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SUSTAINABLE DEVELOPMENT, RENEWABLE ENERGY AND ENVIRONMENT AWARENESS - AN OVERVIEW

Uttam Shankar Pawaskar
Ph.D Student, ITM University, Uparwara, New Raipur, Raipur, Chhattisgarh- 493 661.
Residence: Tata Power, Salsette Hsg. Colony, Bunglow No.5, Lake Road, Bhandup (W), Mumbai 400 078.
E-mail: uspawaskar@gmail.com, pawaskar@tatapower.com

and

Rakesh Raut
Room No.211, 2nd Floor, Administration Building, NITIE, Vihar Lake, Powai, Mumbai-400 087
E-mail: rakeshraut09@gmail.com

Abstract

This aim of the paper is to demonstrate the importance of environmental awareness among the people, particularly in a Metropolitan City like Mumbai which is prone to chronic respiratory problems, arising due to extreme air pollution by industries, garbage burning and inadequate control over emission levels from vehicles. Hence, today, additional responsibility lies with the younger generation, to resist further damage to existing ecosystem and implement various remedial measures to restore the ecosystem which is likely to help in improving the life of future generations. In view of the same, environmental awareness survey was conducted. Based on rank order analysis, it was perceived that "Ability to Act" was the most important element for environmentally responsible consumers and as per independent sample "t" test, both genders have given more weightage to the same. There was no significant difference among the genders, on six dimensions such as opinion, belief, awareness, attitude, action taken and ability to act, except "willingness" criterian of Ecoscale. Post hoc analysis indicates that on the criteria of opinion, willingness and knowledge, a significant difference existed between undergraduates and post graduates. On the criteria of opinion, willingness, ability to act and knowledge, significant difference was observed between 15-35 and age group of more than 55 years, between nil income and income upto Rs.25 Lakhs. On the criteria of opinion, awareness, willingness and attitude, significant difference was observed between student and employed groups.

Keywords: Sustainable Development (SD), Global Climate Change (GCC), Analysis of Variance, ECOSCALE, Corporate Social Responsibility (CSR), Environmental Management Systems (EMS), Green House Gases (GHG) and Load Dispatch Centers (LDC).

JEL Code: L94, Q01, Q42, Q54.

1. Introduction

Today, climate change is the issue of top priority all over the world but the world economy is still revolving around the carbon emitting industries as sudden and drastic changes are likely to cause disequilibrium in the markets. Negligible measures are collectively applied in dealing with the global warming. Hence market mechanism and government policies are required to deal with the growing negative externality (**Duffy, 2008**). Sustainable development can be achieved, with the help of Environmental Management Systems (EMS). Implementation of various environmental management programs, through business strategies by corporations, governments, non-profit organizations and communities, will ensure that environmental issues such as global warming, ozone depletion, air pollution, water pollution, land degradation and unsustainable use of natural resources, are tackled. However, due to globalization, the business practices have been changed drastically as multinational corporations need to work across the borders which necessitate working in environmental management education, application and accountability to save the mother earth from pollution. Proactive approach to manage the effect of business processes and activities on the environment, by implementation of environmental management programs, is likely to benefit the organizations **(Flynn and Simone, 2008).**

The negative externalities are causing market inefficiencies, resulting in negative cost towards the people living around the industry. The industries will continue to pump the pollutants into the environment and pay only the cost of the product such as electricity, materials, etc., whereas the individuals living around the industries, will be paying a high cost in the form of higher medical expenses and poorer quality of life, due to the pollution produced by the neighborhood industries. Thus, the cost to society is greater than the cost the consumer is actually paying towards the product, as industry will not be paying a negative cost to the people around the industry. Hence considering the volatile situation in businesses, it will be appropriate to know the relationship between environment, economy and ways to deal with such a situation. There are three ways, such as voluntary corporate environmental protection, national environmental regulation and international governance by global policy regimes, for managing the global environment and protecting the global economy.

The Minamata Bay Tragedy in Japan in 1953, the Coupon Tragedy at Hopewell-Virginia in 1975, The Love Canal Incident in New York in 1977 and Union Carbide, Bhopal Tragedy in December 1984 in India, are some of the examples. After globalization in 1990, extreme economic pressure resulted in the loss of traditional regional approaches to protect the environment and made the relationship between the environment and global economic governance more complicated and debatable. This has triggered the new challenge of environmental protection which is solely depending upon the global economy and energy-efficient technologies (**Flynn, 2008**).

Globalization is resulting in over consumption which is likely to pose increased levels of degradation of the environment. Traditional regulatory approaches to global environmental protection are becoming ineffective due to international business practices and their complexity **(Conca, 2001).** Organizations are adopting environmental management practices, beyond regulatory compliances, due to its own organizational characteristics as well as different levels of institutional pressures, imposed by various stakeholders such as regulators, customers, activists, local communities and industry associations **(Delmas and Toffel, 2004).** It is not only limited to the ecological function but

also covers the human values, behavior and its systems. Hence it will be appropriate to focus on ecological as well as economic analysis simultaneously, to make the best use of interdisciplinary contributions **(Toman, 1994).**

Economic wealth is created by business corporations and they play a dominant role in national affairs and in international relations. Hence it is expected that business firms shall take more responsibility towards the society. The social responsibility is a matter of ethical concern which needs sensitivity to the norms and values of host communities which require open dialogue with representatives of local communities (**Bird and Smucker, 2007**). Manufacturing strategies are nothing but the plans and methods adopted by the company, to make the products of high quality and enhancement in services, with cost reduction. However, one needs to take care of two factors of production such as flexibility and complexity. Flexibility in production is the key success factor for competitive advantage whereas variety of products increases the complexity **(Calvo, et al., 2008).** Thus, complexity counteracts the flexibility that makes the manufacturing a more complex issue and becomes a challenge for the organization, to revise their manufacturing strategies so as to achieve true sustainability.

The paper is organized as follows: A literature review is presented in the second section. The detailed methodology is in the next section. The data collection and analysis for the study is then presented. The next section summarizes the findings of the study, which are discussed in the results and discussion section. Conclusion is drawn in the final section.

2. Literature Review

Today, one of the top priority challenges of the world is to prevent climate change by limiting the increase in global temperature below two degrees, which is possible only by reducing the concentration of GHG's entering the atmosphere. Mainly, the energy production is resulting in increase of emission of greenhouse gases, which has caused global climate change (GCC). There is a compelling debate of how to meet current and future energy needs while controlling the greenhouse gas emissions (**Culley, 2011**). Therefore, to achieve the global mission of reducing carbon emission, it is necessary to replace fossil fuel-based energy production systems to low or zero carbon energy sources. Most of the countries, which have ample supplies of alternative energy sources, are finding it extremely difficult to develop 'clean' energy systems, due to economic costs, associated with a transition to cleaner technologies. It will be a challenge to maintain the organization viable and profitable while achieving reductions in GHGs (Green House Gases) in an economy which is dominated by private interests (**Snell and Schmitt, 2012**).

Hence there is a need to align the climate change policies and response of corporate towards climate change. The rapid emergence of green electricity in the Netherlands shows how the alignment between governments, leaders and civil society can create momentum for more environment-friendly concepts. However, this carbon-free electricity system largely depends on the direction and speed of further processes of institutional change (**Hofman, 2002**). It is, therefore, necessary to understand that energy source is one of the most important factors, which needs to be thoroughly examined, in order to achieve sustainable development. However, it will be a challenge to make the renewable energy sources more effective and efficient. There is a need to identify suitable solutions for future energy requirements, keeping in mind the consequent environmental impacts and establishing linkage between renewable energy and sustainable development, focusing on renewable energy sources and technologies (**Prakash, 2010**). Government policies, for mandatory use of certain units of

power generated from renewable energy, could promote private organizations to develop renewable energy sources as implemented in Yugoslavia, Denmark and Scandinavia. Organizations believe that cost towards environmental investment to become green, will diminish their profits. Hence their commitments towards renewable and 'cleaner' energy production, is likely to be continued as 'token gestures'. It has been reported that there is around 22 % of loss in transmission and distribution of the electricity in India compared to 7% in China, which makes the power sector uneconomical and inefficient (**Dasaraju and Murthy, 2011**) and shortage of about 11% in supply and demand, which is likely to increase by about 7.5% per annum over the next decade.

The government intervention, by adequately revising the renewable energy policies, will assist in the 'transitioning' to a low-carbon economy. The Indian Electricity Act 2003 has several provisions, favorable to renewable energy, including rural electrification. However, production of renewable energy at large scale is hindered due to initial high capital cost, limited access to credit, subsidies to fossil fuels and low purchasing power in energy consumers. In the context of the Indian atmospheric condition, solar power generation will be more appropriate but present low cost structure of coal – based power generations is making the solar power generation uncompetitive. Even then, if emission reduction targets are not achievable, then encouraging and promoting research and development will be essential for the developing countries like India, to bring down the cost of renewable energy technologies (**Rana, 2003**). India is depending upon energy sources, mainly oil and coal, which is mostly imported. Hence in order to become self-sufficient and sustain national economic growth, India needs to utilize its own immense potential of solar energy. India is receiving abundant radiant energy from the sun since it is located in the equatorial sun belt of the earth, which offers clear, sunny weather around 250 to 300 days in a year, resulting in the equivalent energy potential of around 6,000 million GWh of energy per year (**Sharma, 2011**).

Considering the current scenario of climate change and sustainable energy development in India, it can be noticed that energy use and CO_2 emissions are increasing, due to increasing quality of life and economic growth, which need to be closely monitored and controlled to accelerate GHG mitigation. International carbon trade has limited impact on GHG mitigation, Hence there is a need to focus on alternative carbon management with carbon neutrality and carbon literacy **(Sarkar, 2010). Pachauri et al., (2004)** maintain in India, that around 20-30% of our population are still living in poverty, which is more acute in rural areas of the country. The people, not having the money to use electricity, but have access to it, provide the prospect of using it someday in future, which entails the hope for a better life. At the same time, access to electricity alone does not provide sufficient information to conclude the wellbeing of the people. **Pachauri and Spreng (2003)** asserted that the households, which are using sufficient quantities of less efficient energy sources, will be in a much better situation than the people who have access to more efficient energy sources but not able to consume adequate amount of energy. The implementation of renewable energy technologies, needs significant initial investment and hence may need support for relatively long periods, before reaching profitability **(Prasad and Visagie, 2005).** Therefore, poverty needs to be looked in terms of both the dimensions such as access to clean and efficient energy sources and sufficiency in terms of the quantity of energy consumed. It will be appropriate to subsidize the energy infrastructure expansion projects, in disadvantaged poor areas rather than offering subsidies so that renewable energy will become affordable.

3. Statement of the Problem

As far as the power industry of India is concerned, coal is being used as prime fuel for thermal power generation in most of the power plants in India as it is one of the cheapest natural resource available at present compared to other fuels such as oil and gas. From the literature, it is evident that more than 55% of air pollution is due to the use of coal in thermal power stations. Various research studies have been conducted towards environmental issues in developed countries as well as in developing countries. It is felt appropriate to undertake indepth study about awareness of environment in Metropolitan cities like Mumbai. In this paper, various aspects of environment degradation and its linkage with energy sources, have been discussed. It is emphasized that the use of renewable energy sources, would probably help in reducing GHG's emission and thereby controlling and minimizing the current problem of climate change and striving towards the desired sustainable development goals. In view of the same, environment awareness survey was conducted and a result of the survey has been discussed in detail, with respect to consumer demographic variables viz., Gender, Age, Education, Occupation and Income in this paper.

4. Need of the Study

Sustainable Development (SD) is the pattern of growth which ensures a balance between natural systems and environment so that not only the needs of present generations but also human needs of the next generations, will also be met. The most widely recognized definition of sustainable development is that "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" **(Brundtland, 1987).** As the urbanization is taking place in tandem in developing countries like India, it has become very essential to conduct research to identify the level of awareness about the environment among the people, in order to minimize the damage to the ecosystem and achieve desired sustainable development goals.

5. Objective of the Study

Sustainable development is a very wide term and it is yet to establish direct relations with business strategies in India. Due to the absence of appropriate method, it is very difficult to measure the social and environmental performance and how the corporate social responsibility (CSR) initiatives are actually helping to achieve the sustainability. This research was carried out to identify the level of awareness amongst the consumers about the environment so that immediate steps could be deployed to minimize the damage to the ecosystem and help to achieve desired sustainable development goals.

6. Hypotheses of the Study

Based on the literature review, it was proposed to test the following alternative hypotheses.

H1: There is significant difference in opinion & belief

H2: There is significant difference in awareness

H3: There is significant difference in willingness

H4: There is significant difference in attitude

H5: There is significant difference in action taken

H6: There is significant difference in ability to act

H7: There is significant difference in knowledge

7. Research Methodology

In this study, primary data were collected through survey. The questionnaire was developed, to understand the level of awareness among the people about the environment. The questionnaire, ECOSCALE-A Scale for the Measurement of Environmentally Responsible Consumers, was developed by **George Stone (1995),** to measure the various dimensions towards environment responsibility. The

questionnaire, used in this research, contained 36 statements **(Annexure-I),** for mapping the profile of the target respondents in Mumbai, in order to identify their level of environmental awareness. The results of analysis of variance, carried out by using One Way ANOVA, for the other four variables like Age, Income, Education and Occupation, were obtained. Also, rank order analysis was performed, with the help of weighted average, in order to find out the importance of all seven dimensions of ECOSCALE amongst the people. Five point scale was used, where 1=strongly disagree/ never, 2=disagree/rarely, 3=neither agree or disagree/sometimes, 4=agree/often and 5=strongly agree / always. The value of Cronbach's alpha coefficient was more than .6, which was sufficient and within the acceptable range **(Table 1).**

7.1 Sample Selection

A simple random sampling was used to collect the primary data. The total size of independent sample was 334, out of which 80% respondents were male and remaining 20% were female respondents. Out of total 334 responses received, 102 responses were received through on line survey and balance 232 responses were collected through survey form .62% of respondents were employed and 36% were students and remaining 2% were self-employed. It can be observed that sample represented the employed and non-employed groups adequately.

7.2 Sources of Data

The primary data were collected through questionnaire **(Annexure-I).** The survey was conducted through on line, using software available in Google drive as well as in hard form. The primary survey data were codified and uploaded in Excel file.

7.3 Period of the Study

The study was conducted between August 2014 and September 2015.

7.4 Tools used for the Study

The proven and identified marketing scale, "ECOSCALE" **(George Stone, 1995),** was used, to find out the level of awareness in consumers, about the environment, particularly in a metropolitan city like Mumbai. A scale for the Measurement of Environmentally Responsible Consumers, developed in October 1995, was used to measure the various dimensions towards environment responsibility

8. Data Analysis

Based on the rank order analysis, it can be concluded that "Ability to Act" was the most important dimension, for environmentally responsible consumers and independent sample "t" test indicated that there was no significant difference between genders, on six dimensions, except the dimension of "Willingness" under the ECOSCALE and both genders had given more weightage to dimension of "Ability to Act". It can be concluded that people agreed that in order to save the environment, one should stop buying products that are known to cause pollution and implementation of pro environmental regulations will help in reducing the pollution and thereby saving the whole environment. Awareness about environment will not only change the buying behavior of the people but also likely to demand pro-environment changes in the regulations by the Government. The data analysis of "opinion and belief" and "willing to act" dimensions, indicated positive correlation with all variables such as Age, Education, Income and Occupation. Hence it is recommended that one should support people to attend environmental meetings and conversations. This approach will create necessary awareness about the environment in the people and will help in changing the attitude of the people towards environment, which will result in boycotting the products which created excess pollution. Research could help in establishing the correlation between all these seven dimensions of ECOSCALE, with other variables, assumed in the above research **(Table 2 to 7).**

9. Results and Conclusion

The following conclusions have been drawn, based on the above study.

- According to the rank order analysis, it can be concluded that "Ability to Act" was the most important dimension, for environmentally responsible consumers.
- Based on independent sample "t" test, where $p > 0.05$, null hypothesis was accepted and it is concluded that there was no significant difference for both genders, on all six dimensions of ECOSCALE, except the dimension of "Willingness to Act" where $p < 0.05$. Hence the hypothesis **H31** was accepted. In other words, there was significant difference for both genders, towards "Willingness to Act" dimension.
- Based on "t" test, it can be seen from the group statistics that both male and female respondents had given more weightage to "Ability to Act" dimension.
- On the criteria of opinion **(H12)**, willingness **(H32)** and knowledge **(H72)**, post hoc analysis indicates that significant difference existed between graduate and post graduates, undergraduate and post graduates, undergraduate and graduate, post graduates respectively. Hence hypotheses **H12**, **H32** and **H72,** were accepted.
- On the criteria of opinion **(H13)**, willingness **(H33)**, ability to act **(H63)** and knowledge **(H73)**, post hoc analysis indicates that significant difference existed between age groups and hence hypotheses **H13**, **H33**, **H63** and **H73,** were accepted.
- On the criteria of opinion **(H15)**, willingness**(H35)**, ability to act **(H65)** and knowledge **(H75)**, post hoc analysis indicates that significant difference existed between nil income and income upto Rs.25 Lakhs and hence hypotheses **H15**, **H35**, **H65** and **H75** were accepted.
- On the criteria of opinion **(H14)**, awareness **(H24)** and willingness **(H34)**, post hoc analysis indicates that significant difference did exist between students and employed groups and hence hypotheses **H14**, **H24** and **H34,** were accepted.
- On the criterian of attitude, post hoc analysis indicates that significant difference did exist between service and student, self-employed group and hence hypothesis **H44** was accepted.
- All other hypotheses were rejected.

10. Suggestions

The level of awareness and guidance, that we need to work on "attitude" of the people, needs to create an environment where people are empowered so that they are able to act towards resisting and minimizing the damage to the ecosystem. Also, enhanced awareness has to be created, among the people, about the environment and help to change the buying behavior of the people in order to create a pro-environment, eco-system in the long run.

11. Limitations of the Study

This research suffers from certain limitations. The sample size of female respondents was comparatively small and hence it may be inappropriate to draw conclusion about difference in male and female. Further research will help in understanding, how future generations will value different attributes of natural environments and both physical limits and ethical constraints on resource use, which is likely to affect the shadow values of natural capital stocks.

12. Future Scope of Research

As urbanization is taking place in developing countries like India, it has become

imperative to conduct indepth research, with a larger sample size about the environment awareness, among the people, particularly in a Metropolitan City like Mumbai. Also, further research is required to be carried out in today's emerging paradigm shift in the management of energy services, particularly in the contest of nuclear establishment as other available renewable energy sources are yet to be fully exploited.

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Table-1: Reliability Statistics

No.of Items	Cronbach's alpha based on std.items	Cronbach's alpha
31	0.608	0.609

Source: Author's findings

Table-2: Result showing significant relationships

Sr. No.	Regression Relations	Sig.	Supported (Yes/ No)
H1	**There is a significant difference in opinion & belief**		
H11	There is a significant difference in opinion & belief in both genders	.586	No***
H12	There is a significant difference in opinion & belief due to education	.009	Yes***
H13	There is a significant difference in opinion & belief in different age	.011	Yes***
H14	There is a significant diff. in opinion & belief in different occupations	.001	Yes***
H15	There is a significant diff. in opinion & belief in different income levels	.002	Yes***
H2	**There is a significant difference in awareness**		
H21	There is a significant difference in awareness in both genders	.431	No***
H22	There is a significant difference in awareness due to education	.355	No***
H23	There is a significant difference in awareness in different age	.132	No***
H24	There is a significant difference in awareness in different occupations	.012	Yes***
H25	There is a significant difference in awareness in different income levels	.299	No***
H3	**There is a significant difference in willingness**		
H31	There is a significant difference in willingness in both genders	.038	Yes***
H32	There is a significant difference in willingness due to education	.006	Yes***
H33	There is a significant difference in willingness in different age	.010	Yes***
H34	There is a significant difference in willingness in different occupations	.000	Yes***
H35	There is a significant difference in willingness in different income levels	.000	Yes***
H4	**There is a significant difference in attitude**		
H41	There is a significant difference in attitude in both genders	.420	No***
H42	There is a significant difference in attitude due to education	.487	No***
H43	There is a significant difference in attitude in different age	.049	Yes***
H44	There is a significant difference in attitude in different occupations	.001	Yes***
H45	There is a significant difference in attitude in different income levels	.246	No***
H5	**There is a significant difference in action taken**		
H51	There is a significant difference in action taken in both genders	.659	No***
H52	There is a significant difference in action taken due to education	.314	No***
H53	There is a significant difference in action taken in different age	.077	No***
H54	There is a significant difference in action taken in different occupations	.572	No***
H55	There is a significant difference in action taken in different income levels	.317	No***
H6	**There is a significant difference in ability to act**		
H61	There is a significant difference in ability to act in both genders	.331	No***
H62	There is a significant difference in ability to act due to education	.164	No***
H63	There is a significant difference in ability to act in different age	.013	Yes***
H64	There is a significant difference in ability to act in different occupations	.093	No***
H65	There is a significant difference in ability to act in different income levels	.030	Yes***
H7	**There is a significant difference in knowledge**		
H71	There is a significant difference in knowledge in both genders	.815	No***
H72	There is a significant difference in knowledge due to education	.009	Yes***
H73	There is a significant difference in knowledge in different age	.003	Yes***
H74	There is a significant difference in knowledge in different occupations	.754	No***
H75	There is a significant difference in knowledge in different income levels	.001	Yes***

*** mean difference is significant at p> 0.05

Source: Author's findings

Table-3: Result of Rank Order Analysis

Variable	Scale						Rank
	1	2	3	4	5	Weighted Average	
Opinion & Belief	0	64	199	67	4	1013	IV
Awareness	3	74	216	39	2	965	V
Willingness	27	169	124	11	3	796	VII
Attitude	1	30	217	80	6	1062	II
Action taken	1	33	211	85	4	1060	III
Ability to act	0	25	133	147	29	1182	I
Knowledge	2	152	163	15	2	865	VI

Source: Author's findings

Table-4: Result of "t" Test for Gender - Group Statistics

Variable	Gender	N	Mean	Std. Deviation	Std. Error Mean
Opinion & belief	Male	268	3.0299	0.67530	0.04125
	Female	66	3.0455	0.61848	0.07613
Awareness	Male	268	2.8843	0.62235	0.03802
	Female	66	2.9091	0.62579	0.07703
Willingness	Male	268	2.4366	0.72391	0.04422
	Female	66	2.1667	0.66986	0.08245
Attitude	Male	268	3.1791	0.62831	0.03838
	Female	66	3.1818	0.57937	0.07131
Action taken	Male	268	3.1642	0.62043	0.03790
	Female	66	3.2121	0.62055	0.07638
Ability to act	Male	268	3.5373	0.77078	0.04708
	Female	66	3.5455	0.70562	0.08686
Knowledge	Male	268	2.6082	0.62370	0.03810
	Female	66	2.5152	0.58815	0.07240

Source: Author's findings

Table-5: Results of Independent Sample Test - Levene's Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig	t	df	Sig (2-tailed)	Mean diff.	Std. Error diff.	95% Confidence Interval of the Difference Lower	Upper
Opinion & Belief	Equal Variances assumed	.298	.586	-.171	332	.864	-.01560	.09132	-.19524	.16404
	Equal Variances not assumed			-.180	106.535	.857	-.01560	.08659	-.18726	.15605
Awareness	Equal Variances assumed	.620	.431	-.289	332	.773	-.02476	.08561	-.19317	.14365
	Equal Variances not assumed			-.288	99.089	.774	-.02476	.08590	-.19520	.14568
Willingness	Equal Variances assumed	4.318	.038	2.752	332	.006	.26990	.09807	.07699	.46281
	Equal Variances not assumed			2.885	105.639	.005	.26990	.09356	.08439	.45541
Attitude	Equal Variances assumed	.653	.420	-.032	332	.975	-.00271	.08506	-.17005	.16462
	Equal Variances not assumed			-.034	105.941	.973	-.00271	.08099	-.16328	.15785
Action Taken	Equal Variances assumed	.195	.659	-.562	332	.574	-.04794	.08526	-.21566	.11977
	Equal Variances not assumed			-.562	99.474	.575	-.04794	.08527	-.21713	.12124
Ability to Act	Equal Variances assumed	.949	.331	-.078	332	.938	-.00814	.10422	-.21317	.19688
	Equal Variances not assumed			-.082	106.573	.934	-.00814	.09880	-.20400	.18772
Knowledge	Equal Variances assumed	.055	.815	1.098	332	.273	.09306	.08477	-.07370	.25981
	Equal Variances not assumed			1.137	104.044	.258	.09306	.08181	-.06917	.25529

Source: Author's findings

Table-6: Post Hoc Tests of Education Criteria Multiple Comparisons

Dependent Variable	(I) Education	(J) Education	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
opinion_belief	under graduate	graduate	.21930	.19480	.261	-.1639	.6025
		post graduate	-.01032	.19925	.959	-.4023	.3816
	graduate	under graduate	-.21930	.19480	.261	-.6025	.1639
		post graduate	-.22962*	.07663	.003	-.3804	-.0789
	post graduate	under graduate	.01032	.19925	.959	-.3816	.4023
		graduate	.22962*	.07663	.003	.0789	.3804
awareness	under graduate	graduate	.06499	.18467	.725	-.2983	.4283
		post graduate	-.03909	.18888	.836	-.4106	.3325
	graduate	under graduate	-.06499	.18467	.725	-.4283	.2983
		post graduate	-.10408	.07264	.153	-.2470	.0388
	post graduate	under graduate	.03909	.18888	.836	-.3325	.4106
		graduate	.10408	.07264	.153	-.0388	.2470
willingness	under graduate	graduate	.60766*	.21123	.004	.1921	1.0232
		post graduate	.69912*	.21605	.001	.2741	1.1241
	graduate	under graduate	-.60766*	.21123	.004	-1.0232	-.1921
		post graduate	.09146	.08309	.272	-.0720	.2549
	post graduate	under graduate	-.69912*	.21605	.001	-1.1241	-.2741
		graduate	-.09146	.08309	.272	-.2549	.0720
attitude	under graduate	graduate	.10167	.18363	.580	-.2596	.4629
		post graduate	.01991	.18782	.916	-.3496	.3894
	graduate	under graduate	-.10167	.18363	.580	-.4629	.2596
		post graduate	-.08176	.07223	.258	-.2239	.0603
	post graduate	under graduate	-.01991	.18782	.916	-.3894	.3496
		graduate	.08176	.07223	.258	-.0603	.2239
Action taken	under graduate	graduate	.26834	.18390	.145	-.0934	.6301
		post graduate	.22198	.18809	.239	-.1480	.5920
	graduate	under graduate	-.26834	.18390	.145	-.6301	.0934
		post graduate	-.04636	.07234	.522	-.1887	.0959
	post graduate	under graduate	-.22198	.18809	.239	-.5920	.1480
		graduate	.04636	.07234	.522	-.0959	.1887
Ability to act	under graduate	graduate	.41427	.22426	.066	-.0269	.8554
		post graduate	.35029	.22938	.128	-.1009	.8015
	graduate	under graduate	-.41427	.22426	.066	-.8554	.0269
		post graduate	-.06398	.08821	.469	-.2375	.1096
	post graduate	under graduate	-.35029	.22938	.128	-.8015	.1009
		graduate	.06398	.08821	.469	-.1096	.2375
knowledge	under graduate	graduate	.54266*	.18111	.003	.1864	.8989
		post graduate	.45501*	.18524	.015	.0906	.8194
	graduate	under graduate	-.54266*	.18111	.003	-.8989	-.1864
		post graduate	-.08765	.07124	.219	-.2278	.0525
	post graduate	under graduate	-.45501*	.18524	.015	-.8194	-.0906
		graduate	.08765	.07124	.219	-.0525	.2278

*. The mean difference is significant at the 0.05 level.

Source: Author's findings

Table-7: Post Hoc Tests of Occupation Criteria

Multiple Comparisons

LSD

Dependent Variable	(I) Occupation	(J) Occupation	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
opinion_belief	student	service	.27282*	.07485	.000	.1256	.4201
		self employed	-.05000	.23799	.834	-.5182	.4182
	service	student	-.27282*	.07485	.000	-.4201	-.1256
		self employed	-.32282	.23487	.170	-.7848	.1392
	self employed	student	.05000	.23799	.834	-.4182	.5182
		service	.32282	.23487	.170	-.1392	.7848
awareness	student	service	.19765*	.07071	.005	.0586	.3367
		self employed	-.11667	.22483	.604	-.5589	.3256
	service	student	-.19765*	.07071	.005	-.3367	-.0586
		self employed	-.31432	.22187	.158	-.7508	.1221
	self employed	student	.11667	.22483	.604	-.3256	.5589
		service	.31432	.22187	.158	-.1221	.7508
willingness	student	service	-.33819*	.08087	.000	-.4973	-.1791
		self employed	-.33333	.25715	.196	-.8392	.1725
	service	student	.33819*	.08087	.000	.1791	.4973
		self employed	.00485	.25378	.985	-.4944	.5041
	self employed	student	.33333	.25715	.196	-.1725	.8392
		service	-.00485	.25378	.985	-.5041	.4944
attitude	student	service	.19943*	.06959	.004	.0625	.3363
		self employed	-.45833*	.22127	.039	-.8936	-.0231
	service	student	-.19943*	.06959	.004	-.3363	-.0625
		self employed	-.65777*	.21836	.003	-1.0873	-.2282
	self employed	student	.45833*	.22127	.039	.0231	.8936
		service	.65777*	.21836	.003	.2282	1.0873
Action taken	student	service	.07104	.07127	.320	-.0692	.2112
		self employed	-.03333	.22662	.883	-.4791	.4125
	service	student	-.07104	.07127	.320	-.2112	.0692
		self employed	-.10437	.22365	.641	-.5443	.3356
	self employed	student	.03333	.22662	.883	-.4125	.4791
		service	.10437	.22365	.641	-.3356	.5443
Ability to act	student	service	-.15405	.08661	.076	-.3244	.0163
		self employed	-.44167	.27539	.110	-.9834	.1001
	service	student	.15405	.08661	.076	-.0163	.3244
		self employed	-.28762	.27177	.291	-.8222	.2470
	self employed	student	.44167	.27539	.110	-.1001	.9834
		service	.28762	.27177	.291	-.2470	.8222
knowledge	student	service	.00914	.07102	.898	-.1306	.1488
		self employed	-.15833	.22582	.484	-.6025	.2859
	service	student	-.00914	.07102	.898	-.1488	.1306
		self employed	-.16748	.22285	.453	-.6059	.2709
	self employed	student	.15833	.22582	.484	-.2859	.6025
		service	.16748	.22285	.453	-.2709	.6059

*. The mean difference is significant at the 0.05 level.

Source: Author's findings

Annexure - 1 - Questionnaire

Sr.	Question	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	The burning of the oil fields in Kuwait, the meltdown in Chernobyl and the oil spill in Alaska are examples of environmental accidents whose impact is only short term.	☐	☐	☐	☐	☐
2	The United States is the biggest producer of fluorocarbons, a major source of air pollution.	☐	☐	☐	☐	☐
3	The earth's population is now approaching 2 billion.	☐	☐	☐	☐	☐
4	Excess packaging is one source of pollution that could be avoided if manufacturer were more environmentally aware	☐	☐	☐	☐	☐
5	Economic growth should take precedence over environmental considerations.	☐	☐	☐	☐	☐
6	The earth's resources are infinite and should be used to the fullest to increase the human standard of living.	☐	☐	☐	☐	☐
7	The amount of energy I use does not affect the environment to any significant degree.	☐	☐	☐	☐	☐
8	This country needs more restrictions on residential developments	☐	☐	☐	☐	☐
9	If I were hunter or fisherman, I would kill or catch more if there were no limits.	☐	☐	☐	☐	☐
10	In order to save energy, Municipal Corporation should not heat the pool during the winter.	☐	☐	☐	☐	☐
11	One of the primary reasons for concern in destruction of the ozone layer is its ability to screen ultraviolet radiation.	☐	☐	☐	☐	☐
12	There is nothing the average citizen can do to help stop environmental pollution.	☐	☐	☐	☐	☐
13	My involvement in environmental activities will help save the environment for future generations.	☐	☐	☐	☐	☐
14	I would not car pool unless I was forced to. It is too inconvenient.	☐	☐	☐	☐	☐
15	Ivory is a hard white stone that when polished can be used in making piano keys.	☐	☐	☐	☐	☐
16	Acid rain affects only Canada.	☐	☐	☐	☐	☐
17	It is no use worrying about environmental issues: I can't do anything about them anyway.	☐	☐	☐	☐	☐
18	I would describe myself as environmentally responsible	☐	☐	☐	☐	☐

Sr.	Question	Never	Rarely	Sometimes	Often	Always
19	I attend environmental / conversation group meetings	☐	☐	☐	☐	☐
20	I have started / joined consumer boycott programs aimed at companies that produce excess pollution.	☐	☐	☐	☐	☐
21	Whenever no one is looking I litter.	☐	☐	☐	☐	☐
22	Wearing exotic furs and leather is not offensive.	☐	☐	☐	☐	☐
23	I turn in polluters when I see others dumping toxic liquids.	☐	☐	☐	☐	☐
24	I have my vehicle engine tuned to help stop unwanted air pollution.	☐	☐	☐	☐	☐
25	I have my vehicle engine oil changed at installations which recycle oil.	☐	☐	☐	☐	☐
26	The earth is so large that people have little effect on the overall environment	☐	☐	☐	☐	☐
27	People who litter should be fined Rs.500/- and be forced to work on road crews and pick up garbage.	☐	☐	☐	☐	☐
28	The EPA stands for "Environmental Planning Association" and it is responsible for matters dealing with protection of environment.	☐	☐	☐	☐	☐
29	I do not purchase products that are known to cause pollution.	☐	☐	☐	☐	☐
30	I vote for pro-environmental politicians.	☐	☐	☐	☐	☐
31	I cut up plastic rings around packs of soft drinks.	☐	☐	☐	☐	☐
32	Gender	Male ☐	Female ☐			
33	Age	15-25 ☐	26-35 ☐	36-45 ☐	46-55 ☐	55 & above ☐
34	Education	Matriculat ☐	Under Graduate ☐	Graduate ☐	Post Graduate ☐	
35	Occupation	Student ☐	Service ☐	Self Employeed ☐		
36	Income / Annum (Rs. in Lakhs)	Nil ☐	Below 5 L ☐	5 L-15 L ☐	15-25 L ☐	> 25 L ☐