

## Research article

# Glass flame-work of Firozabad: Unfolding the potential clusters and design intervention

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### Abstract:

This paper explores the craft of Glass Flame-work and its significance. It narrates the history, location, pattern and structure of the craft, and explains the craft practice in detail. The paper also discusses the methodology for the research, which involves identifying the influential components of the craft. The main part of the paper analyzes the socio-economic data related to the craft. The paper then focuses on the design development process, aiming to create products that can sustain the art in the current market. The paper chooses jewellery as the area of product development and incorporates Glass Flame-work into it. The research was based on primary, secondary and additional data collected from market surveys, closet studies of potential buyers, client studies from various perspectives, and trend research. The data was then filtered and selected according to the research objectives. This paper offers an opportunity for the artisan to meet the aesthetic demands of the market.

**Keywords:** Craft and design, Glass flame work, Firozabad glass craft, Glass forming, Lamp work, Torch work.



**Reduced Inequalities, Decent Work and Economic Growth**

## 1. Introduction:

India, the land of crafts, has gifted us with a cheerful heart-melting process of glass. Forming and shaping of glass has been practised and manufactured in Firozabad for ages. Firozabad is situated in north-central India, in the western part of Uttar Pradesh. There is an entire District of Firozabad, of which Firozabad is a city. This diverse practice of cold and hot glass processes has become a bloodline of almost every family in Firozabad. The craft of Glass Framework, known as Torch or Lamp work, has been practised in borosilicate and soda-lime colour glass in Firozabad only (Ranjan & Ranjan, 2009). Both Hindus and Muslims practice this particular craft in the region, making it even more unique while celebrating the forms and designs. Today crafts are considered to express the emotions or creativity of individual artisans or a

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community, which initially was a medium to satisfy daily needs. Since the craft's characteristics and mood depends on climatic conditions, cultural diversities, community traditions, and rituals, the glass art of Firozabad holds its position among all other glass practices worldwide. Traditional products have different colours, motifs, and forms based on community choices and demands. Though some products of Firozabad can be identified focusing on tourism needs.

Flameworking is a glass-forming technique where the flame uses primarily to melt the glass through a burner which is also known as a torch or a lamp. Once in a molten state, the gathered glass is blown, formed, and shaped using different tools and hand actions. For melting glass, LPG gas and Oxygen are used in combination. The lack of a precise definition for flameworking makes it challenging to determine when it was first developed. The earliest verifiable flame-worked glass is a collection of beads noticed in Mesopotamia dated 2700-2600 BC (Kumar Kanungo, 2004). Lamp-working became widely practised in Murano and Italy in the 14th century. In India, only in Firozabad this process was being practised as a craft largely. In this process, mainly borosilicate glass is used, though soda-lime glass is used for small-scale and size products. Borosilicate glass is primarily the composition of un-combined silica mixed with boron and a little aluminium (Sahakian, 2017). It has no lead and has very little sodium in it. This formula lowers the expansion and is far more resistant to thermal shock. The melting temperature (1620°C) is too high for practical use by glassblowers and other possible ways of use (Loneragan et al., 2020). But for glass framework, oxygen gas increases the flame's temperature to get the glass moulded, which helps to make complex pieces. Three or multiple components can be made individually and assembled later, thus having an advantage by using borosilicate glass even to repair damaged parts. The Borosilicate glass has significantly fewer options in terms of colour in the Firozabad glass market. Glass beads are also made in framework technique. These beads have been dated back to Roman times; beads made from transparent or coloured glass with holes were available for threading (van der Sleen, 1958). Purdilnagar, near Firozabad in India, is famous for glass bead making, not only in India but abroad as well. Glass beads are usually categorized by the method used to manipulate the glass - Wound beads, Drawn beads, and Moulded beads can be identified as types. Through the research, it is observed that glass beads of Purdilnagar are produced mainly by the Muslim community of Firozabad.

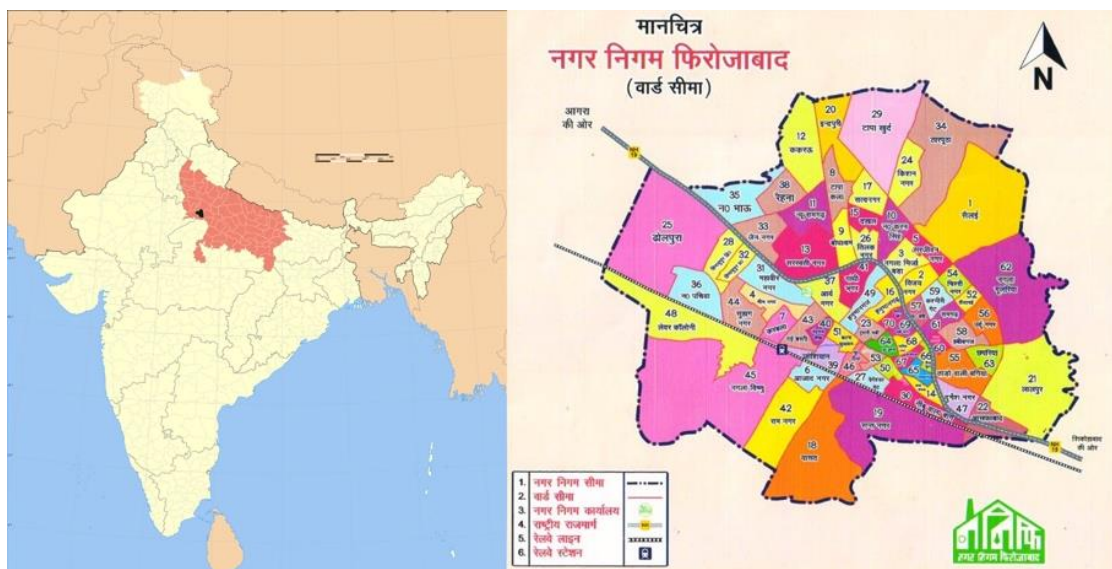


Figure 1: Map of Firozabad. Image source: <https://shorturl.at/iPTUZ>

## **2. Research methodology:**

The study was done between 2021-2022 with 70 respondents, including skilled and master artisans of flame work, glass blowers of local industries, part-time flame workers, and family members who directly or indirectly take part in the system of glass flame work. The interviews were scheduled to analyse the data related to artisan demographic, religion, health condition, type of skills acquired over time, literary level, migration, earnings, living conditions, and inhouse work culture of the respondents. The factors were considered to understand based on what influences the craft while celebrating its form, design, and other aspects. The data were documented using statistical diagrams, charts, and different graphs. The second phase of the research puts effort into developing products that meet the aesthetical demand of the contemporary market. This phase also aims to train a few artisans to develop newer products for the demanding market.

## **3. The research objective:**

- To document and analyse the present status of the artisans along with the craft.
- To determine a way to target better market.
- Product diversification and economic aspect of the craft.

## **4. The community and its practice:**

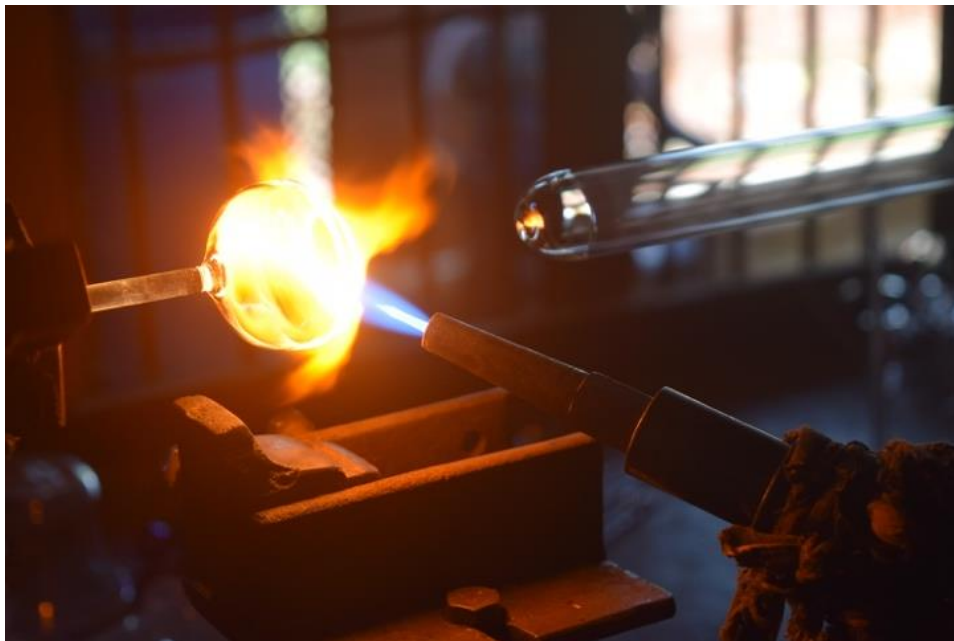
The community participates in glass art making; can be identified as industry workers and flame workers. The community's people mostly fall under the middle to lower-income groups, and very few fall under lower-income groups (SHARMA, 2017). Most people are connected to glass factories or practice the craft in one way or the other. The practice does not fall under any particular community. Industrial workers are picked up from the labour market and work on a daily basis. The industries have significantly less amount of permanent employees (Burra, 1986). Many people nearly belonging to a somewhat upper-income group are involved and act as middlemen to outsource specific orders. Most of the joint families stay with all the grandparents and siblings, all together, and practice the flame work craft as a team. Both men and women practice the art, though men are more skilled in such practices. In the industry, child labour is present in high percentages. There are almost 50000 children below the age of 14 years working in the glass industry, making it one of the world's highest concentrations of child labour (Burra, 1986). The city has good schools but fewer options for higher studies. Many people left practising glass crafts and moved to industry for stable and regular incomes, and many of them have moved out to other cities for other job options.

The industry in Firozabad is about 300 years old system, having almost 70 per cent of all the glass items produced in the unorganized sector (United Nations Industrial Development Organization., 1995). More than 350 units are engaged in making soda glass and glassware items, having a turnover of Rs.450 million each year, which has given employment of about 1,40,000 jobs (United Nations Industrial Development Organization., 1995). The Industrial product includes lighting, various packaging, interior décor, tableware, laboratory ware, bangles, glass beads, chandeliers, etc. In addition, almost 800 - 1000 different types of units are involved in post-production activities like finish and decoration (United Nations Industrial Development Organization., 1995). The glass products for Automobile, Lighting, Medical,

Education, Households, and Perfume industries are directly or indirectly involved and dependent on this system. It is observed that the domestic market products are poor in quality while the products for the international market are high in quality and finishes.



**Figure 2: Industry scenes(Glass Blowing)**



**Figure 3: The craft of flame work(lathe work).**

##### **5. Products and productions:**

Firozabad glass cluster has been practicing flame work with a massive array of products. Most artisans commonly practice decorative artifacts like idols. The products mainly cater because

the market changes are happening slowly in terms of products productions. It is observed that artisans have different skill sets dealing with different types of products. All artisans may not be equally skilled in working with different techniques. The skills can be noticed as hollow glass work, solid glass work, lathe machine work, and bead makers. People are involved in making customized works and utility products, including jewellery, hookahs, paperweight, pen, door handles, bells, etc. According to some master artisans, hookahs, bongos, and smoking pipes have a substantial international market that helps the craft keep running.

The product range has two categories:

- Functional: Smoking Pipes, Chillums, Bongos, Hookahs, Pens, Stirrers, Jewellery, Knobs, Door handle, Paperweight, etc.
- Decorative: Vase, Idols of Ganesha, Shiva & Swaraswati, figurines, marble, beads, animal toys and souvenir, tabletop pieces, flowers, birds, etc.

There are many different techniques involved within the process of lampworking, which make variations of lampworking. The methods are all different based on the various tools and other surface treatments. The tools used in practicing the craft can be divided into two categories; production tools which are mainly used while giving the form of glass(i.e., different tongs, which are locally known as Chimta<sup>1</sup>, Carborundum die moulds, cutters, etc.), and post-production tools for giving finishes and other details on the surface of the glass, joining of multiple parts and assemblies (if required). The production types can be identified below:

- Alphabet making. (Products: alphabets used on top of earrings, rings, bangles, pendants, and as per client requirements).
- Beads and Die-beads. (Products: Beads used for necklaces or pendants and for decoration in mirrors).
- Lathe work. (Products: Labware, Diya, Diwali lights, hanging decoration).
- Baal Ka Kaam<sup>2</sup>. (Products: Toys, Flowers, Ear ring, etc.)
- Silver foil work. (Balls, Paperweights, finger rings, pendants, jewellery, etc.)
- Jali work. (Trees, Houses, Birds, Balls, jewellery).

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<sup>1</sup> Chimta' refers to different kinds of tongs being used while shaping the molten glass. In the craft of flame work, the tongs are self-made with different patterns and shapes.

<sup>2</sup> It refers to making fine glass threads to a body/mass of glass for creating a textural surface. Baal in Hindi it means hair and kaam in Hindi it means work.



**Figure 4 : Traditional products of the craft in Firozabad. From left, Home décor product, Ganesha Idol, Chillam <sup>3</sup>also known as hukkah. Image source: <https://shorturl.at/yHQ19>**

## 6. Raw Material

The market for this craft of flameworking has been going on for years, which leaves no doubt that it has managed to spread its diversity but at a prolonged rate indeed. There is a lot of potential scope for the craft in terms of design, product options, and market. Most of the cluster artisans have moved from working with Soda-lime glass to Borosilicate glass due to its build quality, longer life, required outcome, working safety reasons, and involvement of fewer processes. However, India could produce Borosilicate glass, due to cheaper price options China took over the market of serving raw materials. Bellow, a comparison of Borosilicate Glass and Soda-lime Glass shows its characteristics in the most possible sense to portray its workability.

Borosilicate glass is considered hard glass among all the available glasses.	Soda-lime glasses are soft glasses. It has a less mouldable working span.
The transition temperature is around 820 degrees Celsius and above (Ltd, <i>Borosilicate glass</i> 2017).	The transition temperature is around 570 degrees Celsius and above. (Martin, <i>Soda-Lime Glass</i> 2006)
Silicon oxide, sodium carbonate, and boron are the main constituents.	The main constituents are sodium carbonate, Lime, dolomite, silicon dioxide, and alumina.
Having a very low expansion coefficient makes it highly resistant to thermal shock.	Comparatively low expansion coefficient. Thus less resistant to thermal shock.
Market availability as pipes and rods.	Only solid rods are available in Firozabad.
Most of the colour rods and clear rods come from China. Because of its good quality, artisan prefers to work with it. Clear rods are	These are locally made in Firozabad. Soda glass comes in almost all the colours.

<sup>3</sup> Chillum is a straight, conical smoking pipe that is traditionally crafted from soft stone or clay.

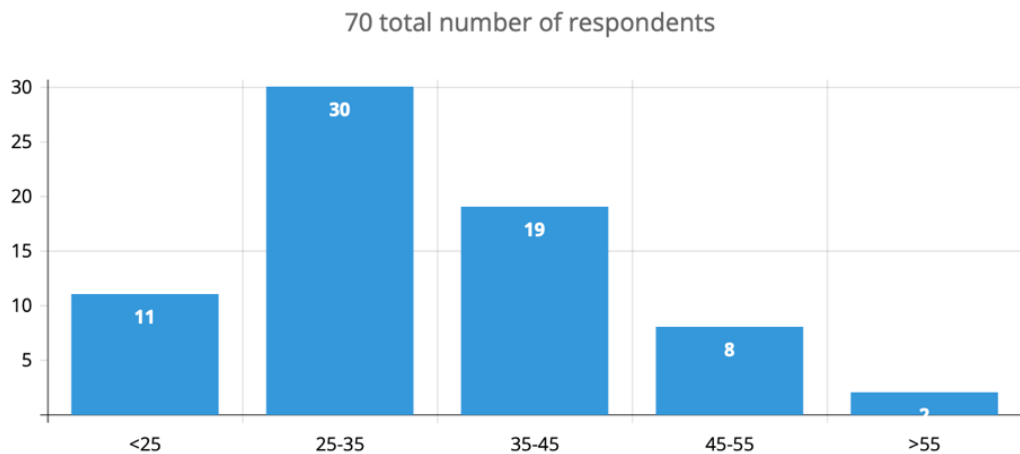
produced in India, but availability is significantly less and more expensive.	
Dimensions of glass rods are consistent.	Dimensions of glass rods are not consistent. They all are uneven and with impurities.
Borosilicate glasses are available per kilogram and the cost ranges from somewhere between 150 to 900 rupees for transparent and colour rods.	The soda-lime glass comes as a bundle, locally known as " <i>Per Mutha</i> ". Each bundle is equivalent to 2.5 to 3 kilos. The cost ranges between 100 to 300.
The diameters available: 5, 6, 7, 8, 10, 12, 14, 16, 18, 19, 20, 22, 24, 26, 30, 31, 32, 42 and 45 mm.	As soda rods are produced locally and are not machine-made, their thickness is close to the required size and is not even. Almost all the diameters are available up to 40 mm of all the sizes available; 5, 12, 16, and 20mm rods are the most picked up. Any thinner or broader for a specific order.
The colours widely available are blue, green, amber, golden yellow, black, white, momi/moom <sup>4</sup> , smoke, teal, purple, and pink. These colours range between 300 to 900 per kilo. Some stains come at expensive rates, opal yellow, opal white, and blood red comes between 900 to 1300 as per supply/availability in the market.	Soda glass costs do not really matter on the colour and size. Colour options are more than Borosilicate glass; almost all the colour shades are available in soda glass.
Borosilicate glasses do not get manufactured in Firozabad; they come from China. In CGDI these glasses are made but it is not produced as bulk uses, thus it comes comparatively expensive.	Soda-lime glasses are produced in local industries where glass is blown manually, although some bangle-making industries also make soda rods. Coloured glasses culets get melted in separate ceramic pots kept in a pot furnace. Molten glass gathered on a hot iron rod. Another iron is heated and attached to the collected glass from the opposite side. The glass is then stretched and pulled into a rod by people before it cools down. As a result, the rod becomes slightly flat with varying diameters. Once it cools down, rods are kept into pieces in 2.5 ft. sizes for packaging.

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<sup>4</sup> It is a locally known color that appears close to opal or opaque white, which typically looks like a candle.

## 7. Socio-economical study:

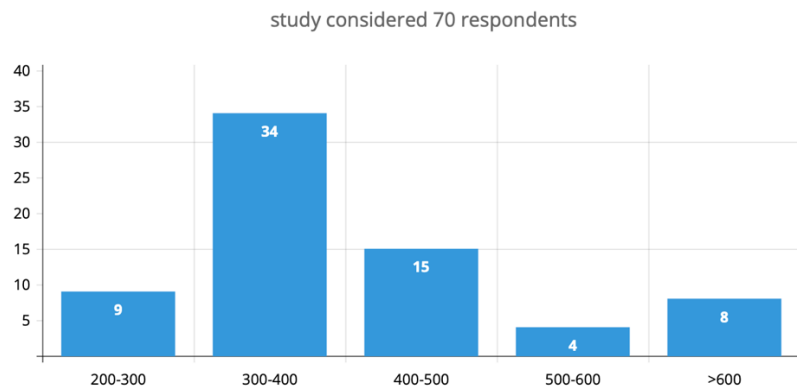
The workplace culture of flame workers and industrial glass blowers are closely linked. In Firozabad, the lower strata of society are the industrial workers. Due to fewer local job prospects in and around Firozabad, most are migrants from rural to metropolitan or semi-urban areas. The majority of them relocate in search of better jobs. The migrants are dispersed among various parts of the industrial systems due to their varying skill levels. Over years of practice, they get skilled at different glass-blowing techniques. Compared to others, fewer become proficient and earn more money later in service. They are landless individuals who work in agriculture, construction, and other fields who also take on this position because it has no tangible obligations and provides immediate cash. The industrial sector does not employ the majority of Firozabad residents. Instead, Firozabad residents work on post-production tasks, including packaging, product finishing, and flame work. Because flame work is less laborious, industrial workers occasionally switch to it. They get married early; having a family may be the primary driver of employment in the industrial sector. Since the majority of industrial workers are male, the study has only considered male respondents. However, there are female blowers also, but significantly fewer in number.



**Figure 5: Graph 1; Artisan involvement percentage relation to age group.**

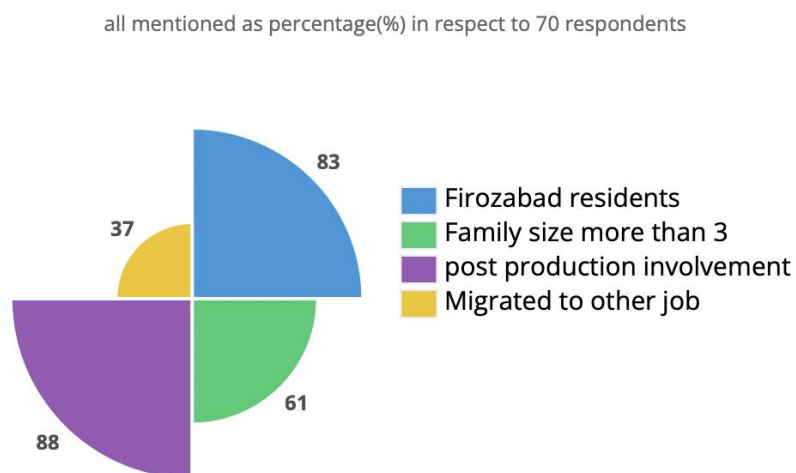
**Graph 1:** The graph shows the age of individual workers presently working in glass making. The samples were taken randomly from industrial workers and people who moved into frameworking later. The study found mostly aged between twenty-five to thirty-five because people are most active physically at this age. Forty-five aged and above are moving slowly to other professions or in-house post-production activities. The unhealthy and unsafe environment is also a significant factor in leaving this job for many. Since Firozabad has few job opportunities, the industries have a substantial worker flow that keeps it running. Some artisans are linked to education sectors providing live flame work activities and taking workshops; they also work with product designers.





**Figure 6: Graph 2; Income average of artisans.**

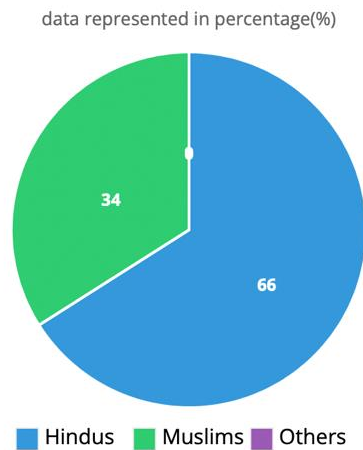
**Graph 2:** The study shows the average income of glass artisans. The study found a different pay grade between the industry and flame workers. Most of the industry workers are in intergenerational abject poverty. But, flame workers are well aware of the job and choose to work as themselves but not as forcefully. The industry have a hierarchy of workers. Here, the industrial workers who only work for the glass forming (shaping, blowing, attachment making, etc.) are considered with flame workers outside. It has been found that most payers are between 300 to 400 brace of the pay scale. Some master artisans who works as the finest part of the object (locally known as 'bariki kaam') and 'Tar' makers (shaping and giving the required amount of glass while making bangle thickness) get the highest pay of more than 600 per day. People are also hired from the labour market for other activities in the industry. They are not considered glass workers. The study did not find a medium person who supplies workers in the industry.



**Figure 7: Graph 3; Family involvement in craft practice**

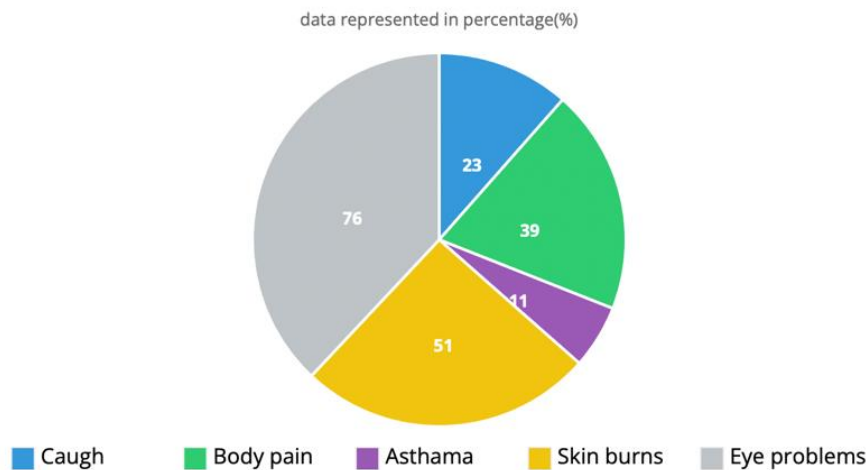
**Graph 3:** The study shows that the family members are between three to seven most, among seventy respondents. Twenty-six were found in other businesses and professions and migrated to bigger cities for another career. Sixty-two respondents have family members involved in craft-making for supportive activities and post-production processes. The study also found

that fifty-eight are Firozabad residents and practicing through generations. The chart shows the percentage of the same.



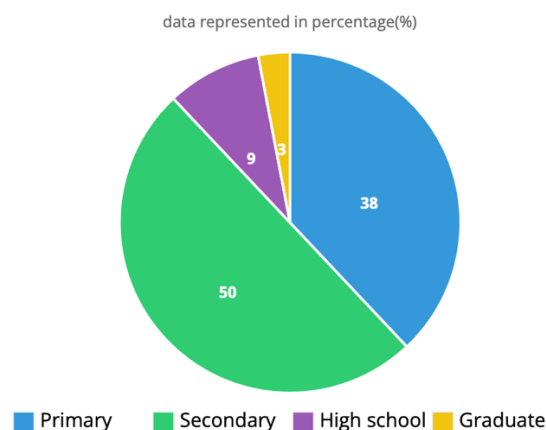
**Figure 8: Graph 4; Craft practitioners in reference to religion**

**Graph 4:** The chart shows the religious perspective of the craft practitioners. In this study, 46 respondents found Hindu, and 24 found Muslims. The study could not find any other religion in craft makers. The study also finds a mix of castes within the Hindu religion as scheduled casts, OBC, and general categories. The data has been represented in percentages here.



**Figure 9: Graph 5; Percentage of health issues of the practitioners**

**Graph 5:** The study shows here sixteen artisans have coughs which are tween three percent. Twenty-six artisans face body pain due to long working hours, which is thirty-nine percent. Eight people have been identified as having asthma, which is eleven percent. Thirty-six have major skin burns and marks, which came to fifty-one percent. Fifty-three people were using power glasses for their eyes and complained of dryness, which is seventy-six percent. The percentage is mentioned here for seventy total respondents.



**Figure 10: Graph 6; Percentage of educational level of the artisans.**

**Graph 6:** The study finds twenty-seven people illiterate, which is thirty-eight per cent of the respondents. Thirty-five people have cleared secondary, which is fifty per cent. Six people among them have earned high school, which is nine per cent. Two people found graduates who have their small-scale unit.

## 8. Identification of potential clusters:

Over the periods, there has been a drastic change as artisans started developing traditional designs using new forms and integrating the same for a more modern and urban market. Artisans collaborate with designers and artists to produce more unique options and customized ways of making pieces for the market. As artisans are not directly connected to the market, many leave the craft to take up other job options due to lower profit margins. The art is practised in different clusters, depending on the type of craft with the skill sets of the artisans. To understand the skills, different ways of making the same objects have also been explored while working with hollow or solid glass and identified the types of works. Understanding the scope and limitations of the craft as well as the material behaviour, can help assemble decisions on designing while developing products and parts. The notable clusters details below:

1. Mr. Rajesh Sharma and the team at Suhag Nagar. This master artisan and the cluster were identified in skill sets on hollow and solid, both soda-lime and borosilicate glass. Mr. Rajesh Sharma also owns his lathe machine studio near Agra, where his team only works on lathe work. He is one of the oldest practitioners in the area.

2. Mr. Rajkumar Sharma from Raaja Ka Taal Kheda. He has a small-scale homely setup, exceptionally good while working in solid borosilicate glass. He is also comfortable in soda-lime glass. Rajkumar ji has his own team while working together for bigger productions and orders. He also involved in training people in this craft which includes government and non-governmental projects.

3. Mr. Debendra from Sabji Mandi in Potla Chungi area. He is locally known as Baba. He is a parttime farmer and works on various small scale projects on lathe work. Because of his age he works less in glass forming. He owns his lathe machine set up near the market. Some of the common projects he works on are; chemical labware, medical wares small-size glasses, Diwali lamps and other festive lights and caps, etc. Mr. Debendra can be noted as exceptionally good at critical lathe work.

4. Md. Aslam, Md. Faizan, and Md. Zishan from Station Road. Three people of the same family make customized products, mainly on soda-lime glasses with solid sticks, in collaboration with various stakeholders and design houses. They are equally comfortable working with borosilicate glass. They are involved in teaching and collaborating with various art and design institutes.

5. Mr. Rakesh Sharma and Mr. Lokesh Sharma at Agra. They are both equally skilled in working with hollow borosilicate glass. Most of the time, they work in the Agra area for their projects. A most recommended team while working in hollow borosilicate glass.

6. Mr. Manoj Kumar in Ramprakash, Donkeli area. He is involved in silver and gold foil lampwork. Various types of glass ball, jewellery, glass beads, and glass drops are his major expertise.



**Figure 11: Artisan (Md. Aslam) working in his studio.**



**Figure 12: Artisan (Debendra Ji) demonstrating glass lathe machine in his studio.**

### 9. Form explorations:

The form language has been understood up to this stage, and ideas for product implementation have been made. At this stage, an attempt is made to look for the artisans whose work or elements can be relatable and the component using the best craftsmanship to contemporaries. This process helped in the product's production and craftsmanship, which is considered to have excellent quality, cheaper, and satisfaction. Different natural objects have been taken to explore possible forms in glass framework using different glasses and techniques in this stage of progress. All possible forms from the inspiration boards were drawn and made based on the theme chosen to work further. Later, The forms were selected to attach with metal fixtures, and initial prototypes were developed.



Figure 13: Colour explorations and compatibility tests in using mushroom forms.



Figure 14: Form explorations and creating joints within the antler forms.

## 10. Product development followed by design process:

Since the craft already deals with some jewellery with beads, the decision was made to take up jewellery as the initial product category. Considering product size, transportability, and breakage percentage, artisan's skills, and other influencing factor on glass products, the area of jewellery has been taken. The way the customers keep the jewellery at home helped to ideate the packaging requirements and gave an overview of the types of jewellery they wear. While looking at the storage, it was understood that regular and non-precious jewellery are kept without much care. Their jewellery was mostly silver, German metal, and tin, some of which were beads jewellery. Few of the potential customers were found collecting well-kept craft jewellery. Gold jewellery was mostly well packaged and preferably in safe conditions, which is not accessible to the other family members. In the case of fashion or regular jewellery, it is found that people do share them with close ones in the family. Meaningful jewellery, gifted from someone close is often kept well. Considering men's products in the segment of jewellery while observing the trend in terms of form, colour, material finishes, and liked by people, it is found that idiosyncratic product choices (vintage, directional, skull, moustache), Modish classics (chrome finish, metal, simple forms), Black represent boldly and stands out thus black and grey are most preferred. Visually heavy perceived material combination choices (Leather, stone, wood, metal, glass) are accepted as men's accessories which is used as jewellery. Most sellable products are found in cufflinks, brooches, and bow-tie. Very few brands offer men's jewellery which is mostly high-end and expensive. Individual product options are fewer and are available mostly online or in exhibitions. Men buyers are found to be aimless buyers (figure 15). When glass is considered fragile yet highly achieved value, it is observed that it boosts up ego and confidence in reflections while self-comparisons. Thus the developed products could be an introduction to Indian choices as options. The designs may add to fresh product options for artisans in Firozabad to work with. Diversity in glass forming techniques could be one kind of unique selling point (USP) while selling products. It is also observed that men's preferred colours are available in borosilicate glass. The prepared below chart gives a comparison in terms of product sell ability between men and women (figure 15). The other chart was made to observe the pattern of buying among men and women to understand the product viability before introduction. The market trend, consumer behaviour, and present market approach online and offline, along with material possibilities, were observed. It is understood that, to give options for newer consumers and look at a bigger approach, one collection of unisex accessories and two collections of jewellery for women can be developed. The nature of the product shall target the customers of having experimental choices in heart, people who belong to metro cities, craft admirers, fashion buyers and stylists or college students, and people who are more into attending events. After finalizing the designs and allied materials, it was shared with the artisans to produce the required brass and silver attachments. An attempt was made to develop different themes through which men and women can associate the design, for the same products were visualized.



**Figure 15 : Graph 7; Potential consumer buying preference graph.**



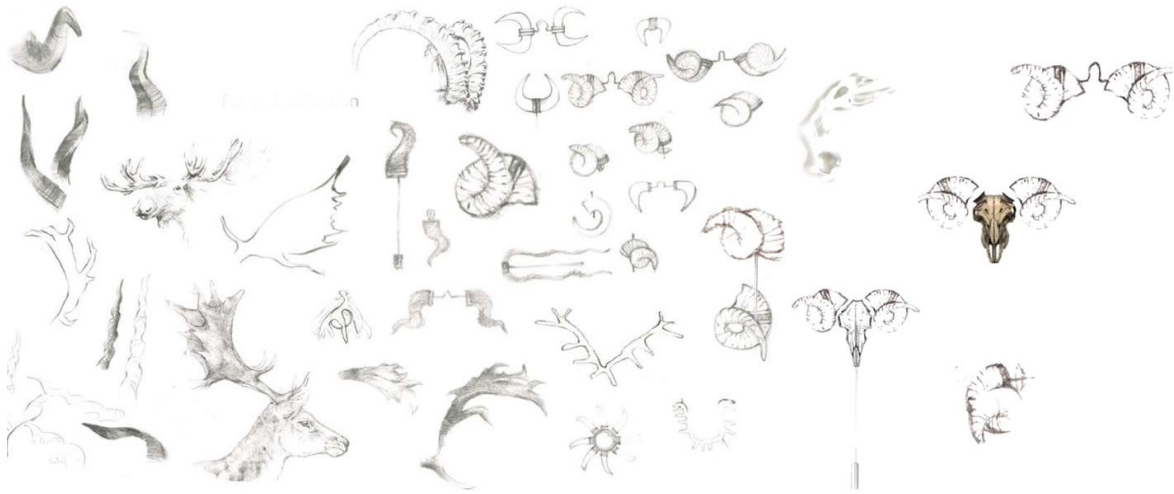
**Figure 16: Prototyping and product development.**

## 11. The authors' contribution in design:

Considering the artisan gets more attention through new products and the aesthetic exploratory practice, five collections were developed, each containing three to five designs depending on the collection type. Three collections, two for women and one for unisex, have been considered here.

### 11.1. Collection 1(Unisex): The extreme inhabitants. Figures 17, 18 & 19.

This collection, named 'The extreme inhabitants', explores the objects which showcase the extreme conditions of life in nature to express the mood of stand-out among others, pushing the self-limits through its unique features, elements, and forms. Human life, bound up with change and growth, implies adventure by its very nature. Usually, it can relate to getting out of the comfort zone, new experiences, excitement, and exploration. For this collection, the user has been considered young, aged between 22 to 30, in casual attire, yet attending events or parties.



**Figure 17 : Sketches, alternate ideations and product visualisations**



**Figure 18 : Final products of collection-1**





Figure 19 : Final products of collection-1 (Product view)

### 11.2. Collection 2 (Women): The spiritual bond. Figure 20 & 21.

Lord Shiva is globally worshipped and accepted as an everyday god in the Hindu religion, mostly celebrated through women. Women's economic empowerment refers to the ability to enjoy their right to control and benefit from their resources, assets, income, and own time, as well as the ability to manage risk and improve economic status and well-being. Thus the collection named 'The spiritual bond' may become insightful in the commercial aspect and have immense treasure while exploring it in the jewellery segment.

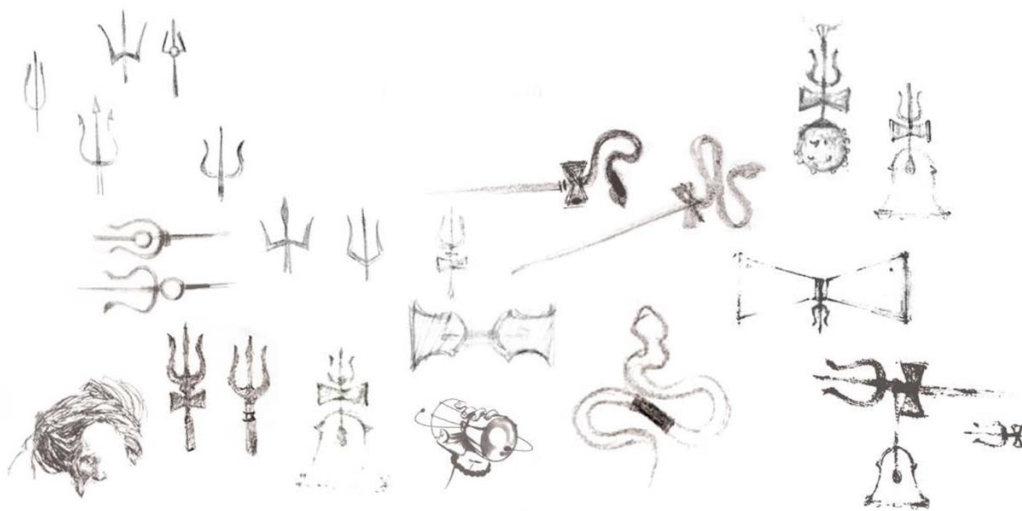


Figure 20 : Sketches, alternate ideations and product visualisations



Figure 21 : Final products of collection-2

### 11.3. Collection 3(Women): The blooming dreams. Figure 22 & 23.

Flowers symbolize love, beauty, care, enthusiasm, joyfulness, purity, positive vibes, and happiness. Flower adornment is something that makes all women feel exceptional and one of a kind. Also, Indian weddings have a well-established convention of utilizing blooms to design the wedding scene. Flowers are so elegant and delightful that each flower has its meaning. The delicate form of the flower goes well with the forming of glass and can be well represented through glass.

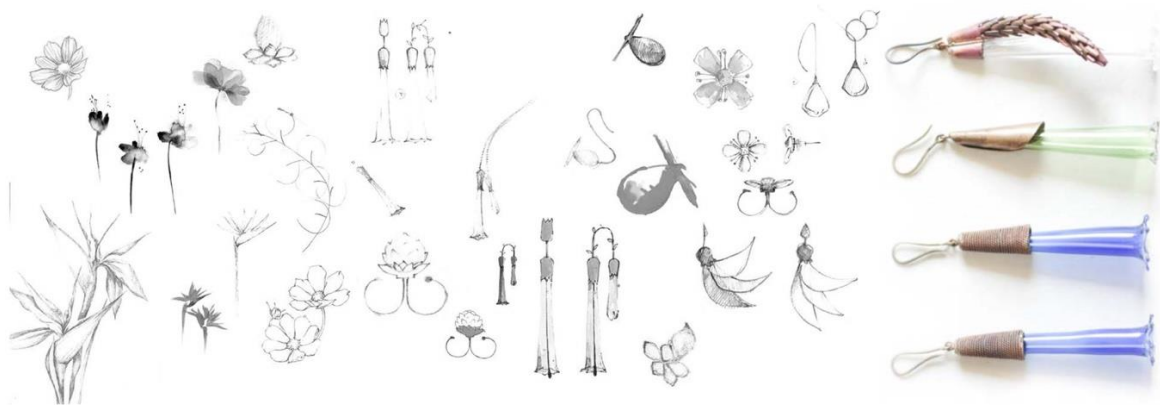
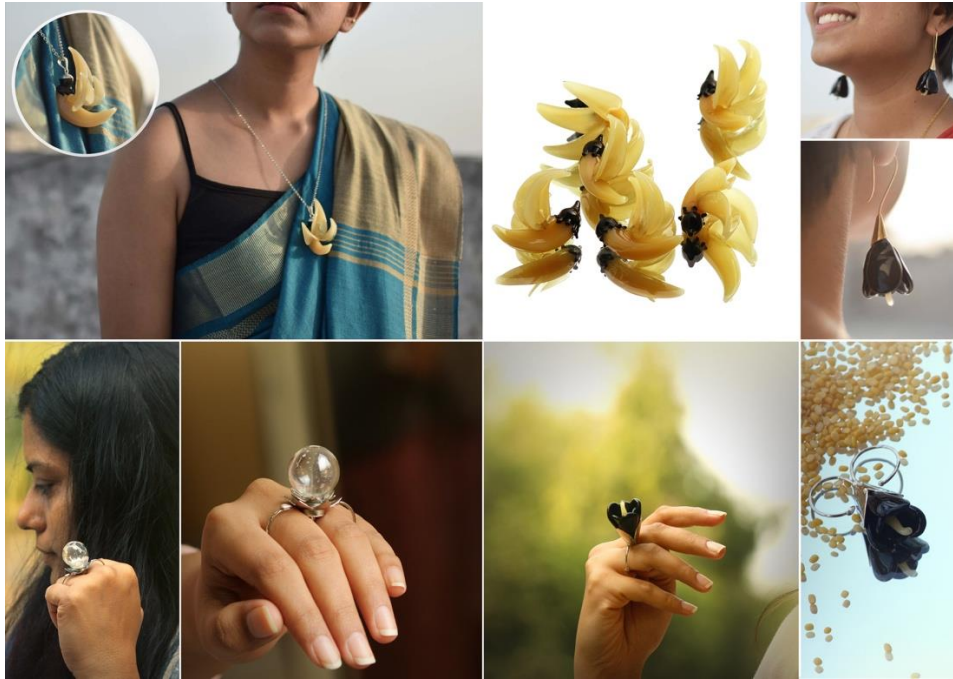


Figure 22 : Alternate ideations and product prototyping.



**Figure 23 : Final products of collection-3.**

## 12. Conclusions:

The study indicates two types of conclusions. One is in product development, and another reveals the practitioners' socio-economic perspective, which eventually impacts craft making. The study finds that most people get married earlier, forcing them to work in industry or other glass practices due to family responsibilities. The study reveals the horrible condition of health and work environment. The study also finds less interested future generations to take up the craft ahead. The study highlights the demand for government interference for appropriate policy or framework implementation in collaboration with business entrepreneurs for sustainable craft practice.

Different skill sets fit into various product characteristics; appropriate artisans can produce the best output according to the skills acquired over the years. Though material handling skills exist, fresh professional interventions are required to upgrade the present craft scenario. The artisans still need to gain more idea of glass compatibility in terms of colours. A study or training for the artisans, which provides the concept of glass selection, may lead to developing better products. The Government should interfere with the gas cylinders market for L.P.G and Oxygen to provide a safe environment while practicing at home since the craft still runs on black market gas procurement. Better medical facilities for craft practitioners may help sustain the craft longer. Almost every family has potential artisans to work with the material, but it is largely unexplored and not guided by professionals. Thus, we are continuously losing possible development in the area. A further study can be carried out to provide pedagogical infrastructure for educational collaboration in multidisciplinary domains or institutes, which may directly impact the craft to develop.

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The author(s) declared no potential conflicts of interest.

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