

Z-Test for Gender Populations: Green Marketing

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Author Note

This research paper is an initiative for Green Marketing using Gender as categorical variables for enhanced study. The information presented reflects the author's interpretation and does not support or is against any policy or practice.

There comes a day which is the last day on earth and wants to make it up again... Thus finding ways to recover....roughly estimates global carbon emission 980 crore tonnes, 3 to 6 crore trees cut, 55 thousand to 73 thousand varieties of plants, insects, birds and mammals extinct, 55 lakhs of deaths due to water pollution, 693 marine species lost due to plastics, 55 lakh deaths due to air pollution, 35 lakh deaths due to scarcity of water and that's too in just one year....

Introduction

Knowledge has been proved as source of inspiration with virtual facts related to outer world hence connects an unknown brain to the outside world with funding facts of agnostic world. Funding facts refer to the truth that money can buy things hence youths understand the economically driven world without understanding the true essence of life, virtues of truth and kindness of surroundings. Even knowledge drives them to the economic world without being hesitant of exploiting natural resources which otherwise could have not faced problem of depletion.

Knowledge is based on substantial facts required to teach something better with outsourcing from outside world in a set pattern to follow growing culture and trend. Hence it can maintain balance in everything and future. Knowledge plays an indispensable role that enables any marketing to provide strategic communications to enhance marketing programs.

Optimum utilization of resources can help to lead a balance and healthy life. It saves money along with proper utilization of resources. The problem is actions and resources utilization is not planned so depletion is faster than recovery. However basic knowledge

about green practices can save lot of resources. Green marketing is a latest version of marketing created to link present needs for eco-friendly amendments. Green marketing is actually a connecting link between real and virtual world existing between economic and ecological balance. World is economically driven hence changing marketing with care of environment can help in repletion.

Rationale of Proposed Investigation

Boys and girls vary in habits and choices. Girls are more involved in household activities and boys in outside activities. This is a generalized view in geographical area of investigation. Gender based studies have been conducted at so many places at many times and have shown various results. Hence a common opinion cannot be reached as there are other factors also varying as per geographical location. Hence this study is conducted to study the difference in knowledge level of boys and girls of Bikaner about resources of daily use which carry maximum importance in daily lives.

Research Scope

Bikaner is developing fast and has been rated fastest growing city in terms of population in India. It is situated in the fringe of Thar desert where resources are scarce. Hence proper utilization of resources is a must for the survival of town. This study can help us understand level of knowledge of boys and girls. This can also work upon dimensions need improvement in case of knowledge about resources of daily use.

Objectives

1. To find out the difference in the knowledge level of Boys and Girls.
2. To find out dimensions of environmental marketing needing improvement covered under study.
3. To calculate knowledge index of Boys and Girls.

Review of Literature

Gigliotti (1994) studied the relative importance of various environmental issues and the willingness to take action to help solve environmental problems in Cornell University students. The results about environmental issues indicated: - The reduction of hazardous waste (14.3%) and improvement of air quality (13.5%) are the two most important environmental issues for the students. The conservation of endangered species seems to be least important (10.3%). The spread between least and most important was only 4%.

Hampel, Holdsworth, and Boldero (1996) studied the impact of parental work experience and education on environmental knowledge, concern and behaviour among adolescents. The study was based on the data collected in 1993, and the schools were selected according to SES (socio-economic status), ethnic composition and rural location in Victoria, Australia. The results indicated: - Girl's scores on attitude were generally higher than boys across the six schools ($p < 0.001$). The boy's score were higher on knowledge ($p < 0.05$).

Reserach Methodology

- ✚ **Geographical area of investigation:** Bikaner city of Rajasthan state, country India is the geographical area of investigation. This study is conducted on youths hence data is collected from various Government and private secondary and senior secondary schools. So that it covers all the age and medium.
- ✚ **Target population:** Youths of age group 14 to 20 years are targeted for the study as they have studied environment in their course curriculum and at this age they are mature enough to grasp proper knowledge and have its practical utility in daily lives.
- ✚ **Data collection:** Primary data is collected using questionnaire. Questionnaire is pre-tested on some individuals and applied. Data is collected from 541 individuals who act as representative of youths population of Bikaner. Cluster sampling technique is utilized for data collection.
- ✚ **Research tool:** Questionnaire is based on 5 categories namely- electricity utilization, cooking gas usage, vehicle usage to save petrol/diesel, plastic issues and green products. First three categories are included to test knowledge about resource utilization to observe status of utilization of resources in daily lives. Plastic issue is even taken care by Government still is not banned however is dangerous hence included to check knowledge gap and Green products are healthy solution for future hence to check its status this category is included. Questions are framed on the basis of various aspects of these issues.
- ✚ **Data analysis:**
 - Z- test for two population proportions has been used for analysis at a significance level 0.05 to test two-tailed hypothesis.
 - Knowledge index of individual topics is calculated to find out the dimensions need to be improved.

- Knowledge index is calculated to compare the level of knowledge of boys and girls about resources of daily usage.

Analysis I: Z Test For 2 Population Proportions

Significance level 0.05

Two-tailed test

Sample population 1-Boys

Sample population 2-Girls

Hypothesis

H_0 : There is no difference in the knowledge levels of boys and girls about resources of daily usage.

H_1 : There is significant difference in the knowledge levels of boys and girls about resources of daily usage.

(1.a) Electricity reduction- fans/lights off

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -5.2022. The p-value is 0. The proportion of Yes responses for Observation 1 is 0.647. The proportion for Observation 2 is 0.849. The H_0 is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant.

(1.b) Electricity reduction- L.E.D.

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -0.2834. The p-value is 0.77948. The proportion of Yes responses for Observation 1 is 0.48. The proportion for Observation 2 is 0.494. The H_0 is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(1.c) Electricity reduction- solar appliances

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -2.3723. The p-value is 0.01778. The proportion of Yes responses for Observation 1 is 0.36. The proportion for Observation 2 is 0.473. The H₀ is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant.

(1.d) Electricity reduction- power saving ratings

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -0.2078. The p-value is 0.83366. The proportion of responses for Observation 1 is 0.387. The proportion for Observation 2 is 0.396. The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(2.a) Gas saved- burner off

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -1.6221. The p-value is 0.10524. The proportion of Yes responses for Observation 1 is 0.62. The proportion for Observation 2 is 0.693. The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(2.b) Gas saved- replace rubber tube

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -0.4341. The p-value is 0.6672. The proportion of Yes responses for Observation 1 is 0.46. The proportion for Observation 2 is 0.481. The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(2.c) Gas saved- cooker

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -2.3832. The p-value is 0.01732. The proportion of Yes responses for Observation 1 is 0.467. The proportion for Observation 2 is 0.581. The H₀ is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant.

(2.d) Gas saved- low flame

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is 1.8172. The p-value is 0.06876. The proportion of Yes responses for Observation 1 is 0.413. The proportion for Observation 2 is 0.33. The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(2.e) Gas saved- solar cooker

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -0.1079. The p-value is 0.9124. The proportion of Yes responses for Observation 1 is 0.407. The proportion for Observation 2 is 0.412. The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(3.a) Petrol/diesel saved- no vehicle for small distance

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -0.3995. The p-value is 0.68916. The proportion of Yes responses for Observation 1 is 0.767. The proportion for Observation 2 is 0.783. The H0 is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(3.b) Petrol/diesel saved- public transport

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -1.3627. The p-value is 0.17384. The proportion of Yes responses for Observation 1 is 0.433. The proportion for Observation 2 is 0.499. The H0 is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(3.c) Petrol/diesel saved- vehicle sharing

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -1.6686. The p-value is 0.09492. The proportion of Yes responses for Observation 1 is 0.153. The proportion for Observation 2 is 0.217. The H0 is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(3.d) Petrol/diesel saved- service of engine

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is 2.7854. The p-value is 0.00528. The proportion of Yes responses for Observation 1 is 0.4. The proportion for Observation 2 is 0.276. The H0 is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant.

(3.e) Petrol/diesel saved- engine off at signal

Individuals from sample Population 1

95

Individuals from sample Population 2

274

The Z-Score is -1.5078. The p-value is 0.13104. The proportion of Yes responses for Observation 1 is 0.633. The proportion for Observation 2 is 0.701. The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(4.a) Discarded plastic problem- littering

Individuals from sample Population 1

95

Individuals from sample Population 2

286

The Z-Score is -2.2387. The p-value is 0.0251. The proportion of Yes responses for Observation 1 is 0.633. The proportion for Observation 2 is 0.731. The H₀ is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant.

(4.b) Discarded plastic problem- chocking the drainage

Individuals from sample Population 1

77

Individuals from sample Population 2

254

The Z-Score is -2.9117. The p-value is 0.00362. The proportion of Yes responses for Observation 1 is 0.513. The proportion for Observation 2 is 0.65. The H₀ is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant.

(4.c) Discarded plastic problem- washed into water bodies

Individuals from sample Population 1

82

Individuals from sample Population 2

242

The Z-Score is -1.5351. The p-value is 0.12356. The proportion of Yes responses for Observation 1 is 0.547. The proportion for Observation 2 is 0.619. The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(4.d) Discarded plastic problem- soil degradation

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -0.7221. The p-value is 0.47152. The proportion of Yes responses for Observation 1 is 0.533. The proportion for Observation 2 is 0.568. The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(5.a) Green products- less damage on production

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -1.8426. The p-value is 0.06576. The proportion of Yes responses for Observation 1 is 0.467. The proportion for Observation 2 is 0.555. The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(5.b) Green products- less energy consumption

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -2.6351. The p-value is 0.0083. The proportion of Yes responses for Observation 1 is 0.36. The proportion for Observation 2 is 0.486. The H₀ is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant.

(5.c) Green products- less pollution

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is 0.2074. The p-value is 0.83366. The proportion of Yes responses for Observation 1 is 0.493. The proportion for Observation 2 is 0.483. The H0 is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(5.d) Green products- less harm to health

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is 0.41. The p-value is 0.6818. The proportion of Yes responses for Observation 1 is 0.48. The proportion for Observation 2 is 0.46. The H0 is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant.

(5.e) Green products- recycle/biodegradable

Individuals from sample Population 1

Individuals from sample Population 2

The Z-Score is -3.1459. The p-value is 0.00164. The proportion of Yes responses for Observation 1 is 0.333. The proportion for Observation 2 is 0.483. The H0 is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant.

Analysis II: Knowledge Index (Eki) For Dimensions

Various topics are used as dimensions to analyze scope of improvement variation as per topic (Here “no response” has been counted as “no knowledge”)

Knowledge Index (KI) = $\left[\frac{\{(\sum \text{Scores for different items}) \div \text{Number of respondents}\}}{\text{Number of questions}} \right] \times 100$

Knowledge index for dimensions

	Boys	Girls
Q1-a	97	332
(Electricity reduction)		
b	72	193

c	54	185
d	58	155
Total1	281	865
Total1/sample size	1.8733	2.2122
Knowledge Index1	46.83	55.3
Q2-a (Gas saved)	93	271
b	69	188
c	70	227
d	62	129
e	61	161
Total2	355	976
Total2/sample size	2.3666	2.4961
Knowledge Index2	47.33	49.92
Q3-a (Petrol/diesel saved)	115	306
b	65	195
c	23	85
d	60	108
e	95	274
Total3	358	968
Total3/sample size	2.3866	2.4757
Knowledge Index3	47.73	49.51
Q4-a (Discarded plastic problem)	95	286
b	77	254
c	82	242
d	80	222
Total4	334	1004
Total4/sample size	2.2266	2.5677

Knowledge Index4	55.67	64.2
Q5-a	70	217
(Green products)		
b	54	190
c	74	189
d	72	180
e	50	189
Total5	320	965
Total5/sample size	2.1333	2.468
Knowledge Index5	42.67	49.36

Analysis Iii: Knowledge Index Of Populations For Scope Of Improvement

Knowledge Index (KI) = $\left[\frac{\sum \text{Scores for different items}}{\text{Number of respondents}} \div \text{Number of questions} \right] \times 100$

$$\begin{aligned} \text{KI}_{\text{Boys}} &= 10.9867/23 \\ &= 0.47768 * 100 \\ &= 47.77 \end{aligned}$$

$$\begin{aligned} \text{KI}_{\text{Girls}} &= 12.2199/23 \\ &= 0.5313 * 100 \\ &= 53.13 \end{aligned}$$

Comparison between the indices shows that the level of knowledge is higher among the girls as compared to boys.

Result (I): Z-Test For Two Population Proportions

1) Z-test result on ways of electricity reduction

The H₀ is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant on the following methods- switch off fans and lights when not needed to save electricity and use of solar appliances helps in electricity reduction.

The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant on the following methods- use of L.E.D. (light emitting diode) and power saving rating help in electricity reduction.

2) Z-test result on ways of saving cooking gas

The H₀ is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant on the use of cooker save cooking gas.

The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant on the following methods to save cooking gas- keeping burner off when not needed by keeping things ready for cooking, by timely replacing rubber tube connecting cylinder and burner, by cooking at low flame and by using solar cooker.

3) Z-test result on ways of saving petrol/diesel

The H₀ is **rejected** means that the difference in the knowledge levels of the Boys and the Girls is significant on the regular service of engine saves vehicle fuel.

The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant on the following methods to vehicle fuel- by not using vehicle for small distances, by using public transport, by sharing vehicle till work place and by engine off at signal.

4) Z-test result on discarded plastic problem

The H₀ is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant when asked about littering and chocking of drainage caused due to discarded plastics.

The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant when asked about discarded plastics- washed away into water bodies cause water pollution and discarded plastics cause soil degradation.

5) Z-test result on Green products

The H₀ is **rejected**, means that the difference in the knowledge levels of the Boys and the Girls is significant when asked about features due to which products are called as Green products are- less energy consumption and are recyclable and biodegradable.

The H₀ is **accepted**, means that the difference in the knowledge levels of the Boys and the Girls is not significant when asked about features due to which products are called as Green products are- less damage on environment, cause less pollution and less harmful for health.

Result (Ii): Knowledge Index For Dimensions Of Improvement.

- Knowledge index of girls 55.3 is higher as compared to boys of 46.83 on electricity reduction.
- Knowledge index of girls 49.92 is higher as compared to boys of 47.33 on saving cooking gas.
- Knowledge index of girls 49.51 is higher as compared to boys of 47.73 on saving petrol/diesel.
- Knowledge index of girls 64.2 is higher as compared to boys of 55.67 on discarded plastic problem.
- Knowledge index of girls 49.63 is higher as compared to boys of 42.67 on electricity reduction.

Result (Iii): Environmental Knowledge Index For Scope Of Improvement

The knowledge index of girls is 53.13 which is higher as compared to the knowledge index of boys which is 47.77.

Conclusion

- H_0 is rejected means that the difference in the knowledge levels of the Boys and the Girls is significant. Girls seem to possess more knowledge as compared to boys of the same age group in all the dimensions or topics.
- In all the questions except for discarded plastics knowledge index of both the genders is below 50 and resource utilization is proportionate to knowledge about resources of daily use. Hence there is good scope for resource utilization techniques.
- Comparison between the indices shows that the level of knowledge about resources of daily use is higher among the girls as compared to boys. There lies a significant difference of 5.36 in knowledge index of Girls when compared with boys of the same age group.

Suggestions and Recommendation

- Knowledge should be imparted to students about resource utilization of daily use to avoid wastage in daily routines which will show its good impact on living standard.
- Resource utilization techniques are easy to understand and people can be easily convinced as it saves lot of money also.
- More knowledge about resource utilization is both economically and ecologically beneficial.

Limitations

- Exceptional cases are there always as girls and boys are treated as population.
- Bikaner city is a developing city where girls are more into household work and boys into outdoor activities without complete social acceptance.

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