

Modern Slavery in the Diamond Jewelry Business: How Can Science Combat It?

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Abstract

Modern slavery exists in developed and developing countries and in both labor-intensive and high-end sectors. While the business literature has paid attention to the role public, private, and social actors play in combating modern slavery business practices, the contribution science can make has so far remained under the radar of business scholars. Yet science is a critical player that can disrupt modern slavery. Focusing on the precarious state of diamond mining in Africa, long known for labor exploitation, we argue that synthetic diamonds can bring transparency to the diamond jewelry industry and help disrupt modern slavery practices prevailing in this business. The article contributes to scholarly conversations that address Sustainable Development Goal 8 aimed at eliminating modern slavery.

Introduction

Although jewelry has different connotations for different people, it is typically associated with feelings of beauty and affection. Diamonds, which are merely polished minerals, are considered one of the dominant displays of affection. Diamonds are known and appreciated for their durability — the original Greek word “adamas” means indestructible. De Beers, one of the largest diamond companies worldwide, made it their mission to brand diamonds as a “psychological necessity.”¹ Their marketing strategy included the popular phrase “a diamond is forever,” providing consumers the

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opportunity to convey eternal love.² Such emotional branding has been fueling the diamond jewelry industry for many years. It is likely to persist.

However, the industry is tainted by cruelty. De Beers was no exception. The company, initially called De Beers Consolidate Mines, was co-founded in 1888 by Cecil Rhodes, who later became Prime Minister of the Cape Colony. Rhodes, in general, extensively supported prison labor and racial segregation and applied “extreme violence against African people.”³ More recently, labor exploitation and modern slavery practices have been detected in several diamond mines worldwide. Consumers and the general public are often unaware of the unacceptable labor conditions under which their diamonds (purchased at premium prices) are mined and manufactured. More often than not, they unknowingly and unwillingly fuel inhumane business practices.

In 2016, the United Nations (UN) Sustainable Development Goals (SDG) came into effect. SDG 8 (Decent Work and Economic Growth) target 8.7 calls for governments to “Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms.”⁴ Some other SDGs also cover dimensions of slavery: 5.3 refers to eliminating child, early, and forced marriages, whereas 16.2 focuses on ending abuse, exploitation, trafficking, and all forms of violence against children.⁵

This article argues that it is unrealistic to achieve target 8.7 (and the overall SDG to which it belongs) unless modern slavery is understood as a business. We portray modern slavery as a business and pose the question of how science can help disrupt it. In the next section we provide a brief overview of modern slavery, highlighting that no country or industry is immune to it. This is followed by a focus on modern slavery practices in the diamond jewelry industry, the disruption of such practices and the role science plays. We conclude by offering future perspectives on eradicating the business of modern slavery.

The Essence and Persistence of Modern Slavery

“Modern slavery” is an umbrella term that covers practices such as forced labor, debt bondage, forced marriage, involuntary servitude, and human trafficking. Although there is no universal legal definition of modern slavery, it is typically described as “a state marked by the loss of free will where a person is forced through violence or the threat of violence to give up the ability to sell freely his or her own labor power.”⁶ Other important features of modern slavery include inhumane working conditions, the

commoditization of human beings, restrictions on movement, meager (or non-existent) wages, and unstable (or non-existent) employment contracts.

In 2021, an estimated 49.6 million people worldwide were subject to modern slavery, with 64 victims of modern slavery per 10,000 people and a disproportionately high effect on women and children.⁷ More than 3.3 million children are victims of forced labor. Modern slavery is most prevalent in Africa (76 per 10,000 people); on any given day in 2016, approximately 9.2 million people were victims of modern slavery, with Nigeria and the Democratic Republic of Congo (DRC) having the highest number of victims (26.3% jointly).⁸ However, it is not Africa alone that suffers; no continent is immune to modern slavery, including both developed and developing countries. European nations, the USA, Canada, Australia, and New Zealand—countries that pride themselves on the soundness of their business practices—all have modern slavery networks operating within their borders. Corporations in these countries also exhibit traces of modern slavery in their spatially-fixed supply chains.⁹

Industries are no less guilty when it comes to modern slavery; the private sector employs approximately 17.3 million victims of forced labor.¹⁰ Such crimes are not confined to particular industries; they range from commodity-based, labor-intensive industries (e.g., construction, horticulture, mining) to high-tech sectors (e.g., information technology, cell phone, electronics, diamonds, and high fashion). Hospitality and fishing industries, nail bars, and farms are sites of modern slavery. Resource procurement or extraction, such as that for diamonds, is also included in this list. Furthermore, diamonds mined under precarious working conditions may enter the supply chains of legitimate businesses and companies.

Several key factors enable and perpetuate the practice of modern slavery. The first is an environment where “the use of forced labour makes ‘business sense’, even if illegal, because the risks of discovery and prosecution are low, and [there is] weak enforcement of labour standards.”¹¹ It is hardly surprising that modern slavery has emerged as an industry worth USD 150 billion annually, an elaborate and sustained business practice that generates high-profit margins for both exploiters and intermediaries.¹²

Poverty is another enabling factor.^{13,14} Economic vulnerability and desperation can drive workers into debt bondage for employment wherein they accept exploitative working conditions.^{15,16} Poverty can create the “structural conditions in which capital can create and harness a highly precarious, substantially unprotected and easily exploited global labor force, and in tandem increases individual workers’ vulnerability to labor exploitation.”¹⁷

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A third factor is that modern slavery is a hidden business, making the detection of slave labor complicated. Over time, firms have become increasingly dependent on multiple external suppliers. Supply chains are often multi-layered and characterized by significant geographical distance between the initial and final consumption stages.^{18,19} The interplay of these factors increases the fragmentation of supply chains and reduces visibility at the various nodes of the chain.²⁰

Cost minimization and revenue maximization models and the externalization of low-value and/or high-risk activities contribute to the business of modern slavery.²¹ Outsourcing and subcontracting are inherent in supply chain business models. Continual upstream pressure along the supply chain for competitive factors of production can lead to global labor arbitrage. Buying firms (e.g., large retailers) pressure intermediary firms (e.g., subcontractors) to reduce costs through the subcontracting model; in turn, the intermediary firms pressure the sub-contractors supplying them. In situations where savings can be generated through labor cost reduction, the precarious condition of workers operating at the bottom tiers of the supply chain can lead to modern slavery. The greater the number of subcontracting layers within a supply chain, the greater the potential risk of slavery, particularly for informal or illegal subcontracting networks.²² The “[p]ursuit of flexibility, relentless downward pressure on wages and conditions” intensifies the practice.²³

Modern slavery may be invisible, but it is not necessarily indecipherable.²⁴ Several key actors are involved: victims/slaves, intermediaries, and exploiters/slaveholders/managers. The profits—which can be astoundingly high—are captured by the “slaveholders, who benefit from global markets and global prices.”²⁵ The cost of acquiring slaves varies across countries and regions, ranging between USD 20 in the poorest countries and USD 8,000 in the developed countries.²⁶ Highly resourceful managers artfully manipulate labor procurement and accounting rules to render their engagement in modern slavery invisible.²⁷ Intermediaries, including labor brokers, play a critical role in the provision of workers. Through the recruitment process, vulnerable workers can become subject to debt bondage—an indicator of forced labor—and thereby, potentially modern slavery.

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So far, researchers have mostly focused on the environmental issues related to the diamond jewelry industry.^{28,29,30} Human rights issues have primarily been discussed in the context of civil wars and conflict diamonds.^{31,32,33,34}

Exploitation and Forced Labor in African Diamond Mines

In 2016, diamonds ranked 11th among the world's most traded commodities with a worth of USD 255 billion.³⁵ 2020 statistics reveal that the top five countries in terms of mined diamond production volume are Russia, Botswana, the DRC, Australia, and Canada—Russia is the largest producer and exporter of rough diamonds in volume terms, whereas Botswana is the largest producer in value terms. 80% of all mined diamonds are used in research and industrial applications.³⁶

Diamond mining comprises five different methods: artisanal mining (alluvial deposits), hard rock mining (underground), marine mining (offshore deposits), open-pit mining (ground extraction), and placer mining (using high-pressure water). Artisanal diamond mining is the most common in African countries. Although the quantity of diamonds mined by artisanal miners varies between countries, this type of extraction is substantial. Approximately 20% of the world's gem-quality diamonds are mined by individuals and their family members, including children, many of whom are informally employed.³⁷ Moreover, precarious working conditions also exist in open-pit mines. This article thus focuses on the precarious working conditions in Africa's artisanal diamond mining and open-pit mining sectors, which cater to the retail jewelry industry.

In the late 1900s and early 2000s, non-governmental organizations (NGOs) highlighted human rights abuse in the diamond industry in the context of civil wars and rebel organizations in countries such as Sierra Leone and Angola.³⁸ The Revolutionary United Front in Sierra Leone operated the diamond mines using forced labor; the profits financed civil wars.³⁹ The products of these human rights violations are referred to as “blood diamonds” or “conflict diamonds.” These conflicts have since been settled, and consequently, the spotlight has moved away from forced labor in diamond mines. Nevertheless, severe exploitation and forced labor practices persist in the diamond mining industry.

In 2009, Human Rights Watch, a global NGO, reported that miners were physically enslaved, regularly threatened, and severely abused in Zimbabwe's Marange mine. The Zimbabwean military maintained the conditions of modern slavery, with their syndicates guarding enslaved workers.⁴⁰ The report described the disturbing conditions that miners were forced to endure; one interviewee, aged 17 years, recalled: “At the diamond fields, the soldiers forced us into a cage and beat us throughout the night.”⁴¹ Andersson described the security forces as running a torture camp.⁴² More recently, in Angola, there have been reports of guards employed by mining companies, government torture, and the murders of miners who refuse to pay bribes.⁴³

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Desperate and living in a struggling economy, diggers work grueling hours in hazardous conditions.⁴⁴ Thousands depend on the extraction of rough diamonds to survive, with some working in illegal mines. Diggers use their bare hands, sieves, and pans to sift through riverine mud or gravel deposits. Because many diggers work outside the formal sector, they are vulnerable to extortion and other forms of economic exploitation. Diggers engage “supporters” who pay for gear and other expenses, a relationship that typically develops into debt bondage as the lenders charge usurious interest rates.⁴⁵ Mining communities thrive on mutually beneficial relationships, which can quickly become exploitative without the miners realizing its extent. As artisanal miners see no other viable sources for employment and social mobility, often their only resort is a choice between “entering into exploitative relationships with supporters and the insecurity of mining illegally.”⁴⁶

Due to economic necessity and the lack of opportunities, diggers recruit their family members to work in mines, subjecting their children, spouses, and extended families to exploitative practices. Diamonds are mined using child labor in six African countries: Angola, the Central African Republic, the DRC, Guinea, Liberia, and Sierra Leone, and using forced labor in Angola and Sierra Leone.⁴⁷ Child trafficking for employment in diamond mines may occur, leading to both physical and sexual abuse.⁴⁸

In addition to the adversities of forced labor, miners face several health and safety risks, including a lack of training and safety equipment. Industrial mining can be a dangerous occupation because old mining pits are filled with stagnant water and pose the threat of malaria.⁴⁹ The diamond miners’ risk of asbestos exposure has also been documented as a valid concern, as asbestos fibers are often located near diamond deposits.^{50,51} COVID-19, combined with the close quarters in which miners work, has also aggravated health and safety concerns.⁵²

The artisanal diamond supply chain lacks transparency. Diamonds are mined and sold to local buyers or middlemen traveling between villages. Diggers are price-takers with limited bargaining power over price negotiations and are open to exploitation. Middlemen, in turn, sell rough diamonds to diamond traders, who send them to trading and sorting centers in Europe and the Middle East and subsequently to countries specializing in cutting and polishing diamonds. Traditionally, this production stage occurred in the Netherlands, South Africa, and Israel. However, China and India have recently emerged as significant sites due to their low labor costs. There is pressure on competitive prices at each stage of the supply chain, with a lack of upstream transparency. Therefore, diamonds mined illegally or using forced labor may eventually be channeled into legal supply chains.

Pressure from NGOs and Governments

The Kimberley Process (KP) Certification Scheme—a tripartite structure of governance between the government, civil society, and industry—was implemented in 2003 to halt the flow of conflict diamonds into the mainstream diamond market. Despite the decline of civil wars, the scheme has not been expanded to include other forms of exploitation. The exit of several NGOs has dispersed the critical voices within the tripartite structure. Most of the remaining members have vested interests and now oversee the regulation of the diamond industry.⁵³ In 2021, the KP Civil Society Coalition (CSC), an observer organization, raised concerns about the narrow definition of “conflict diamonds” and the need to move beyond the “stifling framework of the Kimberley Process.”⁵⁴ The KP does not require companies to undertake “robust on-the-ground human rights assessments,” even certifying diamonds mined through modern slavery in Zimbabwe and Angola.⁵⁵

In October 2019, the United States Customs and Border Protection (USCBP) banned the import of rough diamonds from Zimbabwe’s Marange mine, which constitutes “one of the world’s richest diamond reserves.”⁵⁶ The USCBP took this action to address forced labor practices that had become rampant, particularly workers’ physical entrapment, given the declaration of the local Bocha Diamond Trust that people were being “rounded up” to work under forced labor conditions.⁵⁷ Although the Zimbabwean government refuted these claims, the import ban remained.

Human Rights Watch assessed 15 jewelry companies and found that most did not meet international standards for responsible sourcing.⁵⁸ Furthermore, they could not trace the diamonds back to their mines of origin. This indicates that if large diamond companies are unaware of mining conditions, consumers cannot be sure that the jewelry they buy does not perpetuate slavery.

The Disruption of Modern Slavery Business Practices

The Role of Public, Private, and Social Actors

Thus far, researchers have primarily focused on a few key actors. One such actor is the government. Governments have introduced (or are considering) legislation that requires companies to ensure traceability and transparency within their supply chains. Examples include the California Transparency in Supply Chains Act 2012, the UK Modern Slavery Act 2015, the Australia Modern Slavery Act 2018, and France’s 2017 Corporate Duty of Vigilance Law. Other initiatives include the UN’s 2011 Guiding Principles on Business and Human Rights, under which businesses must respect human rights. In particular, businesses should “[s]eek to prevent or mitigate adverse human rights impacts that are directly linked to their operations, products,

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or services by their business relationships, even if they have not contributed to those impacts.”⁵⁹

Not-for-profit organizations can be powerful actors in combating modern slavery. One among the many NGOs engaged in this sphere is the Walk Free Foundation, founded by Australian businessman Andrew Forrest, which publishes the *Global Slavery Index* and, to a large extent, dominates the NGO space by collaborating with prominent business and religious figures worldwide to fight slavery and trafficking. Other not-for-profit organizations include Verité and Swedwatch. In collaboration with governments, corporations, and civil society, Verité identifies and addresses labor exploitation in supply chains. Swedwatch, a Swedish not-for-profit organization, investigates how companies and other actors assume accountability for human rights.

Businesses have also joined the war on modern slavery. Even as some remain opportunistic and focus on the high returns on investment from using slave labor, others have championed efforts to increase transparency and reduce slavery within their respective supply chains. An industry initiative that has sought to ameliorate modern slavery is the Global Business Coalition Against Human Trafficking, including Google and The Coca-Cola Company. Simultaneously, consumer pressure on brands and companies has been mounting to ensure that the products they purchase are not detrimental to human rights. For instance, in 2015, private citizens in California filed lawsuits against three US companies sourcing seafood products from Thailand, claiming that the companies had not disclosed the existence of slavery in their supply chains. Although the lawsuits were subsequently dismissed, “[t]hese suits have not all been for naught, as they have heightened awareness of this issue.”⁶⁰

Despite the efforts of governments, businesses, and NGOs, modern slavery and other extreme forms of exploitation continue to thrive. Slavery has not been abolished; in fact, new and “innovative” variants have emerged, and the profitability of businesses relying on slave labor continues to rise. We argue that the missing part of the puzzle is an actor that has not hitherto been considered—science.

Disrupting Modern Slavery in the Diamond Jewelry Sector: The Role of Science

One way jewelry companies can significantly reduce the risk of slavery in their supply chains is to incorporate synthetic diamonds into their collections. Prominent diamond companies, including De Beers and Swarovski, include lab-grown diamonds in their range. During the KP, De Beers was among the leading companies that refused to source conflict

diamonds. This may well be interpreted as an attempt to make up for the role De Beers played in implementing slavery practices within the diamond industry. De Beers sells its synthetic diamond range through its subsidiary, Lightbox Jewelry, which promotes affordability and sustainability.⁶¹ Michael Hill International Limited, a jewelry company that operates hundreds of stores in Australia, Canada and New Zealand, has also established a lab-grown collection.

Synthetic diamonds can be produced in two ways. The first method mimics the high-pressure, high-temperature (HPHT) process of natural diamond formation and was the first to be used to create synthetic diamonds. Similar to the natural processes that form diamonds in the Earth's mantle, diamonds created through HPHT processes are built using machines that exert appropriate heat and pressure.⁶² A second, more modern approach to diamond formation utilizes chemical vapor deposition (CVD), which involves low and not high pressure. A carbon seed is placed in a CVD chamber along with a combination of appropriate gases and heated to a very high temperature.⁶³ After the diamond's layer formation, it is cut using traditional methods. Most companies, including Lightbox Jewelry and Michael Hill, employ this technique.

Synthetic diamonds are not a recent phenomenon. The Swedish company ASEA was credited with producing the first synthetic diamond in 1953.⁶⁴ At the time, such diamonds were of low quality and suitable only for industrial applications; however, their quality has improved with technological advancement. Diamond Foundry, a US company, is recognized for refining synthetic diamond technology in the jewelry industry. In 2018, *TIME* magazine named Diamond Foundry's sustainable diamonds one of the year's best inventions.⁶⁵ Other companies have also invested in research and development for process improvements. De Beers founded Element 6, a company focused on improving existing technologies.⁶⁶ Also in 2018, the United States Federal Trade Commission confirmed that synthetic diamonds created for the jewelry industry are "chemically, optically, and in physical makeup, the same" as natural diamonds.⁶⁷ The time difference between the creation of natural and synthetic diamonds is immense—diamonds formed by biological processes take between one and three billion years; in contrast, synthetic diamonds are developed in only three to four weeks in a CVD chamber.^{68,69} Synthetic diamonds are also significantly cheaper, priced at approximately USD 800 a carat compared with USD 1,800–USD 12,000 a carat for natural diamonds.⁷⁰ The key factors applicable in classifying natural diamonds—cut, clarity, carat and color—are also used to classify synthetic diamonds.⁷¹

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In 2020, 50%–60% of the 6–7 million lab-grown carats produced in China—the largest manufacturer of synthetic diamonds—were manufactured using HPHT technology.⁷² India and the US are also increasingly producing lab-grown diamonds; the US is the largest market for lab-grown diamonds, followed by China.

Lab-grown diamonds are a sustainable alternative to diamonds mined under precarious labor conditions, making the former especially attractive to new-age consumers. Diamond retailers target lab-grown diamonds to consumers who prioritize sustainable practices, increasing the proportion of this segment's consumer demand. A 2018 survey of 1,010 millennial respondents based in the US found that almost 70% of respondents were willing to consider lab-grown diamonds. Additionally, 68% of the respondents agreed or strongly agreed with the statement "I would consider lab-grown diamonds because I do not like what mining does to indigenous labor."⁷³ Although this report cannot provide concrete generalizable insights into the lab-grown diamond market, it is a promising start, particularly because lab-grown diamonds are priced nearly ten times cheaper than mined diamonds.⁷⁴ Cost, coupled with sustainability value, is an important factor especially for younger consumers, leading to the growing popularity of lab-grown diamonds. This is likely to be perpetuated by the global oversupply and the decreasing demand for mined diamonds, as observed in China, the world's second-largest diamond market, where sales declined by 5% in 2019.⁷⁵

Future Prospects

Tracing the origin of the supply chain poses a problem for large multinational corporations because of the evolving intricacies and complexities of their respective supply chains. Diamonds produced in the laboratory appear to have a promising future in this regard. As we explained in the article, the technology is so advanced that there are no differences between natural and synthetic diamonds in regards to quality and appearance. The latter are not stained with slavery and so, they would appeal to many consumers and particularly those belonging to younger generations. While science can play a key role in helping to disrupt modern slavery in the diamond industry, we are not suggesting that companies switch entirely to synthetic diamonds. Such a switch would be detrimental to those who live and work in a precarious situation. More must be done to provide protection for them. Companies, governments and NGOs all have a role to play.

There are other lessons decision makers in companies can draw from this article. Tracing diamond supply chains can be time-demanding and effort-consuming, but it is a worthwhile investment not only short-, but also longer-term. Supply chains can be, and typically are, complex, multi-layered and

based on sophisticated sub-contracting models. So is the supply chains' governance. Yet, these complexities are no excuse for lack of action in figuring out what goes on in the supply chains beyond their initial layers. Furthermore, as discussed earlier, governments are requiring companies to undertake transparency or due diligence of their supply chains. With legislation enacted in several countries and with the European Union considering mandatory due-diligence legislation, companies will increasingly need to report on their efforts to address slavery in their supply chains.⁷⁶

Monitoring diamond mining sites is another option that companies can and should pursue through, for instance, engaging with specialized services. There are various kinds of advanced technology, including satellite-based monitoring, that allow following in real time what goes on at the mining sites. Turning a blind eye to such options is a sign of a lack of willingness to identify and locate modern slavery there. In addition, tracking diamonds through blockchain technology, such as Everledger's blockchain diamond tracking, offers new opportunities to identify slavery in the diamond industry. Together, these mechanisms deserve more attention and action.

Scientific advancements provide the knowledge, expertise, and power to define and enact verifiable ethical sourcing and production. Science can, indeed, emerge as a powerful weapon to effectively disrupt modern slavery in the diamond jewelry industry. It can help delineate future human rights, transparency, ethics and responsibility standards. This is one way forward to accomplishing the crucial SDG target of eliminating modern slavery.

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