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Determinants of the Usage of Plastic Bags

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***Abstract*—** Determinants of the usage of plastic bags were studied through regression analysis. The data was collected by questionnaire from different areas of wazir bagh and murshaid abad Kohat road Peshawar Pakistan. The obtained results of the data show that size of household and monthly income of the consumers/individuals has positive relationship with the consumption of plastic bags, as household size and monthly income of consumer increased the consumption of the plastic bags increase, while it has negative relationship with awareness as individual awareness about dangers of plastic bags increased the amount of plastic bags reduce. The recommendations are suggested in the light of the results obtained regarding the use of plastic bags.

***Keywords*—** Plastic bags, household size, consumer income

I. INTRODUCTION

In the contemporary era, every country is striving to upgrade their economic activities without taking into consideration the environmental degradation. Recently, it has been observed that there is an inverse relationship between economic growth and the sustainable environment. The reason behind it is the competitive global markets that are forcing countries to cope up with the speed in the production of outputs by any means. Due to the said reason, countries develop different techniques and methods that no doubt boost up their production but at the unrecoverable cost of environmental degradation. This study is also about such a problem, which has affected the environment on the global level for about 50 years now. The use of the plastic bags by the stores is a serious issue these days. Handing over groceries in a bag to the customer is an essential part of grocery stores. The bag can either be made of paper or plastic . Up until the 1970s, people used to carry their groceries in paper bags. Then first plastic grocery bags were introduced in the 1970s that was very convenient because of its light weight and ability to carry more load than paper bags. Because of its flexibility customers were able to put more groceries in one bag. Plastic bags are made from high- density polyethylene (HDPE) and it involves 1.75 kg of petroleum to make 1 kg of plastic bags [1]. If we take into consideration the big stores, where cashiers are busy in attending long lines of customers, plastic bags are a convenient option because of its lightweight, storing more goods (because of its flexibility), easy to open, easy to pack and comparatively easier to double up the bag than paper bags. For retailers, plastic bags are efficient in use and convenient to store. Moreover, plastic bags are more cost-effective, as it is purchased in bulk where one piece cost merely a fraction of a cent. On the other hand, consumers find it a convenient option as well. Because plastic bags are more durable than paper bags. Plastic is comparatively less inclined to tearing up, easy to hold, and more suitable to carry in rain.

Apart from the number of desirable properties of plastic bags, there are enormous negative externalities for using it. The use of polyethylene as a raw material is non-degradable in nature and takes up to 1000 years to break down in the environment. And its chemical substances merged in the atmosphere remains there even longer than that. It has been considered a serious issue worldwide for a while now. Many cases have been brought to the knowledge of the international communities of the hazardous impacts of the plastic bags. A lot of cases are being found about the wildlife and marine life being suffered from the inappropriately discarded plastic bags in the environment. Turtles of endangered species and marine life have been found to have suffocated due to mistakenly consuming plastic. The agriculture sector has also faced loss due to agricultural land pollution. Due to the inappropriate disposal of plastic bags, the remains of the plastic are mixed with the fertile land that decreases its productivity and also harms the agricultural products that are consumed by the people. The hazardous impacts of plastic bags on humans does not limit to agricultural products only. The dumping of such plastic bags occupies trillions of land area worldwide and emits toxic gases like methane and carbon dioxide during the decomposition process. These gases then merge into the atmosphere, thus, proving to be an unbearable place for humans to breathe [2]. Apart from its hazardous impacts in form of agricultural polluted lands, toxic emissions and negative impacts on wildlife and marine life, there is also another factor that has proven to be an essential demerit of using plastic bags and then discarding it inappropriately. Many under-developed and developing countries have been facing the problem of blocked sewerage due to plastic bags.

Pakistan is also one of these countries that are facing the negative impacts of plastic bags on the environment. The choking of sewerages resulting in the contaminated water out

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in the streets makes a good home for the harmful diseases created by flies and mosquitoes. Moreover, the stinking pools in the streets create a very bad smell in the area, thus discouraging the people to live in that society. Different diseases generate due to the blockage of sewerage, like cholera and typhoid spread by the vectors of these diseases. Diarrhea is also very common yet serious diseases caused by drinking contaminated water thus spreading further diseases like hepatitis B in some cases. This blockage due to plastic bags is dominantly deteriorating the sanitation system in the bigger cities of Pakistan. There is no road or street in Pakistan where we cannot see the sign of a plastic bag and there is no recycling system for the said purpose. Banning plastic bags is an essential step that has to be taken in order to preserve our environment and also to prevent humans and wildlife from its negative and harmful impacts and also to create awareness among the illiterate population of Pakistan about the hazardous consequences of using plastic bags [3].

The government of Khyber Pakhtunkhwa has taken initiatives to reduce the usage of plastic bags by banning its manufacturing and also the concerned authorities will charge a fine of Rs. 50,000 to Rs. 5 million if anyone violates the ban, moreover, two years of imprisonment is also declared. The ban is imposed to ensure a clean and healthy environment for the people of the province. The enforcement of ban was based on an extensive research study on the hazardous impacts of the usage of plastic bags and after coming to a conclusion, a law was passed in the provincial assembly. In meeting with the Peshawar press club, PTI's MPA Shaukat Yousafzai told the media that, they have given three months to all shopkeepers and manufacturers to dispose of all plastic bags in the given time period. After three months if the bags were found then serious punishment will be given to the violator, which is mentioned above already. He also stressed the importance of the environmental degradation and serious health problems with the use of plastic bags including clogged drains, cancer, and generation of unhygienic conditions. Therefore the MPA said that no leniency will be granted once the ban is effective [4]. Moreover, he said that the government is also planning to research on the negative, harmful effects of the packaging of the toffees that are also made of plastic.

It is a great step taken by the government of Khyber Pakhtunkhwa on the micro level. And it is certainly hoped that in coming days, other provinces of Pakistan follow the footsteps of Khyber Pakhtunkhwa province in eliminating the use of plastic bags from their province and cleansing its environment. Governments should increase the budget for the research and development department of the environmental protection agencies all over Pakistan, in order to ensure a healthy environment and also to come up with different techniques to cope up with the exponential growth of negative externalities of different economic activities.

A. Green Marketing and Stakeholder Theory: (Theoretical Background:

From the 1980s, a green concept started to emerge in the world where people are becoming more and more green-conscious. An abundance of the green product such as renewable energy, a product with reduced energy usage and greenhouse gases and product without hazardous materials are being introduced in the market. Thus, most of these products are being initiated by the corporate big companies. There are doubts about the participation of smaller business and also the green-conscious of the consumer purchasing products from those small businesses. For example for the case in Pakistan, a plastic bag which is not environmentally friendly can be seen everywhere being used to pack groceries and food. Even though the government has some campaign to prevent the use of the plastic bag, the effects are yet to be determined especially for small business. There are a few stakeholders recognized on the effectiveness of green issue adaptation. The most important stakeholders being identified are consumers, shareholders; organizations; communities, regulations, and media especially mentions that even though regulations might be considered as the most important variable in the theory, the power of consumer cannot be ignored as they are the backbone for a business organization so consumer pressure will cause an organization to re-think about their green marketing strategy like in case of plastic bags usage [5].

Figer: 1

Figer: 2

II. METHODOLOGY

We use the consumption of bags as a dependent variable along with other variables. We use the following model to estimate the impact of bags on the environment.

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- The quantity of Bags Used = f (household size, the log_ monthly income of the household, and awareness of individual).
- The results will be interpreted in the next section where the data collected on the basis of questionnaires is regressed through econometric techniques.

III. Results Analysis

Multicollinearity means the existence of a perfect linear relationship between some or all independent variables of a regression model. Multicollinearity is the condition where the independent variables are related to each other.

Variance Inflation Factors (VIF Test)

Minimum possible value = 1.0

Values > 10.0 may indicate a collinearity problem.

ANALYSIS

hs	7.763
l_ mi	6.158
awr	2.735

A. Interpretation:

The Variance Inflation Factor (VIF) measures the impact of Multicollinearity among the variables in a regression model. Values of VIF that exceed 10 are considered as Multicollinearity, but in weaker model values above 2.5 may be a cause for concern, the above results show that the value is less than 10 so there is no Multicollinearity in a specific regression model.

B. Regression Analysis:

TABLE I. HETEROSKEDASTICITY-CORRECTED, USING OBSERVATIONS 1-148 DEPENDENT VARIABLE: CPB

Varriables	Coefficients	T Values	P Values
Household size	3.28800	6.213	5.27e-09 ***
l_monthly income of household	56.7456	4.613	8.70e-06 ***
Awareness of individual	-2.95928	6.323	3.03e-09 ***

TABLE II. STATISTICS SUMMARY

	Mean	Median	Minimum	Maximum
cpb	65.939	60.000	20.000	105.00
hs	12.392	13.000	3.0000	18.000
l_mi	4.6820	4.6990	4.2553	4.9031
awr	0.57432	1.0000	0.00000	1.0000

C. Interpretation:

There is a number of explanatory variables that bring variation in the dependent variable. This study has covered the significant variables that affect the dependent variable that is the consumption of plastic bags. The empirical results are shown in the above table a; the slope coefficients of independent variable household size has positive significant impact on consumption of plastic bags as 1 unit increase in household size bring 3.28800 unit increase in consumption of plastic bags. Earlier in this study, it has been mentioned several times that the use of plastic bags is much more convenient for grocery shopping. So it is evident from the model that the size of the household has a positive relation with the quantity of bags used. Because the more people in the house, the more groceries would be needed. In other words, the quantity of consumption would be more for the large size of a household than the household having less number of people. Another variable that has a significant effect on the consumption of the plastic bags is the monthly income of household as 1 percent increase in monthly income of household increase 56.7456 percent in consumption of plastic bags. There is a significant relationship between the two variables because as the monthly income span of the household increases, it will also increase the consumption of the plastic bags. The reason is simple and explained above in the interpretation of the previous independent variable. The reason is the consumption smoothing phenomenon in macroeconomics. When income increases, it also increases the consumption of the individual. Therefore, when the individual increases his/her consumption, it also increases the possibility of the quantity of plastic bags brought to the home. The study has taken the aggregate behaviour of the individual in the form of the household. If the monthly income of the household increases, it will also increase the consumption of the plastic bags. The last variable that can also significantly affect the dependent variable is the awareness of the individual regarding the consequences of using the plastic bags. This is the most important variable in the model. The reason is that the dependent variable is highly elastic to the awareness of the individual's behaviour. The results of this study show a negative relationship between awareness and consumption of plastic bags. As if the individual is aware of the hazardous outcomes of using the plastic bags, it will vastly reduce the demand for using the plastic bags in the society. Moreover, it has also a multiplier effect in the form of word of mouth. A fully informed individual can spread the information about the disadvantages of using the plastic bags in his/her neighbourhood that can lead to the reduction in the demand of the consumption of plastic bags. It can

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also be observed on the aggregate level, as more awareness is spread among the individuals, more and more people will reduce the consumption of plastic bags. Apart from the word of mouth, the government also play a vital role in creating the awareness among the citizens of the country. There are different mediums through which government can send its message like print media, electronic media, social media that can significantly increase awareness in the individuals and reduce the consumption of plastic bags. All the above variables in the model are very important and have a significant effect on the consumption of plastic bags.

D. Interpretation from the statistical table:

From the above mentioned table, we can see that cpb has approximately the same mean and median which is a sign of normality. Similarly, Household size and log monthly income have the same result which shows normality. Also, the minimum and maximum values are in the range which means the data is symmetrical normal distributed.

CONCLUSION

The conducted study on determents of the usage of plastic bags concludes that there is a positive relationship between consumption of plastic bags size of household and monthly income of the household, while as it has a negative relationship between awareness and use of plastic bags. Which mean when an individual's awareness of the dangers of plastic bags increases so it will lead to the reduced the consumption of plastics bags.

IV. THE SUGGESTION OF THE STUDY

The economists and social scientist have a compulsory in need of replacing the traditional usage of plastic bags with others types of materials such as low price and commonly ease of manufacturing which would a supporting sin for a reduction in the usage of plastic bags and will be helpful in a clean environment. The following are the main uses for the government regarding the use of plastic bag.

A. A specific recommendation from the study：

As from the finding of our study, it reveals that awareness from the perspective of a retailer as well as the consumer is the main factor to reduce the consumption of plastic bags [6]. For this purpose government should take initiatives for the awareness of an individual at each level because there is an inverse relationship between awareness and usage of plastic bags.

The government should control the annual population growth through proper policies which will be in help indirectly the household size as a result consumption of plastic bags will be reduced.

B. General Recommendation:

- Replace the plastic bags, paper bags or cloths bags
- Quality and designs of a plastic bag should be improved for the sake the EPR system should provide proper incentives for manufactures for the betterment of product and surrounding.
- With proper quality design we could lead to both plastic bags being potentially least harmful to the environment or ecosystem but more importantly, it could lead to an increase in the level of recyclability of the plastic bag.
- The waste management system should be improved which reduced the number of bags ending up in dumps and [7].
- The ban on plastic bag usage should be properly implemented throughout the province with this ban the demand for the plastic bag would be reduced as it is a direct and efficient way to the reduced plastic bag.

C. Country and Action of Plastic Bags Containment：

TABLE III. COUNTRY AND ACTION OF PLASTIC BAGS CONTAINMENT

Country	**Action**
Botswana	A ban on the use of plastic bags took effect in 2006
Eritrea	A ban on the use of plastic bags took effect in 2005
Kenya	Imposing a ban on bags less than 30 microns thick
Rwanda	Ban the use of plastic bags, however, some traders continue to use the banned
	plastic bags
Somalia	Ban the use of all types of plastic bags in 2005
South	Plastic bag tax. A tax on thicker bags is in place to discourage use
Tanzania	Ban on thin plastic bags
Uganda	Ban on plastic bags as of July 1st, 2008. Bags thinner than 30 microns will be
	banned, all other Polythene with be taxed 20%
Zanzibar	Plastic Bags Banned in 2008
Australia	Currently considering a ban or a levy
Bangladesh	In March 2002, Bangladesh slapped an outright ban on all polyethylene bags in the capital, Dhaka
Bhutan	Ban the use and sale of plastic carry bags in 1999
China	Ban thin plastic in 2008
India	Prohibit plastic bags thinner than 20 microns in the cities of Bombay and Delhi,
Japan	12 major operators of convenience stores have set up five-year plans to reduce the consumption of plastic bags.
Nepal	Ban all kinds of plastic bags and bottles in the Khumbu region in 1999
Taiwan	EPA banned and then lifted the ban
Denmark	Tax on plastic bags
Finland	Supermarkets pay a levy on the amount of plastic bags used
France	The French island of Corsica was the first to ban plastic bags in 1999
Germany	Extra changes for the plastic bag
Holland	Incinerate the bags in accordance with strict environmental rules and use them.

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Ireland	PlasTax – a charge to customers of 22 cents
Italy	Tax on plastic bags
Scotland	Bill to tax plastic bags was withdrawn, but its initial conception succeeded in
	raising awareness for voluntary efforts.
Sweden	Tax on plastic bags
Switzerland	Switzerland requires supermarkets to charge $.15 to $.20 per paper bag
Canada	Investing millions of dollars into "bag to bag" recycling programs
USA	Some local governments have enacted regulations, and many stores allow
	Customers to return the bags for recycling.

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