

Comparative Analysis in Piping Industry: An Empirical Study by Mixed Methodology in Research

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ABSTRACT

This study presents the comparative study of pipe industry regarding to Ashirvad and Finolex pipes with its competitors. Competitive analysis as a method is used in the formulation of strategic plans in most organizations; usually it is adopted due to its rational process of making long term strategies. This is the procedure for identifying specific acceptable strategy for each of the individual organization, by its own circumstances. The main aim of this study is to know about the dominant players in the plumbing market and to identify the factors that influence the builders and contractors towards choosing plumbing piping material. The central focus of the study is to know about the various elements in terms of quality, availability, pricing on which company needs to work to compete with its competitors which ultimately leads to the increase in market share of Ashirvad and Finolex pipes. The study was carried out among builders and contractors to ascertain the customer/consumer behavior with regards to the plumbing market across the South Kolkata region.

Keywords: piping industry, competitive analysis, PVC, market, influencers

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INTRODUCTION

The Indian pipe industry has been showing rapid growth since past several years and it is among the top three manufacturing hubs after Japan and Europe. The major reasons for the growth of this industry is the increasing demand for pipes in the irrigation sector, oil and gas sector and also the real estate industry. The demand for steel pipes such as seamless pipes, HSAW, LSAW pipes is increasing as the need for oil and gas transportation in India is growing. The demand for plastic pipes such as PVC and CPVC is also increasing as these pipes are better in quality and durability. Infrastructure development, urbanization and the subsequent development of residential and industrial construction are facilitating the growth of the pipe industry in India.

In India, the commonly used polymers for manufacturing pipes and fittings are UPVC, HDPE, LLDPE, CPVC, and PPR. The major property improvement of CPVC over PVC is increase in heat resistance. While the maximum operating temperature of PVC is 60 degrees and softening point is 70 degrees, for CPVC it is 85 degrees and 100 degrees, respectively. CPVC, thus opens the market for hot water systems in plumbing and hot, corrosive liquids in chemical plants, which was previously shut to PVC.

The present study intends to determine the factors taken into consideration by builders and contractors while choosing plumbing piping material and their opinion regarding CPVC pipes. This study helps to know about the dominant players in the plumbing market and the various elements on which

company needs to work to compete with competitors.

STATEMENT OF PROBLEM

There are many players in the Indian plumbing market like Ashirvad, Finolex, Supreme, Astral, Prince etc. Each brand is providing better products than its competition and trying to capture the market. Therefore, there is a tough competition among the different brands and it is not easy for a brand to sustain in such a competitive environment. Ashirvad and Finolex are providing the best plumbing, sanitary and agriculture products which suits the customer's requirements better. But for the last 3–4 years, Ashirvad pipes and Finolex pipes have been facing tough competition and is not getting any escape from it and have not been getting much idea of product differentiation to compete with its competitors. So, the company needed a better way to handle competition in plumbing market.

This study among the builders and contractors used a sample of 209 respondents from South Kolkata region to ascertain the buying behaviors, motivators, influencers, dominant players in the plumbing market which will helps Ashirvad and Finolex in the formulation of strategic plans in future.

OBJECTIVE

Fixing the objective is like identifying the star. The objective decides where we want to go, what we want to achieve and what is our goal or destination. Every study is carried out for the achievement of certain objectives. The objective of this study is:

- To know the dominant players in the plumbing market.
- To find out the opinion of builders and contractors regarding CPVC pipes.
- To find out the major factors taken into consideration while choosing plumbing piping material by the builders and contractors.

- To know on which element company must work to compete with its competitors.

SCOPE OF THE STUDY

Every brand in the piping industry provides various plumbing materials to capture the market share. The main focus of this study is to increase the market share of Ashirvad and Finolex pipes in the Indian plumbing market. The scope of the study is:

- Based on the findings, Ashirvad and Finolex can differentiate its products with respect to their competitors' products.
- Measurement of performance is important for every company in any segment. Companies make strategies based on their current performance. Companies can measure their performance in the piping industry.
- Based on the analysis and findings, companies can design the products as per the needs, concerns and interests of the customers, which ultimately lead to customer satisfaction.

VALUE OF THE STUDY

The findings of the study will redound to the benefit of the society considering that plumbing systems in the homes contribute to a healthy place to live, lower operating costs and a sustainable lifestyle. The study will help the company to know its overall performance to its competitors. The company would be able to find the opinion of builders and contractors regarding CPVC pipes and flow guard technology. The company will get to know about current trends, main factors taken into consideration by customers while choosing plumbing material and on which attributes in terms of quality, pricing, availability and awareness, company needs to work to compete with its competitors. The given data would help the company formulate effective strategies to increase the market share of Ashirvad and Finolex pipes in plumbing market. For the researcher, the

Table 1: Related Studies on Piping Industry

Year	Authors	Publisher/Journal/Book/University/Proceeding	Topic
2016	Shaik Junaid Ahmed, Arati Birdar	International Journal of Engineering Science and Computing (IJESC)	The Comparative Study of PVC Pipe Industry Regarding to the PARAS PVC Pipes with its competitors.
2016	Vinay Kumar	Indian Institute of Planning and Management	The Market Study on ERW pipes in Punjab Market
2013	George Otieno Osewe	University of Nairobi	The effectiveness of Internet Advertising on Customer Behavior
2017	Pratik Nachane	Symbiosis Institute of Management Studies (SIMS)	Competitor Analysis of Pragati Leadership Institute
2017	Prashant Jayswal	Gujarat Technological University	Estimation of Market Potential for a Kant PVC pipe
2017	Niranjan Mohanta	International Journal of Commerce and Management Research	Applications and market of PVC pipe industry in India
2017	Shamindra Nath Sanyal, Saroj Kumar Datta, Asok Kumar Banerjee	International Journal of Pharmaceutical and Healthcare Marketing	Factors influencing prescribing decisions among physicians: an empirical study on generic drugs
2010	Ashli Owen-Smith, Claire Sterk, Frances McCarty, Dana Hankerson-Dyson, Ralph DiClemente	Journal of Alternative and Complementary Medicine	Development and Evaluation of a Complementary and Alternative Medicine Use Survey in African-Americans with Acquired Immune Deficiency Syndrome
2016	Dr. Suwarna Torgal	IOSR Journal of Mechanical and Civil Engineering	Non-Destructive Inspection of Pipe using Pipe Inspection Robot
2013	Prof. Nitinchandra R. Patel, Avinash Vasava, Jalesh G. Vasava, Alpesh V. Kunapara, Savan D. Patel	International Journal of Innovative Research in Science, Engineering and Technology	Comparative Analysis in Pipe Design by Analytical and Graphical methods for selection of materials
2015	Rathod Prakash Kumar	International Journal of Commerce and Management Research	Analytical Study of Branding & Expansion of Franchise Network of Pre School

study will help uncover the critical areas in the piping industry that many researchers were not able to explore Table 1. At the end of the study, the researcher would finally know about the influencers, motivators, dominant players and current trends in the plumbing market which will help ascertain the customer/consumer behavior.

LITERATURE REVIEW

Shaik Junaid Ahmed and Arati Birdar (2016) studied the competitive strength of Paras PVC company to know its major competitors, which brand of PVC pipe customer more prefer to buy, various factors of Paras PVC pipe which differs from its competitors, brand image of Paras PVC pipe, overall performance of company and on which marketing element company has to work to compete with its

competitors. Data was collected by survey method among retailers and whole sellers through questionnaires and analysis was done using MS Excel and Chi-Square test. It has been found that Astral and Ashirvad are major competitors of Paras PVC pipe. Credit policy of Paras company is more attractive offer among customers and doing business with Paras company is much profitable for customers. The overall performance of company is average. It has got good image among the customers and is stronger in marketing and organizing areas. Company should do something on product differentiation and new and attractive mediums of promotion should be adopted [1].

Vinay Kumar (2016) conducted a study among the distributors, retailers, dealers to

understand the ERW (Electric Resistance Welded) pipes in Punjab. Data collection was done through questionnaire and analysis was done using Statistical Package for the Social Sciences (SPSS). It has been found that Jindal Hisar and Ravindra are the main competitors of JPL, quality of Jindal pipe is excellent among distributors and retailers due to its bend ability, thread quality, weld quality and zinc coating. PVC pipes are swallowing the market of steel pipes because of low prices and many customers switch from Jindal pipes to other pipes because of unavailability of required sizes at the time of requirement. Proper means of communication and an effective advertisement can tend to increase in the sale of Jindal pipes.

George Otieno Osakwe (2013) highlighted the effectiveness of internet advertising on consumer behavior by conducting a case study among University of Nairobi students. The study used a case study research design and stratified sampling technique. Collection of primary data was done through questionnaires. Data collected was of both qualitative and quantitative type. For the analysis of qualitative data, content analysis was used and SPSS was used for the analysis of quantitative data. It has been found that internet advertising is an effective medium used by various companies in creating awareness regarding the products due to its usage by a large majority of people. Internet advertising influences the customer behavior and plays an important role in taking decisions related to the purchase of various products.

Pratik Nachane (2017) conducted a competitor analysis of Pragati Leadership Institute and content marketing using primary research and secondary research. Primary research was done on various insights collected via questionnaires and secondary research was conducted on competitors of Pragati leadership by referring various social media platforms i.e.

Facebook, Twitter, LinkedIn to discover their strategies, the ways of promoting and communication. It has been found that Dale Carnegie and Franklin Covey are the main competitors of Pragati leadership. Pragati leadership needs to work on its social media presence by concentrating on various platforms like Facebook, Twitter, and LinkedIn on which quality contents needs to be put up regularly to improve engagement with the audience and in turn improve its visibility. Pragati leadership also needs to diversify into other verticals like organizational development and should engage into outbound training programs for their clients.

Prashant Jayswal (2017) estimated the market potential for a Kant PVC Pipe based on the insights given by consumers and retailers. Data was collected through questionnaires, interviews, abstract forms and analysis was done separately for consumers and retailers through MS Excel. Studies have shown that majority of the prospects are using Kant PVC pipes. They are good in terms of quality, durability, service, delivery, after sales services, offers and discounts. Kant PVC pipes are found to be reasonable in terms of price. Company needs to maintain the same level services with related to price, quality, quantity, availability etc. Advertising would be more effective. Company needs to expand customer network to increase the product access to the customers. Small incentives can be given to the customers to inculcate interest among them to buy pipes.

Niranjan Mohanta (2017) studied the applications and market of PVC for piping industry. PVC is used in plastic pressure pipe systems for pipelines in the water and sewer industries because of its inexpensive nature and flexibility. Over 50% of the PVC manufactured is used in construction. PVC is cheap and easy to assemble. It has been replacing traditional building materials such as wood, concrete and clay. PVC is used widely even though its production

affects the natural environment and human health. PVC is used as insulation on electric wires. It is also used to create the voids in the materials which provide additional thickness to the material. UPVC is used in the building industry as a material which requires less maintenance. A significant volume of polymers are used in the production of thermoplastic pipe systems. In the extrusion process of pipes, PVC is used. Usage of PVC in pipe extrusion process accounts to cost advantages due to its dry blends [6].

Shamindra Nath Sanyal, Saroj Kumar Datta, and Asok Kumar Banerjee (2017) carried out an empirical study among the physicians across six major cities in eastern India to understand the attitude of physicians while prescribing a generic drug under medical conditions and to identify various factors that influences a physician towards prescribing a branded generic drug. The study was based on the introduction of some significant changes into modified technology acceptance model (TAM) and introduced a new model with title the extended tam for product usage (TETPU). Various constructs i.e. perceived utility perceived no need, availability of alternatives, perceived cost, other influencing factors i.e. product brand equity, corporate brand equity, opinion leaders as communicators of brand, physicians' perceptions, pharmaceutical brand age in brand awareness were used in studying the physicians' attitude. It has been found that the attitude of the physician is influence by various factors and perceived utility of pharmaceutical product largely influences the attitude in Indian context. Effective cost of the generic drugs should be low, and it should correlate with the brand equity. Factors taken into consideration in the study across the pharmaceutical industry are equally relevant in the other industries, so the

proposed model TETPU can be used for research in any other industry [2].

Ashli Owen-Smith, Claire Sterk, Frances McCarty, Dana Hankerson-Dyson, Ralph Di-Clemente (2013) conducted a study among African-American individuals with acquired immune deficiency syndrome to develop and understand the usage of complementary and alternative medicine among the population. Data was collected in two phases and mixed methods design was used. Content analysis technique in SPSS Version 17.0 was used for the analysis of data. Based on the analysis, it has been found that participants identified many therapies listed on the original CAM survey that they did not feel were relevant to their experiences like they did not feel that HIV-positive individuals used special diets, practiced cleansing regimens or took health food supplements. Participants commented that though they felt that vitamins should be included, the examples provided on the original survey (Vitamin E and Selenium) were not the most commonly used vitamins by HIV-positive patients [3].

Dr. Suwarna Torgal (2016) explained the designing of a pipe inspection robot using static analysis. Transportation through pipe is among one of the ways in which large quantity of material is supplied from one place to another in an economical manner. As the flow is continues and in certain cases it cannot stop, due to this continuous flow, wear and tear, corrosion, etc. in pipe takes place. Inspection of pipeline is an important task so as to ensure there are no defects that may eventually lead to problems such as leakage, which may lead to explosion. Pipe inspection system consists of a fore leg system, a rear leg system and a central body. Each wheel of robot is at an angle of 120 degrees with each other and wireless camera is used for inspection of pipe. The robot can inspect any pipe within the range of 48–60 cm [4].

Prof. Nitinchandra R. Patel, Avinash Vasava, Jalesh G. Vasava, Alpesh V. Kunapara, and Savan D. Patel (2013) analyzed the various pipe design for the selection of materials. The study consists of analysis of pipe flow by considering stresses induced in the materials of different standards with the help of working medium as water at normal temperature. Analysis is done using analytical and graphical methods. It has been found that tangential stress is maximum at the inner surface and minimum at outer surface and the radial stress is maximum at inner surface and zero at the outer surface of the pipe. In thick pipes, the stresses over the section of the walls are uniformly distributed and they develop both tangential and radial stresses with values which are dependent upon the radius of the element under consideration [5].

Rathod Prakash Kumar (2016) carried an analytical study of branding and expansion of franchise network of preschool study of Kidzee school. The research design used is the combination of Exploratory and Descriptive designs. Data was collected through primary sources i.e. questionnaire, interview and secondary sources i.e. internet, magazines, journals, text books. Statistical tools like mean score, percentage, average etc. were used for analysis of data. It has been found that preschool franchise is profitable. People are satisfied with the environment of KIDZEE. Franchising is the safest to start best way to run the business. There is a need of various tools for branding and expansion of franchise network of Preschool. Emphasis should be done on personal advertisement and expansion of its advertisement. More franchise should be opened to ensure availability of good network.

METHODOLOGY

Research methodology makes the most important contribution towards the enrichment of study. In a research there are numerous methods and procedure to be

applied but it is the nature of the problem under investigation that determines the adoption of a method for all studies. Methods selected should always be appropriate to the problem under investigation.

This study is based on mixed methodology in research. This research is a quantitative and qualitative research where sources of information are collected from questionnaires. To find the statistical differences between data, quantitative research is being used. This study is also based on qualitative research to examine feelings, attitudes and motivation behind respondents. Both are inductive in nature and based on empirical observations. These two set of research base can be complementary one another but never competitive. To achieve the objectives of the survey, a structured questionnaire was designed to gather primary data from respondents. We conducted a face to face survey wherein each survey contained a copy of the questionnaire. The given insights by builders and contractors were analyzed using MS Excel. This study is interested in describing the characteristics of population or phenomenon, thus the study is descriptive study.

Data Collection Method: The methods of collecting data were being used in study are primary and secondary sources.

Primary Sources

- Questionnaires
- Interviews with builders and contractors

Secondary Sources

- Database by Indian Institute of Architects (IIA)
- Builders listed in CREDAI
- Various websites like proptiger.com, just dial, Google search, 99acres, magic bricks, housing.com etc.

Research Approach: Survey method

Sample Size: 209

Sample Units: Builder: 122, Contractor: 87

Area of Research: South Kolkata (Joka, Thakurpukur, Behala, Chetla, Majerhat, Kalighat, Hazra, Tollygunge, Ballygunge, Alipore)

Contact Method: Telephonic and cold calling

Research Instrument: Questionnaire

Sampling Method: The techniques used for conducting the study were convenience sampling technique as sample of respondents was chosen according to convenience.

Statistical Tools: Statistical tools like mean score, percentage, average etc. were used in study for analysis of data. Charts, Figures and Graphs were also used to make the data more represent able and easy to understand. The tools used in this study were MS-EXCEL and MS-WORD.

DATA ANALYSIS AND INTERPRETATION

Category I: The sample size of the following data is 122 builders in the South Kolkata region.

Hot and Cold Portable Water Supply Pipes

Hot and Cold Portable Water Supply

Pipes used by Builders in PVC Category

Builders in South Kolkata region are using various brands of hot and cold portable water supply pipes in PVC category i.e. Ashirwad, Astral, Finolex, Supreme, Oriplast, Policop, Skipper, Utkarsh, Wavin etc. Hot and Cold Portable Water Supply Pipes used by Builders in PVC Category means to find out the count for various brands in PVC category used by builders.

In Table 2, N depicts the total count for various pipes in PVC category (N=138).

Table 2. Count of brand in PVC category.

Brand	Total N (%)
Ashirvad	26(18.8)
Astral	34(24.6)
Finolex	4(2.9)
Supreme	62(44.9)
Others	12(8.7)

Analysis: It is found that the count for Ashirvad is 18.8%, Astral is 24.6%, Finolex is 2.9%, Supreme is 44.9%, others (include Oriplast, Policop, Skipper, Utkarsh and Wavin) is 8.7%.

Interpretation: From the Figure 1, it was found that Supreme and Astral are the major competitors of Ashirvad and Finolex pipes. Supreme is the big brand in PVC market and is used by 45% builders in South Kolkata region.

Hot and Cold Portable Water Supply

Pipes used by Builders in CPVC Category

Hot and Cold Portable Water Supply Pipes used by Builders in CPVC Category means to find out the count for various brands of hot and cold portable water supply pipes i.e. Ashirwad, Astral, Finolex, Supreme, HB, Oriplast, Skipper, Utkarsh etc used by builders in South Kolkata region.

In Table 3, N depicts the total count for pipes in CPVC category (N=166).

Table 3. Count of brand in CPVC category.

Brand	Total N(%)
Ashirvad	44(26.5)
Astral	40(24.1)
Finolex	2(1.2)
Supreme	68(41.0)
Others	12(7.2)

Analysis: It is found that the count for Ashirvad is 26.5%, Astral is 24.1%, and Finolex is 1.2%, Supreme is 41%, others (include HB, Oriplast, Skipper and Utkarsh) is 7.2%.

Interpretation: From the Figure 1 & 2, I came to know that Supreme is the major competitor of Ashirvad and Finolex in CPVC segment. Supreme is again the big brand in CPVC market and is used by 41% of the builders in South Kolkata region.

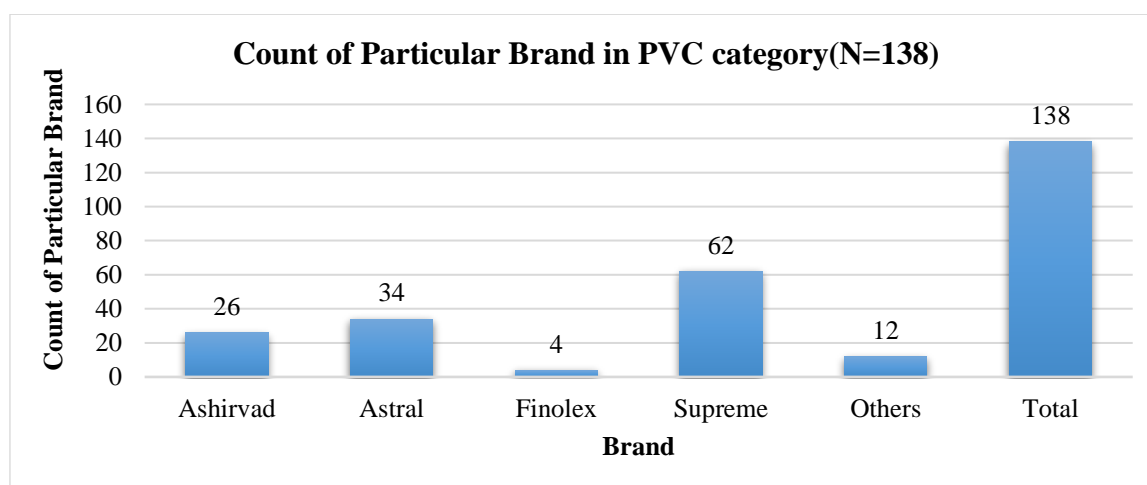


Fig. 1. Respondents using particular brand in PVC category.

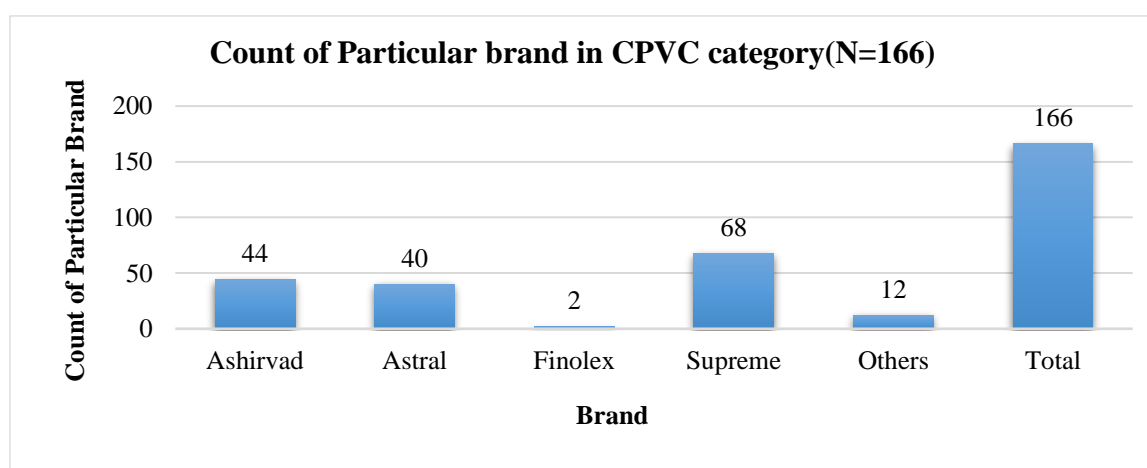


Fig. 2. Respondents using particular brand in CPVC category.

Hot and Cold Portable Water Supply Pipes used in GI Category

In GI category, there are various hot and cold portable water supply pipes i.e. Jindal, Tata, H.B etc which are used by builders in South Kolkata. Hot and Cold Portable Water Supply Pipes used in GI Category means to find out the count for various brands of pipes used by builders in GI category.

In Table 4, N depicts the total count for pipes in GI category (N=22).

Table 4. Count of brand in GI category.

Brand	Total N(%)
Jindal	10(45.5)
Tata	10(45.5)
H.B	2(9.1)

Analysis: It is found that the count for Jindal is 45.5%, Tata is 45.5% and H.B is 9.1%.

Interpretation: From the Figure 3, it is found that Jindal and Tata are big brand in GI category and both are equally used by builders.

Hot and Cold Portable Water Supply Pipes used in UPVC Category

Hot and Cold Portable Water Supply Pipes used by Builders in UPVC Category means to find out the count for various brands of hot and cold portable water supply pipes i.e. Ashirwad, Astral, Finolex, Supreme, Oriplast, Polycop, Skipper, Utkarsh etc used by builders in South Kolkata region.

In Table 5, N depicts the total count for pipes in UPVC category (N=144).

Table 5. Count of brand in UPVC category.

Brand	Total N (%)
Ashirvad	34(23.6)
Astral	36(25.0)
Finolex	2(1.4)
Supreme	60(41.7)
Others	12(8.3)

Analysis: It is found that the count for Ashirvad is 23.6%, Astral is 25.0%, and Finolex is 1.4%, Supreme is 41.7%, others

(include Oriplast, Polycop, Skipper and Utkarsh) is 8.3%.

Interpretation: From the Figure 4, it is found that Supreme and Astral are major competitors of Ashirvad and Finolex in UPVC category. Supreme pipes are used by 42% of the builders interviewed and it is a big name in UPVC category.

Opinion about CPVC Pipes

Opinion about CPVC Pipes means to find out the builders' opinion regarding quality, availability, pricing, durability, ease of use, awareness, communication from company and schemes/offers of the CPVC pipes.

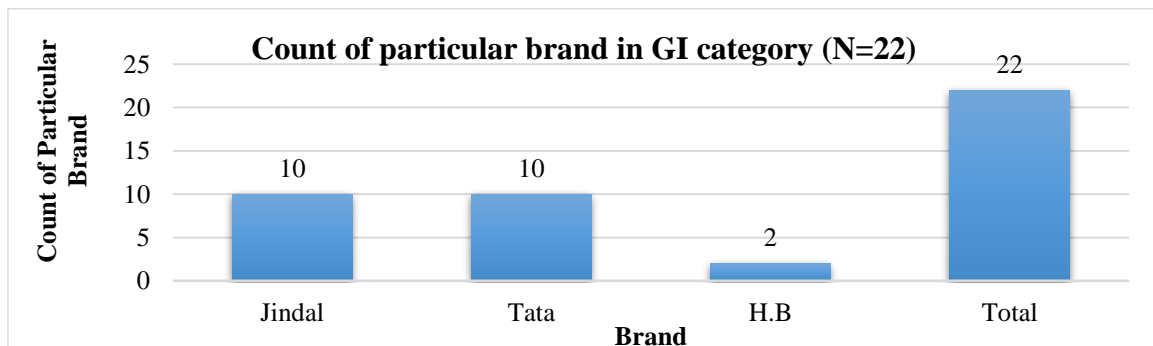


Fig. 3. Respondents using particular brand in GI category.

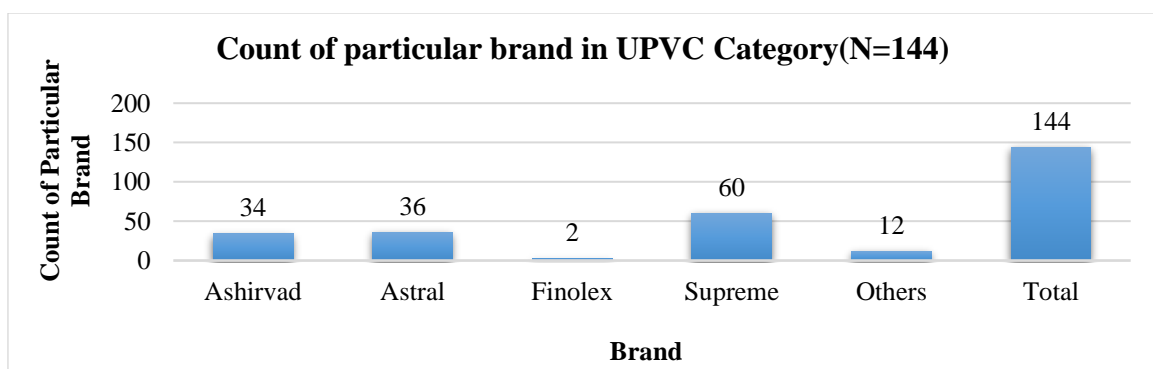


Fig. 4. Respondents using particular brand in UPVC category.

Table 6. Opinion regarding CPVC pipes by builders.

Attribute	Quality	Availability	Pricing	Durability	Ease of Use
Opinion	Total N(%)	Total N(%)	Total N(%)	Total N(%)	Total N(%)
0	0(0)	8(6.6)	0(0)	0(0)	12(9.8)
1	0(0)	0(0)	12(9.8)	0(0)	0(0)
2	14(11.5)	42(34.4)	96(78.7)	28(23.0)	18(14.8)
3	108(88.5)	72(59.0)	14(11.5)	94(77.0)	92(75.4)

Attribute	Awareness	Communication from Company	Schemes/Offers
Opinion	Total N(%)	Total N(%)	Total N(%)
0	36(29.5)	26(21.3)	68(55.7)
1	0(0)	2(1.6)	4(3.3)
2	48(39.3)	36(29.5)	24(19.7)
3	38(31.1)	58(47.5)	26(21.3)

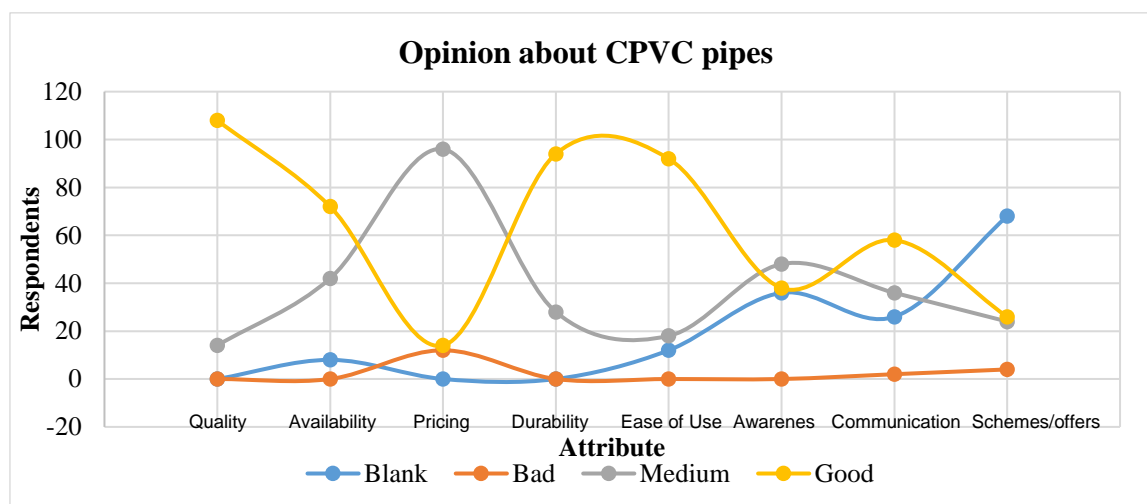


Fig. 5. Opinion of builders regarding various attributes of CPVC pipes.

In Table 6, N depicts the total number of builders who have given their opinion about CPVC pipes. Under opinion, “3” represents good/High, “2” represents Okay/Medium, “1” represents low/bad, “0” represents blank.

Interpretation: From the Figure 3,4 & 5, it is found that quality of CPVC pipes is good. They are easily available. Builders have found CPVC pipes durable. Communication by various companies which manufactures CPVC pipes is good. Pricing and awareness are the areas of concern for Ashirvad and Finolex and company must do something for that.

Major Factors Taken into Consideration while Choosing Plumbing Piping Material by Builders

Builders take various criteria i.e. quality, convenience, technology, brand name, availability, pricing, durability, ease of use, awareness, communication from company, schemes/offers into consideration while choosing plumbing piping material.

In Table 7, N depicts the total number of builders who have been interviewed (N=122). Under opinion in Table 7, “1” represents those respondents who have selected particular attribute as major factor and “0” represents “Blank”.

Interpretation: From the Figure 6, it is found that quality of pipes is the major factor taken into consideration by builders while choosing plumbing piping material. Apart from quality, pricing and durability are the other two factors taken into consideration.

Element on Which Company Must Work to Compete with the Competitors as per the Builders

As per the builders, the company must work on various elements in terms of quality, availability and awareness to compete with its competitors, and ultimately increase its market share.

Table 7. Factors influencing the builders in choosing piping material.

Attribute	Quality	Convenience	Technology	Brand Name	Availability
Opinion	Total N (%)	Total N (%)	Total N (%)	Total N (%)	Total N (%)
0	22 (18.0)	110 (90.2)	60 (49.2)	76 (62.3)	50 (41.0)
1	100 (82.0)	12 (9.8)	62 (50.8)	46 (37.7)	72 (59.0)

Attribute	Pricing	Durability	Ease of Use	Awareness	Communication from Company	Schemes/offers
Opinion	Total N (%)	Total N (%)	Total N (%)	Total N (%)	Total N (%)	Total N (%)
0	40 (32.8)	42 (34.4)	64 (52.5)	98 (80.3)	96(78.7)	114 (93.4)
1	82 (67.2)	80 (65.6)	58 (47.5)	24 (19.7)	26 (21.3)	8 (6.6)

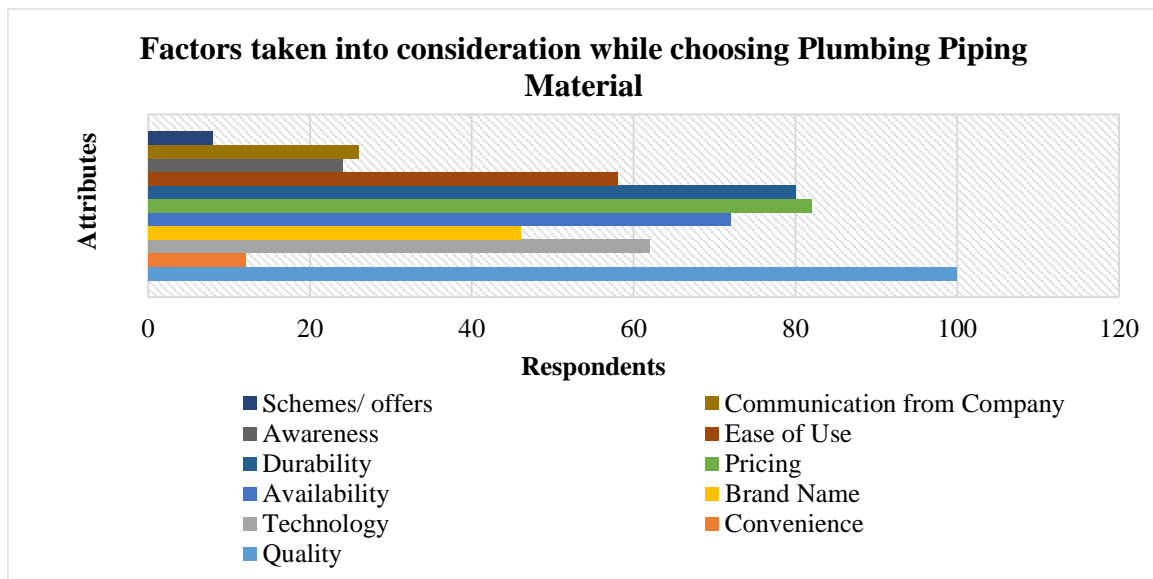


Fig. 6. Factors taken into consideration by builders while choosing Plumbing Piping Material.

Table 8. Attributes of improvement in terms of quality.

Attribute	Leakage proof	Durability	Physical Strength	Peace of Mind	Reliability	Brand Image
Opinion	Total N (%)	Total N (%)	Total N (%)	Total N (%)	Total N (%)	Total N (%)
0	10 (8.2)	24 (19.7)	40 (32.8)	114 (93.4)	46 (37.7)	74 (60.7)
1	112 (91.8)	98 (80.3)	82 (67.2)	8 (6.6)	76 (62.3)	48 (39.3)

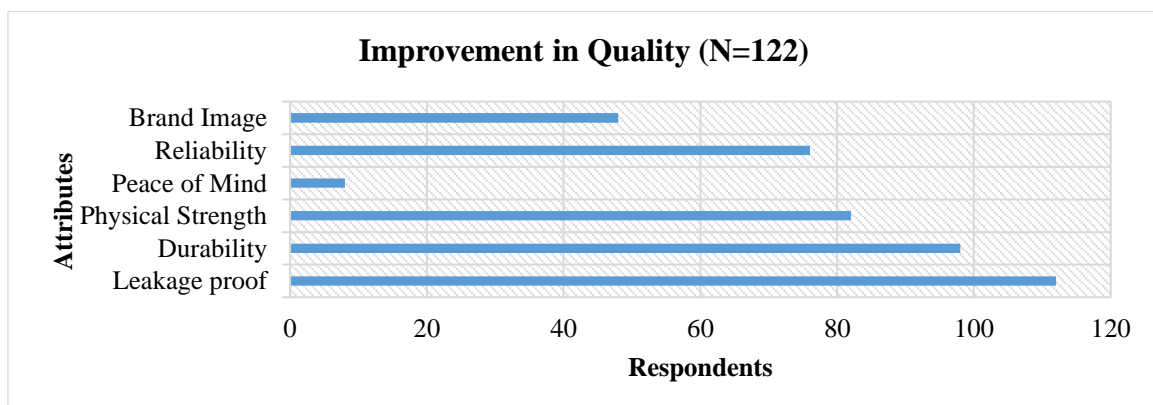
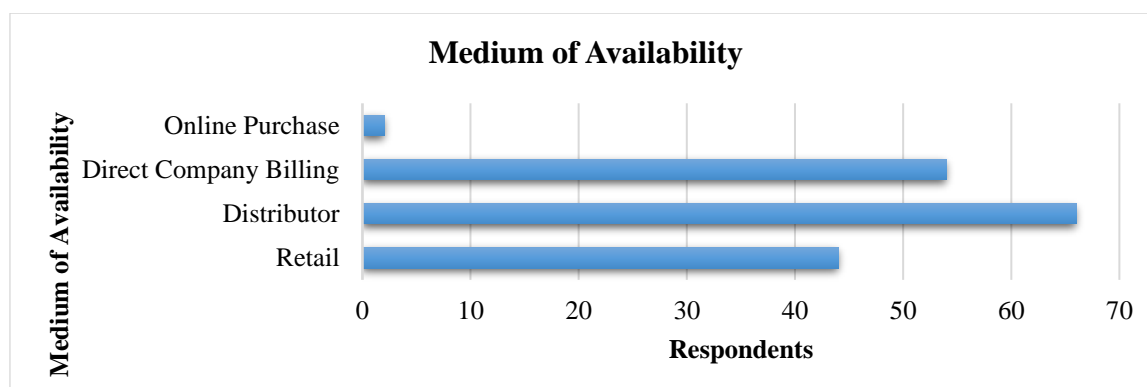


Fig. 7. Respondents choosing particular attribute as area of improvement.

Table 9. Opinion of Builders Regarding the Medium of Availability.

Medium of Availability	Retail	Distributor	Direct Company Billing	Online Purchase
Opinion	Total N (%)	Total N (%)	Total N (%)	Total N (%)
0	78 (63.9)	56 (45.9)	68 (55.7)	120 (98.4)
1	44 (36.1)	66 (54.1)	54 (44.3)	2 (1.6)

**Fig. 8. Respondents choosing particular medium of availability of pipes.**

Areas of Improvement in terms of Quality

Areas of Improvement in terms of Quality means to find out the elements in terms of quality i.e. leakage proof, durability, physical strength, peace of mind, reliability, brand image on which the company must work to compete with its competitors as per the builders.

In Table 8, N depicts the total number of builders who have been interviewed (N=122). Under opinion Table 8, “1” represents those respondents who have selected attribute as one of the parameters and “0” represents “Blank”.

Interpretation: From the Figure 7, it is found that company should make sure that pipes manufactured are leakage proof, durable and has got good physical strength.

Medium of availability of pipes

Pipes are available to the builders through various mediums i.e. retail, distributor, direct company billing and online purchase.

In Table 9, N depicts the total number of builders who have been interviewed (N=122). Under opinion in Table 9, “1” represents those respondents who have

selected medium as medium of availability and “0” represents “Blank”.

Interpretation: From the Figure 6,7 & 8, it is found that 54% of the builders wants the pipes to be available to them through distributor. Company should make sure that it has large distributor based in the market.

Table 10. Opinion by Builders Regarding Medium of Awareness.

Awareness	Sales Person	Social Media	Company Organized Event
Opinion	Total N (%)	Total N (%)	Total N (%)
0	0 (0)	108 (88.5)	100 (82.0)
1	122 (100.0)	14 (11.5)	22 (18.0)

Medium of awareness of pipes

Companies use various medium of communication i.e. Sales Person, Social Media, Company Organized Events to create awareness regarding its products among the customers.

In Table 10, N depicts the total number of builders who have been interviewed (N=122). Under opinion in Table 10, “1” represents those respondents who have selected medium as medium of awareness and “0” represents “Blank”.

Interpretation: From the Figure 9, it is found that 100% of the builders wants sales person as the medium to create awareness regarding pipes among them.

Category II: The sample size of the following data is 87 contractors in the South Kolkata region.

Hot and Cold-water Supply Pipes Hot and Cold Portable Water Supply Pipes Used by Contractors in PVC Category

Contractors in South Kolkata region are using various brands of hot and cold portable water supply pipes in PVC category i.e. Ashirvad, Astral, Finolex, Supreme, Oriplast, Policop, Skipper, Utkarsh, Wavin etc. Hot and Cold Portable Water Supply Pipes used by contractors in PVC Category means to find out the count for various brands in PVC category used by contractors.

In Table 11, N depicts the total count of pipes in the PVC category (N=105).

Table 11. Count of Brand in PVC Category.

Brand	Total N (%)
Ashirvad	17 (16.2)
Astral	23 (21.9)
Finolex	6 (5.7)
Supreme	53 (50.5)
Others	6 (5.7)

Analysis: It is found that the count for Ashirvad is 16.2%, Astral is 21.9%, Finolex is 5.7%, Supreme is 50.5%, others (include Oriplast, Policop, Skipper, Utkarsh and Wavin) is 5.7%.

Interpretation: From the Figure 10, it was found that Supreme and Astral are the major competitors of Ashirvad and Finolex pipes. Supreme is the big brand in PVC market and is used by 51% contractors in South Kolkata region.

Hot and Cold Portable Water Supply Pipes used by Contractors in CPVC Category

Hot and Cold Portable Water Supply Pipes used by Contractors in CPVC Category means to find out the count for various brands of hot and cold portable water supply pipes i.e. Ashirvad, Astral, Finolex, Supreme, HB, Oriplast, Skipper, Utkarsh etc used by contractors in South Kolkata region.

Table 12. Count of Brand in CPVC Category.

Brand	Total N (%)
Ashirvad	28 (21.4)
Astral	36 (27.5)
Finolex	7 (5.3)
Supreme	52 (39.7)
Others	8 (6.1)

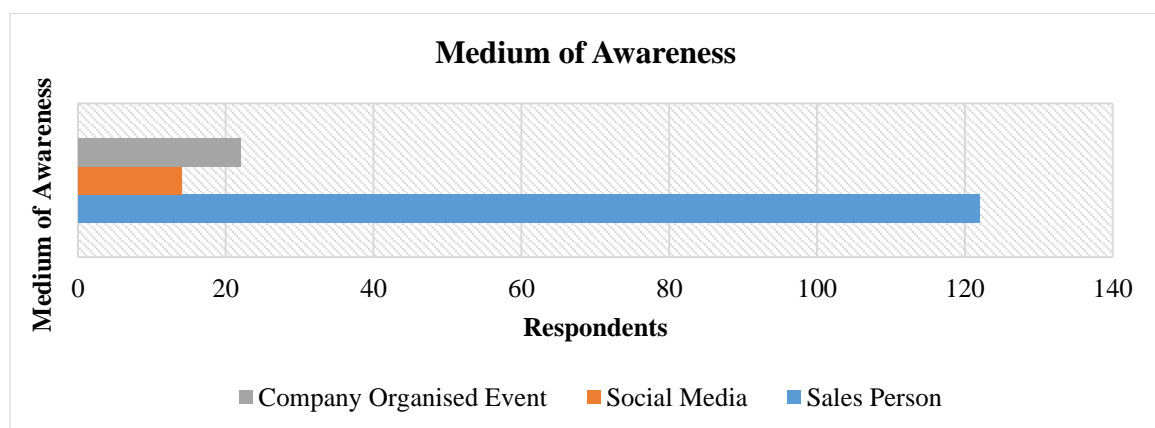


Fig. 9. Respondents choosing particular medium of awareness of pipes.

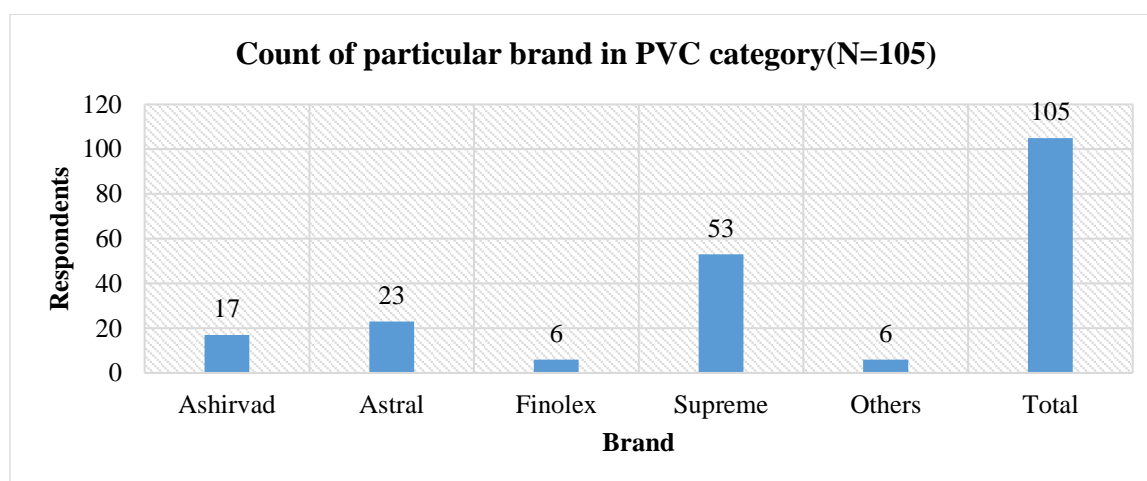


Fig. 10. Respondents using particular brand in PVC category.

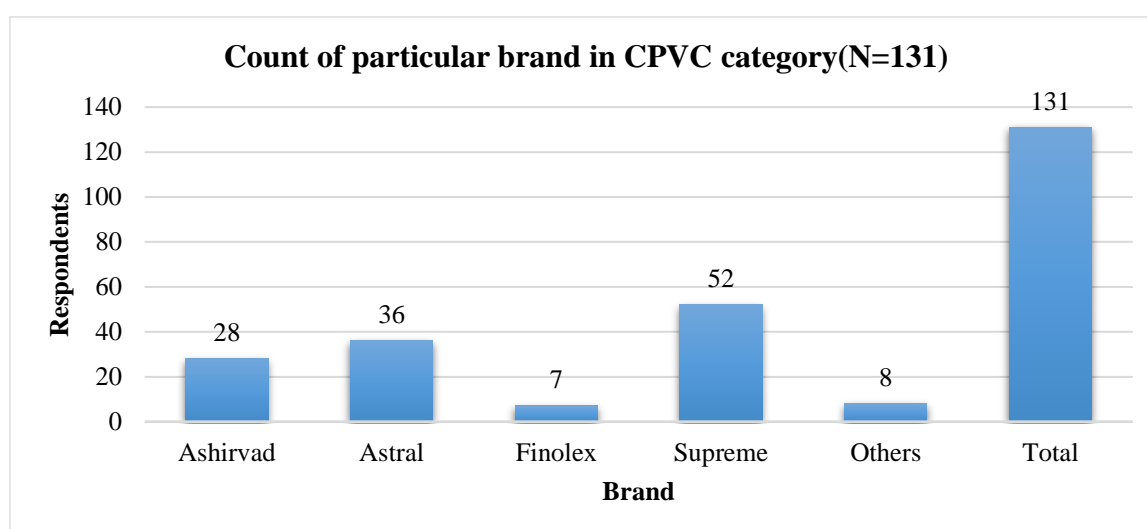


Fig. 11. Respondents using particular brand in CPVC category.

In Table 12, N depicts the total count of pipes in the CPVC category (N=131).

Analysis: It is found that the count for Ashirvad is 21.4%, Astral is 27.5%, and Finolex is 5.3%, Supreme is 39.7%, others (include HB, Oriplast, Skipper and Utkarsh) is 6.1%.

Interpretation: From the Figure 9,10 & 11, I came to know that Supreme is the major competitor of Ashirvad and Finolex in CPVC segment. Supreme is again the big brand in CPVC market and is used by 40% contractors in South Kolkata region.

Hot and Cold Portable Water Supply Pipes used by Contractors in GI Category

In GI category, there are various hot and cold portable water supply pipes i.e. Jindal, Tata, H.B, Zenith etc which are used by contractors in South Kolkata. Hot and Cold Portable Water Supply Pipes used in GI Category means to find out the count for various brands of pipes used by contractors in GI category.

In Table 13, N depicts the total count of pipes in the GI category (N=29).

Table 13. Count of Brand in GI Category.

Brand	Total N (%)
HB	1 (3.4)
Jindal	11 (37.9)
Tata	15 (51.7)
Zenith	2 (6.9)

Analysis: From the Table 13, it is found that the count for HB is 3.4%, Jindal is 37.9%, Tata is 51.7% and Zenith is 6.9%.

Interpretation: It is found that Tata is the major brand in the GI category which is used by 52% contractors in the South Kolkata region (Figure 12).

Hot and Cold Portable Water Supply Pipes used by Contractors in UPVC Category

Hot and Cold Portable Water Supply Pipes used by Contractors in UPVC Category means to find out the count for various brands of hot and cold portable water supply pipes i.e. Ashirvad, Astral, Finolex, Supreme, Oriplast, Polycop, Skipper, Utakarsh etc used by contractors in South Kolkata region.

In Table 14, N depicts the total count of pipes in the UPVC category (N=114).

Analysis: It is found that the count for Ashirvad is 20.2%, Astral is 24.6%, Finolex is 6.1%, Supreme is 42.1%, others (include

Oriplast, Polycop, Skipper and Utakarsh) is 7.0%.

Table 14. Count of Brand in UPVC Category.

Brand	Total N (%)
Ashirvad	23 (20.2)
Astral	28 (24.6)
Finolex	7 (6.1)
Supreme	48 (42.1)
Others	8 (7.0)

Interpretation: From the Figure 13, it is found that Supreme and Astral are major competitors of Ashirvad and Finolex in UPVC category. Supreme pipes are used by 42% of the builders interviewed and it is a big name in UPVC category.

Opinion about CPVC Pipes

Opinion about CPVC Pipes means to find out the opinion of contractors regarding quality, availability, pricing, durability, ease of use, awareness, communication from company and schemes/offers of the CPVC pipes.

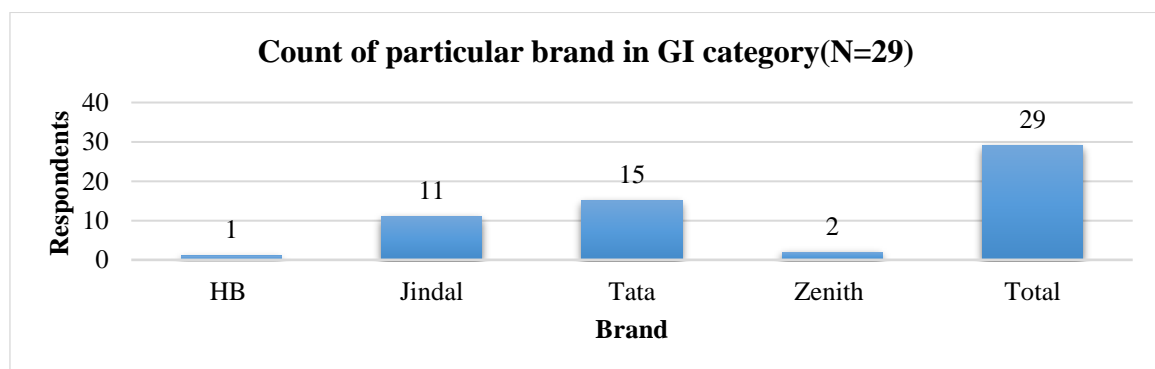


Fig. 12. Respondents using particular brand in GI category.

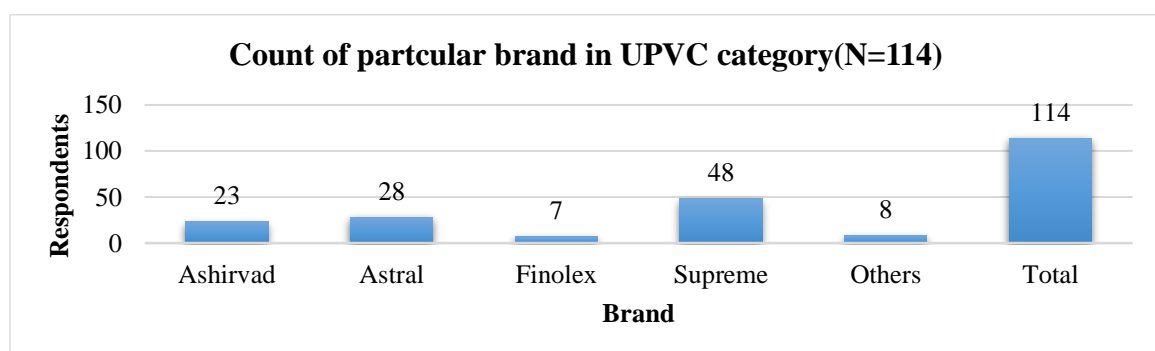
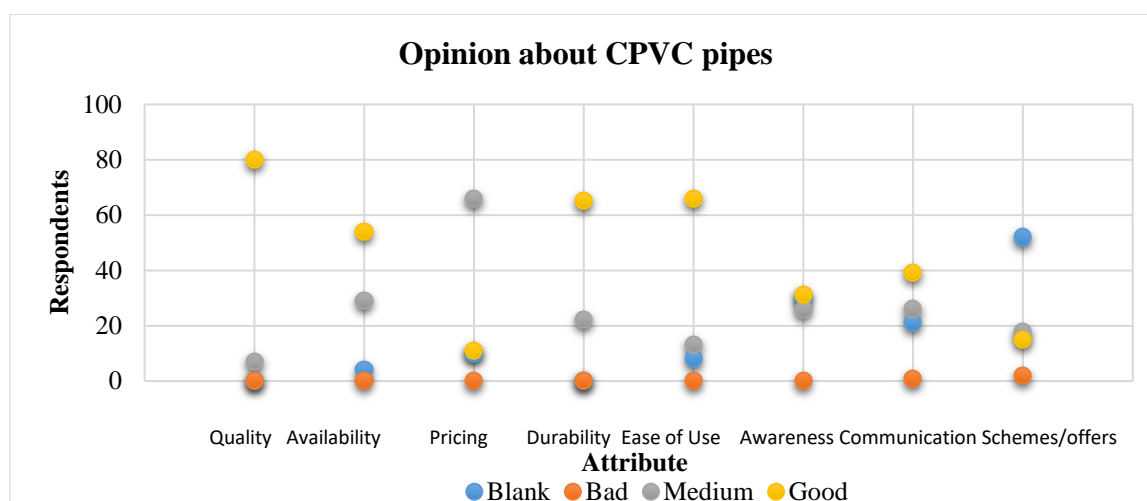


Fig. 13. Respondents using particular brand in UPVC category.

Table 15. Opinion Regarding CPVC Pipes by Contractors.

Attribute	Quality	Availability	Pricing	Durability	Ease of Use
Opinion	Total N (%)	Total N (%)	Total N (%)	Total N (%)	Total N (%)
0	0 (0)	4 (4.6)	10 (11.5)	0 (0)	8 (9.2)
1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
2	7 (8.0)	29 (33.3)	66 (75.9)	22 (25.3)	13 (14.9)
3	80 (92.0)	54 (62.1)	11 (12.6)	65 (74.7)	66 (75.9)

Attribute	Awareness	Communication from Company	Schemes/Offers
Opinion	Total N (%)	Total N (%)	Total N (%)
0	30 (34.5)	21 (24.1)	52 (59.8)
1	0 (0)	1 (1.1)	2 (2.3)
2	26 (29.9)	26 (29.9)	18 (20.7)
3	31 (35.6)	39 (44.8)	15 (17.2)

**Fig. 14. Opinion of contractors regarding various attributes of CPVC pipes.****Table 16. Factors Influencing the Contractors in Choosing Piping Material.**

Attribute	Quality	Convenience	Technology	Brand Name	Availability
Opinion	Total N (%)	Total N (%)	Total N (%)	Total N (%)	Total N (%)
0	13 (14.9)	75 (86.2)	44 (50.6)	56 (64.4)	37 (42.5)
1	74 (85.1)	12 (13.8)	43 (49.4)	31 (35.6)	50 (57.5)

Attribute	Pricing	Durability	Ease of Use	Awareness	Communication from Company	Schemes/offers
Opinion	Total N (%)	Total N (%)	Total N (%)	Total N (%)	Total N (%)	Total N (%)
0	20 (23.0)	33 (37.9)	42 (48.3)	75 (86.2)	66 (75.9)	81 (93.1)
1	67 (77.0)	54 (62.1)	45 (51.7)	12 (13.8)	21 (24.1)	6 (6.9)

In Table 15, N depicts the total number of contractors who have given their opinion about CPVC pipes. Under opinion, “3” represents good/high, “2” represents Okay/Medium, “1” represents low/bad, “0” represents blank.

Interpretation: It is found that CPVC pipes are good in terms of quality, availability, and durability, ease of use, awareness and communication by company. Pricing of CPVC pipes is a concern for contractors and companies

should do something for that (Figure 12,13 & 14).

Major Factors Taken into Consideration while Choosing Plumbing Piping Material by Contractors

Contractors take various criteria i.e. quality, convenience, technology, brand name, availability, pricing, durability, ease of use, awareness, communication from company, schemes/offers into consideration while choosing plumbing piping material.

In Table 16, N depicts the total number of contractors who have been interviewed (N=87). Under opinion in Table 16, “1” represents those respondents who have ultimately increase its market share.

Areas of Improvement in terms of Quality

Areas of Improvement in terms of Quality means to find out the elements in terms of quality i.e. leakage proof, durability, physical strength, peace of mind, reliability, brand image on which the company must work to compete with its competitors as per the contractors.

In Table 17, N depicts the total number of contractors who have been interviewed (N=87). Under opinion in Table 17, “1” represents those respondents who have

selected particular attribute as major factor and “0” represents “Blank”.

Interpretation: It is found that quality, pricing are the main factors taken into consideration by contractors while choosing plumbing piping material (Figure 15).

Element on which Company must work to Compete with the Competitors as per the Contractors

As per the contractors, the company must work on various elements in terms of quality, availability and awareness to compete with its competitors, and

selected attribute as one of the parameters and “0” represents “Blank”.

Interpretation: From the Figure 16, it is found that the company should make sure that the pipes manufactured are leakage proof, durable and has good physical strength.

Medium of availability of pipes

Pipes are available to the contractors through various mediums i.e. retail, distributor, direct company billing and online purchase.

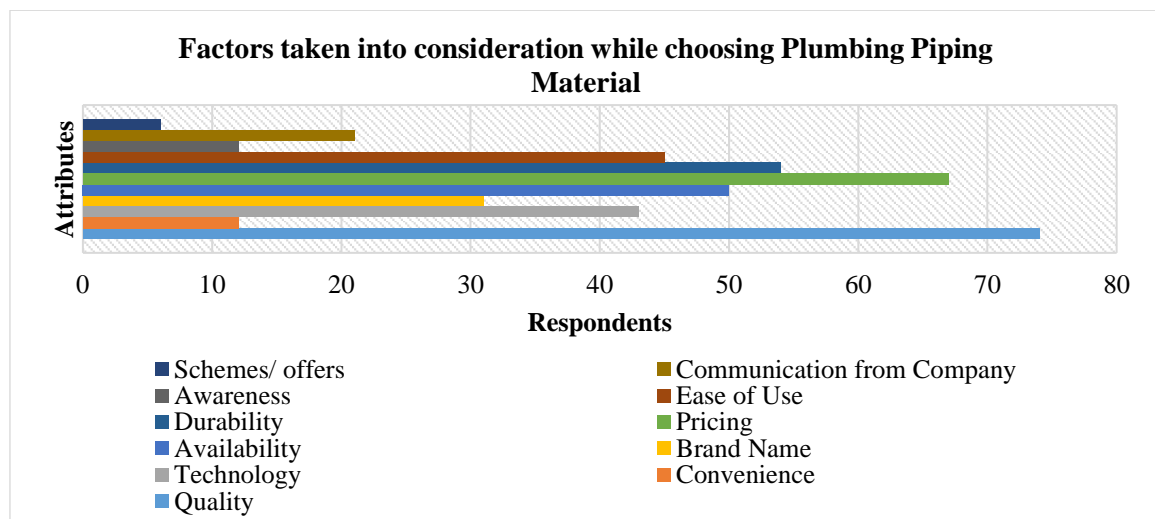
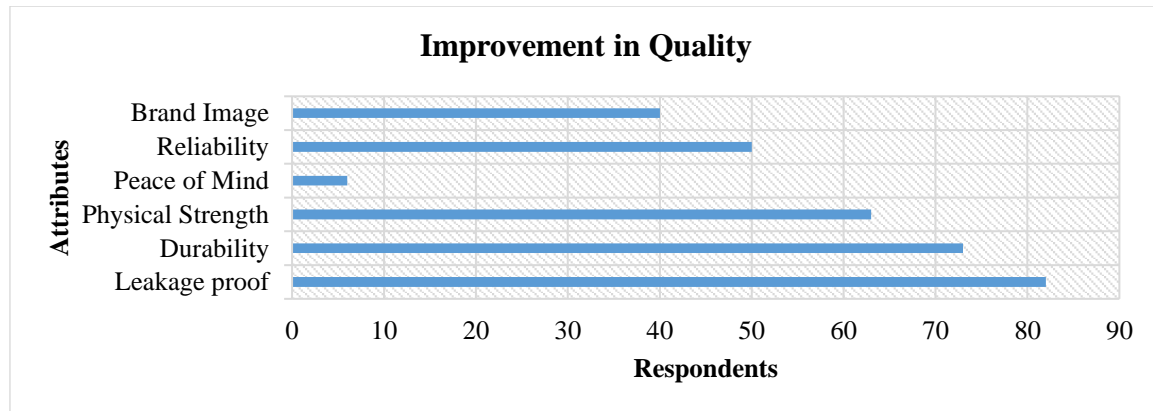


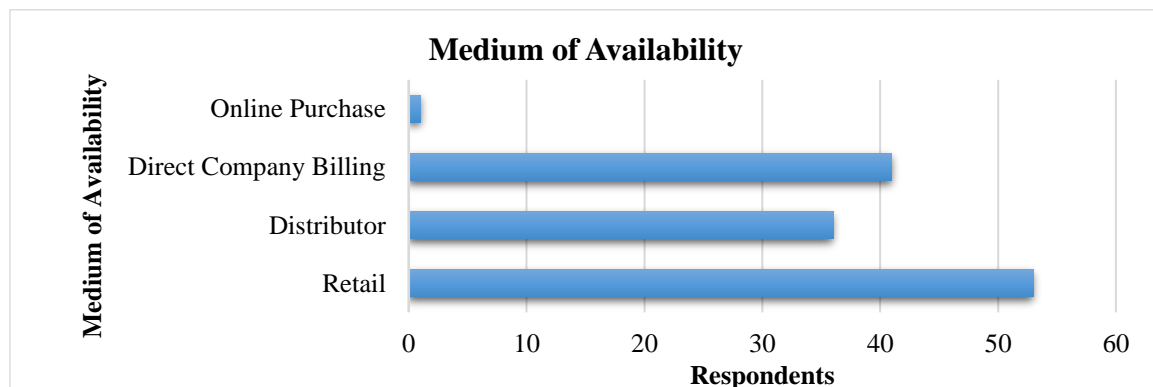
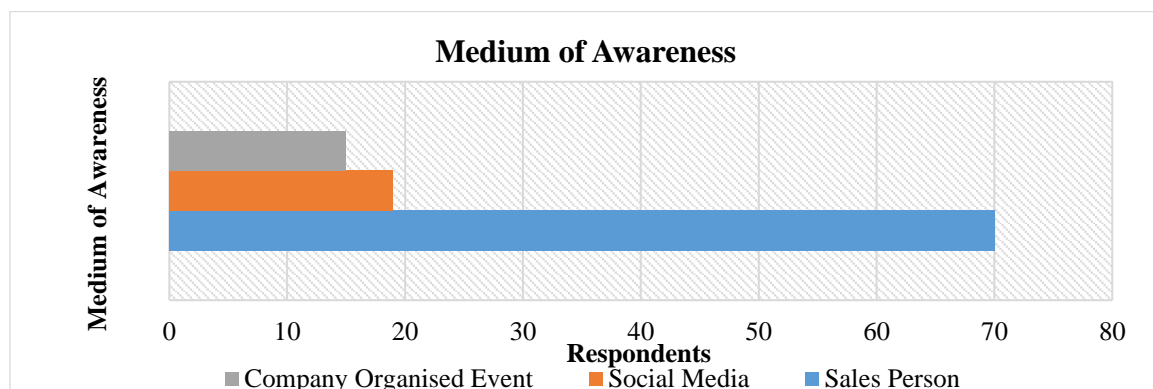
Fig. 15. Factor taken into consideration by contractors while choosing Plumbing Piping Material.

Table 17. Attributes of improvement in terms of quality.

Attribute	Leakage proof	Durability	Physical Strength	Peace of Mind	Reliability	Brand Image
Opinion	Total N (%)	Total N (%)	Total N (%)	Total N (%)	Total N (%)	Total N (%)
0	5 (5.7)	14 (16.1)	24 (27.6)	81 (93.1)	37 (42.5)	47 (54.0)
1	82 (94.3)	73 (83.9)	63 (72.4)	6 (6.9)	50 (57.5)	40 (46.0)

**Fig. 16.** Respondents choosing particular attribute as area of improvement.**Table 18.** Opinion of contractors regarding the medium of availability.

Medium of Availability	Retail	Distributor	Direct Company Billing	Online Purchase
Opinion	Total N (%)	Total N (%)	Total N (%)	Total N (%)
0	34 (39.1)	51 (58.6)	46 (52.9)	86 (98.9)
1	53 (60.9)	36 (41.4)	41 (47.1)	1 (1.1)

**Fig. 17.** Respondents choosing particular medium of availability of pipes.**Fig. 18.** Respondents choosing particular medium of awareness of pipes.

**Table 19. Opinion of Contractors
Regarding the Medium of Awareness.**

Awareness	Sales Person	Social Media	Company Organised Event
Opinion	Total N (%)	Total N (%)	Total N (%)
0	17 (19.5)	68 (78.2)	72 (82.8)
1	70 (80.5)	19 (21.8)	15 (17.2)

In Table 18, N depicts the total number of contractors who have been interviewed (N=87). Under opinion in Table 18, “1” represents those respondents who have selected medium as medium of availability and “0” represents “Blank”.

Interpretation: It is found that a 61% contractor wants the pipes to be available to them through retail (Figure 15, 16 & 17).

Medium of awareness of pipes

Companies use various medium of communication i.e. Sales Person, Social Media, Company Organized Events to create awareness regarding its products among the customers.

In Table 19, N depicts the total number of contractors who have been interviewed (N=87). Under opinion in Table 19, “1” represents those respondents who have selected medium as medium of awareness and “0” represents “Blank”.

Interpretation: From the Figure 18, it is found that 80% of the contractors want the awareness should be created among them regarding pipes via sales person.

FINDINGS

- Supreme is the big brand in the PVC, CPVC and UPVC category. It is used by 45% builders and 51% contractors in PVC category, 41% builders and 40% contractors in CPVC category, 42% builders and 42% contractors in UPVC category.
- Supreme and Astral are major competitors of Ashirvad and Finolex

pipes. In PVC category, Supreme is used by 45% builders and 51% contractors while Astral is used by 25% builders and 22% contractors. In CPVC category, Supreme is used by 41% builders and 40% contractors while Astral is used by 27% builders and 28% contractors. In UPVC category, Supreme is used by 42% builders and 42% contractors while Astral is used by 25% builders and 25% contractors.

- Tata and Jindal are two big names in the GI category of pipes. Jindal pipes are used by 45% builders and 38% contractors while Tata pipes are used by 45% builders and 52% contractors.
- CPVC pipes are found to be good in terms of quality, availability, durability, ease of use and communication by company based on the insights by builders and contractors. Pricing of CPVC pipes is a concern for the prospects and company should do something for that.
- Quality and Pricing are main factors taken into consideration while choosing plumbing piping material by builders and contractors. 82% builders and 85% contractors considered quality as the main factor while 67% builders and 23% contractors chosen pricing as the main factor for choosing plumbing material.
- Pipes manufactured should be leakage proof, durable and good physical strength. Salesperson is the medium chosen by builders and contractors to create awareness among them.

SUGGESTIONS

- Internal and external sources of promotion i.e. television advertisements, newspaper advertisements and social media campaigns can be used by company for spreading awareness among the prospects about to its products.
- As quality and price are the main factors taken into consideration while choosing

plumbing piping material, company should focus on providing good quality pipes at reasonable price. Ultimately, it will increase the market share of Ashirvad and Finolex pipes in the piping industry.

- Company should make sure that the pipes are leakage proof, durable and has good physical strength as these are the main attributes of improvement in pipes by builders and contractors.
- Pipes should be made available to prospects through retail, distributor as 36% builders and 61% contractors have chosen retail as the medium by which pipes should be available to them. Distributor, as a medium of availability of pipes is chosen by 54% builders and 41% contractors.
- Salesperson from the company should meet the builders and contractors more frequently to create awareness among them and for the other purposes like demonstration, providing technical specifications, quotations, etc.

CONCLUSION

The objective of the study was to do the comparative analysis of pipe industry regarding Ashirvad and Finolex pipes with its competitors like Supreme, Astral, and Prince etc. After analysis of study findings, the study concludes that Supreme is the dominant player in the PVC, CPVC and UPVC category of pipes. It is used by most of the builders and contractors in the South Kolkata region. The research established that Supreme and Astral are major competitors of Ashirvad and Finolex pipes. The study concludes that Tata and Jindal are the two dominant players in GI category of pipes. The study further concludes that CPVC pipes are good in terms of quality, availability, durability, ease of use and communication. Quality and price are main factors taken into consideration by builders

and contractors while choosing plumbing material. This implies that company should make sure that they provide good quality pipes at reasonable price.

REFERENCES

- [1] Ahmed SJ, Birdar A. The Comparative Study of PVC Pipe Industry Regarding to the PARAS PVC Pipes with its competitors. *International Journal of Engineering Science and Computing*. 2016; 6 (6): 7733–7739p.
- [2] Sanyal SN, Datta SK, Banerjee AK. Factors influencing prescribing decisions among physicians: an empirical study on generic drugs. *International Journal of Pharmaceutical and Healthcare Marketing*. June 2017; 11 (4): 330–360p.
- [3] Owen-Smith A, Sterk C, McCarty F, Hankerson-Dyson D, DiClemente R. Development and Evaluation of a Complementary and Alternative Medicine Use Survey in African-Americans with Acquired Immune Deficiency Syndrome. *Journal of Alternative and Complementary Medicine*. 2010; 16(5); 569–577p.
- [4] Torgal S. Non- Destructive Inspection of Pipe using Pipe Inspection Robot. *IOSR Journal of Mechanical and Civil Engineering*. May–June 2016; 13(3): 87–89p.
- [5] Patel NR, Vasava A, Vasava JG, Kunapara AV, Patel SD. Comparative Analysis in Pipe Design by Analytical and Graphical methods for selection of materials. *International Journal of Innovative Research in Science, Engineering and Technology*. May 2013; 2(5): 1738–1747p.
- [6] Mohanta N. Applications and market of PVC pipe industry in India. *International Journal of Commerce and Management Research*. May 2017; 3(5): 30–34p.