

**PERSPECTIVE OF PRODUCERS AND CONSUMERS FOR NATURAL VERSUS  
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**INTRODUCTION**

Lab-grown diamonds (LGD) are gaining traction as a viable alternative to natural diamonds (ND). Also referred to as synthetic or cultured diamonds, LGD are meticulously produced within controlled laboratory settings using technological methods that mimic the natural conditions conducive to diamond formation, as outlined in the 2021 Forbes article titled "The Choice Is Getting Clearer for Consumers and Retailers."

One of the distinctive attributes of LGD is their relatively lower cost compared to ND of equivalent quality and size. This cost-effectiveness renders them an attractive choice for individuals seeking diamond jewelry that falls within a more budget-friendly range. LGD possess comparable physical and chemical characteristics to ND, rendering them virtually indistinguishable from their natural counterparts to the naked eye, without necessitating specialized equipment. This characteristic resonates with consumers desiring the elegance and brilliance of a diamond minus the exorbitant price tag.

Furthermore, LGD holds appeal for certain consumers due to their production process that circumvents the environmental and ethical concerns associated with conventional diamond mining. The cultivation of LGD results in a diminished carbon footprint and avoids contributing to issues like habitat degradation and unfair labor practices.

However, it's essential to acknowledge that the sustainability of laboratory-grown diamonds may not always align with prevalent claims. The manufacturing procedure, spanning several weeks, is resource-intensive, necessitating energy levels akin to 20% of the Sun's surface temperature, as highlighted in the Natural Diamond Council's 2022 report. Notably, a significant portion of LGD, exceeding 60%, is manufactured in China and India, where a substantial 63% and 74% of electricity originates from coal-based sources.

Interestingly, while existing research predominantly delves into the popularity of LGD over ND due to factors like pricing, ethical and environmental considerations, quality, and appearance, there exists a notable gap in research exploring the validation of ethical and environmental considerations throughout the LGD production process.

The overarching objective of this research paper is to delve into the underlying motivations for the endorsement of LGD primarily driven by ethical and environmental considerations, along with delving into the pertinent facts surrounding their production. However, it's imperative to acknowledge that the favorability of lab-grown diamonds can fluctuate based on diverse factors such as geographical location, consumer inclinations, and prevailing market trends. Keeping abreast of the current market landscape and consumer sentiments is crucial to obtain the most up-to-date insights.

## LITERATURE REVIEW

A natural diamond (ND) is an exceptionally rare mineral that forms naturally over a staggering span of 1-3 billion years. Composed entirely of pure carbon in a crystalline structure, it stands as the hardest substance found in nature. The term "diamond" generally signifies a naturally occurring diamond (Lussier & Agranoff, 2014).

In contrast, a laboratory-grown diamond (LGD), also referred to as a synthetic or lab-created diamond, is a product meticulously crafted by humans to replicate the physical traits and optical characteristics of a natural diamond. Unlike their natural counterparts, lab-grown diamonds have the potential to be produced in boundless quantities (Kuznetsov, 2019).

As highlighted by Mosses in 2016, lab-grown diamonds frequently offer enhanced affordability when compared to natural diamonds. This affordability becomes an appealing option for consumers seeking high-quality diamond alternatives within a more accessible price range. This sentiment is echoed by Epstein in 2020, emphasizing that LGD's lower price point appeals particularly to budget-conscious consumers who desire the allure and attributes of a diamond. An interesting facet of LGD lies in their capacity to be customized, catering to individual preferences and facilitating the creation of unique and personalized jewelry designs. This aspect further enhances their allure.

Significant strides in diamond-growing technologies have resulted in improved quality for lab-grown diamonds over time. These engineered gems now possess identical physical and optical characteristics to their natural counterparts, rendering them virtually indistinguishable to the naked eye. Despite this equivalence, they are still often valued comparably to natural diamonds. Research focused on diamonds has substantiated that LGD serves as a more ethical and sustainable choice. Free from the taint of unethical mining practices, such as labor exploitation and environmental harm, lab-grown diamonds garner favor from consumers who prioritize these values (Kuznetsov, 2019).

From an environmental standpoint, Kuznetsov (2019) asserts that lab-grown diamonds are regarded as an ethical and sustainable option. They circumvent the environmental impact typically associated with conventional diamond mining, including issues like land degradation and water pollution. However, it's worth noting that the process of producing laboratory-grown diamonds is energy-intensive, demanding the generation of extremely high temperatures, approaching levels equivalent to 20% of the Sun's surface temperature (Frost & Sullivan, 2021).

Additionally, LGD offers an avenue to address concerns linked to conflict diamonds, as they can be traced and certified to ensure ethical sourcing (Zimnisky, 2018).

The natural diamond industry plays a substantial role in supporting the livelihoods of approximately 10 million individuals globally (Lussier & Agranoff, 2014). Through mechanisms like local purchasing, employment opportunities, social initiatives, infrastructure investments, and governmental contributions in the form of taxes, royalties, and dividends, as much as 80% of the value derived from rough diamonds can remain within local communities (Kuznetsov, 2019). This economic impact contributes to sustaining local economies and nurturing the growth and welfare of communities associated with the natural diamond industry, as highlighted by the World Diamond Council in 2018.

Gereffi & Ponte (2005) underscore the importance of the natural diamond industry in engaging local suppliers, generating employment opportunities, supporting social programs, investing in

infrastructure, and ensuring adequate financial contributions to respective governments.

## RESEARCH METHOD

The research utilized semi-structured interviews with 25 diamond producers and 60 consumers from Dubai and India. These participants are involved in both laboratory-grown diamond (LGD) and natural diamond (ND) production. Interviews were conducted virtually to capture detailed emotions and insights. Additionally, observations were made at LGD factories and diamond showrooms.

Semi-structured interviews allowed for flexible discussions, yielding qualitative data on motivations for LGD adoption based on ethical and environmental concerns. This mixed-methods approach aimed to comprehensively understand perspectives from producers and consumers alike.

Table 1: Summary of sample

Manufacturers	Number of samples	Description
LGD Manufacturers	5	Geographical Area, India
ND Manufacturers	5	Geographical Area, India
LGD & ND Manufacturers	15	Geographical Area, India & UAE
LGD Consumers	10	Geographical Area, India & UAE
ND consumers	10	Geographical Area, India & UAE
LGD as well as ND consumers	40	Geographical Area, India & UAE

The analysis of the collected sample data relied on detailed notes recorded by the researchers during both the interview sessions and the observations. To ensure ethical compliance, specific guidelines were established during the consent process, restricting the use of audio or video recording with the diamond producers. This cautious approach was taken to safeguard the confidentiality of the participants.

The analysis process involved a systematic examination of the gathered data. Comparisons were drawn both between different cases and within individual cases, allowing for the identification of common themes and patterns in the responses. This analytical approach aligns with the method advocated by Miles and Huberman (1994), which emphasizes the importance of organizing qualitative data to extract meaningful insights.

The collected responses from both producers and merchandisers were subjected to a thematic grouping process. These themes were further categorized based on their positive or negative connotations, reflecting the sentiments expressed by the participants. The results of this thematic analysis were then organized and presented in a tabulated format, which facilitates a clear and structured presentation of the findings.

It is noteworthy that due to the relatively modest size of the sample, statistical analysis of quantified data was not pursued. Instead, the focus was on qualitative insights garnered from the interviews and observations. While statistical analysis can provide a robust understanding of relationships and correlations, the small sample size might limit the generalizability of such findings.

By employing this analysis approach, the research aimed to distill meaningful patterns, perceptions, and attitudes among the participants. This qualitative exploration offers a deeper

understanding of the motives behind the endorsement of LGD from ethical and environmental perspectives, and the insights derived from the analysis contribute to the broader discussion on the adoption of lab-grown diamonds in the market.

Based on the researchers notes student attitudes were identified as being positive, negative, or unsure, on several variables of interest to the researcher. These results are presented in table 2. Table 2: Manufacturers perspective towards the social & environmental consideration in LGD

	Positive	Negative	Unsure
Sustainable use of energy, chemical, material, water	69%	31%	0%
Diamonds are mining-free as stated in some marketing campaigns.	78%	22%	0%
Diamonds supports employment and human rights	46%	43%	11%
The support provided for local communities in Diamond regions	30%	48%	22%
Overall popularity due to price and sustainable consideration	92%	8%	0%

Based on manufacturers opinion towards diamonds the average of manufacturer’s fondness towards LGD & ND were traced out to opt the sustainability and environmental consideration for regulators in future.

Table 2.1 Average of Manufacturer fondness towards LGD & ND

	LGD	ND
Sustainable use of energy, chemical, material, water	1	2
Diamonds are mining-free as stated in some marketing campaigns.	1	2
Diamonds supports employment and human rights	-Equal-	-Equal-
The support provided for local communities in Diamond regions	2	1
LGD popularity due to price	1	2
LGD popularity due to ethical & social Consideration	1	2

Based on Merchandisers responses, their attitudes were identified as being positive, negative, or unsure, on several variables of interest to the researcher. These results are presented in table 3.

Table 3: Consumers perspective towards the social & environmental consideration in LGD

	Positive	Negative	Unsure
Sustainable use of energy, chemical, material, water	50%	11%	29%
Diamonds are mining-free as stated in some marketing campaigns.	68%	22%	10%
Diamonds supports employment and human rights	56%	33%	11%
The support provided for local communities in Diamond	50%	28%	22%

regions			
Overall popularity due to price and sustainable consideration	89%	11%	0%

Based on consumer opinion towards diamonds the average manufacturer’s fondness towards LGD & ND were traced out to opt the sustainability and environmental consideration for regulators in future.

Table 2.1 Average of consumer preference towards LGD & ND

	LGD	ND
Sustainable use of energy, chemical, material, water	1	2
Diamonds are mining-free as stated in some marketing campaigns.	1	2
Diamonds supports employment and human rights	Equal	Equal
The support provided for local communities in Diamond regions	2	1
Overall popularity due to price	1	2
Overall popularity due to sustainability consideration	1	2

A notable 69% of manufacturers are of the belief that LGD's environmental impact is minimal due to its efficient use of energy, chemicals, materials, and water. However, a contrasting 31% dispute this, potentially due to concerns about energy-intensive processes involving coal and water in LGD production.

Interestingly, a substantial 78% of manufacturers acknowledge that lab-grown diamonds are free from mining. This is attributed to methods like Chemical Vapor Deposition (CVD) and High Pressure, High Temperature (HPHT) techniques.

Surprisingly, only 46% of manufacturers express support for LGD's positive impact on employment and human rights. This suggests a potential decline in employment opportunities within the LGD sector compared to traditional mining. The highlighted result is the near parity in the average support for employment between LGD and ND. Additionally, 11% of consumers lack awareness of this variable, emphasizing the significance of social considerations in LGD production.

Around 48% of manufacturers concede that LGD doesn't contribute positively to local communities in diamond regions. Intriguingly, LGD ranks second to ND in this aspect. This perspective is echoed by 28% of consumers.

Despite variations in manufacturers' views on different factors, the overall popularity of LGD remains notably high at 92%. Similarly, 89% of consumers concur with this sentiment.

Certain manufacturers reveal that a reasonable amount of coal is needed for LGD production, particularly in countries like India and China.

It's apparent from manufacturers that the natural diamond industry highly values the involvement and welfare of local communities throughout the production process. By prioritizing community well-being, the natural diamond industry aims to foster sustainable relationships that contribute to overall regional development.

Among younger consumers, there's a strong preference for LGD due to its unique customization options. A consumer explains her preference, citing the diversity of sizes, shapes, and colors that allow for personalized jewelry design.

The sentiment is echoed among younger consumers who prioritize sustainability and ethical considerations when making purchasing decisions, making lab-grown diamonds their preferred choice.

### **DISCUSSION**

Broadly speaking, manufacturers are inclined to believe that LGD offers a notably smaller environmental impact compared to mined diamonds. LGD eliminates the need for mining operations, which often cause land degradation, habitat destruction, and water pollution. Notably, the water consumption associated with natural diamonds remains relatively high.

Consumers opting for LGD can be regarded as making an ethical choice, as these diamonds are free from the issues associated with traditional mining practices. By choosing lab-grown diamonds, individuals can align their purchases with their values and actively support ethical sourcing practices.

However, it's crucial to acknowledge that some manufacturers recognize a significant portion of grid electricity originates from coal. Consequently, making a straightforward assertion about the environmental friendliness of lab-grown diamonds would be an oversimplification. (Lum & Cluett, 2017)

In a broader context, the surging popularity of lab-grown diamonds can be attributed to their affordability, sustainability, ethical attributes, customization possibilities, and alignment with the values held by the younger demographic of consumers.

### **CONCLUSION**

The escalating popularity of cultured diamonds underscores a burgeoning trend among consumers, primarily propelled by factors such as affordability, sustainability, and ethical sourcing. This trend is particularly conspicuous among the younger demographic. Cultured diamonds hold considerable value due to their cost-effectiveness, facilitating easier access to luxury goods for a broader audience. (Fraser, 2019)

Significantly, they address the contemporary consumer's aspiration for sustainable and ethically manufactured products, offering a conscientious substitute to conventionally mined diamonds. However, the allure and grandeur associated with natural diamonds remain intact. (Hollings & Aitken, 2018)

Moreover, LGD opens up exclusive avenues for personalization, granting consumers the authority to craft bespoke jewelry pieces. Consequently, while natural diamonds continue to maintain a substantial market presence, the growing inclination towards cultured alternatives reflects a notable shift in consumer preferences that holds profound implications.

### **LIMITATIONS AND FUTURE RESEARCH**

As is inherent in all research endeavors, this exploratory study carries several limitations. Primarily, the sample size of both manufacturers and consumers remains relatively small, and the majority of manufacturers hail from India. Furthermore, the research was confined to a virtual setting, which could be deemed unique. The decision not to record the interviews, due to confidentiality concerns, adds another layer of limitation. The involvement of two researchers, with one having ties to the diamond industry, introduces a certain level of subjectivity. Optimal clarity could have been achieved with the involvement of two or three

observers. Additionally, the geographical scope of the study is confined to just two countries. Future research must aim to address the weaknesses, such as conducting a comparative analysis of the social and environmental impacts of lab-grown diamonds versus natural diamonds. Exploring specific facets of social and environmental considerations pertinent to diamond production should also be a focal point. Furthermore, the efficacy of existing regulations in upholding environmental and social concerns within the diamond-making process deserves attention. Lastly, investigating sustainable methodologies in the production of lab-grown diamonds can be of significant interest to researchers invested in the diamond industry.

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