MSC Program in Business Administration

Master Thesis in Business Administration (FE2413/FE2409)

PET Recycling
Behavior of consumers in Lahore, Pakistan
Available knowledge and general attitudes
Impact on recycling

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Abstract

Lahore, Pakistan is one of the most populated and hottest regions of the world. Due to long summers beverages consumption is generally high leading to an increase in consumption of beverage PET bottles. There is a huge amount of municipal waste which is not being recycled and as a result it ends up in landfills. Through a survey I have tried to figure out that how different factors like income level, educational level, recycling facility, knowledge and incentives influence recycling behavior of 124 individuals in Lahore, Pakistan. The research conducted shows us a positive relationship between recycling and low income level and also shows an increase in recycling trend with an increase in financial incentive to the general public. However a negative relationship can be observed among the recycling trend and an increase in private cost in terms of effort and time. According to the study one of the major factors which demotivates the public sector from recycling is the shabby condition of junk shops. Furthermore it seems lower recycling rates are due to lack of awareness in general public regarding importance of recycling, people want a clean environment but are unaware of the fact that recycling is a key component in preserving the environment. So, the appended study below shows that effort needs to be done to create awareness and start an effective and planned collection system which can reduce private cost of recycling, similarly efforts should be made for advertising and campaigning about the benefits of recycling and encouraging individuals to feel proud of the fact that they are contributing towards the betterment of society by recycling.
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1. Introduction:

1.1 Recycling trends

“Preventing the generation of solid waste is a critical task if we are to create a truly sustainable society” (M. amino, 2004).

The world is changing day by day; people no longer prefer reusable materials so the use of disposable material (plastic and paper) is getting higher. Because of the increases in the number of disposable materials, the amount of waste being produced from it has also subsequently increased. Dr.-Ing. Heino Vest (2003)

This is a hot issue all around the world now a day’s because there is an increase in the number of people who are well educated and see this as a major environmental threat. Use of disposable material is creating unmanageable wastes and the best solution to handle this problem is by doing more and more recycling. We are using more energy now than ever before. As we begin to understand the limits of making energy we are also developing ways to conserve energy. The bottom-line is - recycling saves energy. Although it may not directly affect our pocket books, indirectly it does. The more we recycle; the more product is available - the lower the cost of material, which lowers the price tag on the goods that we buy (Clare country recycling guide, 2007)

Recycling is the easiest way an individual can contribute towards the betterment of environment. Recycling is more common in developed countries that help the common house hold control their waste and similar practices are being adopted by developing countries. Developing countries face different hurdles in adopting recycling systems, major hurdles faced by them include lack of funding (from government sector), poor
management and corruption. The percentage of households who recycle in Lahore, the second largest city of Pakistan, is nowhere near any satisfactory level. Lahore has approximate population of 10 million people (trueknowledge, 2010) and there are a very modest proportion of people who are motivated towards recycling. In Lahore, recycling is being done by the private sector at a micro level and local municipal committees don’t do much to promote recycling (S. Batool, N. chaudhry, K. majeed, 2007). Individuals are not that keen to recycle mainly because of lack of knowledge and motivation. Public is unaware of the consequences of not recycling and the incentives provided to them are too small. It’s hard to find companies which facilitate people to recycle or provide them any kind of financial incentives in this regards. I was really impressed by the deposit and return system on plastic and tin cans in Sweden. The machines used to collect waste, (plastic and tin cans) and after reading the barcode of the waste, it used to give money back in shape of vouchers. Currently, Lahore’s household waste is been collected by the municipal committee or contract garbage collectors and then it is simply thrown away near River Ravi. House hold waste which can be recycled is being picked up by the scavengers or in some cases being sold to junkshops. These junk shop owners are the only ones who are supporting the recycling process right now by separating the reusable stuff and selling it to the industry which requires it. This study will try to look into the behavior and attitude of the general public towards the need of recycling and its importance. With regards to the recycling system I am going to investigate the current situation of Lahore, and I will try to figure out what are the major motivational factors driving the people towards recycling. If consumers of the PET bottle want to dispose of the used bottles there is no separate facility provided to them so that they can do so while
contributing towards recycling, similarly so far no collection system has been set up in Lahore. So basically no system is in place for the consumers to recycle, moreover there is lack of knowledge and casual attitude towards recycling. In my work I want to go a bit deep into the study of the motivational factors driving the people to recycle.

1.2 PET Recycling

My main focus in this whole study is on PET Recycling and PET stands for polyethylene terephthalate it is the “most common plastic being used by consumers” (rethinkfabrics, 2010) and is also known as polyester. Recycled polyester, recycled PET or RPET are all considered synonyms for the same material. RPET is made from used plastic bottles which have been collected, cleaned, smashed, melted, polymerized to be reused by manufacturing polyester fibers, polyester sheets, strapping and even back into PET bottles (eawag, 2010). “It is shown that 21.2% of all recyclable waste in Lahore is recycled, and it generates an amount of Rs. 271 million (US$ 4.5 million) per year through the informal sector” (batool, 2007)

1.3 Swedish EPA role in PET recycling:

I was really impressed by the deposit and return system adopted by Swedish EPA (pet recycling, 2004) and looking towards the history how Sweden EPA developed over time is really plausible. It is clearly stated on the products that the manufacturer of packaging is responsible for collection system of its waste and for ensuring that household receive
full information on what they should do with it when they have used the product. And producer responsibility is being regulated by Environmental code (1998:808) (pet recycling 2004). But currently manufacturers of PET bottles in Pakistan are not following any such law which can force them to recycle the material they have produced.

1.4 Scope of thesis:

The aim of this thesis work is to investigate the attitudes and knowledge related PET recycling behavior which can create profit in terms of both capital and environmental. This study will highlight what are the factors which are discouraging consumers from recycling. Current situation is so that only 21.2% of the material is being recycled among which a major portion consists of plastic (PET bottles). A high amount is paid to make PET packaging and still there is no planned recycling going on. I will try to investigate the current situation and to propose some recommendations by which a system can be created. This proposed system will motivate and persuade consumers towards recycle PET. The thesis work will answer following points.

- How can general public be motivated towards recycling and what kind of awareness, social image and incentives are required?
- What kind of attitude and knowledge is required for consumers to start recycling?
1.5 Motivation:

The major motivation for me, for conducting this study, is to improve the current situation of my home town with regards to the recycling system. “It is interesting to note that from the period of 1980–2005, the quantity of paper and plastic has shown a continuous increase whereas glass and iron products have shown a decline”. (Batool, 2007). In early days bottles were just thrown away after use and not even scavengers collected this material but since last few years, some businesses have started to recycle PET bottles but on a very small level. General public seems to have no clue about the benefits of recycling and even consumers are interested in recycling don’t know how they can contribute in recycling. Generally after using PET bottles they are re-used as containers for tap water. Swedish deposit and return system of collecting waste and motivating consumers to recycle has impressed me and it has motivated me towards writing a thesis on this topic.

- My motivation clears my research question which is: what are the current obstacles which stop public from recycling and how can these obstacles cleared?
2. Literature review

The PET recycling literature is a collective contribution from psychology, economics, management and environmental a study (C. Axelsson and M. karlsson, 2010).

The psychology research is going to be paying attention towards the recycling consumer that what exactly is required to motivate them and what changes can motivate the people towards making a recycling society.

The Economics research will highlight that what exactly consumer and business man expect in return from recycling and investing time and effort in doing recycling.

The management research will outline the initiation of the recycling scheme and improving them through address design elements. (C. Axelsson and M. karlsson, 2010).

What are the constraints in PET recycling in Lahore, Pakistan? There is little research done in Pakistan and EPA is currently not enforcing any law which can pressurize PET manufacturers to think about the recycling of their products once they are used. Even the major multinational companies (for example Coca-Cola and Pepsi) which use most of the PET bottles for selling their product on large scale are ignorant in this regard (EPA Pakistan, 2010).
2.1 Recycling psychology

The KNUD S. Larsen, Department of psychology Oregon University, in his article of Environmental waste: Recycling articles and correlates, has discussed that there was predictable relationship between attitudes towards recycling and attitudes toward environmental issues, right issues, and political participation. Furthermore the article gives reference to the Simmons and Widmar (1990) who found that recyclers were more likely to believe in environmental conservation and to feel personally responsible for the conditions of the environment but that such positive attitudes may not result in recycling if knowledge about recycling is lacking. Lastly the article concludes with the findings that the relationship between positive attitudes towards recycling, political participation, suggest that there is a connectedness between positive environmental attitudes, personal responsibility and broader social concern. (Dr.-Ing. Heino Vest (2003) “Research has shown that the quality of the recycling experience can affect participation”. Taylor (1988).

2.2. Importance of recycling system on behavior

The kinds of social behavior related to environmental problems are more consistent with regard to the solution chosen by the public authorities (Graces and lafuente, 2002). Research that investigates recycling systems recognizes that recycling behavior has an important role in behavioral change and it tries to understand other influencing elements (A. Velagic). “There is empirical evidence that the individual is unlikely to accept the recommendation of the informant if he does not understand the underlying reasoning processes” E. Milichrahm, (2002).
2.3. **Current situation of Lahore**

“Plastic Pet bottles are environmental problem to many countries. In Lahore Pakistan, due to heat the consumption of soft drink is very high; therefore PET consumption is also high. The amount of collecting verses what goes to the dump is higher” (mopyarn, 2006)

Considering Lahore’s situation where the weather is extremely hot and there are long summers with temperature even reaching 48 Celsius, therefore generally the use of beverages is on a high side.

In 1980’s the glass bottles were widely used for containing different types of beverages but as the demand changed through time, industry trend shifted towards PET bottles due to lower cost, ease in handling, refilling returned bottles and non breakage due to mishandling.

![Comparison of recyclables by weight percent of total waste](image)

Figure A 2.1 shows Comparison of recyclables by weight percent of total waste.

In FIG 2.1 it can be clearly observed that plastic use has increased and due to increase use of plastic the PET recycling has become major issue.”

The composition of solid waste in 2005 reveals that waste in Lahore contains 21.2% recyclables, such as plastic, paper, glass and metal. There are no regulations on recyclables or recycling in Pakistan, and the formal sector is not actually involved in recycling.

2.4 Cost being paid by society

Bruvoll and Nyborg (2004) highlighted that several recycling campaigns do not provide economic incentives, but appeals public to participate having perception of ideal public behavior towards recycling. Bottle cost is added when Society (public) pays for the bottle. According to pre-feasibility report made by SMEDA (small and medium enterprise development authority) of Pakistan on May 2010 the Raw material cost for manufacturing PET Bottles is PKR. Rs. 130/kg and a single bottle of 1.5 liter will raw material cost approximately Rs. 5. And after manufacturing sold at Rs.8 and 5 liter pet bottle will raw material cost Rs. 46 and after manufacturing sold at Rs. 82 (SMEDA, 2010). The Raw material cost is almost 60% of the bottle price and manufacturing cost including profit of manufacturing company is 40%. Thus, recycling can help consumers to save some part of their money invested on PET bottles.
2.5. **Knowledge which can create awareness**

“Currently, worldwide PET recycling rates are low, with bottle-collection rates at less than 2.5 million tons in 2005 (Claudio bertelli, 2006). “If you consider that consumers used over 9 million tons of PET bottles worldwide in the same year—that translates to about a 28 percent recycling rate. By the year 2010, it is predicted that four million tons of PET bottles will be recycled, rising marginally to a thirty-two percent collection rate” (Claudio bertelli, 2006). The estimated increase in PET recycling as predicted by Claudio Bertelli will be 30% by 2010 which accounts for 70% of those which are not being recycled, considering this amount one can imagine that the landfills they can create and if recycled properly how much profit can be generated.

RPET is not widely used to make same bottles: Its strange that all the pet recycled in 2005 only 9% of that amount was use to make the bottles again in contrast, the fiber which was made from RPET is widely used in polar fleece jackets, which amounts 70% of RPET.” By 2014, Petcore estimates that 600,000 tons of PET bottles will be collected alone in Europe, which will be in turn, recycled directly back into bottles—an increase of 968 percent from 2005” (Claudio bertelli, 2006).

2.6 **Identifying the behavior change required**

There’s a concept of environmental act drawn from a causal linear model which is often referred to as “information deficit” Model;(Owens 2000),in which it presume what has become known as the A-I-D-A logic of behavior; which stands for “Awareness, Information, Decision, Action. Most policies”, “especially at the national level, make an implicit assumption that the means by which to resolve environmental issues is to make
individuals aware of environmental problems (sometimes providing “hard-hitting”
examples of their impacts), then to provide accurate information about how to ameliorate
the problem, which in turn should lead to a decision to act, and then finally a behavioral
change” (barr and gilg, 2007).

![Framework of environmental behavior](image)

**Fig.** Framework of environmental behavior.

### 2.7 How Consumer can become recycling consumer:

One strand of the literature is grounded in the belief that people are primarily utility
maximizes motivated by costs and benefits (Porter, Leeming, & Dwyer, 1995)

"Furthermore both social and personal norms were actually anticipated to be enforcing in
place where support requires less sacrifice” (Von Borgstede and Anders Biel, 2002)

” The interpretation of the concept end or final customer assumes a “location” at the end
of the value chain and following that the value will be used. Traditionally, to a very high
extent the products thereafter became waste and were collected in special disposal areas.”
(Huge Brodin and Skottheim, 2001)
2.8 Developing Recycling system

First step of recycling is how to establish, “manage and operate effective and efficient recycling system” (Huge Brodin and Skottheim, 2001). Longer term education and awareness campaigns will change public attitudes (Omran and Mahmood, 2008). The awareness of recycling is at its peak in developed countries even developing countries are moving towards adopting recycling. Value of development can be studied in many different ways but among them two major are societal level and business level.

The creation of legitimate, formalized recycling system in developing countries where informal employment and poor sanitation services are commonplace, allows people to feel as though their jobs and working conditions are more dignified and so too are the environments in which they are living (K. Letizia and M. Whitty, 2010). Governments play a vital role in promoting recycling taking Swedish example the collection system for packaging waste: The Environmental Code (1998:808); According “The purpose of this Code is to promote sustainable development, which will assure a healthy and sound environment for present and future generations. Such development will be based on recognition of the fact that nature is worthy of protection and that our right to modify and exploit nature carries with it a responsibility for wise management of natural resources”. Reuse and recycling, as well as other management of materials, raw materials and energy are encouraged with a view to establishing and maintaining natural cycles (Maria and Helén, 2008). To Swedish EPA its “The producer shall ensure that the packaging is recoverable; provide suitable collection systems; inform customers and
households of their activities; consult with municipalities and report the recovery rates to the Swedish EPA. Households and other consumers shall separate packaging from other waste” (boverket, 2006).

As recycling requires investment of time, space, money and effort, making recycling convenient should increase household participation (S. sidique and Lupi, 2010).

“For developing recycling system collection plays a vital role if it’s easy for PET-bottle user to recycle at a convenient location the collection quantity will increase following are the steps for processing:

1. Collection
   - Returning to supplier
   - Kerbside collection
   - Drop-off locations
   - Buy-back centres
   - Return vending
   - Separation from mixed solid waste

2. Sorting
   - Manual positive/negative sorting from mixed waste
   - UV-light assisted sorting
   - automated sorting with optical sensors

3. Baling/storage
   - Perforation of bottle
PET Recycling behavior of consumers in Lahore, Pakistan

- Baling, manually or with balers
- Intermediate storage

4. Shredding

- Wet or dry

5. Cleaning, drying, fine separation

- Washing
- Float/sink separation
- Drying
- Air classifying
- Electrostatic separation
- X-ray/optical sorting

6. Pelletising (optional)

7. Manufacturing to final goods.

Not all of the process steps mentioned above are always needed. Depending on the final product, the requirements of the customer, and the availability of technology and funds the right process step has to be selected. For small scale industry in developing countries, manual or semi-mechanized techniques are most appropriate” (Dr.-Ing. Heino Vest, 2003).
2.9 influence of Deposit and return system on consumers:

“Beverage containers that are included in a deposit and return system have their own collection system in the form of reverse vending machines in shops and other places. These beverage containers comprise containers for ready-to-drink beverages such as aluminum cans, glass bottles for beer and soft drinks, and PET bottles. Glass bottles and large PET bottles (1.5 and 2 liters) are reused, while aluminum cans and the smaller PET bottles are recycled. Steel cans are not included in the deposit and return system” (petrecycling, 2004). Usually all separated material end up to material companies but it’s not mandatory to join any such company one can have its own system. “A ban on land filling of combustible waste was enacted on 1 January 2002 in Sweden. It will be followed in 2005 by a ban on land filling of compostable waste” (petrecycling, 2004). The same type of approach can also be adopted by private sector companies in Lahore which can set up a system like deposit and return system for every bottle returned some amount of money in any shape let’s say a voucher may be given to the consumer as reward.

2.10.1 Environmental profitability:

Primary recycling is generally more desirable because it reduces the need for virgin material and eliminates the need to create new market niches for secondary products (hegberg et al. 1992)
Although the percentage of refillable PET-beverages containers increases in Europe and North America, majority of PET-bottles worldwide are one-way bottles which are discarded after use. PET-bottles contribute increasingly to generation of waste and litter especially in developing countries. One-way discard PET-bottles have a negative impact on the environment. If this ONE-way use can be converted into reuse and recycle then it can help prevent following environmental issues:

- Waste resources
- Pollute soil, rivers, coastal areas
- Pollute the air when burned
- Consume a lot of landfill site space
- Get scattered and make the environment look untidy

(David Siddiqui, 2005)

2.10.2 Management contribution for affective PET recycling company

- Set-up of a central buyback centre for used PET-bottle
- Promotion of regional buyback centres
- Organisation of transport of collected used PET-bottles
- Set-up of a central processing plant for used PET-bottles
- Promotion of privately operated processing plants
- Marketing of processed and unprocessed used PET-bottles
- Training and education of small scale
2.10.3 Making partners by providing financial Incentives or saving environmental to following:

- Municipalities, cleansing departments
- Private waste management companies
- Small scale waste pickers and recyclers
- NGOs, charity organisations, schools
- Private homes.

(David siddiqui, 2005)
3. Research Methodology

Under this heading, I am going to illustrate the research methods I have applied in this study.

3.1 Research Approaches

Quantitative and Qualitative Research approaches

Quantitative research methods are used by researchers who use logical positivism or quantitative research employ experimental methods and quantities measures to test hypothetical generalizations, and they also emphasize the measurement and analysis of casual relationship between variables.

It familiarizes him/her self with the problem or concept to be studied, and perhaps generate hypotheses to be tested. (Naheed. G, 2003)

On the other hand qualitative research used a naturalistic approach that seeks to understand phenomena in context specific setting. In qualitative research, researcher tries
to commit itself more towards the research process and the role of researcher remains till
the last part of the process. (Naheed. G, 2003)

In my study, I am going to conduct detailed interviews from the beverage consumers and
buyers of the used PET bottles and I will try to gather substantial data in order to carry
out my research and arrive at a solid conclusion. It is pertinent to mention that part of my
required data is not easily available and even if it is available it is virtually impossible to
find it in a numerical form.

3.2 Data Collection

3.2.1 Primary Data:

Primary Data collection technique basically is gathering data directly from the source
which is related to the topic of study. This means gathering from methods like
experiment, observations and communication. Here in this study the communication is
sub divided in to two categories surveys and interviews. Ghauri, P., & Gronhaug, K.

In my study, the main mean of gathering primary data will be through interviews which
will be conducted from individuals belonging to different class of society ranging from
very high class to very low class. Furthermore with the help of my survey I will try to
gather data like why or why not people recycle.
Interviews are to be conducted from:

- Consumers (who use PET bottles on daily basis)
  1. Low income consumer (which usually are servants and helpers)
     - Medium income consumers
     - High income consumers
  2. Junkshops
  3. Pet bottle recycling plants
  4. PET bottle manufacturer

### 3.2.2 Secondary Data:

The secondary data in a study will aid in collecting required information from books, journal articles and from websites. Secondary data helps the researcher to understand and
formulate the research problem more clearly on the broad way to draw conclusion.

Further secondary data is extremely helpful in international context because we can easily compare data from two different countries. Ghauri, P., & Gronhaug, K. (1995).

In my study, I am going to use secondary data which will further help me in conducting this research. It will also help me in comparing the recycling system of Sweden to Pakistan and what can be adopted from Sweden’s recycling system.

3.3 Sampling:

In research methodology, population refers to any group of people that are the main subject of the research. It is not possible economically and practically to study the whole population (Goddard & Melville, 2007).

**Random sampling:** For conducting this survey a random sampling technique is going to be used. Sampling will include people belonging to different income class and having different education level.

In my study I will try my best to collect data from as much people as I can, which will represent the whole population. The population will consist of people belonging to both genders, male and female. I have decided to use a sample size of 150 respondents.

3.4 Method of Data Analysis: The data obtained from questionnaire will be analyzed using the Statistical Package for Social Science (SPSS). Descriptive statistics would be used to examine the data collected. Such descriptive statistics would include the use of
simple percentages and pie charts, which according to Vaughan (2001) are the only descriptive analysis suitable for nominal variables.

3.5 Questionnaire: The questionnaire constructed for the purpose of conducting this study aims to identify significant factors for explaining the behavior and trend of general public towards recycling. Following are some questions in particular that will lead me to key findings for my study:

Q. What is your income level?
- Low (Rs. 0-7999)
- Medium (Rs. 8000-21,999)
- High (above Rs. 22,000)

Q. Education level:
- Not educated
- Primary/high school
- College/university

Such questions will help me obtain demographic information about the respondents. Much of the answers obtained here after will give me a direct idea that how many of the respondents who are more keen towards recycling belong to what income group and how much educated they are. Results to these answers are key towards my findings regarding behavior of people towards recycling.

Q. Do you recycle?
- Never
- Sometimes
- Often
PET Recycling behavior of consumers in Lahore, Pakistan

Do you recycle PET bottles?

☐ Never
☐ Sometimes
☐ Always

The above question is obviously one of the most important one. We require data from this answer to basically get a picture that how many respondents are actually interested in recycling. Further the next question “do you recycle PET bottle” will help me in comparing trends between general recycling and pet recycling.

Q. According to your view which point will motivate people more towards PET recycling
Choose 1 option

☐ Company buy back centers(clean shops)
☐ Promotional schemes( give 5 bottles empty bottles back and get one free)
☐ Increase the amount being paid by junk shops
☐ Bottle collection machine at your local store

I am really looking forward to the result of the above question in order to get a better picture that what does the respondents feel is the best motivating factor for them to recycle more often.

Q. Would you recycle more? If you were

(a) Compensated with Rs.5000 per year as returns from recycling

☐ Less
☐ same
☐ more
☐ much more

(b) Given a fine of Rs.5000 per year if not recycling:

☐ Less
☐ Same
☐ More
☐ Much more

Q. Would you return PET bottle if an initial cost is incurred on time of purchase which will be returned?
☐ YES / ☐ NO

From these questions I hope to obtain a good picture of how people feel about returning the PET bottles if there is a financial motivational factor involved with it. This will also
highlight the general habits of consumers about they being motivated more by fines or reward schemes and how much this affects them psychotically.

**Q. How much important is a clean environment to you?**

- Not at all
- Little bit
- Very important

The findings to the above question will indicate that how many of the respondents see clean environment as a major issue.

**Q. Are you concerned about the land filling/dumping currently going on in different areas of Lahore?**

- Not at all
- Little bit
- Very much

Yet again I look forward to the result from this question to get the idea that how concern is the general public about the hazardous land filling and dumping problem.

**Q. Does recycling make you feel proud?**

- Not at all
- Little bit
- Very proud

**Q. Do you think that recycling makes you appear better to others?**

- YES / NO

**Q. How important is it for you to be viewed as an environmentally responsible person?**

- Not at all
- Little bit
- Very important

Such questions are intended to get a feeler that how the public feels about recycling and does recycling make them feel good or proud of them in some way.
4. Presentation of data and along with its analysis

In this chapter, I will be focusing on the presentation of the collected data and later on I will try to analyze it. One of the major softwares used for the purpose of analysis was SPSS.

4.1 Data presentation:

Initially I distributed 150 questionnaires out of these 124 respondents filled in the forms properly. The questionnaires were carefully distributed among people belonging to different income class and having different educational backgrounds and qualifications.

Some basic statistics from questionnaire conducted are as follows: Total number of respondents 124, 68(55%) were females while males were 56(45%). The age of respondents was in range of 20-50 years, however the largest respondent number was between 20-30 years i.e. 76(61%), 28(22%) respondent ranging 30-40 years and 10(8%) respondents ranging 40-50 years. The income level of respondents were 53(43%) were low income, 35(28%) respondent were medium level income and 31(25%) were high income level respondents. The educational level of the respondent for (not educated) was 48(39%) because it will also include servants apart from user, 30(24%) respondents were primary/high school and 41(33%) respondents were college/university qualified.

The answer to the question do you recycle has been included in order to create a link between income level and recycling also educational level with recycling.
PET Recycling behavior of consumers in Lahore, Pakistan

Responses from questionnaire are mentioned in detail below using Pie chart for better understanding.

Table A 4.1.0 shows what’s your income level * what’s your education Cross tabulation

![bottle consumption per week](image)

32(26%) respondents chosen 0-2 bottles, 34(27%) chosen 3-5 bottles, 40(32%) chosen 5-10 bottles and 18(15%) chosen 11-20 bottles per week. By taking this data further the average bottle consumption resulted.
Figure C 4.1.2 shows respondents answers to do you recycle?

Out of 124 respondents 42(34%) respondents answered **never**, 50(40%) respondents answered **sometimes** (which include people who even recycle once a year) and 32(26%) respondents answered they **often** recycle. Here considering sometimes as yes

Figure D 4.1.3 shows respondents answers to do you recycle PET bottles?

Out of 124 respondents 63 (51%) respondents answered **never**, 33 (27%) respondents answered **sometimes** (which include people who even recycle once a year) and 27 (22%) respondents answered they **often** recycle.
Figure E 4.1.4 shows respondent’s answers to do you have knowledge and facility required for recycle PET bottles?

Out of 124 respondents 19(15%) respondents answered yes and 105(85%) respondents answered no. 85% of respondents don’t have knowledge and facility required for recycling. Even the 15% are those who belong to low income level.

Figure F 4.1.5 shows respondent’s answers to whom do you find more responsible for not motivating towards PET bottle recycling?

Out of 124 respondents 55(44%) respondents answered Dirty junk shops, 30(24%) respondents answered (system) government and bottle manufacturer, and 39 (32%) respondents answered high cost and low incentives.
Figure G 4.1.6 shows respondent’s answers to According to your view which point will motivate people more towards PET recycling:

Out of 124 respondents, 39 (31%) respondents answered promotional schemes, 38 (31%) respondents answered bottle collection machines, 34 (27%) respondents answered company buy back policy, and 13 (11%) respondents answered increase incentives.

Figure H 4.1.7 shows respondent’s answers to would you return the bottle if initial cost is incurred on time of purchase which will be returned:

Out of 124 respondents, 98 (79%) respondents answered yes, 26 (21%) respondents answered no.
Figure I 4.1.8 shows respondent’s answers to what are your means of your transport to the junk shop?

Means to reach junk shop?

Out of 124 respondents 32(34%) respondents answered walk, 18(19%) respondents answered bicycle and 45(47%) respondents answered motor cycle/car but only 95 out of 124 answered 29 never been to junk shop.

Figure J 4.1.9 shows respondent’s answers to would you recycle more if you had a junk shop closer to your home?

if junk shop is near your place would you start recycling or increase recycling ?

Out of 124 respondents 36(29%) respondents answered no and 88(71%) respondents answered yes
Figure K 4.1.10 shows respondent’s answers to how difficult do you find recycling?

Out of 124 respondents 73(59%) respondents answered very difficult, 40(32%) respondents answered little bit and 11(9%) respondents answered not at all.

Figure L 4.1.11 shows respondent’s answers to what is most difficult part of recycling PET bottles?

Out of 124 respondents 69(56%) respondents answered takes up much space, 34(27%) respondents answered takes up much time and 21(17%) respondents answered other.
4.1.12. Would you recycle more? If you were

Figure M 4.1.12 (a) shows respondent’s answers to Compensated with Rs.5000 per year as returns from recycling.

Out of 124 respondents 75(61%) respondents answered much more, 40(32%) respondents answered more, 9(7%) respondents answered same and none replied less.

Figure N 4.1.12(b) shows respondent’s answers to given a fine of Rs.5000 per year if not recycling.

Out of 124 respondents 73(58%) respondents answered much more, 41(32%) respondents answered more, 13(10%) respondents answered much more.
Figure O 4.1.13 shows respondent’s answers to how important a clean environment is to you?

![Importance of clean Environment](image)

Out of 124 respondents, 98 (79%) respondents answered very important, 23 (19%) respondents answered little bit, and 3 (2%) respondents answered not at all.

Figure P 4.1.14 shows respondent’s answers to how big of an impact does recycling have on the environment?

![Impact of recycling on environment](image)

Out of 124 respondents, 66 (53%) respondents answered strong impact, 32 (26%) respondents answered little impact, and 26 (21%) respondents answered no impact.
Figure Q 4.1.15 shows respondent’s answers to have you ever visited areas where they dump all your PET bottles?

Out of 124 respondents 31(25%) respondents answered yes and 93(75%) respondents answered no

Figure R 4.1.16 shows respondent’s answers to are you concerned about the land filling/dumping currently going on in different areas of Lahore?

Out of 124 respondents 32(38%) respondents answered little bit, 45(36%) respondents answered not at all and 32(26%) respondents answered very much
Figure S 4.1.17 shows respondent’s answers to Do you think there is a moral responsibility to recycle?

<table>
<thead>
<tr>
<th></th>
<th>Don’t agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>31%</td>
<td>31%</td>
<td>38%</td>
</tr>
</tbody>
</table>

Out of 124 respondents 47(38%) respondents answered agree, 39(31%) respondents answered strongly agree and 38(31%) respondents answered don’t agree.

Figure T 4.1.18 shows respondent’s answers to does/would recycling make you feel proud?

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Little bit</th>
<th>Very proud</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>59%</td>
<td>25%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Out of 124 respondents 73(59%) respondents answered not at all, 31(25%) respondents answered little bit and 20(16%) respondents answered very proud.
Figure U 4.1.19 shows respondent’s answers to do you think that recycling makes you appear better to others?

| recycling makes you appear better to others? |
|-----------------|-----------------|
| YES | NO |
| 89% | 11% |

Out of 124 respondents 96(89%) respondents answered no and 12(11%) respondents answered no.

Figure V 4.1.20 shows importance respondents being environmental responsible

| Importance you being viewed as environmental responsible person |
|-----------------|-----------------|-----------------|
| Not at all | Little Bit | Very Important |
| 83% | 12% | 5% |

Out of 124 respondents 103(83%) respondents answered not at all, 15(12%) respondents answered little bit and 6(5%) respondents answered very important.

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Figure W 4.1.21 shows response to would you start/increase recycling if people around you recycle

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Little bit</th>
<th>Much more</th>
</tr>
</thead>
<tbody>
<tr>
<td>6%</td>
<td>38%</td>
<td>56%</td>
</tr>
</tbody>
</table>

Out of 124 respondents 70(56%) respondents answered much more, 47(38%) respondents answered little bit and 7(6%) respondents answered not at all.

Figure X 5.1.22 shows response to question are you generally influenced to others behavior?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Little bit</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>27%</td>
<td>26%</td>
<td>47%</td>
</tr>
</tbody>
</table>

Out of 124 respondents 59(47%) respondents answered little bit, 33(27%) respondents answered not at all and 32(26%) respondents answered very much.
Figure Y 4.1.23. Shows respondents answer to would you prefer buying returnable PET bottles?

Out of 124 respondents 51(41%) respondents answered sometimes, 39(32%) respondents answered never and 39(27%) respondents answered often.
4.2 Analysis of data

Figure Z 4.2.1 shows graph made from above calculation showing relationship of recycling respondents to income level and educational level while having y-axis as percentage.

This is also drawn in for of pie chart below and discussed further.
FIG A 4.3.1 shows the relationship of recycling to income level and educational level.

From the above Pie chart, we can see the respondent’s recycling patterns are totally different towards different income levels and educational levels. It can easily be observed from the above figures of Pie chart and graph that high income to medium income level consumers is much less keen towards recycling. From the results obtained we can see that the fact that higher level of education seems to play a negative role towards recycling.
turnover in general, meaning that higher the education level lower the recycling rate which is totally an opposite case from Sweden.

Furthermore according to the results the average number of bottles used by consumers is approx 6 bottles a week making it almost one bottle consumed every day. This in case of population of Lahore will use approx. 8.57 million PET bottles every day.

FIG B 4.3.2 show relationship of educational level to income level and de-motivational factor
Further more in the above Pie charts, we can see the relationship of educational level to income level and de-motivational factor. It is clear that people having high income level and having relatively strong background of education are less likely to contribute to recycle. One of the major causes of this unfortunate situation is that the junk shops are of shabby conditions and the rich class prefers not to visit such shops voluntarily. However people belonging to low income level and subsequently having lower education are also not that interested in recycling, this is due to the fact that there is low financial motivation for such people.

Moreover while taking interview from scavengers and owners of junk shops, junk storage houses and recycling plants, I observed that everyone is taking advantage. From low to high scale everyone has a monopoly which can be clearly seen through FIG 4.3.1 but due to monopoly on every level everyone takes a good share of profitability. There are few recycling plants and more junk storage so demand is less thus monopoly same goes till consumer level, which in the end decrease incentive to end user.
Above flow chart shows how a PET bottle is handled at each step right after it is sold to a consumer. As it can be seen from the figure above that the consumers after using the bottle either throw these bottles in the garbage which ultimately ends up with the scavengers or these consumers themselves become a source of providing the junk shops these recyclable PET bottles. Then these junk shops which are located at different places all over the city send the collected waste to the final recycling plant. Consumers which are interested in recycling are being directly affected by the price that is involved in this whole process as these consumers are being paid less financial incentives for returning the bottles. To explain this I’ve gone in detail of prices of the waste PET bottles at subsequent level and the data collected highlights that consumers sells PET bottles at Rs.22-28/kg(price is decided by scavengers/junk shops due to lack of competition and their monopoly). Most of the bottles are collected by the scavengers and some are sold
directly to the junk shops by the consumer. Selling to scavengers reduces the profitability to consumers as they (scavengers) retain their own profit margin. Scavengers then sell this junk to the main junk shops. As these Junk shops are small and have limited space and hence they can retain only a certain amount of material, they send these collections to the junk storage/yards at Rs. 28-32 (again the price is dictated by the junk shops due to lack of competition and monopoly). Junk storage/yards collects huge amount of bottles and sells them (sometimes after crushing and sorting) at Rs.32-40 to the recycling plant and then finally the recycling plants use this material for making fiber sheets out of this (don’t make bottles again from recycled bottles). The maximum price paid by recycling plants is Rs.40 for this crushed and sorted bottles however if they purchase new virgin PET resin (basic raw material) it will cost them around Rs.130. Therefore if the consumers can directly sell their waste to the recycling plant there will be a definite increase in the price that the consumer will be getting for his deposited waste, hence the financial incentive of doing more recycling will increase which will in turn result in an overall increase of recycling turnover.
5. Conclusion and recommendation

5.1 Conclusion

Most of the people are not that keen towards recycling. Thus, no one give any importance to the fact that they are viewed as recycling individual of society. All of the respondents find clean environment as very important factor of their life and almost half of these respondents feel recycling to be a strong factor on environment recycling. Furthermore the public seems to be unaware of the bad outcomes of the large amount of land filling currently going on due to the fact that the PET is not being recycled.

Also, the bottle manufacturing companies which include both the government and private sectors seems not interested in the process of recycling in general and therefore haven’t provided right knowledge and facilities to the general consumers in this regard. According to the study conducted a negative relationship can be seen among the consumers who are educated and people who recycle. Clearly this is the most shocking fact about the whole study. People belonging to medium-high income level consumers(who use almost 4 times more bottles per person) are not that keen towards recycling in general, which is mainly due to the fact that the junk shops are in shabby conditions and hence most of the consumers belonging to this particular income group are hesitant to even go to any such shop. On the other hand more consumers belonging to the ‘not educated’ and ‘low income level consumers’ are less concerned about the dirty junk shops and hence are contributing more towards the recycling process in general. Still most of the consumers belonging to this group complain about the low incentives given
to them for recycling. The major reason behind the shabby condition of the junk shops is the fact that these shops are being run by uneducated shopkeepers who are least interested in improving the condition of their outlets.

It is pertinent to mention that the major portion of the profit is being enjoyed by the owners of the recycling plant which if reduced may end up in higher financial motivation for the general public to recycle. Moreover a favorable response was observed from the public with regard to the pant system, in which the consumer returns the bottle to the recycler and gets a refund of a certain amount. Putting fine on non-recyclers and giving compensation to recyclers seems to be a positive way for changing current behavior of general consumer. PET recycling is lower than general recycling which is mainly due to space required for bottles.
5.2 Recommendation

The kinds of social behavior related to environmental problems are more affected by the solution chosen by the public authorities. Based on the research following recommendations are made which targets different issues currently hindering recycling PET bottles:

New proposed recycling system could be placed which with the help of Government should provide required knowledge and facility which can improve the recycling system by concentrating on the following factors:

- recycling bins.
- Enforcing international recycling laws which pressure manufacturer to make sure to recycle what they have produced like swedish EPA Environmental code (1998:808)
- Advertising the importance of recycling by showing landfilling and other motivational stuff by the Pakistani media which is quite active than ever before.
- Create more awarness plans with regards to recycling. Educational institutions and other private and governement entities should carry out workshops to educate the general public in this regard.

New proposed recycling system could be positioned which can generate profit with the help of bottle manufacturing companies by helping them fulfill their responsibility of cleaning up by following methods:

- providing bottle collection machines( which can also pay back for the return)
- promotional schemes like (return 5 empty bottles and get a bottle free)
PET Recycling behavior of consumers in Lahore, Pakistan

- buy back policy
- reusable PET bottles

Furthermore, in light of the research conducted I have concluded that a new system, comprising of vending machine and buy back scheme, operated by central recycling system if put in place for PET recycling will help increase the financial incentive being offered to the general public at the moment and hence in turn will induce more people towards the recycling process.

Lastly, to change such habits it is important that people will have to reflect upon their present behaviors and overcome certain obstacles during the process of behavioral changes.
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Appendix A: Questionnaire

BTH Master’s Thesis
Study regarding attitudes and knowledge about recycling.

I’ll be grateful to you if you give some moments from your precious time to answer this questionnaire. Your answers will be completely anonymous. The information that is collected through this questionnaire will be presented as part of a Master’s Thesis in BTH blekinge tekniska hogskola in 2011. It is important that you try to answer it as truthfully as possible.

*PET means the plastic bottles which we used on regular basis like water/cola bottles etc

Please TICK the suitable check boxes

If you have any questions for do not hesitate to ask.

1. What is your gender? MALE □ FEMALE □

2. How old are you? ______

13. What is your income level:

□ Low (Rs. 0-7999)
□ Medium(Rs.8000-21,999)
□ high (above Rs. 22,000)

14. Education level:

□ Not educated
□ Primary/high school
□ College/university

15. How many pet bottles you use in a week

□ 0-2 bottles
□ 3-5 bottles
□ 5-10 bottles
16. Do you recycle?
   - Never
   - Sometimes
   - Often

17. Do you recycle PET bottles?
   - Never
   - Sometimes
   - Always

18. Do you have required knowledge and facility to recycle?
   - YES
   - NO

9. Whom do you find more responsible for not motivating towards PET bottle recycling?
   Choose 2 options
   - (System) Government & Bottle manufacturers
   - Higher cost and Low incentives
   - Poor reputation or dirty place of junk shops

10. According to your view which point will motivate people more towards PET recycling
    Choose 1 option
    - Company buy back centers(clean shops)
    - Promotional schemes( give 5 bottles empty bottles back and get one free)
    - Increase the amount being paid by junk shops
    - Bottle collection machine at your local store

11. Would you return PET bottle if an initial cost is incurred on time of purchase which will be returned?
    - YES
    - NO

12. What are your means of your transport to the junk shop?
    - Walk
    - Bicycle
    - Motorcycle/car

1. Would you initiate recycling/recycle more if you had a recycling station closer to your home?
   - YES
   - NO

14. How difficult do you find PET recycling to be?
15. What is most difficult? Choose 1 option

- Time consuming
- Takes up much space
- Other:

16. Would you recycle more? If you were

(a) Compensated with Rs.5000 per year as returns from recycling

- Less
- Same
- More
- Much more

(b) Given a fine of Rs.5000 per year if not recycling:

- Less
- Same
- More
- Much more

17. How much important is a clean environment to you?

- Not at all
- Little bit
- Very important

18. How big of an impact does recycling have on the environment?

- No impact
- Little bit
- Strong impact

19. Have you ever visited areas where they dump all your PET bottles?

☐ YES / ☐ NO

20. Are you concerned about the land filling/dumping currently going on in different areas of Lahore?

- Not at all
- Little bit
- Very much

21. Do you think there is a moral responsibility to recycle?
22. Does recycling make you feel proud?

☐ Not at all
☐ Agree
☐ Strongly agree

23. Do you think that recycling makes you appear better to others?

☐ YES / ☐ NO

24. How important is it for you to be viewed as an environmentally responsible person?

☐ Not at all
☐ Little bit
☐ Very important

25. Would you recycle more if people around you recycled more?

☐ Not at all
☐ Little bit
☐ Much more

26. Are you generally influenced by others’ behavior?

☐ Not at all
☐ Little bit
☐ Very

27. If there is option available, would you prefer buying returnable PET bottles?

☐ Never
☐ Sometimes
☐ Often

28. Finally, would you like to enlighten why you recycle, or why you do not?

........................................................................................................................................................................
........................................................................................................................................................................
........................................................................................................................................................................
........................................................................................................................................................................

Thank you for your help! Have a great day!
Usman Meer
Appendix B: Questionnaire to scavengers, junk shops, junk storage and recycling plant representatives

BTH Master’s Thesis  
Study regarding attitudes and knowledge about recycling.

I’ll be grateful to you if you give some moments from your precious time to answer this questionnaire. Your answers will be completely anonymous. The information that is collected through this questionnaire will be presented as part of a Master’s Thesis in BTH blekinge tekniska hogskola in 2011. It is important that you try to answer it as truthfully as possible.

*PET means the plastic bottles which we used on regular basis like water/cola bottles etc

Please TICK the suitable check boxes

If you have any questions for do not hesitate to ask.

1. For which price you usually buy PET bottles Rs.__________?
2. What is the lowest price you buy PET bottles Rs.__________?
3. What is the highest price you buy PET bottles Rs.__________?
4. What is the lowest price you sell PET bottles Rs.__________?
5. What is the highest price you buy PET bottles Rs.__________?
6. What do you do with the PET bottles to sell them?
   □ Separate them from other junk
   □ Sort them color wise
   □ Crush them
7. How often you sell them? _______days