

A STUDY ON CONSUMER PERCEPTION AND PURCHASE BEHAVIOR OF GLASS PRODUCTS

Submitted in partial fulfilment of the requirement for the reward of

Bachelor Of Commerce

By

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DEPARTMENT OF BUSINESS ADMINISTRATION

SCHOOL OF MANAGEMENT STUDIES

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade “A” by NAAC | 12B Status by UGC | Approved by AICTE

Jeppiaar Nagar, RAJIV GANDHI SALAI, CHENNAI - 600

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **JAWAHAR C (39740109)** who has done the Project work entitled “**A STUDY ON CONSUMER PERCEPTION AND PURCHASE BEHAVIOR OF GLASS PRODUCTS**” under my supervision from December 2021 to February 2022.

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DECLARATION

I **JAWAHAR C (39740109)**. Hereby declare that the Project Report entitled “**A STUDY ON CONSUMER PERCEPTION AND PURCHASE BEHAVIOR OF GLASS PRODUCTS**” done by me under the guidance of Dr. John Britto, MBA, Ph.D. Assistant Professor, School of Management Studies is submitted in partial fulfillment of the requirements for the award of Bachelor of Commerce degree.

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ABSTRACT

Glass is one of the most useful materials in our daily lives. There is a special relationship between glass and buildings. Glass is a magical material which has so many different properties and uses, that it has presented many new possibilities and designs. Processed glass is that which is subjected to different types of treatment to make it suitable for diverse applications. Basic glass has to be further processed to make it a more useful and high performance product to withstand high wind pressures, increase safety, solar screening, ultra violet filtration, sound absorption, energy efficiency and fire resistance and most of all, provide pleasant interiors and impressive exteriors to perform and to look good. Glass can be colored by adding metal salts or painted and printed with vitreous enamels, leading to its use in stained glass windows and other glass art objects. The main aim of this research is to study the perception of the customers towards glass products and also to understand their buying behavior of glasses in terms of price, quality, quantity, color, design and so on. The customer perception is built around the experience that a customer has with a product. Customer perception can make or break your brand. Consumer buying behavior of glasses helps us to understand what makes a consumer to buy a glass products from glass processing companies. Consumer perception plays a major role in buying behavior. Hence, companies are ready to spend money and effort to influence customer perception and drive profitable consumer behavior.

Key Words: Glass, Glass processing, Customer perception, Customer buying behavior

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Glass has been defined and classified in many ways, either based on their composition or on their characteristics. In a familiar usage, the term glass refers to a class of material of great practical importance with a number of very characteristic properties such as transparency, briefness and the properties of softening progressively and continuously when heated. Glass is a compound formed when molten silica is supper cooled to room temperature. It is an organic product of fusion which has cooled to room temperature without crystallization or with no crystals formed. Glass also has been defined as amorphous (non-crystalline) solid materials that are typically brittle and optically transparent. In science, however, the term glass is usually defined in much wider sense, including every one that possesses a non-crystalline (an amorphous) structure that exhibits a glass transition when heated towards the liquid state. Customer perception is how customers feel about your product and brand. It's an opinion that they had with your company, both direct and indirect. Consumer purchase behavior refers to the actions taken (both online and offline) by consumers before buying a product or service. This process may include consulting search engines, engaging with social media posts, or a variety of other actions.

1.2 STATEMENT OF THE PROBLEM

It is very important for the glass processing industries and company to identify the consumer perception and their purchase behavior of glass products before selling them in the market. Throughout this study, the main problem is to find out the consumer perception and their buying behavior towards glass products. Glass processing companies face major challenges:

- The major challenge is lack of handy experience in customer demands.
- Customer perception can make or break your brand
- What factors influence consumer purchases?
- The changing factors in our society

Thus there is need to analyze and understand what the customers wants and what they buy.

1.3 INDUSTRY PROFILE

Glass is among the most widely produced materials in the world, with a global annual production of over 100 million tons. Due to its versatility, it can be found in a wide range of applications, from the ubiquitous windows, screens or bottles to more specialized usages such as glass for sealing applications. Most of the industrially produced glasses are prepared using similar steps, via melting of raw materials, homogenization of the melt, conditioning, shaping and cooling. Numerous post-processing steps such as cutting or polishing can be applied. Depending on the type of glass prepared and the quantity produced, the processing and fabrication techniques employed may differ greatly from one type of glass to another. Since the first man-made glass articles, some millennia ago, the processing of glass has been constantly improving to produce better, cheaper products, while decreasing the energy demand and the environmental impact of the glass fabrication process. The basics of industrial glass production are described from the selection of the raw materials to the delivery of a homogeneous glass melt to the forming process. The different types of furnaces employed for different types of production are described, and the importance of process and furnace modeling in modern glass making is highlighted.



Fig 1.3 Glass Processing Industry

Glass is a material which plays a vital role in our day to day lives. Both for domestic and industrial purposes. The defining properties of glass include transparency, and

resistance to chemicals. This makes it popular for a range of different applications. Whilst other undesired characteristics such as its brittleness and heavy character makes it unsuitable for others. Careful consideration is always important before choosing to use glass. Most types of glass are manufactured from natural raw materials which are known as “batch” in industry. However each type has its own slightly unique process. In a standard industrial glass manufacturing process, materials are stored in huge silos and include sand, soda ash, limestone and often iron and carbon. Which help to add color to the mixture and later form coloured glass. Common examples of coloured glass include green and brown glass bottles. The glass industry in India is divided into two categories: cottage industry and factory industry. Under cottage industry, glass bangles are made in small furnaces either from glass blocks produced in factories or from inferior glass manufactured from the impure sands of the rivers and the efflorescent alkali. Flower pots, decorative glassware, tableware’s, lamps and lamp-ware are also produced under cottage industry. The factory industry is mostly confined to Uttar Pradesh, Maharashtra, West Bengal, Bihar, Jharkhand and Punjab. Ceramic industries in Uttar Pradesh mainly produce sheet glass, hollow and pressed wares (bulbs, chimneys, reflectors and motor headlights), while Bengal and Maharashtra are famous for glass tubes, test- tubes, beakers and flat glass. Punjab predominates in the production of hollowware’s and scientific and precision goods. Manufacture of glass requires a large number of raw materials such as silica sand, coal and chemicals. Silica sand is the most important raw material. Sands of the degree of purity requisite for glass-making are found at several places in India. All types of glassware are manufactured in India, many of the manufacturing units being in the small sector. There are more than 40 units producing glass containers and hollow ware’s. In 1993, the first plant to make float glass used in construction, architectural, automotive, mirror and solar energy industries was set up in India. Several foreign brands too have entered the market. The use of flat glass not only adds to the aesthetic beauty of buildings but also leads to substantial savings of wood, thus conserving forest resources. Several manufacturing units make vacuum flasks and refills. The quality of vacuum flask refills produced in India has excellent acceptability even in developed countries. Laboratory/scientific glassware is also manufactured in India. Fibre glass production is a recent development from around the 1980s. Fibre glass is used in conjunction with plastic material to produce fibre glass reinforced plastic products (FRP).

1.4 PRODUCT PROFILE

1.4.1 DEFINITIONS

GLASS

Glass, an inorganic solid material that is usually transparent or translucent as well as hard, brittle, and impervious to the natural elements. Glass has been made into practical and decorative objects since ancient times, and it is still very important in applications as disparate as building construction, housewares, and telecommunications. It is made by cooling molten ingredients such as silica sand with sufficient rapidity to prevent the formation of visible crystals.

PROCESSED GLASS

Processed Glass is that which is subjected to different types of treatment to make it suitable for diverse applications.

PERCEPTION

Perception is the sensory experience of the world. It involves both recognizing environmental stimuli and actions in response to these stimuli.

PURCHASE

Purchasing is the buying of goods or services. An item that has been bought is called a purchase.

BEHAVIOR

Actions and mannerisms made by individuals in conjunction with themselves or their environment.

CONSUMER PERCEPTION

Customer perception encompasses the way consumers select, organize and interpret both information and stimuli related to a brand, its products and services, which, in turn, determines what they think and how they feel about them.

CONSUMER PURCHASE BEHAVIOUR

Consumer Buying Behavior refers to the actions taken (both on and offline)

by consumers before buying a product or service.

1.4.2 GLASS

Glass is a solid-like and transparent material that is used in numerous applications in our daily lives. Glass is made from natural and abundant raw materials (sand, soda ash and limestone) that are melted at very high temperature to form a new material: glass. At high temperature glass is structurally similar to liquids, however at ambient temperature it behaves like solids. As a result, glass can be poured, blown, press and moulded.

TYPES OF PROCESSED GLASS AVAILABLE IN THE MARKET

TEMPERED GLASS OR TOUGHENED GLASS

Toughened glass is also known as tempered glass is a strong glass which is heated to a uniform temperature of 620-650 degree Celsius and rapidly cooled to increase the strength. It is 4-5 times stronger than the normal glass of equivalent thickness hence it is used for safety and strength. They break into blunt pieces, thus less damage or injuries occur in case of accidents. Tempered glass is used in commercial applications where wind, snow or thermal loads exceed. It is used for escalator side panels, handrails, balustrades, staircase handrails and viewing partitions of sports complexes, resorts, and airports, etc. Also for the security of important people, these glasses are used in their automobiles and houses.

LAMINATED GLASS

It is also known as heatproof glass or soundproof glass or bulletproof glass or insulating glass or safety glass. Laminated glass is made by sandwiching a layer of polyvinyl butyral (PVB) between two or more layers of glass. Bulletproof glass is a special type of laminated glass in which toughened glass is used. Also upon breakage, the glass fragments stick to the PVB layer and thus injuries are avoided. This type of processed glass also provides excellent sound insulation and thermal insulation. Laminated glass is used in skylight glazing, automobile windshields. It is also used in exterior curtain walls and windows, balustrades, guardrails, canopies, etc.

HEAT STRENGTHENED GLASS

Heat strengthened glass or heat-treated glass is processed with heat treatment for

durability and safety reasons. Its mechanical strength is twice that of normal annealed glass and half of fully tempered glass. Apart from increased mechanical strength, it has all other properties of a float or annealed glass. Heat strengthened glass is used for structural glazing as they safeguard against thermal breakages. It is also used in laminated glass to provide safety as well as strength.

REFLECTIVE GLASS OR MIRROR GLASS

Reflective glass also called mirror glass imparts a mirror like an appearance and wide palettes of colours to the exterior of buildings under daytime conditions. A coating of metal oxide is applied to one side of the clear or body-tinted glass in order to increase the amount of reflection by the glass. Mirror glass also blocks solar heat coming from outside and thus helps in reducing the cost of air-conditioning. For commercial buildings which require privacy, this glass is most suitable, as the interior space cannot be seen from outside. Reflective glass is used in building facades, decorative walls, windows and doors which require privacy, commercial buildings, etc.

INSULATED GLASS UNITS

An insulated glass unit is a prefabricated unit made of two or more glass panes which are separated by cavities filled with dry air. They provide excellent thermal and sound insulation properties. Insulated glass units are used in office buildings, hospitals, hotels, houses and buildings with high heating or cooling requirements and also buildings that need the temperature and humidity controlled such as telephone exchanges, airport control towers, and other environments that need regulated atmosphere and prevention of condensation.

CERAMIC PRINTED GLASS

Ceramic printed glass or ceramic frit glass is also known as silk-screened glass for its appearance like a silk screen. Ceramic frit is fused to the normal annealed glass to create a decorative look. Ceramic printed glass is used when it is important to mask a part or whole of glass for privacy or hiding the background. It is used for curtain walls, shower installations, glass doors, spandrels, partitions, stair rails, conference room, etc. It is also used to impart decorative look to interiors of restaurants, hotels, cinema theatres, etc.

LACQUERED GLASS

Lacquered glass is a processed glass which is also known as back painted glass is obtained by coating the back surface of the float glass with lacquer. They offer an opaque and shiny surface. Generally, they are always viewed from the front surface which is not painted. Lacquered glass is available in many different shades of colours, which can be suited to any application. Lacquered glass is extensively used in architectural spandrels, contemporary cupboards, furniture, kitchen countertops, backsplashes, washrooms of cinemas, hotels, restaurants, etc.

FROSTED GLASS

Frosted glass is a processed glass which has a translucent or obscure surface, rather than the transparent surface in float glass. One surface of the glass is etched and has a rough finish, through which diffusion of light occurs. Due to its translucent nature, it does not people to see through it. Frosted glass is used where privacy is required, such as shower cubicles, conference rooms, office partitions, windows and doors of bedrooms, dressing rooms, etc. Nowadays, frosted glass is also used as decorative glass, as they are available in various colours, patterns and designs.

BULLET RESISTANT GLASS

Bulletproof glass (ballistic glass, transparent armor, and bullet-resistant glass) is a strong and optically transparent material that is particularly resistant to penetration by projectiles. Like any other material, it isn't completely impenetrable. It is usually made from a combination of two or more types of glass, one hard and one soft. The softer layer makes the glass more elastic, so it can flex instead of shatter. The index of refraction for both of the glasses used in the bulletproof layers must be almost the same to keep the glass transparent and allow a clear, undistorted view through the glass. Bulletproof glass varies in thickness from $\frac{3}{4}$ to $3\frac{1}{2}$ inches (19 to 89 mm). Bulletproof glass is used in windows of buildings that require such security, such as jewelry stores and embassies, and of military and private vehicles.

FIRE RATED GLASS

Fire-resistant glass is specialist glass that has been proven to provide a period of protection against fire during a Fire Resistance Test. The use of fire-rated glass is therefore an important component in building safety and Building Regulations specify where it must be used. It is for effective fire retardation and heat insulation.

HEAT SOAK TEST GLASS

The heat soak test or heat soak process is used to minimize the risk of spontaneous breakages of heat-treated glass caused by nickel sulfide inclusions. In this process, glass channels are placed inside a chamber and subjected to an oven temperature of 550°F (287°C) to accelerate nickel sulfide expansion. This causes glasses containing nickel sulfide inclusions to break in the heat soak chamber, thus reducing the risk of potential field breakages.

BENT/CURVED GLASS

Bent glass is normal glass curved by a special process. Bent or curved glass is a great alternative to the conservative rectangular design of buildings as it is available in a wide range of sizes, allowing the creation of unique and unconventional shapes. Bent glass enhances aesthetics of architectural structures.

PRIVACY/MAGIC GLASS

The technologies that allow you to instantly switch surfaces from transparent to opaque are the ones referred to as Privacy Glass. They are particularly popular for glass-walled or partitioned conference rooms in agile workspaces based on open floor plans, or in hotel guestrooms where space is limited and traditional curtains ruin design aesthetics.

1.4.3 PROPERTIES OF GLASSES

- Hardness and Brittleness
- Weather Resistance
- Insulation
- Chemical Resistance
- Colour and Shape Varieties

- Transparency
- Fire Resistant Glazing

1.4.4 APPLICATIONS OF GLASS

Glass is a versatile material which is used in construction since ancient times. Primarily it was used in windows, doors and ventilators. But nowadays glass is used extensively in façade, interior partitions, balustrades, railings for stairs and balconies, etc. Whole new buildings are now constructed by using glass.

- Packaging (jars for food, bottles for drinks, flacon for cosmetics and pharmaceuticals)
- Tableware (drinking glasses, plate, cups, bowls)
- Housing and buildings (windows, facades, conservatory, insulation, reinforcement structures)
- Interior design and furniture (mirrors, partitions, balustrades, tables, shelves, lighting)
- Appliances and Electronics (oven doors, cook top, TV, computer screens, smart-phones)
- Automotive and transport (windcreens, backlights, light weight but reinforced structural components of cars, aircrafts, ships, etc.)

1.4.5 CONSUMER PERCEPTION AND PURCHASE BEHAVIOUR

PERCEPTION PROCESS

Consumer perception is defined as a process by which consumers sense a marketing stimulus, and organize, interpret, and provide meaning to it.

PERCEPTION PROCESS

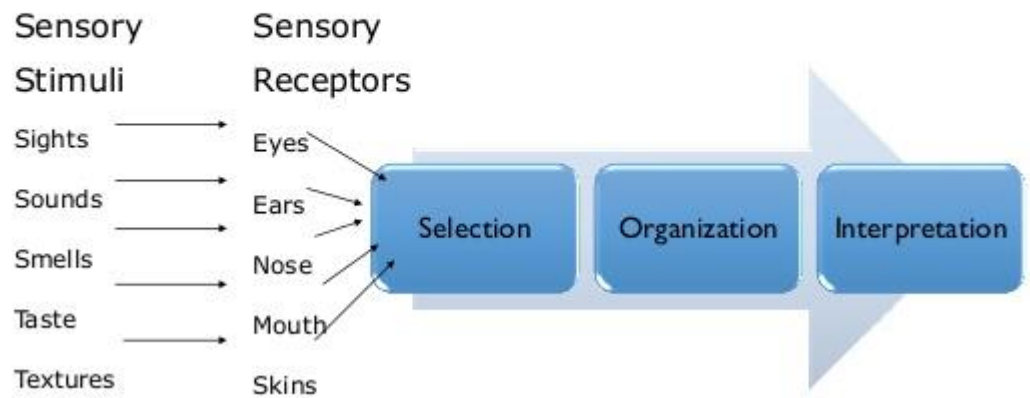


Fig 1.4.1 Perception Process

BUYING BEHAVIOUR

A consumer's buying decision depends on the type of products that they need to buy. Consumer buying behavior is determined by the level of involvement that a consumer shows towards a purchase decision. The amount of risk involved in a purchase also determines the buying behavior. Higher priced goods tend to high higher risk, thereby seeking higher involvement in buying decisions.

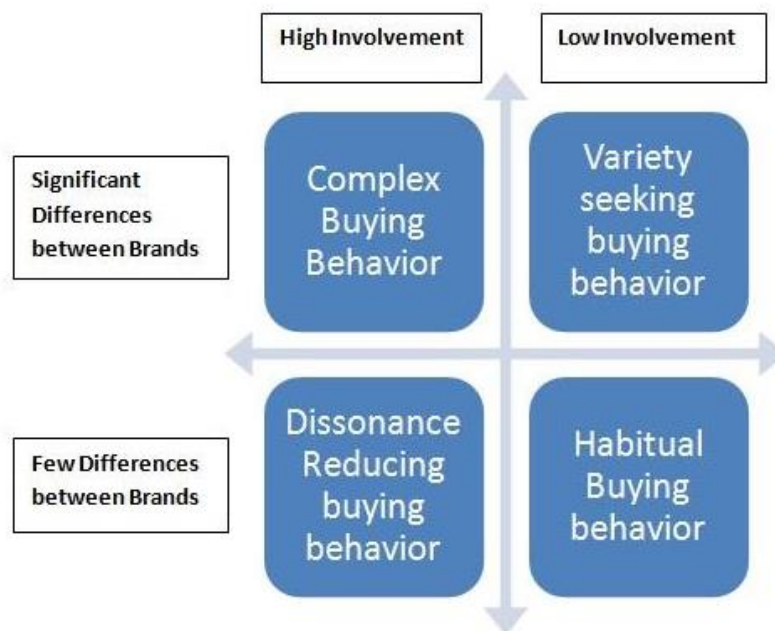


Fig 1.4.2 Types of Buying Behavior

FACTORS INFLUENCING BUYING BEHAVIOR

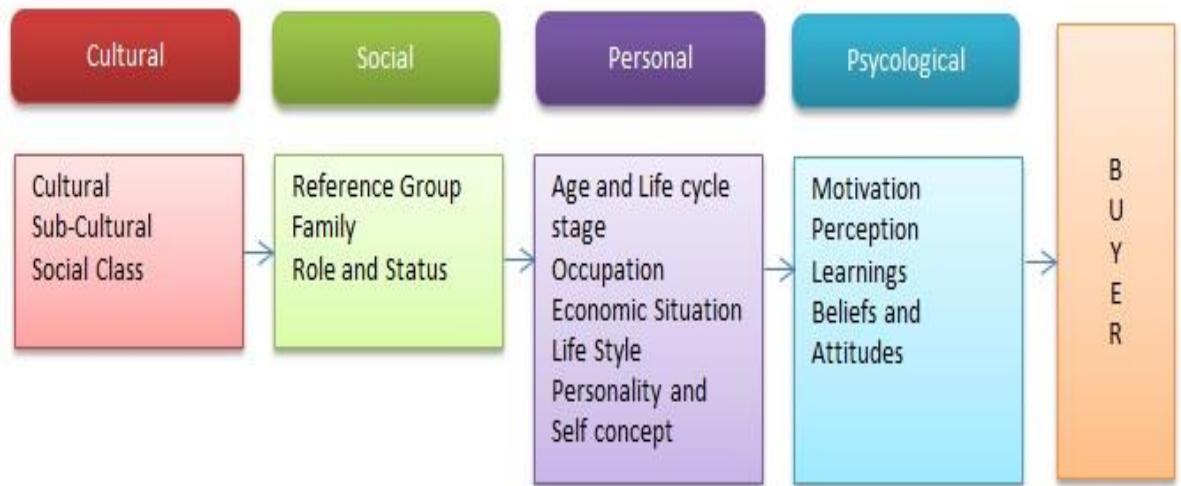


Fig 1.4.3 Factors Influencing Purchase Behavior

1.5 NEED FOR THE STUDY

Glass is a very widely used component, its applications ranging from small (glass bowl, spectacles) to huge (entire buildings). In spite of its versatility in application, Glass is significantly used in the Indian market. There are different types of glass, and their properties differ with the type of processing it undergoes. Glass is also an eco-friendly product and clocks a contribution towards the protection of the environment. The need for the study is to identify different perceptions and buying behavior of a consumers on glass products. In order to avoid customer grievances and to turn customers in to loyal customers analysis of consumer perception and their buying pattern is important. Understanding the expectations of the consumers helps to understand what makes a consumer to buy a product.

1.6 SCOPE OF THE STUDY

The research was conducted relating to customers towards glass products. The research is aimed at understanding the following aspects related to customer perception and purchase behavior of glass products.

- Satisfaction level of customers
- Opinion of customers
- Factors influencing the purchase decision
- It helps the Glass Processing Companies to carry out their business successfully by understanding customer perception, taste and preference towards glass products
- It facilities evaluation of brand names and customers satisfaction

1.7 OBJECTIVES

PRIMARY OBJECTIVES

To study and analyze the consumer perception and buying behavior of the glass products.

SECONDARY OBJECTIVES

- To find the awareness level on glass processing industries.
- To identify the factors influencing purchase decision of the consumers.
- To know the modes of purchase.

- To find the most preferred type of processed glasses.
- To know the necessity of customers in terms of glass products.
- To give suggestions to improve the perception of consumer towards glass products.

1.8 LIMITATIONS OF THE STUDY

Some of the limitations found during the study are:

- The study of consumer perception was limited to a small sample size of 60 people due to time and cost restraints.
- The research process may have been biased of the content of the source is not authenticated, as it is generally perceived.
- The research topic is new, therefore the study has only 60 respondents in that field.
- Glass products has wider application since customer perception and their buying behavior is identified generally without focusing on one glass products.
- There are many factors that influences the purchase behavior of the consumer towards glass products
- Most of the consumers do not have awareness on glass products and glass processing companies. Only the customers who make the purchases of glass products are aware about the processed glasses.

CHAPTER 2

THEORETICAL BACKGROUND

2.1 THEORETICAL BACKGROUND

The history of glass-making dates back to at least 3,600 BC in Mesopotamia, however some claim they may have been producing copies of glass objects from Egypt. Other archaeological evidence suggests that the first true glass was made in coastal north Syria, Mesopotamia or Egypt. The earliest known glass objects, of the mid 2,000 BC, were beads, perhaps initially created as the accidental by-products of metal-working (slags) or during the production of faience, a pre-glass vitreous material made by a process similar to glazing. Glass products remained a luxury until the disasters that overtook the late Bronze Age civilizations seemingly brought glass-making to a halt. Development of glass technology in India may have begun in 1,730 BC. In Ancient China glass-making had a later start compared to ceramics and metal work. The theory of a vitreous state inevitably includes the nucleation phenomena. Every vitreous medium contains the embryos of a crystal phase which are growing extremely slowly. So one can say that they are practically stable objects. Such embryos are the centers of scattering and they affect the optical properties of glass. The start of systematic scattering theory was given by Lord Rayleigh; the scattering on fluctuations was considered by Smoluchowsky and Einstein. Essential contribution in the consideration of the scattering with account of magnetic properties was made by Cabannes. A bright example of the theory of scattering on particles of essential sizes is given by the famous Mie scattering theory. This approach was essentially generalized by Jobst and Debye. In every scattering theory the distribution of the embryos sizes is reflected in the optical coefficients of material. Ordinary it is necessary to know only several first momentums of the distribution of the embryos over sizes. Sometimes it is sufficient to know only the mean size of the embryos. Impurities are inevitably presented in the media and they are like some heterogeneous centers. During the process of the glass preparation it is necessary to have the glass with the necessary optical properties. So it is necessary to have impurities in the necessary quantity and of the given size. Three areas of consumer perception theory relate to consumer perception theory: self-perception, price perception and perception of a

benefit to quality of life.

Self-perception:

Self-perception theory attempts to explain how individuals develop an understanding of the motivations behind their own behavior. Self-perception by customers relates to values and motivations that drive buying behavior which is also an important aspect of consumer perception theory.

Price perception:

The researchers concluded that the price perception strongly influenced whether customers were satisfied with their purchases and whether they would make future purchases. Two factors that shaped the price perception were the perceived quality of the merchandise or service in question and price comparisons with merchants offering similar merchandise or services.

Perception of a benefit to quality of life:

Perceived benefit refers to the perception of the positive consequences that are caused by a specific action.

Theory of consumer buying behavior:

Consumer buying behavior theory allows businesses to understand more about their target audience and so be able to craft products, services and company culture to influence buying habits.

It allows a business to understand:

- What consumers think about your brand versus your competitors
- How they choose between different alternatives
- Their behavior while shopping
- How the environment around them influences their behavior
- What marketing messages or pricing strategies they best respond to
- What products or services they are searching for, to fill a need

Ultimately, by paying attention to your customers' buying patterns you can launch products and services that they'll have a higher inclination to buy. Most consumers will only buy a new product once it has become mainstream, so to make a product mainstream, businesses need to focus their early marketing efforts on getting the innovators and early adopters on board. Consumer buying habits are continually evolving, and the ways that businesses think about them have changed too. Initially, it was believed that consumers were rational and behaved in consistent ways.

2.2 LITERATURE REVIEW

Robert John Strutt, “A study of glass surfaces in optical contact” flat glass or silica surfaces can by suitable manipulation be brought into "optical contact", contact so close that the reflexion at the interface. This study is about the surface of glasses in opticals, aug 1936.

A.R. Boccaccini, M. Bückner, J. Bossert, “Glass and glass-ceramics from coal fly ash and waste glass”. *Tile Brick Int.* 12, 515–518 (1996). This study is about the conversion of waste glass materials in to valuable glass ceramics and other glass products.

M. Erol, S. Küçükbayrak, A. Ersoy-Meriçboyu, M.L. Öveçoğlu, “Crystallization behaviour of glasses produced from fly ash”. *J. Eur. Ceram. Soc.* 21(16), 2835–2841 (2001). This study examines the crystallization behavior of glasses that the solidity of a glass might suggest resistance to crystallization; its very existence implies that crystallization is avoidable. And yet glasses can crystallize, sometimes surprisingly fast.

G.A. Khater, “The use of Saudi slag for the production of glass-ceramic materials”. *Ceram. Int.* 28(1), 59–67 (2002). Glasses can be produced and processed in different forms and treatment. This study explains the preparation of glass ceramic materials through slags. Production process of glass ceramics also discussed.

W. Holand, G. Beall, “Thermal expansion properties of a spodumene-willemite glass ceramic, in *Glass-Ceramic Technology*”, (The American Ceramic Society, Westerville, 2002). Thermal expansion is the tendency of matter to change its shape, area, volume, and density in response to a change in temperature, usually not including phase transitions. This study is based on expansion properties of glass ceramics through thermal expansion.

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characteristics. Also, describes the effect of nucleation catalysts on aluminosilicate glasses based on their crystallization characteristics.

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CHAPTER 3

RESEARCH METHODOLOGY

3.1 RESEARCH METHODOLOGY

RESEARCH

Research is a process of systematic inquiry that entails collection of data; documentation of critical information; and analysis and interpretation of that data/information, in accordance with suitable methodologies set by specific professional fields and academic disciplines.

MARKETING RESEARCH

Marketing Research is the systematic gathering, recording, and analysis of qualitative and quantitative data about issues relating to marketing products and services. More specifically, the American Marketing Association has defined it: "Marketing research is the function that links the consumer, customer, and public to the marketer through information. Information used to identify and define marketing opportunities and problems; generate, refine, and evaluate marketing actions; monitor marketing performance; and improve understanding of marketing as a process. The marketing research field is sometimes described as market research, business research and in some disciplines the same tools are known as social research methods. The use of these research tools in marketing has a long history. Marketing research specifies the information required to address these issues, designs the method for collecting information, manages and implements the data collection process, analyzes the results, and communicates the findings and their implications". The goal is to identify and assess the perception and buying behaviour of customers towards glass products.

RESEARCH METHODOLOGY

Methodology in research is defined as the systematic method to resolve a research problem through data gathering using various techniques, providing an interpretation of data gathered and drawing conclusions about the research data. Essentially, a research methodology is the blueprint of a research or study. According to Somekh and Lewin (2005), a research methodology is both "the collection of methods or rules" you apply to your research, as well as the "principles, theories, and values" that support

your research approach.

3.2 RESEARCH DESIGN

The research design undertaken for the study is descriptive one. A study, which wants to portray the characteristic of group or individual or situation, is known as descriptive study. It is mostly qualitative in nature. The main objective of descriptive study is to study the consumer perception and purchase behavior towards glass products.

DESCRIPTIVE RESEARCH DESIGN

This type of research design is undertaken in many circumstances. When the researcher is interested in knowing the characteristics of certain group such as age, sex, education level, occupation or income etc., The objective of such study is to answer the “who, what, when, where, how” of the subject under investigation, so this project study comes under descriptive research design.

POPULATION

Consumers of glass processing company.

CONVENIENCE SAMPLING TECHNIQUE

Convenience sampling is defined as a method adopted by researchers where they collect market research data from a conveniently available pool of respondents. It is the most commonly used sampling technique as it is incredibly prompt, uncomplicated, and economical. In many cases, members are readily approachable to be a part of the sample.

SAMPLE SIZE

Sample size taken for study is 60.

3.3 SOURCES OF DATA

A data source is the location where data that is being used or originates from. A data source may be the initial location where data is born or where physical information is first digitized, even the most refined data may serve as a source, as long as another process accesses and utilizes it.

TYPES OF DATA

PRIMARY DATA

Primary data means ‘First-hand information’ collected by an investigator.

- It is collected for the first time.
- It is original and more reliable.
-

QUESTIONNAIRE

Researcher collected the primary data using the questionnaire. A questionnaire is a research instrument that consists of a set of questions or other types of prompts that aims to collect information from a respondent.

SECONDARY DATA

Secondary data refers to ‘Second-hand information’. These are not originally collected rather obtained from already published or unpublished sources. Researcher collected the secondary data from books, journal and internal.

DATA COLLECTION

The study is based on secondary sources like company reports, literary works, etc. It thus analyses the glass industry through desktop research. The survey method was adopted to collect the data fulfilling the objectives. Furthermore, survey approach can provide very engaging and rich explorations as it is conducted in a real-world setting. It was begun by secondary data analysis through the detailed review of related literature. To this end; books, articles, journals, magazines were reviewed. Secondary data refers to data that is collected by someone other than the user. Common sources of secondary data include censuses, information collected by government departments, organizational records and data that was originally collected for other research purposes. Secondary data analysis can save time that would otherwise be spent collecting data and particularly in the case of quantitative data, can provide larger and high quality databases that would be unfeasible for any individual researcher to collect on their own. Secondary data can be obtained from different sources:

- Information collected through censuses or sectors from malls, theatres, airports, automotive, interior projects etc.
- Internet searches or libraries.
- surveys from consumers

3.4 TOOLS AND TECHNIQUES: STATISTICAL TOOLS

Statistical methods involved in carrying out a study include planning, designing, collecting data, analyzing, drawing meaningful interpretation and reporting of the research findings. An idea of the sample size estimation, power analysis and the statistical errors is given.

SPSS

SPSS is short for Statistical Package for the Social Sciences, and it's used by various kinds of researchers for complex statistical data analysis. The SPSS software package was created for the management and statistical analysis of social science data. It has two types of views those are Variable view and Data View.

Variable View

- a) **Name:** This is a column field. Which accepts the unique ID. This helps in sorting the data. For example, the different demographic parameters such as name, gender, age, educational qualification. The only restriction is special characters which are not allowed in this type.
- b) **Label:** The name itself suggests, it gives the label. Which also gives the ability to add special characters.
- c) **Type:** This is very useful when different kind of data's are getting inserted.
- d) **Width:** We can measure the length of characters.
- e) **Decimal:** While entering the percentage value this type help us to decide how much one needs to define the digits required after the decimal.
- f) **Value:** This helps the user to enter the value.
- g) **Missing:** This helps the user to skip unnecessary data which is not required during analysis.
- h) **Align:** Alignment as the name suggests helps to align left or right. But in this case for ex. Left align.
- i) **Measure:** This helps to measure the data being entered in the tools like ordinal, cardinal, nominal.

The data has to enter in the sheet named “variable view”. It allows us to customize the data type as required for analyzing it. To analyze the data one needs to populate the

different column headings like Name, Label, Type, Width, Decimals, Values, Missing, Columns, Align, and Measures. These headings are the different attributes which, help to characterize the data accordingly.

Data View

The data view is structured as rows and columns. By importing file or adding data manually we can work with SPSS. The following are the statistical tools which were applied for the project using SPSS software:

- Percentage analysis
- Correlation
- Chi-square test

PERCENTAGE ANALYSIS

A percentage frequency distribution is a display of data that specifies the percentage of observations that exist for each data point or grouping of data points. It is a particularly useful method of expressing the relative frequency of survey responses and other data.

$$\text{Percentage} = \frac{\text{No. of Respondents}}{\text{Total no.}} \times 100$$

CORRELATION

Correlation analysis is a statistical method used to evaluate the strength of relationship between two quantitative variables. A high correlation means that two or more variables have a strong relationship with each other, while a weak correlation means that the variables are hardly related. In other words, it is the process of studying the strength of that relationship with available statistical data. This technique is strictly connected to the linear regression analysis that is a statistical approach for modeling the association between a dependent variable, called response, and one or more explanatory or independent variables. The aim of this work is to provide a general overview of correlation analysis in order to apply it to biomedical applications.

Positive Correlation : when the value of one variable increases with respect to another.

Negative Correlation : when the value of one variable decreases with respect to another.

No Correlation : when there is no linear dependence or no relation between the two variables.

r_{xy} : the correlation coefficient of the linear relationship between the variables x and y.

x_i : the values of the x-variable in a sample.

$\bar{x}$: the mean of the values of the x-variable.

y_i : the values of the y-variable in a sample.

$\bar{y}$: the mean of the values of the y-variable.

$$r_{xy} = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

CHI-SQUARE TEST

A chi-squared test, also written as χ^2 test, is a statistical hypothesis test that is valid to perform when the test statistic is chi-squared distributed under the null hypothesis, specifically Pearson's chi-squared test and variants thereof. Pearson's chi-squared test is used to determine whether there is a statistically significant difference between the expected frequencies and the observed frequencies in one or more categories of a contingency table.

$$\chi^2 = \left[\frac{(O - E)^2}{E} \right]$$

ANOVA TEST

Analysis of variance, or ANOVA, is a statistical method that separates observed variance data into different components to use for additional tests. A one-way ANOVA is used for three or more groups of data, to gain information about the relationship between the dependent and independent variables. ANOVA was developed by statistician and evolutionary biologist Ronald Fisher.

SOFTWARE FOR ANALYSIS

SPSS 16.0 (statistical package for social science)

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

4.1 DATA ANALYSIS

TABLE 4.1.1 AGE OF THE RESPONDENTS

		Number of Respondents	Percentage
Valid	Below 20	14	23
	21-30	23	38
	31-40	14	23
	Above 40	9	15
	Total	60	100

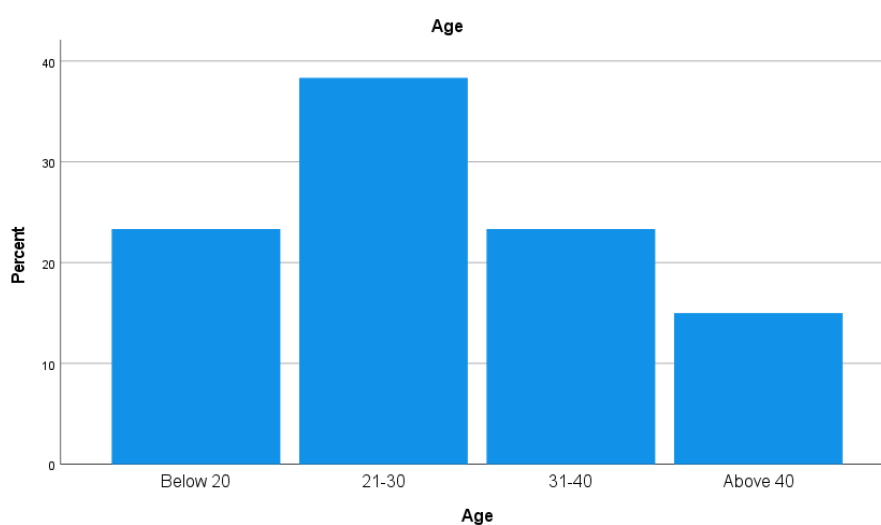


Fig 4.1.1 AGE OF THE RESPONDENTS

INTERPRETATION:

The above table states that 38% of respondents are between 21 and 30 age group, 23% of them are between 31 and 40 age group, 23% are below 20 and the remaining respondents are above 40 age group.

TABLE 4.1.2 GENDER OF RESPONDENTS

		Number of Respondents	Percentage
Valid	Male	21	35
	Female	30	50
	Prefer not to say	9	15
	Total	60	100

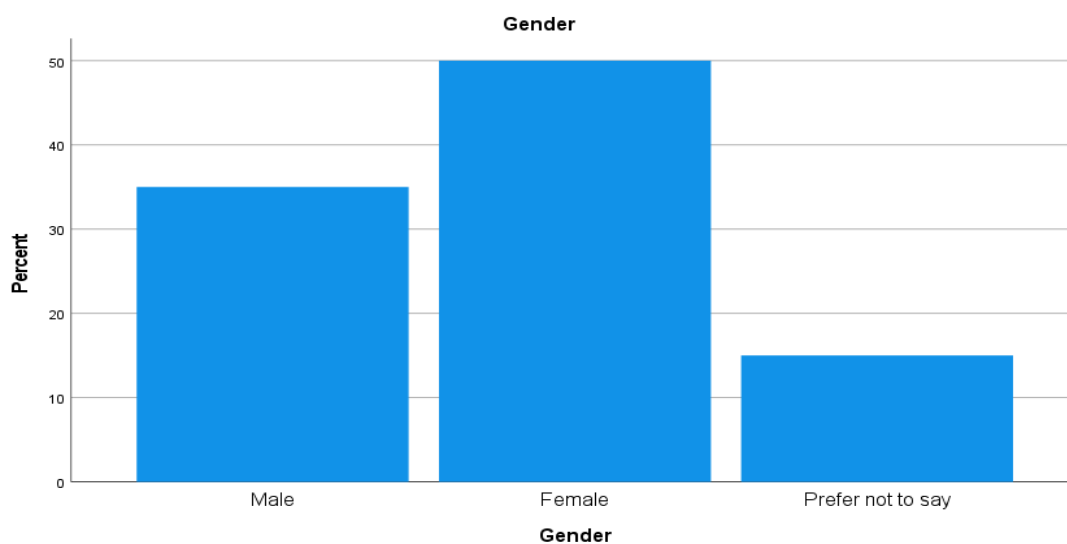


Fig 4.1.2 GENDER OF RESPONDENTS

INTERPRETATION:

The above table states that 50% of them are female genders and 35% are male then 15% prefer not to disclose their gender.

TABLE 4.1.3 QUALIFICATION OF RESPONDENTS

		Number of Respondents	Percentage
Valid	School	9	15
	Under Graduate	22	37
	Post Graduate	23	38
	PHD	6	10
	Total	60	100

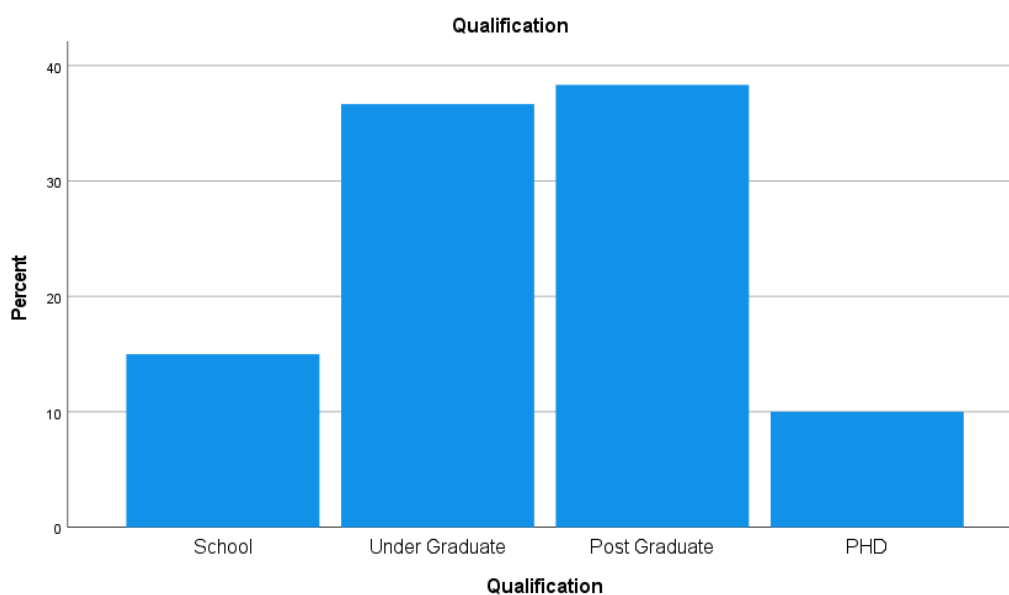


Fig 4.1.3 QUALIFICATION OF RESPONDENTS

INTERPRETATION:

The above table states that maximum amount of people responded are post graduates that is 38% followed by undergraduates 37%, school 15% and PHD 10%

TABLE 4.1.4 TYPES OF RESPONDENTS

		Number of Respondents	Percentage
Valid	Student	21	35
	Self-Employed	19	32
	Employee	19	32
	Unemployed	1	2
	Total	60	100

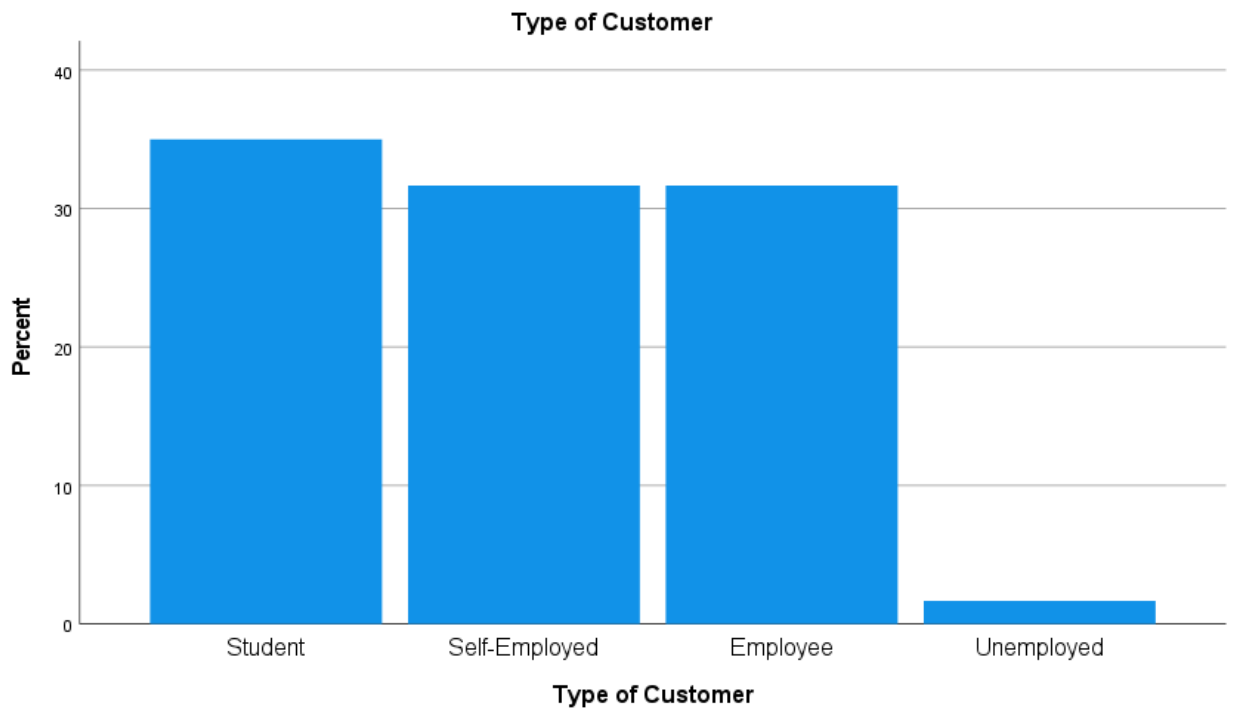


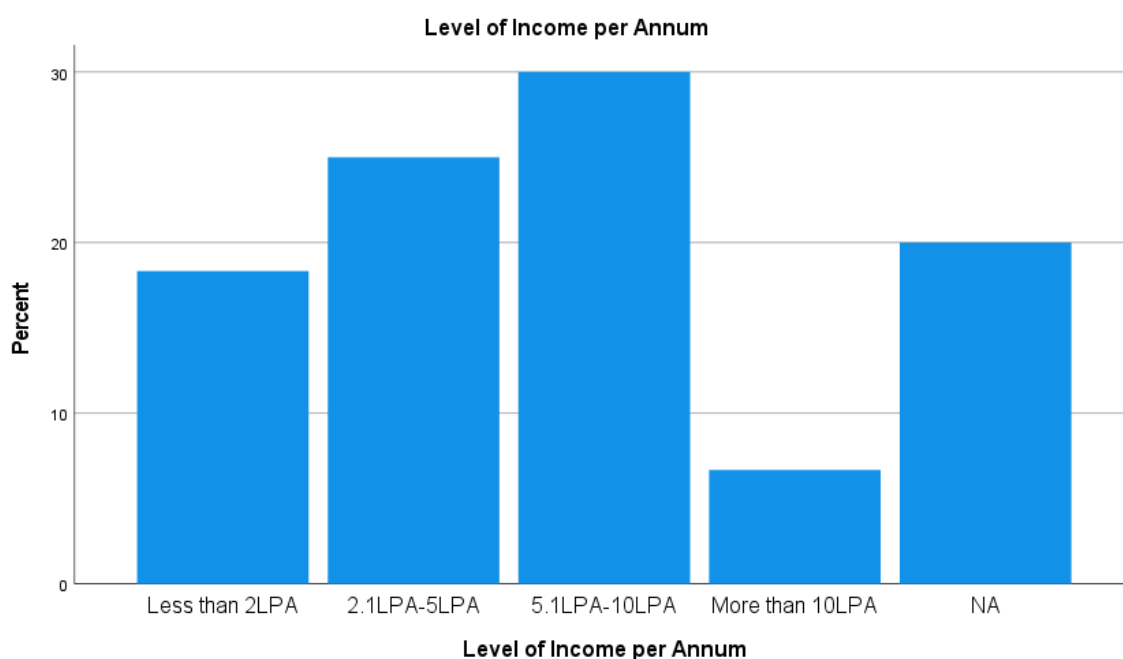
Fig 4.1.4 TYPES OF RESPONDENTS

INTERPRETATION:

The above table states that maximum of people are students that is 35% followed by self-employed people 32%, employee 32% and unemployed 1%.

TABLE 4.1.5 INCOME OF RESPONDENTS

		Number of Respondents	Percentage
Valid	Less than 2LPA	11	18
	2.1LPA-5LPA	15	25
	5.1LPA-10LPA	18	30
	More than 10LPA	4	7
	NA	12	20
	Total	60	100

**Fig 4.1.5 INCOME OF RESPONDENTS****INTERPRETATION:**

The above table states that majority of people that is 30% earn the income between 5.1LPA and 10 LPA. 25% of them earn between 2.1LPA and 5LPA. 18% of them are less than 2LPA and remaining 7% earns more than 10LPA.

TABLE 4.1.6 MARITAL STATUS OF RESPONDENTS

		Number of Respondents	Percentage
Valid	Single	32	53
	Married	28	47
	Total	60	100

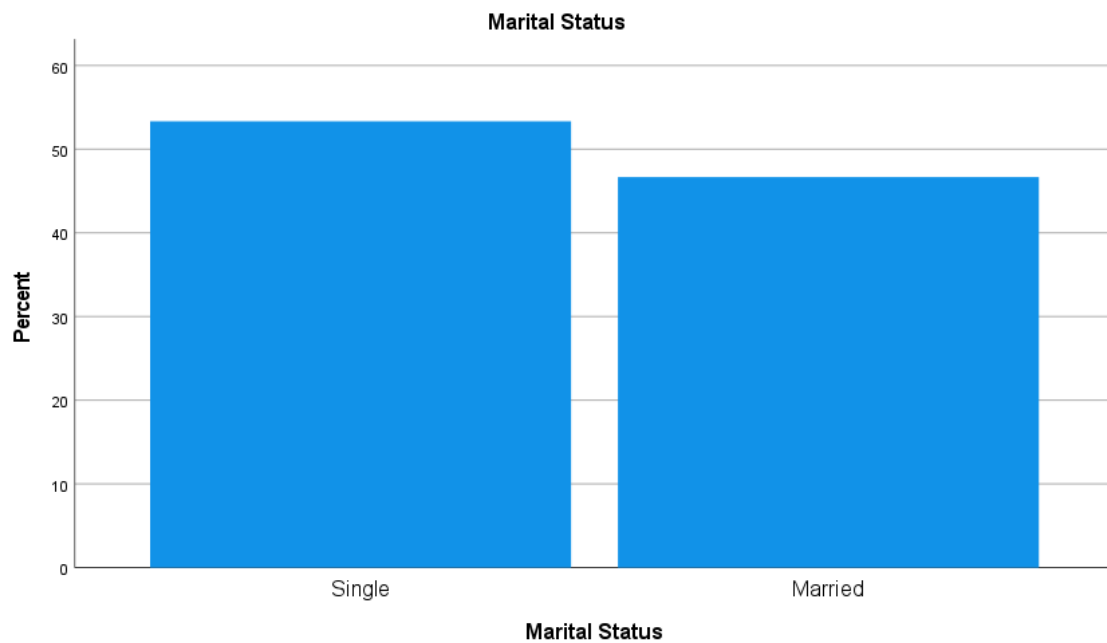


Fig 4.1.6 MARITAL STATUS OF RESPONDENTS

INTERPRETATION:

The above table states that majority of the consumers are single that is 53.3% and the remaining 47% of respondents are married.

TABLE 4.1.7 AWARENESS OF RESPONDENTS

		Number of Respondents	Percentage
Valid	Never Heard	18	30
	Rarely	18	30
	Sometimes	15	25
	Frequently	5	8
	Very Frequently	4	7
	Total	60	100

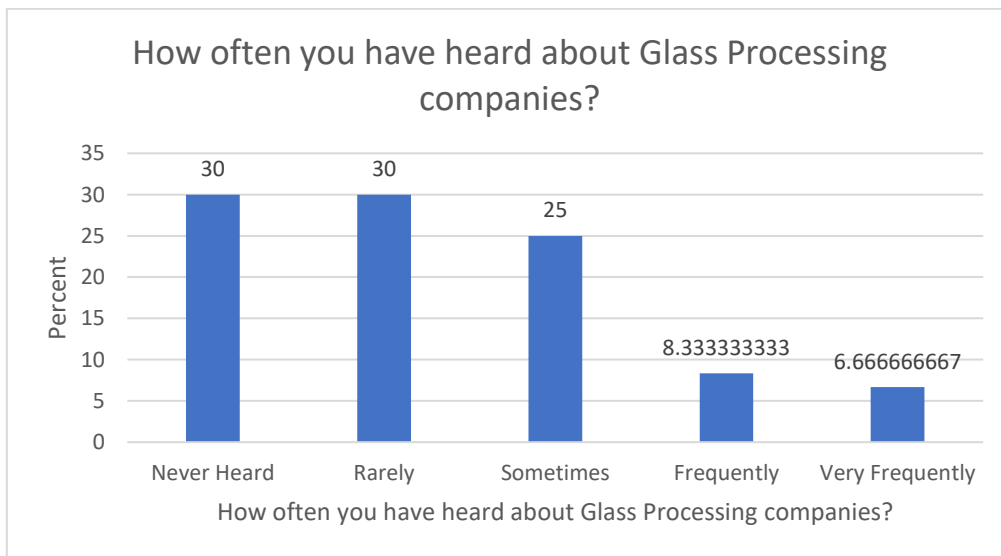


Fig 4.1.7 AWARENESS OF RESPONDENTS

INTERPRETATION:

Majority of consumers that is 30% does not have proper awareness of glass processing industries since they are only the consumer no a customer. 30% of them have heard rarely, 25% of them have heard sometimes and 8 to 6% of them have heard frequently.

TABLE 4.1.8 PURCHASE MODE OF RESPONDENTS

		Number of Respondents	Percentage
Valid	Online	27	45
	Offline	33	55
	Total	60	100

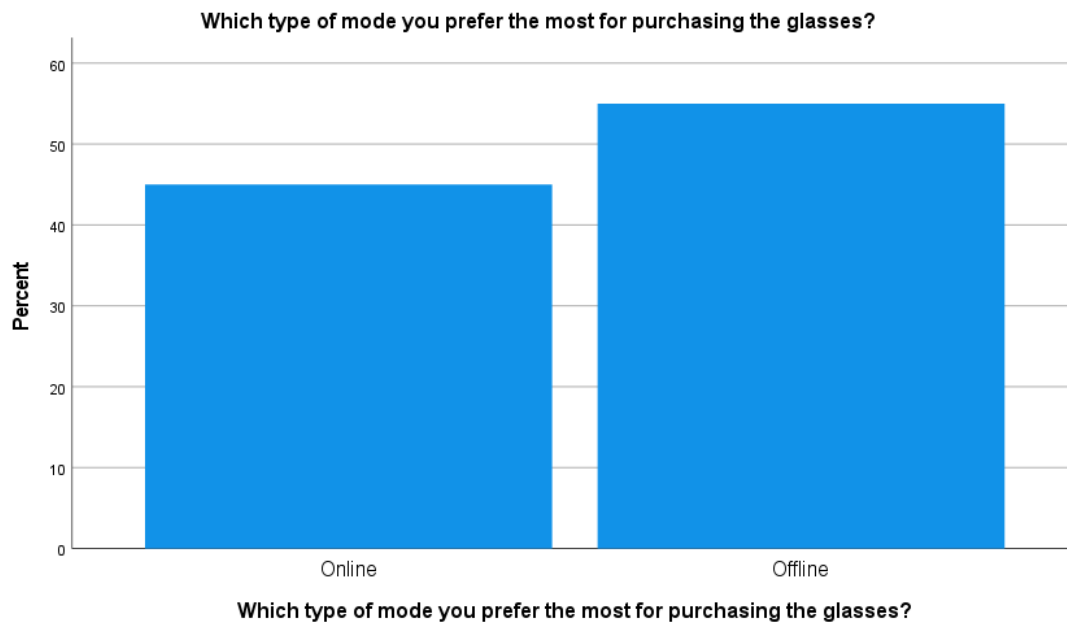


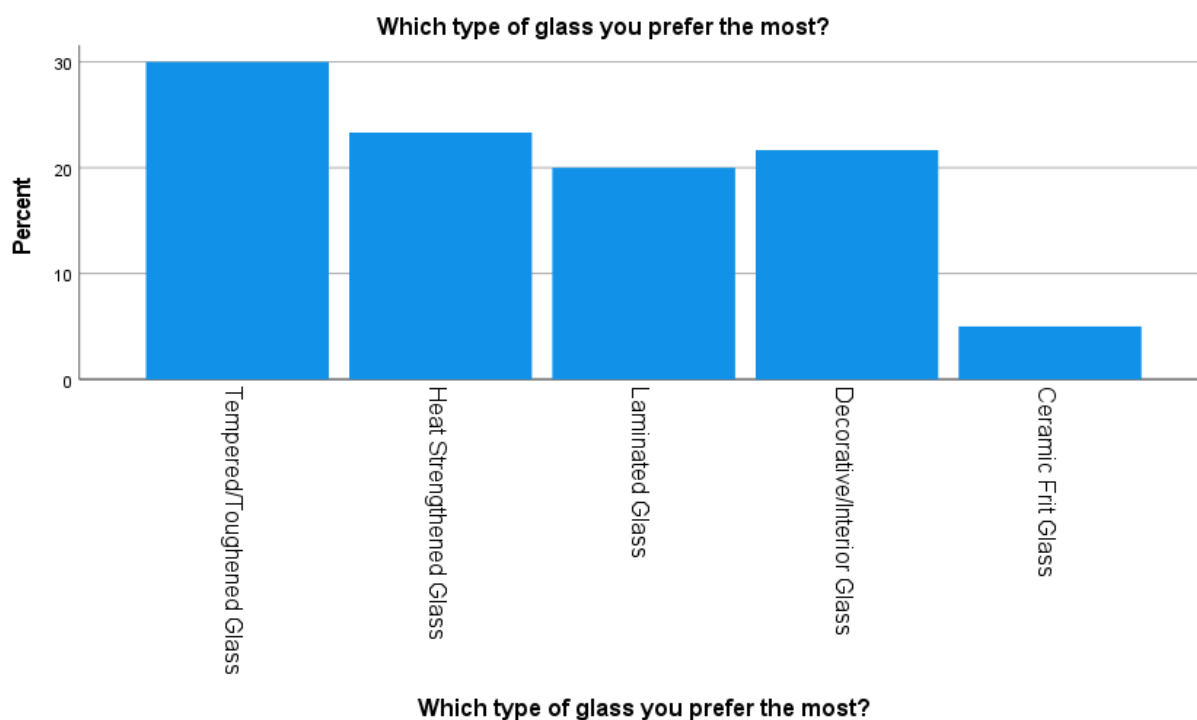
Fig 4.1.8 PURCHASE MODE OF RESPONDENTS

INTERPRETATION:

Most of the respondents prefer offline purchasing over online purchasing that is 55% and the remaining people prefer offline purchase that is 45%. This shows that their perception is to buy the glass products over offline mode.

TABLE 4.1.9 PREFERENCE OF THE RESPONDENTS

		Number of Respondents	Percentage
Valid	Tempered/Toughened Glass	18	30
	Heat Strengthened Glass	14	23
	Laminated Glass	12	20
	Decorative/Interior Glass	13	22
	Ceramic Frit Glass	3	5
	Total	60	100

**Fig 4.1.9 PREFERENCE OF THE RESPONDENTS****INTERPRETATION:**

Maximum amount of respondents that is 30% prefer tempered/toughened glasses since it is cheap and quality product. 23% prefer heat strengthened glass, 22% prefer decorative/interior glasses, 20% prefer laminated glass and remaining 5% of them prefer ceramic frit glass.

TABLE 4.1.10 OPINION TOWARDS COLORED GLASSES

		Number of Respondents	Percentage
Valid	Yes	33	55
	No	27	45
	Total	60	100

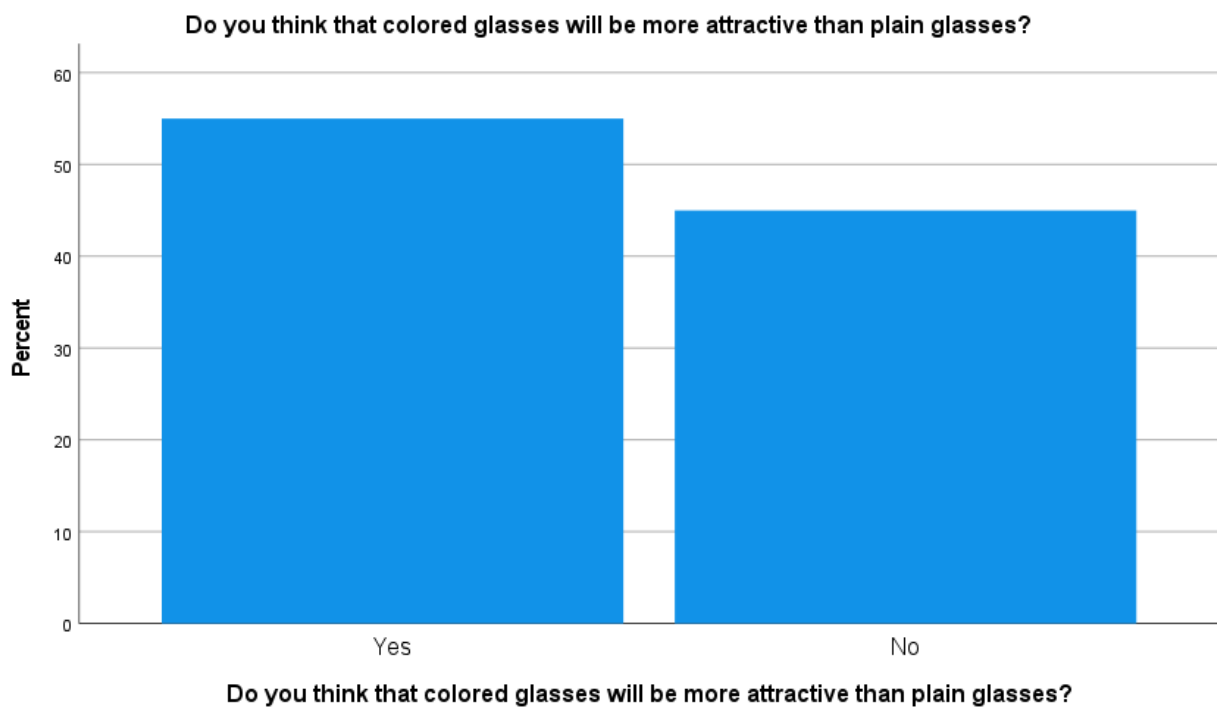


Fig 4.1.10 OPINION TOWARDS COLORED GLASSES

INTERPRETATION:

Most of the people prefer colored glass over plane and ordinary glasses from the study that is 55% prefer colored glasses and 45% prefer ordinary glasses.

TABLE 4.1.11 OPINION TOWARDS ROBOTIC GLASS

		Number of Respondents	Percentage
Valid	Yes	28	47
	No	32	53
	Total	60	100

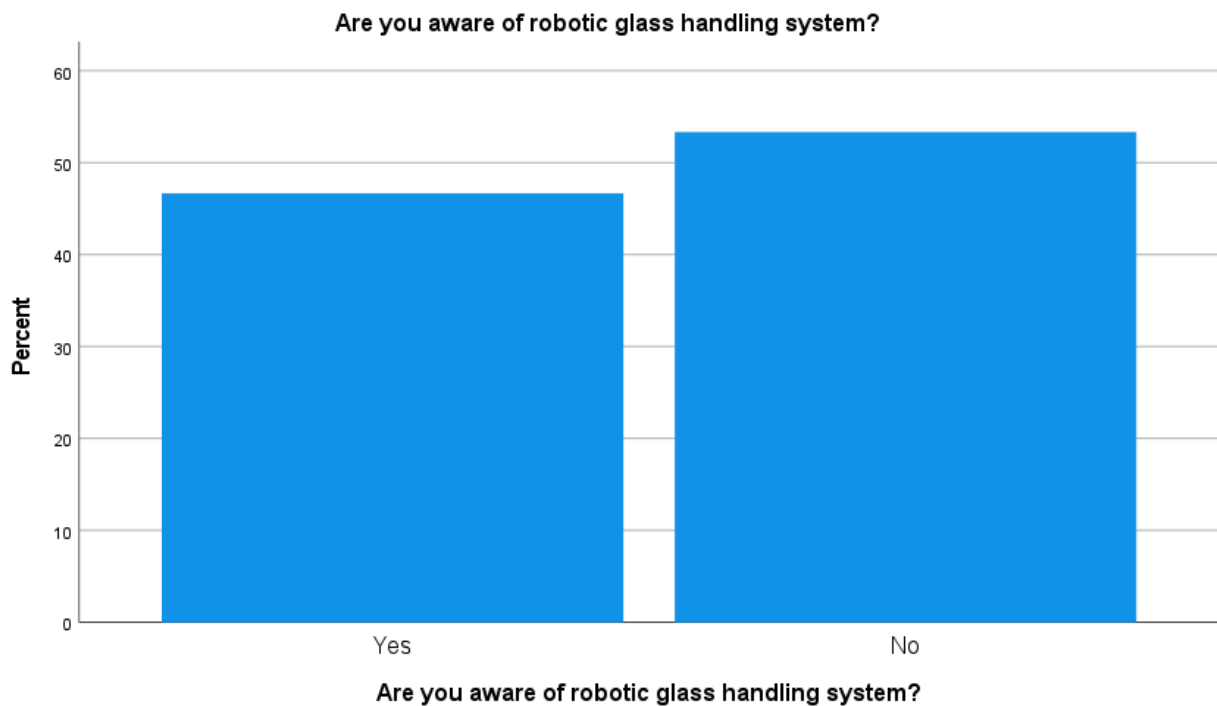


Fig 4.1.11 OPINION TOWARDS ROBOTIC GLASS

INTERPRETATION:

From the above table, most of the people aren't aware of robotic glass handling system. 53% of them are not aware of this newest type of glass products and 47% of them are aware about the robotic glasses.

TABLE 4.1.12 RESPONSE ON INFORMATION SEARCH

		Number of Respondents	Percentage
Valid	Yes	49	82
	No	11	18
	Total	60	100

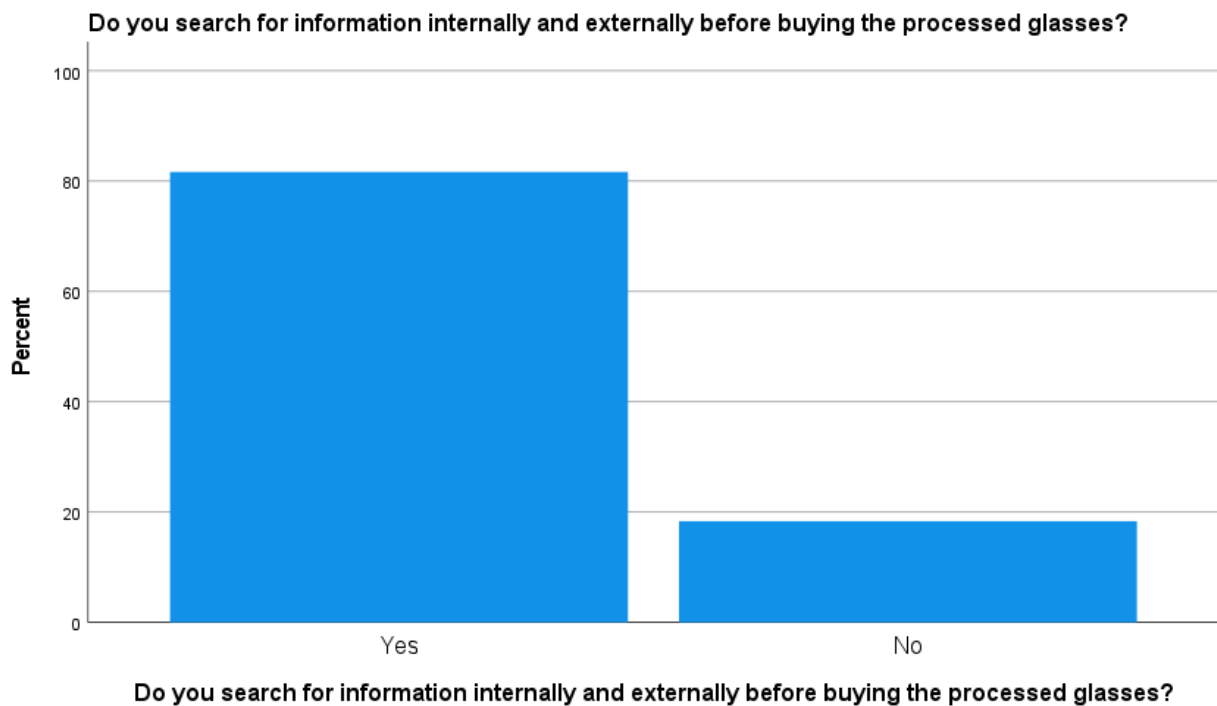


Fig 4.1.12 Response on Information Search

INTERPRETATION:

Most of the respondents that is 82% search for information internally and externally before buying the glass product and remaining 18% do not search for information. So it is necessary for the companies to maintain their brand name and positive reviews on existing purchase.

TABLE 4.1.13 OPINION TOWARDS SLIDING GLASS DOOR OVER ORDINARY GLASS DOOR

		Number of Respondents	Percentage
Valid	Yes	38	63
	No	22	37
	Total	60	100

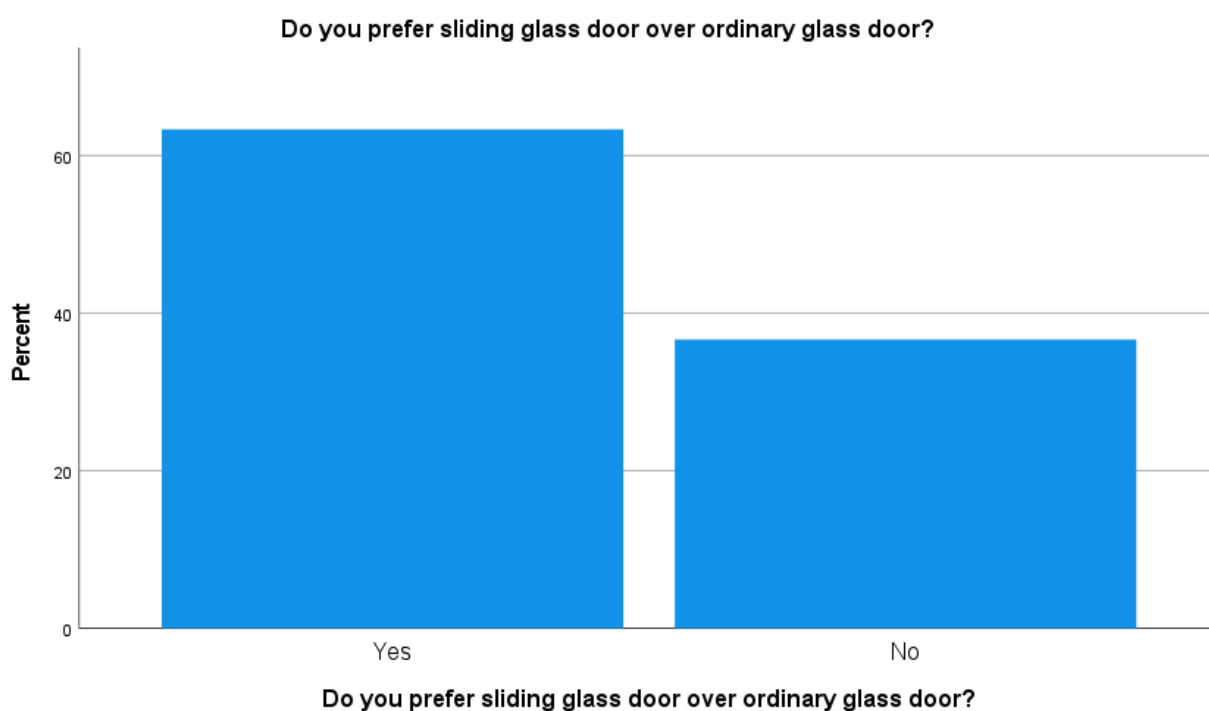


Fig 4.1.13 OPINION TOWARDS SLIDING GLASS DOOR

INTERPRETATION:

From the above table, 63% of respondents prefer sliding glass doors over ordinary one. Only 36% of people prefer normal/ordinary glass doors to buy.

TABLE 4.1.14 OPINION TOWARDS BULLET RESISTANT GLASSES

		Number of Respondents	Percentage
Valid	Yes	27	45
	No	9	15
	Maybe	24	40
	Total	60	100

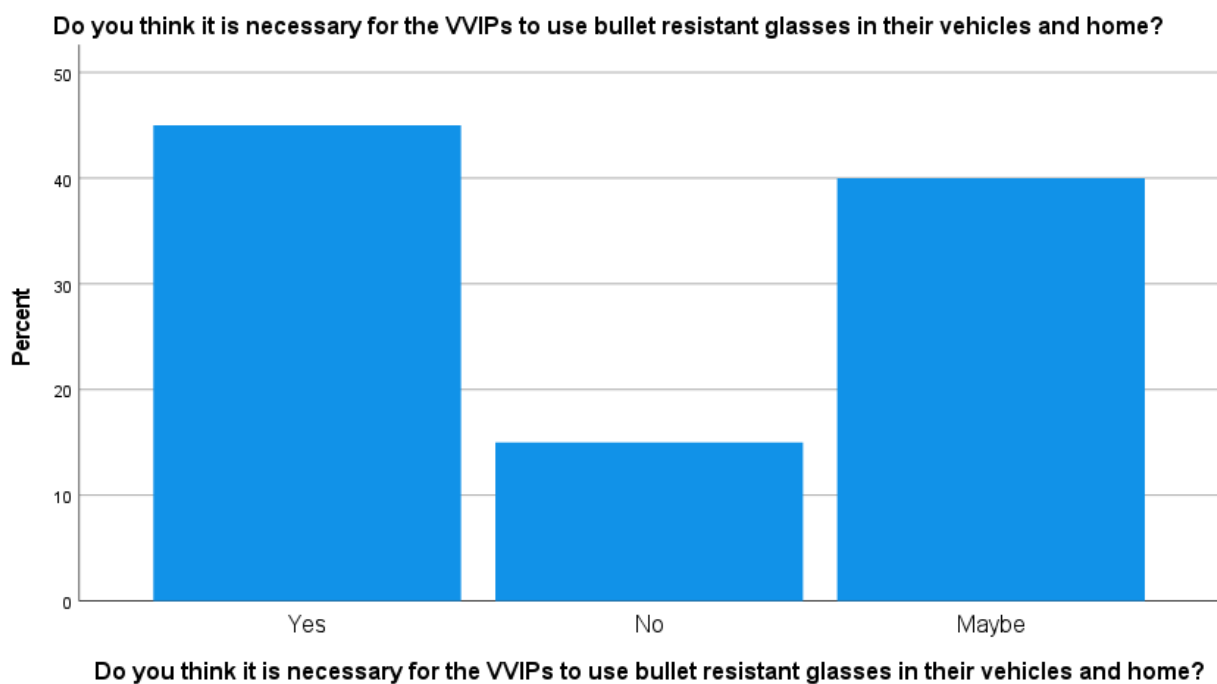


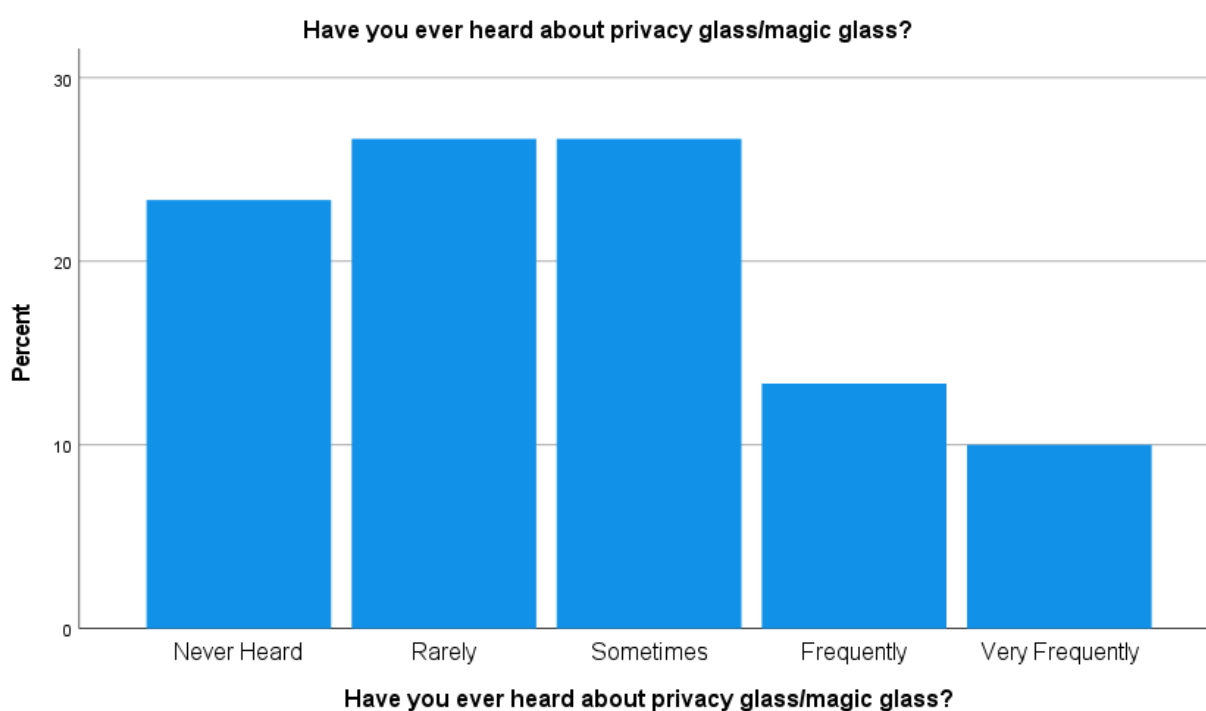
Fig 4.1.14 OPINION TOWARDS SLIDING GLASS DOOR

INTERPRETATION:

Majority of respondents that is 45% of respondents agreed that VVIPs need Bullet Resistant Glasses on their vehicles and home. Only few people that is 15% denied for the necessity to use bullet resistant glasses on vehicles and home of important people. Remaining 40% of them are partially accepted.

TABLE 4.1.15 OPINION TOWARDS PRIVACY/MAGIC GLASSES

		Number of Respondents	Percentage
Valid	Never Heard	14	23
	Rarely	16	27
	Sometimes	16	27
	Frequently	8	13
	Very Frequently	6	10
	Total	60	100

**Fig 4.1.15 OPINION TOWARDS PRIVACY/MAGIC GLASSES****INTERPRETATION:**

From the table, privacy/magic glasses are heard rarely and sometimes only. Only 10% of respondents have knowledge about privacy/magic glasses. 23% of them never heard, 26% of them are rarely heard. Only 13 to 10% of them have heard frequently.

TABLE 4.1.16 OPINION TOWARDS GLASSES ON AIRPORTS

		Number of Respondents	Percentage
Valid	Ballistic Glass	21	35
	PVB Laminated Glass	20	33
	SGP Laminated Glass	10	17
	Heat Soak Tested Glass	9	15
	Total	60	100

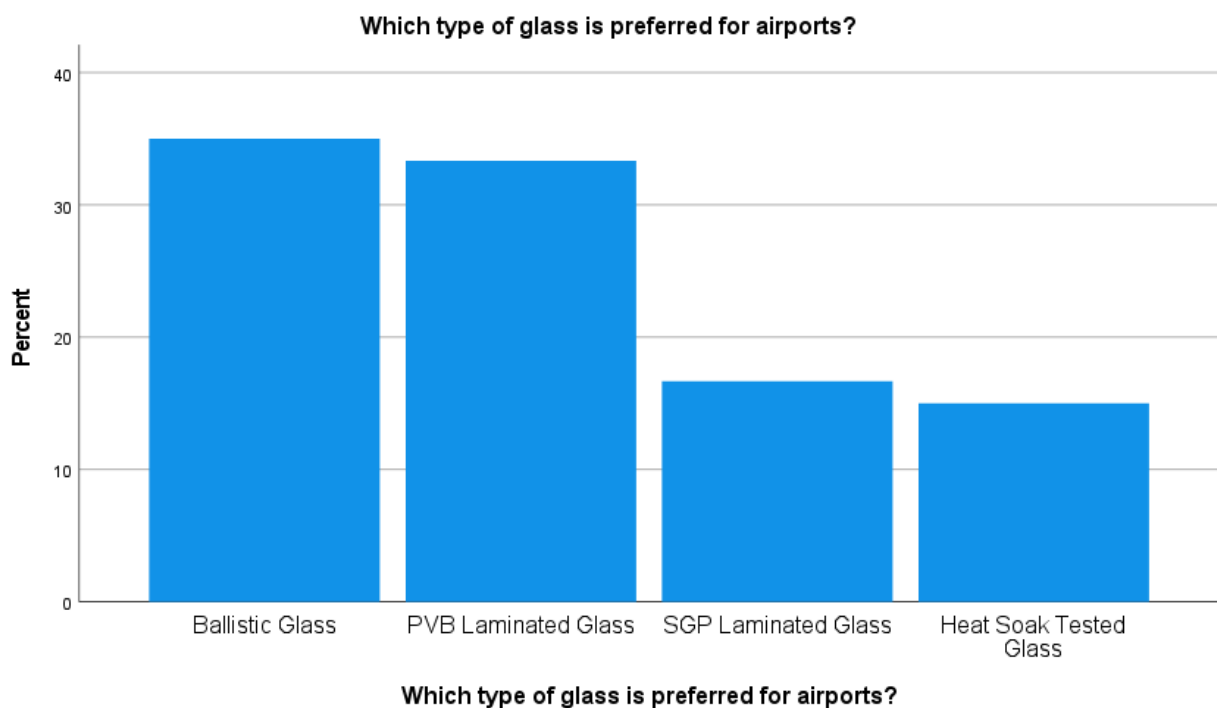


Fig 4.1.16 OPINION TOWARDS GLASSES ON AIRPORTS

INTERPRETATION:

From the above table, ballistic glass is preferred by most of the respondents that is 35% followed by PVB Laminated Glasses 33%. Only 15% to 16% of people prefer SGP Laminated glasses and Heat soak tested glasses.

TABLE 4.1.17 OPINION TOWARDS FIRE RATED GLASSES

		Number of Respondents	Percentage
Valid	Strongly disagree	13	22
	Disagree	25	42
	Neutral	19	32
	Agree	3	5
	Total	60	100

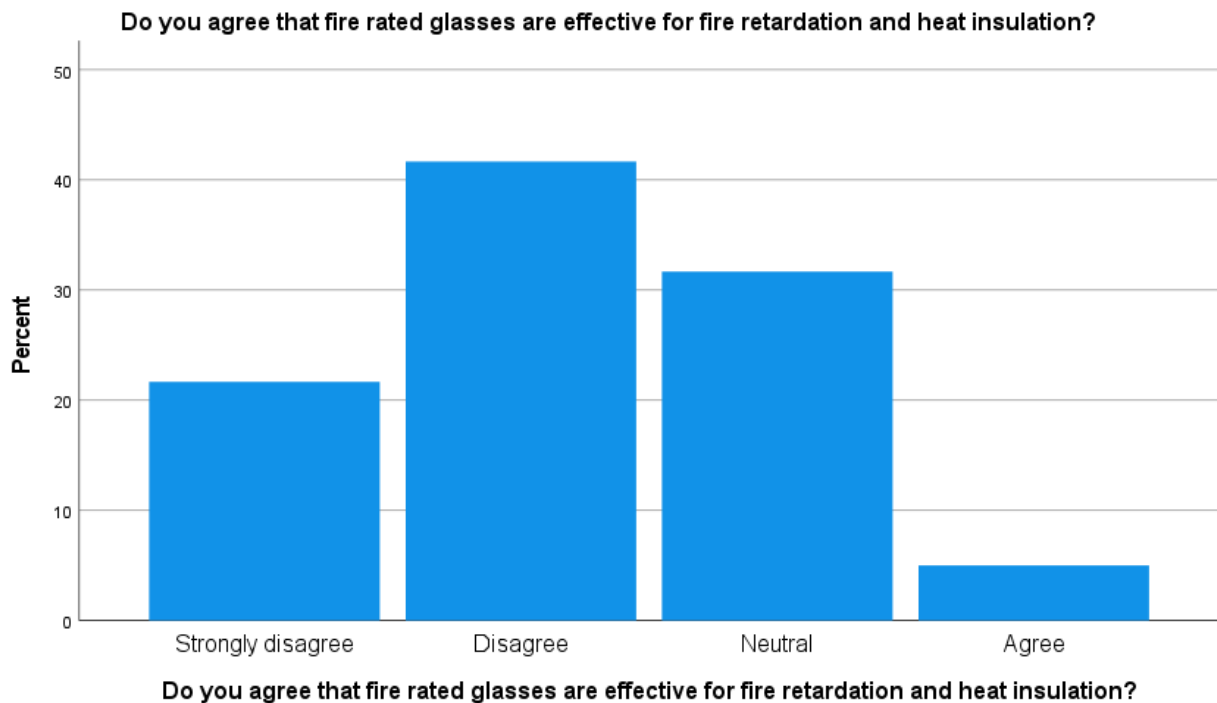


Fig 4.1.17 OPINION TOWARDS FIRE RATED GLASSES

INTERPRETATION:

From the above table, 41% of respondents disagreed that the fire rated glasses are much suitable for fire retardation and heat insulation. 31% of them are neutral, 21% of them are strongly disagreed and only 5% of people agreed that fire rated glasses are suitable.

TABLE 4.1.18 OPINION TOWARDS DECORATIVE/INTERIOR GLASSES

		Number of Respondents	Percentage
Valid	Strongly disagree	16	27
	Disagree	28	47
	Neutral	10	17
	Agree	6	10
	Total	60	100

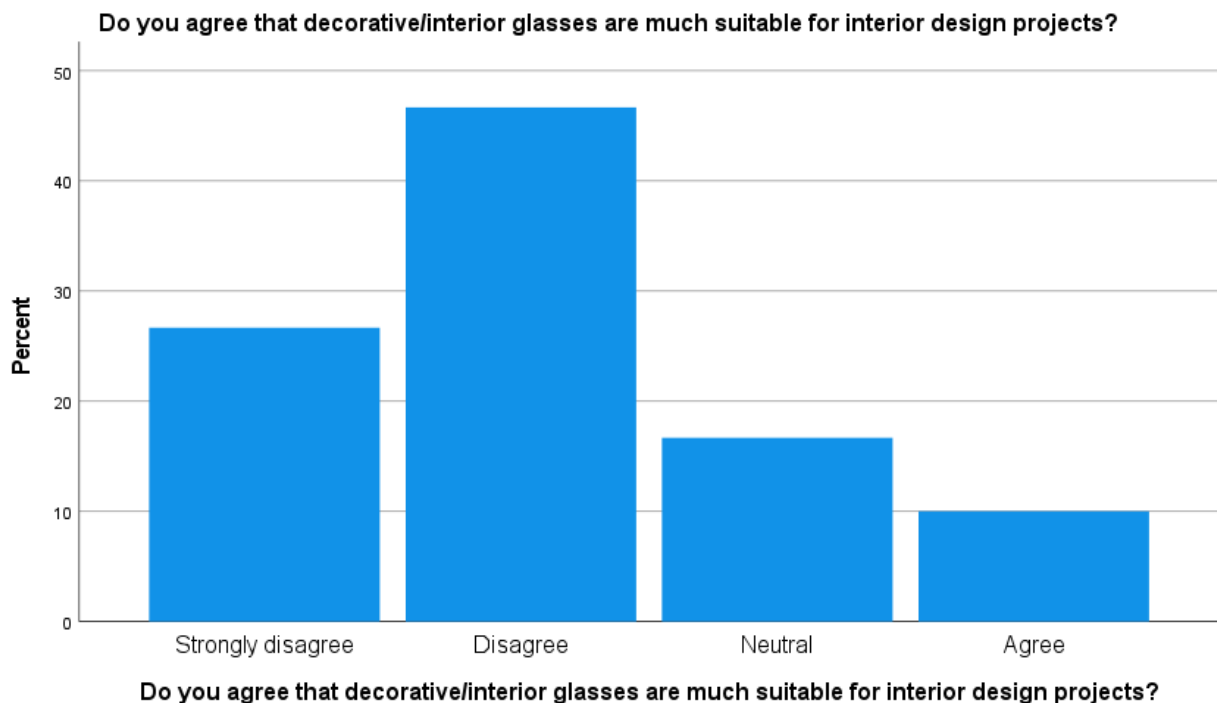


Fig 4.1.18 OPINION TOWARDS DECORATIVE/INTERIOR GLASSES

INTERPRETATION:

From the above table, most of the respondents that is 47% disagreed that the decorative/interior glasses are suitable for design projects. 27% of them were disagreed, 16% of them are neutral and only 10% of people agreed that it is suitable for design projects.

TABLE 4.1.19 OPINION TOWARDS AUTOMOTIVE GLASSES

		Number of Respondents	Percentage
Valid	Strongly disagree	15	25
	Disagree	27	45
	Neutral	12	20
	Agree	6	10
	Total	60	100

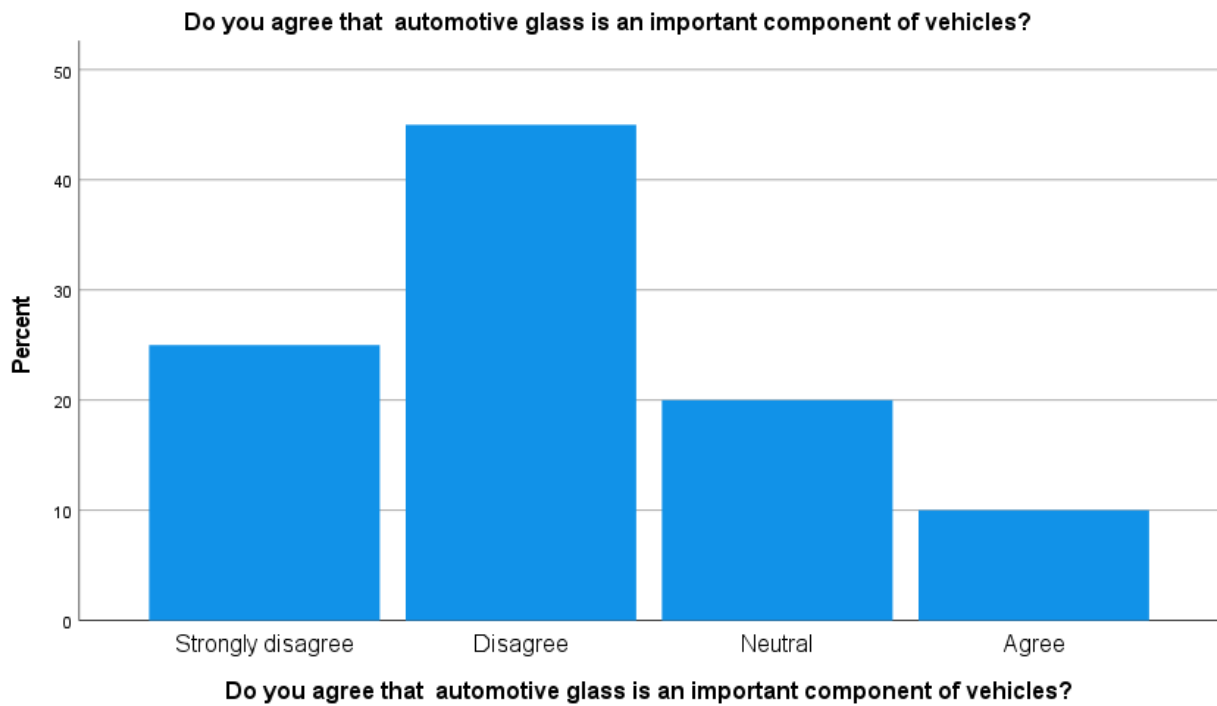


Fig 4.1.19 OPINION TOWARDS AUTOMOTIVE GLASSES

INTERPRETATION:

From the above table, most of the respondents that is 45% disagreed that automotive glass is an important component of vehicles. 25% of them were strongly disagreed, 20% of them are neutral and only 10% of them are agreed that it is suitable.

TABLE 4.1.20 OPINION TOWARDS NOISE IN GLASS

		Number of Respondents	Percentage
Valid	Strongly disagree	9	15
	Disagree	30	50
	Neutral	16	27
	Agree	1	2
	Strongly agree	4	7
	Total	60	100.0

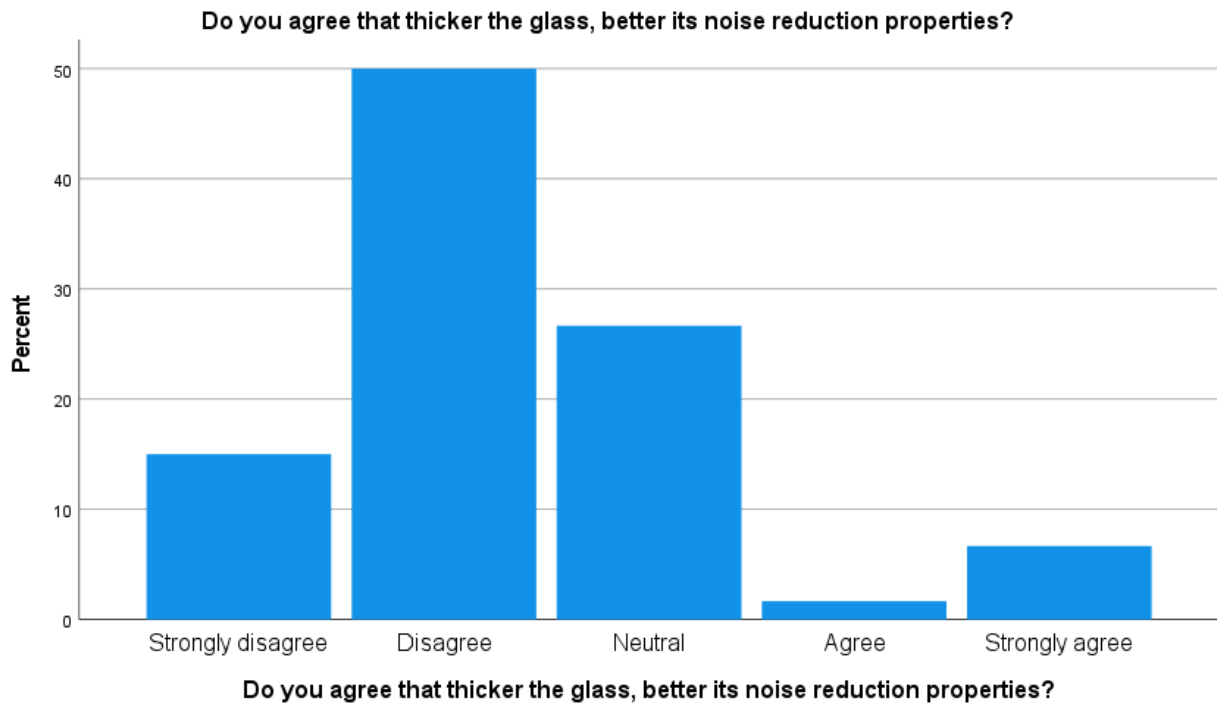


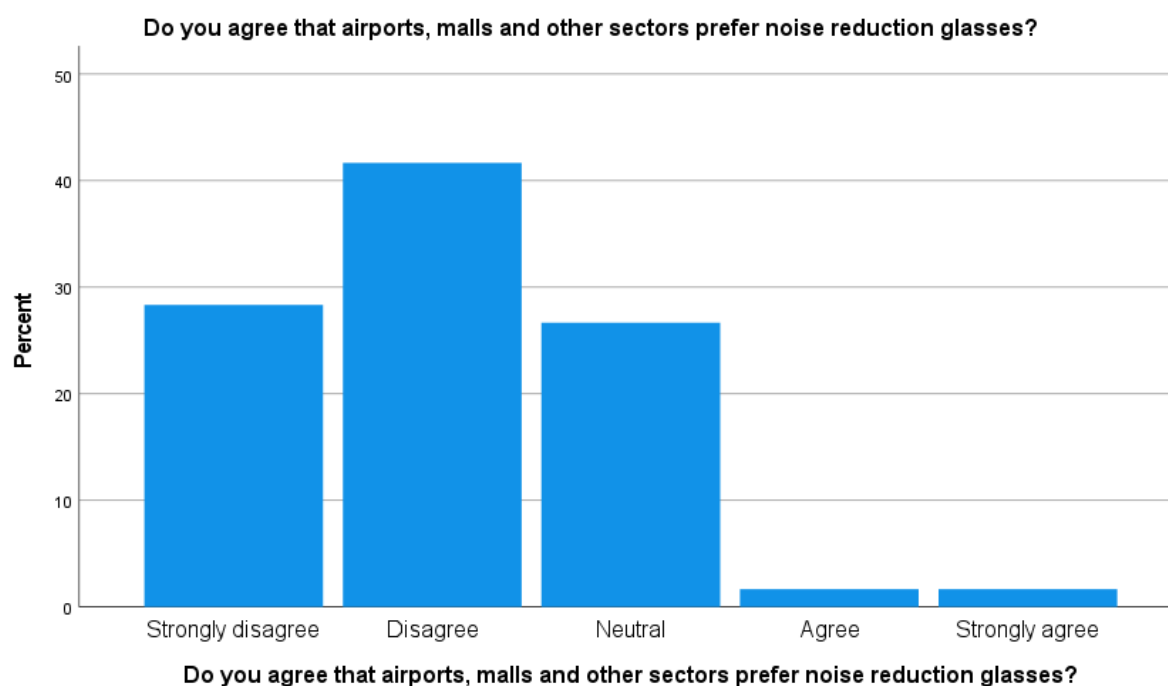
Fig 4.1.20 OPINION TOWARDS NOISE IN GLASS

INTERPRETATION:

From the above table most of the respondents that is 50% disagreed that the thicker the glass, better its noise reduction properties. 26% of respondents are neutral, 15% of them are strongly disagreed and more than 6% of them strongly agreed that thicker the glass will reduce the noise.

TABLE 4.1.21 OPINION TOWARDS NOISE REDUCTION GLASSES

		Number of Respondents	Percentage
Valid	Strongly disagree	17	2
	Disagree	25	42
	Neutral	16	27
	Agree	1	2
	Strongly agree	1	2
	Total	60	100

**Fig 4.1.21 OPINION TOWARDS NOISE REDUCTION GLASSES****INTERPRETATION:**

From the above table, majority of respondents that is 42% disagreed that sectors like malls, airports uses noise reduction glasses. 28% are strongly disagreed, 26% of respondents are neutral and only few percentage that is 1% of people agreed to use noise reduction glasses on different sectors.

4.2 STATISTICAL TEST AND INTERPRETATION

4.2.1 CORRELATION TEST

The testing procedure is as follows:

Null hypothesis H_0 : There is an association between age and preference on colored glasses

Alternate hypothesis H_1 : There is no association between age and preference on colored glasses

Significance level : 0.05

Correlations			
		Age	Do you think that colored glasses will be more attractive than plain glasses?
Age	Pearson Correlation	1	.034
	Sig. (2-tailed)		.021
	N	60	60
Do you think that colored glasses will be more attractive than plain glasses?	Pearson Correlation	.214	1
	Sig. (2-tailed)	.101	
	N	60	60
Correlation is significant at the 0.05 level (2-tailed)			

Table 4.2.1 Correlations

INTERPRETATION:

$H_0 > H_1$ (i.e.) H_0 is rejected, H_0 is lesser than 0.05 H_0 is accepted

There is a significant difference between age and preference of colored glasses.

4.2.2 CHI-SQUARE TEST

Null hypothesis H_0 : There is an association between different type of glasses preferred and colored glasses

Alternate hypothesis H1 : There is no association between different type
of glasses preferred and colored glasses

Significance level : 0.05

Chi-Square Tests			
	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	6.419 ^a	4	.170
Likelihood Ratio	6.554	4	.161
Linear-by-Linear Association	5.973	1	.015
N of Valid Cases	60		
a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.35.			

Table 4.2.2 Chi-Square Tests

INTERPRETATION:

H0 < H1 (i.e.) H0 is accepted,

H0 is greater than 0.05

H1 is accepted

There is a no significant difference between type of glasses that is preferred and colored glasses.

4.2.3 ANOVA (ONE WAY TEST)

Null hypothesis H0 : There is an association between awareness of
glass processing company and modes of purchase

Alternate hypothesis H1 : There is no association between awareness of
glass processing company and modes of purchase

Significance level : 0.05

ANOVA					
How often you have heard about Glass Processing companies?					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.394	1	1.394	.991	.324
Within Groups	81.589	58	1.407		
Total	82.983	59			

Table 4.2.3 Anova (one way test)

INTERPRETATION:

$H_0 > H_1$ (i.e.) $0.324 < 0.05$

H_1 is accepted.

There is no significant difference between awareness of glass processing companies and mode of purchase of glass products.

CHAPTER 5

FINDINGS AND SUGGESTIONS

5.1 SUMMARY OF FINDINGS

- It has been found that most of the respondents are between 21 to 30 age group. Majority of 38% are between them.
- This research helps us to understand that 50% of respondents are female.
- This study helps us to identify that most of the respondents that is 38% of respondents are Post Graduates.
- It has been found that majority of 35% of the type of respondents are students.
- It has been found that the majority of people that is 30% earn the income between 5.1 LPA and 10 LPA.
- It has been found that the majority of people that is 54% of respondents are single.
- Majority of consumers that is 30% does not have proper awareness of glass processing industries since they are only the consumer no a customer. 30% of them have heard rarely, 25% of them have heard sometimes and 8 to 6% of them have heard frequently.
- Most of the respondents prefer offline purchasing over online purchasing that is 55% in maximum and the remaining people prefer offline purchase that is 45%. This shows that their perception is to buy the glass products over offline mode.
- It has been found that people prefer toughened/tempered glasses over other glasses like laminated glass, PVB and SGB laminated glass, heat soak tested glass etc. since tempered/ toughened glasses are cheap than other glasses. Thus it shows majority of 30% respondents prefer toughened/tempered glasses.
- Most of the people aren't aware of robotic glass handling system. 53% of them in

majority are not aware of this newest type of glass products and 47% of them are aware about the robotic glasses.

- It has been found that majority of 82% of customers surf for information internally and externally before buying the glass products. So, it is necessary for the glass companies to maintain their brand and positive reviews on their processed glasses.
- Most of the people aren't aware of robotic glass handling system. 53% of them in majority are not aware of this newest type of glass products and 47% of them are aware about the robotic glasses.
- Majority of respondents that is 45% of respondents agreed that VVIPs need Bullet Resistant Glasses on their vehicles and home. Only few people that is 15% denied for the necessity to use bullet resistant glasses on vehicles and home of important people. Remaining 40% of them are partially accepted.
- Ballistic glass is suggested by most of the respondents that is 35% for airports.
- It has been found that only 10% of respondents has a knowledge about privacy or magic glasses.
- It has been found that there is a significant difference between age and preference of colored glasses using correlation test.
- It has been found that there is no significant difference between type of glasses that is preferred and colored glasses using chi-square test.
- It has been found that there is no significant difference between awareness of glass processing companies and modes of purchase of glass products using anova one way test.

5.2 SUGGESTIONS

- Based on the customer perception, glass processing companies can process more colored glasses over plain glasses.
- Quality of the glasses can be improved that makes customer to buy the product.
- To create awareness of processed glasses to consumers who uses glass products in their routine life since glass is the future hi tech products.
- Companies can recycle the glasses without affecting the environment which makes more cost effectiveness for both the company and customers.
- Glass processing companies can focus on 21-30 age groups since they are majority of respondents in this study.
- Glass manufacturing and processing companies can focus on producing tempered and toughened glasses which is preferred by most of the customers.
- Glass processing companies should commit to higher standards of quality and to produce cost effective delivery for the customers which can turn their customers in to loyal customers.
- Glass processing companies should create and maintain trust among the customers and to have association with a number of builders, fabricators, facade consultants and architects globally.
- Glass processing companies should commit to total customer satisfaction and should be backed by a highly competent technical team.
- Glass processing industries can build strong association with major independent universities and testing laboratories for research and innovations in glass processing.

5.3 CONCLUSIONS

Glass is a solid like and transparent material that is used in numerous applications in our daily lives. Glass can be manufactured with a range of physical properties to be used for many different requirements. It is a hard substance which may be transparent or translucent and brittle. From large industrial designs to basic domestic purposes, their uses are exceedingly large. From this study, glass processing companies can understand different perceptions and the buying behaviour of their customers in terms of price, quality, quantity, design, colour etc., so that they can achieve total customer satisfaction. Each and every consumer should be aware of processed glasses since they are the future hi-tech products. Glass is everywhere and meets societal needs, it is an unlimited material whose number of applications is constantly evolving and which is more and more used in combination with other material for high tech applications.

APPENDIX

A1 REFERENCES

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A2 ANNEXURE

A STUDY ON CONSUMER PERCEPTION AND PURCHASE BEHAVIOR OF GLASS PRODUCTS

QUESTIONNAIRE:

1. AGE

- Below 20
- 21-30
- 31-40
- Above 40

2. Gender

- Male
- Female
- Prefer not to say

3. Qualification

- School
- Under graduate
- Post graduate
- PHD

4. Type of customer

- Student
- Self-employed
- Employee
- Unemployed

5. Level of income per annum

- Less than 2LPA
- 2.1LPA-5LPA
- 5.1LPA-10LPA
- More than 10LPA
- NA

6. Marital status

- Single
- Married

7. How often you have heard about glass processing companies?

- Very frequently
- Frequently
- Sometimes
- Rarely
- Never heard

8. Which type of mode you prefer the most for purchasing the glasses?

- Online
- Offline

9. Which type of glass you prefer the most?

- Tempered/toughened glass
- Heat strengthened glass
- Laminated glass
- Decorative/interior glass
- Ceramic frit glass

10. Do you think that colored glasses will be more attractive than plain glasses?

- Yes
- No

11. Are you aware of robotic glass handling system?

- Yes
- No

12. Do you search for information internally and externally before buying the processed glass?

- Yes
- No

13. Do you prefer sliding glass door over ordinary glass door?

- Yes
- No

14. Do you think it is necessary for the VVIPs to use bullet resistant glasses in their vehicles and home?

- Yes
- No
- Maybe

15. Have you ever heard about privacy glass/magic glass?

- Very Frequently
- Frequently
- Sometimes
- Rarely
- Never Heard

16. Which type of glass is preferred for airports?

- Ballistic Glass
- PVB Laminated Glass
- SGP Laminated Glass
- Heat Soak Tested Glass

17. Do you agree that fire rated glasses are effective for fire retardation and heat insulation?

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

18. Do you agree that decorative/interior glasses are much suitable for interior design projects?

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

19. Do you agree that automotive glass is an important component of vehicle?

- Strongly agree
- Agrees
- Neutral
- Disagree
- Strongly disagree

20. Do you agree that thicker the glass, better it's noise reduction properties?

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

21. Do you agree that airports, malls and other sectors prefer noise reduction glasses?

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree