ROLE OF CONSUMER CHARACTERISTICS IN UNDERSTANDING IMPORTANCE OF LOGISTICS IN MINERAL WATER INDUSTRY

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Abstract

People in Pakistan are increasingly becoming health conscious and this is one of the reason for healthy growth of mineral water industry in Pakistan in very short time span. This research explored the consumer response on quality, pricing and logistics with respect to mineral water industry; the research investigated consumer response on the basis of different demographic, psychographic and socio-economic factors. The main purpose of the study was to determine the role of logistics (which includes accessibility, packaging, handling convenience and transportation) in increased sale / growth of any particular mineral water company. And the researcher also wanted to compute if there are some visible signs of customers brand switching just on the basis of excellent logistical services. To calculate the best results, cousumers who use mineral water were targeted and the procedure adopted to extract the relative data out of these respondents was set to be a survey questionnaire. The extracted data was then processed under one sample T test computation on SPSS and the results derived explained that the consumer's characteristics does have an impact on consumer's response towards pricing, quality and logistics. However, the research could not find any strong evidence of brand switching due to excellent logistical services without keeping the price constant and same is the result for any augmentation in growth of any mineral water company.

Keywords: Consumer Characteristics, Urban Logistics, Mineral Water Industry, Bottled Water Logistics, Mineral Water quality, Water Safety

INTRODUCTION

The global mineral water market utilization was estimated to be 154 billion liters in 2004. (Worldwater, 2006) Affluence and concerns for water quality have created a sharp increase in demand for mineral water in Asia and the Pacific region where the market has grown at the rate of 15% per annum.

People in Pakistan are increasingly becoming health conscious and safe water is becoming a major concern as 30% of the illnesses are attributable to water borne diseases (Haydar, 2009). Government outreach campaigns on boiling water and ensuring safe drinking water have promoted demand for safe and healthy water. For the low-income groups, this demand is being met by bottled water (Wilk, 2006). Consumers are increasingly shifting to mineral water as the quality is more reliable and trustworthy.

Figure 1: Global Bottled Water Utilization by Region, 1997 to 2004

Thousand Cubic Meters								
Regions	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004 (P)**
Europe	34,328	36,074	39,965	42,276	44,520	47,037	51,768	53,661
North America	25,398	25,822	29,695	31,850	34,734	38,349	41,778	44,715
Asia	12,472	14,820	17,647	21,170	24,824	29,783	32,795	35,977
South America	5,484	6,362	7,323	8,528	9,915	11,437	12,677	13,607
Africa/Middle East/ Oceania	2,459	2,808	3,092	3,456	3,837	4,302	4,499	4,823
All Others	508	1,953	737	891	1,033	1,592	1,407	1,597
TOTAL	80,649	87,838	98,459	108,171	118,864	132,499	144,925	154,381

P. Preliminary

Source: Worldwater (2007)

The demand for mineral water has seen a sharp increase during the last decade in Pakistan. The consumers of mineral water however, come from different strata of social groups, income level, and have different concerns regarding the source of mineral water supply.

This study proposes to explore the consumer response on quality, pricing and logistics with respect to mineral water industry; the research will investigate consumer response on the basis of different factors like age, gender, education, income etc.

The aim of the study is to see whether there is any link between price, quality and logistical services provided by the mineral water industry in Pakistan with respect to consumer characteristics. This topic has not been investigated before and would provide valuable input to the marketing and logistics decisions by the mineral water industry.

Problem Statement

To study the impact of various consumer characteristics on consumer's reaction toward Quality, Pricing and Logistics, specifically in mineral water industry.

Background, Objectives and Significance of the study

Mineral water is now available in most of the larger cities in Pakistan. Mineral water is expensive costing typically Rs10 per liter in bulk domestic and office use 18 liter bottles. Smaller pickings are substantially more expensive. It is surprising to see that in a poor economy such as Pakistan people would be using mineral water where majority of the population does not have tap water in their homes.

The objective of this study was to study the growth of mineral water industry in Pakistan and the factors contributing to sharp growth in the middle income group consumers. It would be normal to expect that well to do families could use mineral water but the majority of sales appear to be among the middle class families who are willing to spend a significant part of their income on mineral water.

Drinking water should not be an expense for a middle or lower middle class family if safe potable water supply is available. This study was initiated to investigate the reasons behind sharp growth in mineral water consumption in Pakistan. The study on one hand would be helpful to mineral water marketing companies in identifying potential market growth areas. For consumers who are forced to use mineral water because of non-availability of safe drinking water, the study would be helpful in preparing recommendation to the regulatory bodies to ensure the availability of safe drinking water.

Outline of the Study

The study begins with an introduction to mineral water industry and mineral water usage in Pakistan. The factors that contribute to mineral water use are identified and hypotheses have been developed to identify potential consumers and concerns that promote use of mineral water.

Part 2 reviews the literature on mineral water industry, factors that have been identified which influences consumption of mineral water in countries with similar economic and health related concerns. The literature review reveals cost of containers and cost of transportation as major concerns of mineral water producers. The mineral water users appeared to be more concerned about the costs, quality, potential risk of being served ordinary tap water by unscrupulous suppliers and the problem of carrying heavy mineral water containers home.

Part 3 discusses research approach, organization of data collection, consumer survey approach and identification of analytical tool for analyzing the survey data.

Part 4 presents the analysis of the survey and the results of this research. Whereas, part -5 discusses the conclusions, outcome of this research and the direction for future research.

LITERATURE REVIEW

Sixty-eight percent of Pakistani land area receives less than 250 mm of rainfall per year and is described as arid (Alam, 2000). Per capita water availability in Pakistan is a mere 1200 m^3, which places it among the water stressed country (Siegmann & Shezad, 2006). Nowhere is this scarcity more evident than in the drinking water availability. Women folks have to walk miles to collect water in small jars from ponds that are shared by cattle for drinking and bathing. The diseases caused by unhygienic drinking water claim thousands of life in our rural areas every year (Huttly, Morris, & Pisani, 1997). The situation in cities is better than in the villages but the corroded sewerage and potable water lines criss0crossing each other underground causes contamination and water served by these pipelines is often not safe for drinking. Provision of safe drinking water has become a priority for ordinary families. An array of industry has sprung up to cater to the need of safe drinking water ranging from domestic water filters that is installed on domestic water supply to bottled filter water which claims to be safe for drinking. The domestic filters require replacement after filtering a certain volume of water and failure to replace filters makes this method useless. The bottled water business is being run by small businesses often refilling in back street and suspected of just filling ordinary tap water and are recognized as no improvement on tap water. Due to these problems, people who are conscious of their health and appreciate the importance of safe and healthy water supply have created a viable market for international standard mineral water for drinking purposes.

According to a Consumer Protection Survey Report (Kiani & Qadeer, 2006), 60percent of urban population in Pakistan has access to municipal water. This municipal water supply is badly contaminated with bacteria and chemicals due to damaged pipelines and cross contamination with sewerage lines. A survey of 600 tap water samples collected from various places in Karachi showed that not even one sample was found to be fit for drinking (Gunro, 2013). A World Health Organization report showed that 32% of the patient occupying hospital beds suffer from waterborne diseases (Kiani & Qadeer, 2006). This report also shows that 40% of the deaths in Pakistan are due to waterborne diseases (Kiani & Qadeer, 2006). This stark statistics is sufficient to show why health conscious people will be willing to pay a significant amount for quality drinking water (Haq, Mustafa & Ahmed, 2004). The alternates available in the form of filtered water and home based filters are cheaper but unreliable. These factors have created a market for mineral water which is mostly produced by reputable and reliable firms.

The Benefits of Mineral Water

The principal benefit that the users are seeking from this international standard quality water is that of reliable and safe quality (Hu, Marton & Mahler, 2011). However, the name mineral water was originally used for spring water that naturally contained dissolved mineral that had demonstrated benefits for health. The bottled mineral water is artificially purified water with fixed quantity of dissolved salts and minerals that do not exceed a total of 250 ppm of dissolved solids.

Mineral water contains calcium, magnesium, potassium, bicarbonates, sulfates, silica and provide a balance of electrolytes (salts of potassium, magnesium etc). Mineral water contains roughly 4 times more calcium and magnesium and electrolytes of these salts than ordinary tap water (Azoulay, Garzon & Eisenberg, 2001). Mineral water has also been shown to reduce blood pressure (Rylander & Arnaud, 2004), The mineral water marketing website are full of singing praises for their brand of mineral waters as many kind of mineral waters are marketed internationally. These include, Sparkling, normal and with variety of minerals; low and high mineral content water. The critic of mineral water point to the high cost of mineral water and argue that there are many cheaper sources of the minerals than mineral water.

For this study, the main benefit that we intend to focus is the clean, healthy water that promises to avoid all the risks that are being presented by other sources of drinking water.

Mineral Water Quality in Pakistan

Pakistan Standard Quality Control Authority (PSQCA) has set-up a standard of quality for Mineral water (PSQCA, 2004). All mineral water must meet or exceed these requirements. Many of the high quality mineral water also meet international standards and have authorization to show the certification logos. The PSQCA standard for mineral water is shown in the Appendix.

The PSQCA standards for mineral water set in 2001 have been revised a few times with the aim of ensuring that chemical, physical, bacteriological and organic/ inorganic constituents and toxic substances such as pesticides/ insecticides are maintained in acceptable limits. The producers are expected to monitor the specifications and as a regulatory control also submit samples to PSQCA laboratories for verification of certification. The mineral water quality is assessed for (PSQCA, 2004)

- Physical characteristic for bottled drinking water
- Chemical characteristic for mineral / bottled water
- Microorganisms for mineral / bottled water
- Microbiological Limits

Issues Related to Mineral Water Marketing in Pakistan

As discussed above the drinking quality is a major concern for the consumers in Pakistan. For an assured quality, which mineral water producers have been able to consistently offer to their consumers their choice of drinking water? There is a small minority of consumers for whom: price, quality, logistics, quantity of mineral water required is not a concern. These rich few have all the resources necessary to acquire and consume mineral water in unlimited quantity. The number of these consumers is however so small that even one viable mineral water production facility may meet the requirement of all of these consumers.

For a very vast potential market that has been created due to concern for water quality, these factors become a major area of concern for marketing companies. Ensuring that the cost and delivery part of the supply chain is managed in such a way that this large segment of the market can be included among the consumers is the challenge faced but mineral water industry. Consumer characteristics of this potential market are the subject of this research project. The literature survey indicated the following areas of concern:

- Cost of mineral water
- Cost of mineral water container
- Concern for Quality
- Quantity Required
  o For domestic use
  o For occasional use (e.g. on road, school etc)
- Logistics
  o Transportation (Home or office Delivery)
  o Packaging / Handling (Shape and size of containers)
  o Accessibility (ease to access to all consumers and availability)

Cost of Mineral Water

In order to make mineral water as the sole source of drinking water, the most important concern is the cost of mineral water (Hess, 2006). Typical mineral water when purchased in large 18 liter containers typically costs Rs 10 per liter (Rs 180 per can of 18 liters). At 2 liters per day, the monthly cost for a family of four can be estimated as Rs 2500 per month. People in Pakistan generally live in extended family with in-laws etc. The costs for an extended family household could typically be Rs 5000-6000 per month. This becomes a major barrier to use of mineral water for domestic water supply. Every family must purchase containers, which can be replaced

with refilled mineral water. A typical of 4 containers adds to the initial cost by Rs 2000 per family. We test the importance of cost factor with the following hypotheses:

Hypothesis: High cost of mineral water is negatively related to increase in mineral water

Hypothesis: High family requirement of drinking water is negatively related to increase in mineral water requirements

Quality of Mineral Water

Quality of mineral water is a major positive in its favor. There are many lower cost mineral water but the concern of quality and fear of poor quality is a concern. The major brands such as Nestle, Nature, and Aquafina have brand image and sell much better. The educated are more quality conscious and are willing to pay for the quality. For outdoor use such as on picnics, school and college the youth prefer to have a branded water supply in their hand. This brand image and 'fashion statement' is a factor in sale of mineral water. These factors were included as:

Hypothesis: Poor quality of ordinary water is positively related to bottled water consumption

Hypothesis: Better education and information is positively related to increase in mineral water requirements

Cost consciousness and mature-age are negatively related to increase in mineral water requirements

Affluence of a family is positively related to increased mineral water requirements

Hypothesis: Social and societal concerns are positively related to increase in mineral water requirements

Logistics Issues

The most important concern in mineral water marketing are the issues related to cost of transportation and supply to the interested consumers (Thompson, 2009). The cost of transportation of mineral water from the production facility is a significant fraction of the total cost of mineral water. With increasing fuel prices and labor cost. This cost is increasing sharply. Delivery of mineral water to the retailer is one part of the logistics issue, the other part which makes the consumer reluctant to buy mineral water is its transportation to their homes. A typical mineral water bottle weighs 20 kg, it has no handle that could help users lifting the bottle and carrying a few bottles home is a challenge for even young and healthy individual. For apartment dwellers getting these bottles lifted to 2nd or 3rd floor of a block can be a barrier in the decision to use mineral water. Mineral water companies have started home delivery services but the service is limited to large domestic consumer on a weekly basis. The logistic of a cost effective

and convenient delivery is the most challenging part for mineral water industry. This proposition was included as:

Hypothesis: Easy availability such as home delivery is positively related to increased mineral water requirements

The literature review and the nature of issues involved can help in identifying the problem areas and focusing the effort on determining the customers to expand the mineral water market and create an effective and efficient supply chain.

Hypothesis

As discussed in the literature review above the hypotheses for this research can be summarized as below.

H1   Poor quality of ordinary water is positively related to bottled water consumption

H2   Poor quality of ordinary bottled water is positively related to increase in mineral water requirements

H3   Better education and information is positively related to increase in mineral water requirements

H4   Social and societal concerns are positively related to increase in mineral water requirements

H5   High cost of mineral water is negatively related to increase in mineral water requirements

H6   Cost consciousness and mature-age are negatively related to increase in mineral water requirements

H7   High family requirement of drinking water is negatively related to increase in mineral water requirements

H8   Easy availability such as home delivery is positively related to increased mineral water requirements

H9   Affluence of a family is positively related to increased mineral water requirements

RESEARCH METHODOLOGY

The research project is based on a survey of potential and existing mineral water users. Surveys are an effective way of analyzing issue related to stakeholders' preferences and perceptions. They are less invading compared to telephone or face-to-face interviews, and more interesting (Walonick, 1998). The questionnaire developed for this survey was designed to obtain responses regarding the issues identified as research hypotheses, the survey also collected demographic data to relate the responses to age and income groups.

Method of Data Collection and Procedure

The questionnaire used for the survey is included in the Appendix. Major markets, supermarkets and places frequented by potential respondents were the main area of identifying and collecting the survey data. Polite, well-spoken friends were also used to assist the researcher in requesting the information. Many potential respondents claiming to be in hurry agreed to answer the survey when requested by the able assistants.

Sampling Technique

Researcher proposes to use non-probability method. The sample would be selected on the basis convenience sampling, this technique is used in exploratory research to get an inexpensive approximation of the truth (Analytical Group, 2007)

Sample Size

Although the intention was to survey at least 200 respondent which is considered to be sufficient for confidence level of 95% with a margin of error of 5% for a sample population size of 250,000 (Raosoft, 2004), it was planned to survey 266 Respondents.

Instrument of Data Collection

The instrument of data collection was designed to be user friendly and the respondent had to respond on a Likert scale survey of 1-5 with 1 being strongly disagree and 5 showing strong agreement with the statement.

Figure 2: Research Model Developed
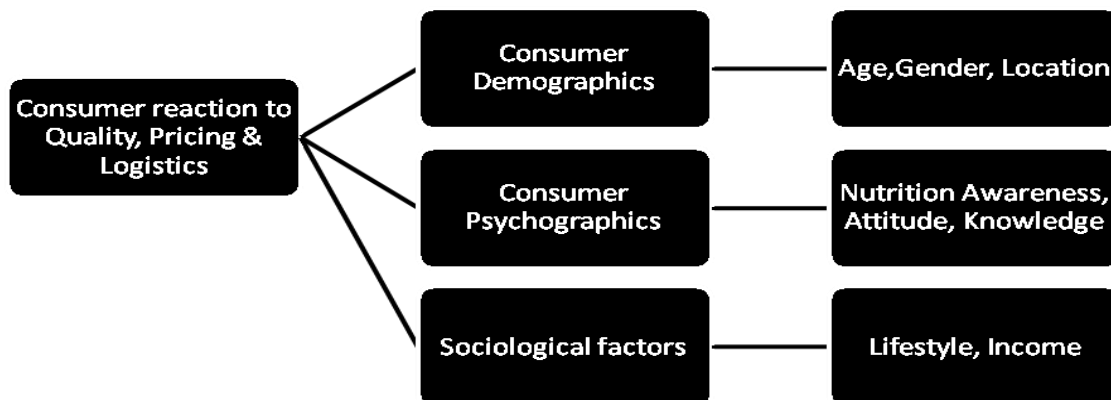
Statistical Test

The test procedure selected for analyzing the research data was one-sample t-test.

EMPIRICAL RESULTS

A total of 266-survey form could be collected in the time available for this project. This number was considered sufficient for meaningful analysis. The survey data was entered into SPSS for analysis. The statistical tool identified for analysis was one sample T-test. The test value was set at 4 as it is equivalent of the respondent agreeing or strongly agreeing with the statements presented to them. A mean value higher than "4" represents that respondent agrees with the hypothesis.

Respondents using Mineral Water Regularly

In order to remain focused on those using or likely to use mineral water the survey was conducted in areas that are considered potential mineral water market. Each respondent was asked if the use mineral water regularly and it appears that the respondents were appropriately selected as almost 85% were mineral water users.

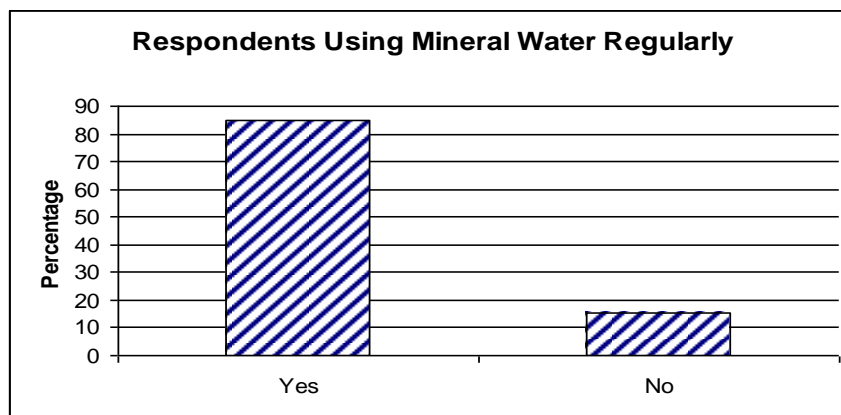Figure 3: Regular Mineral Water Users

Table 1 Respondents Using Mineral Water Regularly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	225	84.6	84.6	84.6
	No	41	15.4	15.4	100.0
	Total	266	100.0	100.0	

Concerns for Safety of Municipal Water

Majority of the respondent considered municipal water supply as unsafe for drinking. Over 76% of the consumer considered it unsafe.

Figure 4: Municipal Water is Unsafe for Drinking
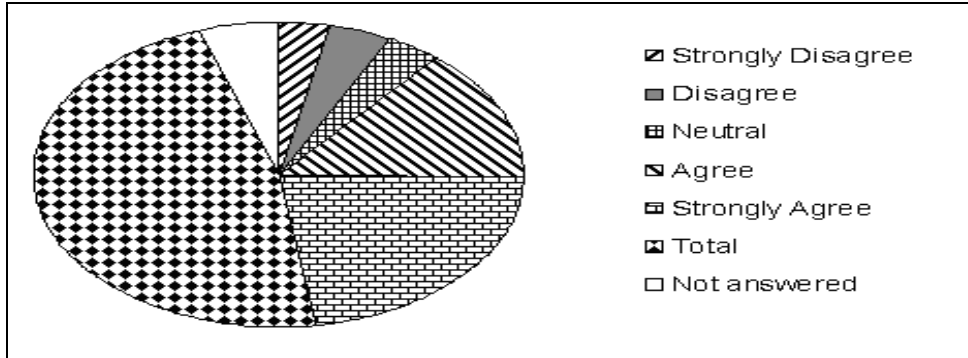
In response to the question regarding the safety of municipal water for drinking purposes 70.7% out of 240 respondents said that they drink bottled water (Mineral Water) because tap water is not safe for drinking. Whereas 18 (6.8%) of total respondents were indifferent on this question and around 39 (14%) of total respondents believed it was safe to drink municipal water supply.

Table 2: Municipal Water Supply is unsafe for Drinking

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	17	6.4	7.1	7.1
	Disagree	21	7.9	8.8	15.8
	Neutral	18	6.8	7.5	23.3
	Agree	72	27.1	30.0	53.3
	Strongly Agree	112	42.1	46.7	100.0
	Total	240	90.2	100.0	
Missing	System	26	9.8		
	Total	266	100.0		

All other questions asked in order to get to the relevant data resulted in negative response in terms of statistics i: e majority of respondents disagreed with the statements. Table 3 gives the result of one sample statistics for the one sample t-test.

Hypothesis Assessment Summary

It was expected that many of the hypotheses proposed for this research would be expected, but the analysis showed that respondent recognized the reason for paying what they might have

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seen as the real reason for using only mineral water was the poor quality of potable water. Filter water being marketed is believed to be almost as unreliable as tap water and that is the reason for rejecting hypothesis =2. Respondent equate tap water and local filtered water as unsafe water. Respondents appear to be of the view that if that had access to clean potable water they would rather not use expensive mineral water. Of course, a minority of respondents who can easily afford it were supportive of mineral water. The hypothesis related to the use of mineral water as tap water is not safe for drinking; the other hypotheses were rejected as shown in Table 4.

Table 3: One-Sample Statistics

		N	Mean	Std. Deviation	Std. Error Mean
H1	Poor quality of ordinary water is positively related to bottled water consumption	240	3.900	1.0943	.0706
H2	Poor quality of ordinary bottled water is positively related to increase in mineral water requirements	240	3.60	1.541	.100
H3	Better education and information is positively related to increase in mineral water requirements	240	3.71	.872	.056
H4	Social and societal concerns are positively related to increase in mineral water requirements	240	2.91	1.083	.070
H5	High cost of mineral water is negatively related to increase in mineral water requirements	240	2.733	0.817	0.053
H6	Cost consciousness and mature-age are negatively related to increase in mineral water requirements	240	2.46	1.167	.075
H7	High family requirement of drinking water is negatively related to increase in mineral water requirements	240	3.18	1.534	.099
H8	Easy availability such as home delivery is positively related to increased mineral water requirements	220	3.35	1.018	.069
H9	Affluence of a family is positively related to increased mineral water requirements	240	3.63	.956	.062

Table 4: One Sample Test

		t	df	Sig. (2-tailed)	Mean Dif.	Lower	Upper
		Test Value = 4				95% Confidence Interval of the Difference	
H1	Poor quality of ordinary water is positively related to bottled water consumption	-1.534	239	.126	-.1083	-.247	.031
H2	Poor quality of ordinary bottled water is positively related to increase in mineral water requirements	-3.978	239	.000	-.396	-.59	-.20
H3	Better education and information is positively related to increase in mineral water requirements	-5.132	239	.000	-.289	-.40	-.18
H4	Social and societal concerns are positively related to increase in mineral water requirements	-15.582	239	.000	-1.089	-1.23	-.95
H5	High cost of mineral water is negatively related to increase in mineral water requirements	-24.013	239	.000	-1.267	-1.371	-1.163
H6	Cost consciousness and mature-age are negatively related to increase in mineral water requirements	-20.405	239	.000	-1.538	-1.69	-1.39
H7	High family requirement of drinking water is negatively related to increase in mineral water requirements	-8.247	239	.000	-.817	-1.01	-.62
H8	Easy availability such as home delivery is positively related to increased mineral water requirements	-9.438	219	.000	-.648	-.78	-.51
H9	Affluence of a family is positively related to increased mineral water requirements	-6.079	239	.000	-.375	-.50	-.25

Table 5: Hypotheses Assessment Summary

		Mean	p-values	Empirical Conclusions
H1	Poor quality of ordinary water is positively related to bottled water consumption	3.900	.126	Accepted
H2	Poor quality of ordinary bottled water is positively related to increase in mineral water requirements	3.60	.000	Rejected
H3	Better education and information is positively related to increase in mineral water requirements	3.71	.000	Rejected
H4	Social and societal concerns are positively related to increase in mineral water requirements	2.91	.000	Rejected
H5	High cost of mineral water is negatively related to increase in mineral water requirements	2.733	.000	Rejected
H6	Cost consciousness and mature-age are negatively related to increase in mineral water requirements	2.46	.000	Rejected
H7	High family requirement of drinking water is negatively related to increase in mineral water requirements	3.18	.000	Rejected
H8	Easy availability such as home delivery is positively related to increased mineral water requirements	3.35	.000	Rejected
H9	Affluence of a family is positively related to increased mineral water requirements	3.63	.000	Rejected

DISCUSSIONS

Mineral water has a viable market and increased affluence of a section of population would continue to justify increased production. Replacement of mineral water as a substitute for healthy, clean tap water if it were to become available is not justified. Availability of safe drinking potable water would take mineral water out of contest. It is a pity that for a poor country like Pakistan, many consumers who believe that they cannot afford mineral water are forced to buy it, as the cost of illness is even higher.

For those who can afford mineral water, the companies, which have established a brand image, reputation for quality and good corporate image, have a distinct advantage over the small local producers. These companies can increase their share of market by offering home delivery which would even further disadvantage the producer who rely on marketing through high street retailers.

CONCLUSION

The research indicates that the main reason that the demand for mineral water has sky rocketed is the lack of quality drinking water from municipal water supply. The quality and reliability of mineral water as safe for drinking has been the main driving force in increasing demand of mineral water, the alternates such as filtered bottled water or the wide variety of water filters have proved unreliable. Many unscrupulous suppliers have compromised quality and brought bad names to what could have been a cheaper source of good quality water. It is common to see dirty bottles green with algae being used for filtered water supply. Translucent bottles hide the suspended particles, which deter the consumers using this water.

The concern for price of mineral water is an obstacle to large expansion of this market and for the larger families the quantity of mineral water needed for family requirement often prevents family from considering mineral water as an option. Many consumers are reluctant to consider mineral water due to the problem of carrying water bottle from the retailer shop to their homes. Any company that desires a large share of the market must consider home delivery.

IMPLICATIONS OF THE STUDY

The research shows that the consumers are cost conscious and if decent quality water supply were to be available, many consumers will not be using mineral water. As water available from municipal supplies is of poor quality many believe that buying mineral water has become the least cost option as the cost of poor quality water in terms of illnesses is much higher than the mineral water cost. Logistics cost is a major factor as transporting water for long distances in the age of high fuel prices adds to the product cost. Large containers are designed for water dispensers but the smaller 3 liter to 10-liter PET bottle can be replaced with pouch packs to reduce cost of packaging.

LIMITATIONS OF THE CURRENT STUDY

The current study gives an insight of consumers' characteristics of those living in the gigantic metropolis of Pakistan which is Karachi. The study is limited to the small number of respondents from just one city. It is possible that consumers from different metropolis would react to the same questions differently, hence concluding the different results, although the chances of it happening are very low.

FUTURE RESEARCH

The first area of research should be on developing means of purifying the municipal water supply. Product such as purification tablets, domestic and affordable reverse osmosis systems

need to be developed to ensure that the available water supply could be converted into safe for drinking water. This will not only help the rich but common people. For people using mineral water, home delivery and refilling at doorstep could reduce the cost of mineral water. Medium pack sizes (3 liters to 10 liters) can be replaced with sturdy pouch packs as the expensive PET bottles in this size range are normally not returned for refilling.

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