the respondents made of complaints through phone calls.
20. Out of 138 respondents, A majority of 52 (38 per cent) of the respondents get their complaints redressed within 2 days.
21. Out of 200 respondents, A majority of 154 (77 per cent) of the respondents are willing to recommend their brand to others.
22. Out of 200 respondents, A majority of 142 (71 per cent) of the respondents got connected only limited number of switches to their inverter.
23. Out of 200 respondents, 58 (29 per cent) of the respondents got connected all the switches to their inverter.

SUGGESTIONS

1. Inverter has become popular only recently due to frequent power cut. And many consumers (47 per cent) came to know of the inverter through advertisement. Therefore it is suggested that the inverter companies may concentrate and spend more on advertisement to attract more consumers and to expand their business.
2. Of the 10 brands studied, Microtek ranks first with 32 per cent, while the Luminous ranks second with 24 per cent. Many other brands have only single digit percentage. This is mainly because of price level. Therefore to be competitive sellers of other brands must try to reduce the price.
3. Majority of respondents (46 per cent) bought the inverter from shop. Therefore the space in shop may be extended to display the inverters and to do demo.
4. Majority of respondents bought inverters costing Rs.16000-21000 (70 per cent), while there are inverters costing Rs.21000-36000 and above Rs.36000. Therefore the manufacturer may produce more inverters costing Rs.16000-21000 than other inverters.



5. Many respondents have inverter with 240+/- 12V-AC power (53 per cent) and with 60+/- 0.3V-AC power (45 per cent), while 2 per cent respondents have inverter with 360+/- 24V-AC power. Therefore manufacturer may reduce the production of high power inverter.
6. With regard to V-DC power of inverter (65 per cent) of respondents have inverter with 450V-DC power. While only 4 per cent respondents have inverter with 120k V-DC power. Therefore manufacturer may reduce production of inverter with low V-DC power.
7. Payment of EB bill after installing inverter as compared with EB bill before installing inverter is higher by around Rs.500. Therefore poor families cannot afford to buy inverter. Hence the manufacturer may try to launch inverters consuming low power.
8. The company should improve the customer care facilities. Contacting customer care official seems to be a tough task today. Companies must facilitate easy access to the customer care. Customer's grievances should be resolved in time.
9. Maintenance of Inverter and using of distilled water level must be improved.
10. Majority of respondents (55 per cent) bought inverter by the reason of easy handling. So the manufacturers of other inverters must try to make their inverters easy handling.
11. Majority of respondents (69 per cent) have experienced problem with their inverter. So the sellers must be prompt in doing after sale service.
12. Since majority of respondents have made complaints through phone call, the seller must arrange for attending phone call at any time from consumers.
13. Complaints received from consumers are redressed within two days. It must be continued and tried to redress within a day.
14. 77 per cent of respondents are willing to recommend their brand to others. It shows their satisfaction. Majority of satisfied respondents are the consumers of microtek. So the seller of other brands should also try to keep their consumers satisfied.

CONCLUSIONS

Inverter has become familiar only recently due to frequent power cut being experienced by the people. Among the various brands of inverter only certain major brands such as luminous, microtek, arise, genus, su-kam, swelect, delta, consul, uniline and true power are familiar to the consumers. Of the ten brands taken for the study microtek and luminous are preferred more by the people in Madurai. The people came to know of inverter mainly through advertisement. Therefore inverter companies may concentrate more on advertisement focusing the advantage of inverter. This study reveals about consumer satisfaction of inverter users in Madurai city. The satisfaction is influenced by age, education, qualification, occupation, monthly income, quality and price of the inverter. The companies must facilitate easy access to the consumer care. Consumer grievances should be redressed in time without more delay.

From the research we conclude that the microtek brand is most preferred by the consumers. It has wide opportunity to become a leader in this segment. This study will help the manufacturer and seller to produce and sell inverters giving continuous power supply with the low consumption power.

BIBLIOGRAPHY

Journal

1. L Li, D Crzakowski, P Pillay, Y. Liu, "Multilevel Selective Harmonic Elimination PWM Technique in Series Connected Voltage Inverters", NY USA.
2. G. Sinha, T.A.Lipo, "A Four Level Rectifier Inverter System for Drive Applications", IEEE IAS Annual Meeting 1996, pp 980 - 987

Websites

3. www.encyclopedia.com
4. www.luminousindia.com
5. www.microtekdirect.com
6. www.ariseindia.com
7. www.genus.in
8. www.su-kam.com
9. www.swelectes.com
10. www.deltapowersolutions.com/en-in/
11. www.consulindia.com