

NHSMUN50

National High School Model United Nations



UNIDO
UPDATE PAPER



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Dear delegates,

I am beyond excited to welcome you to the United Nations Industrial Development Organization Committee (UNIDO)! My name is Emily Ahn, and I will be your Assistant Director for Session II of NHSMUN 2024. It is my first year serving on NHSMUN staff, but I attended NHSMUN in 2022 as a delegate in UNIDO during my junior year of high school.

I was born and raised in Orange County, California. I am a first-year student at the University of California, Berkeley, studying Environmental Science with a biological concentration. This year, I joined Berkeley Model UN (BMUN), and I am very excited to also chair that conference in the spring. After graduating, I plan to pursue a medical career and research the intersections of human health and the environment. Outside school, I love night runs, hikes with family or friends, and reading at cute cafes. A longstanding hobby of mine has been journaling with my extensive sticker collection and making beaded rings and bracelets. When I am back home, I obsessively bake every recipe I save on TikTok and YouTube during the school semester because dorm kitchens are not exactly the best. Recently, I have been binge-watching all three seasons of *Single's Inferno* on Netflix while baking.

Many people are surprised to hear that an Environmental Science major planning to be in the medical field is involved in MUN. However, being in MUN has been much more than building resume experience for college or job applications. The diplomacy skills and practice with leadership that I have obtained through my past five years in MUN conferences have proved invaluable and unique. Naturally, I find myself quite introverted, but MUN has helped me learn to step out of my comfort zone in situations that require me to be extroverted. Not only has it equipped me with confidence in public speaking, but it has also taught me what excellent leadership is. MUN is an excellent way of being exposed to global issues and exploring various aspects of current affairs impacting the international community. Through NHSMUN, I hope delegates can experience all these benefits and more!

I look forward to meeting all of you and hearing your unique and insightful solutions. Both topics of this committee require great communication between country representatives to work considering cultural and regional differences. I hope this year's conference will be a great learning experience. If there is any way I can make NHSMUN a better experience during conference preparation, feel free to reach out! I can't wait to meet you all soon!

Emily Ahn

United Nations Industrial Development Organization

Session I

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Joseph Rojek
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Zaheer Sooliman
Terry Wang
Ellie White

Dear Delegates,

I welcome you to the United Nations Industrial Development Organization for NHSMUN 2024! My name is Brinda Garg, and I am your Assistant Director for Session II. This will be my first year staffing NHSMUN, and I am beyond excited! In high school, I attended NHSMUN as a senior and was a delegate in the European Court of Human Rights. I had an amazing time as a delegate at NHSMUN, and I hope your experience is both educational and enjoyable.

I was born and raised in Los Angeles, California, though my family is from India. I frequently visited India throughout my childhood and spent many summers there. I am a freshman at the University of California Berkeley, where I study Materials Sciences and Engineering. Though I am not entirely sure what I want to do in the future, I am particularly interested in sustainability and hope to pursue a career in the field. Outside of school, I am a big reader (let me know if you have any good book recommendations!) and love watching sitcoms. My favorite sitcoms are *New Girl* and *Brooklyn Nine-Nine*. I also love to travel in any capacity, whether a couple-hour drive or a 12-hour flight. I have recently discovered that it is possible to travel to Antarctica and I would love to visit one day!

I have been a part of Model UN for about seven years, and it has been an incredible journey. Model UN has helped me grow as a person in both attending and staffing conferences. The skills gained from participating in Model UN, such as research and public speaking, are invaluable. Perhaps most importantly, Model UN has helped me understand the importance of compassion and collaboration. Working with like-minded individuals with varying perspectives has been such a gratifying experience. My worldview has tremendously expanded due to Model UN, and I am so glad it has been such a long-standing part of my life. Attending a large conference such as NHSMUN can be daunting, but I hope all of you leave with fond memories and new learning experiences!

Though the topics at hand, “Improving Labor Standards in the Global Economy” and “Sustainable Manufacturing and Waste Management,” focus on different aspects of UNIDO’s mandate, they are both significant in our current day and age. My co-AD and I have prepared this paper to help give insights into any recent updates to the topics. I hope you all can stay updated on current developments, and I look forward to seeing your research and solutions in March. Until then, feel free to reach out if you have questions or concerns about the paper, conference, or Model UN. I cannot wait to meet you all!

Best,

Brinda Garg

United Nations Industrial Development Organization

Session II

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UNIDO

NHSMUN 2024



TOPIC A:

IMPROVING LABOR STANDARDS IN THE GLOBAL ECONOMY

Photo Credit: Kenneth C. Zirkel

Introduction

This Update Paper will provide delegates with a comprehensive overview of labor challenges and possible ways to combat them. Government indifference and ineffective private regulation across all industries pose the greatest threats to fair working conditions.

When governments are indifferent to current labor challenges, workers risk further oppression by employers and systematic violations of their rights. Government indifference occurs when a government does not offer solutions to distressed working conditions, whether it is intended or not. We have seen labor standards deteriorate in many conflict zones, particularly within the Middle East and North Africa.¹ The current conflicts have divided the government’s attention from issues such as labor standards.

Additionally, private regulations set by managers of corporations and supply chains have been inadequate. There are currently 152 million children working around the world.² Much of this is allowed due to private regulations, and there has seemingly been no urge to change these regulations from the private sector. Thankfully, many governments have imposed regulations of their own to put an end to this. Still, the work from invigorated delegates in the United Nations Industrial Development Organization (UNIDO) is also much needed. Through reading this Update Paper, delegates will have a clear understanding of the recent trends in the labor market. Such information can be used to create strong solutions that will secure the safety of every worker, future and present.

Government Indifference to Labor Standards

Labor standards exist to protect workers and ensure that they are treated fairly. However, when a government neglects enforcing or updating these standards, poor working conditions may arise. This is known as government indifference, and it can take the form of nonresponsiveness to workers’ concerns, failure

to implement or enforce policies, or apathy towards worker welfare. With such neglect, workers are left vulnerable to exploitation, unsafe working conditions, and unfair treatment. The lack of enforcement of labor standards contributes to inequality and can generate social and economic instability.³ Addressing these challenges requires efforts from governments and international organizations to advocate for the protection of workers’ rights on a global scale. Sincere initiatives that promote transparency, accountability, and inclusivity play a crucial role in reversing the trend of declining workers’ rights and fostering conditions that prioritize the well-being of the workforce.

The International Trade Union Confederation (ITUC) recently published the 2023 Global Rights Index (GRI). The GRI is an index that ranks countries on a scale from one to five, with a lower rank indicating that people in that country enjoy greater rights. Countries are ranked based on International Labor Organization (ILO) conventions and how well they uphold workers’ rights and advocacy. A closer look at the GRI shows that certain regions underperformed regarding the fair treatment of labor over the past year.⁴

A notable cause of government indifference stems from internal conflict within the government or society. In 2023, the Middle East and North Africa were recorded to be the worst regions in the world for workers’ rights. The GRI score for the Middle East and North Africa was 4.53, indicating poor working conditions. This is mainly due to political conflict in these regions. The conflict zones of Libya, Palestine, Syria, and Yemen have seen a breakdown of the law, which has prevented workers from receiving protection. Further, hostile authorities in Algeria and Egypt have made it difficult

1 “Global Rights Index 2023: Middle East and North Africa,” International Trade Union Confederation, accessed December 2023, <https://www.globalrightsindex.org/en/2023/regions/middle-east-and-north-africa>.

2 *Ending child labour, forced labour and human trafficking in global supply chains* (Geneva: International Labour Organization, November 2019), https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---ipecc/documents/publication/wcms_728062.pdf.

3 “Enforcement of Labor and Employment Laws,” Homeland Security, accessed December 25, 2023, <https://www.dhs.gov/enforcement-labor-and-employment-laws>.

4 International Trade Union Confederation, “Global Rights Index 2023.”

for independent trade unions to obtain the registration needed to function effectively.⁵ It is important to note how conflict connects to the lack of attention to labor rights. Many governments cannot acknowledge workers' protections amid conflict, leading to poor outcomes for workers. It is crucial to find ways to emphasize the protection of workers who are residing within conflict zones.

Conflict zones also lead to the migration of many impacted workers. The world's 170 million migrant workers represent 4.9 percent of all workers, and 37.7 percent of these migrant workers reside in Europe or Central Asia.⁶ A survey conducted from December 2022 to November 2023 by the Business and Human Rights Resource Centre (BHRRC) revealed that migrant workers from Nepal, the Philippines, Bangladesh, China, and India were frequently abused.⁷ Undocumented, temporary, or low-wage migrant workers are particularly vulnerable to labor rights abuses. Further, gender and nationality affect the extent to which they are abused.⁸ Whether it is intended or not, government indifference can lead to poor

5 International Trade Union Confederation, "Global Rights Index 2023."

6 ILO *Global Estimates on International Migrant Workers*, (Geneva: International Labour Organization, June 2021), https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---migrant/documents/publication/wcms_808939.pdf.

7 "New database exposes business inaction on migrant worker abuse," *Business & Human Rights Resource Centre*, December 15, 2023, <https://www.business-humanrights.org/en/from-us/media-centre/new-database-exposes-business-inaction-on-migrant-worker-abuse/>.

8 *Business and Human Rights Resource Centre*, "New database exposes business inaction."

9 Sean Teehan, "Cambodia garment worker strike unravels," *Al Jazeera*, January 2014, <https://www.aljazeera.com/features/2014/1/8/cambodia-garment-worker-strike-unravels>.

10 Sangeetha Amarthalingam, "Migrant Workers Suffered Worst Forms of Abuse In Asia," *Kiripost*, December 13, 2023, <https://kiripost.com/stories/migrant-workers-suffered-worst-forms-of-abuse-in-asia>.

working conditions, especially for migrant workers.

When left unchecked, government indifference can lead to violence against workers themselves. Examples include government-sanctioned physical harm and imprisonment against workers. Labor conflict in Cambodia from 2013 to 2014 embodies this. During this time, Cambodia experienced a rapid expansion of its garment industry. During this expansion, the Cambodian government responded with violence and imprisoned workers who spoke out against the unfair working conditions at the time. This aggressive reaction led to a decade of worker repression, which made them vulnerable to multiple forms of workplace abuse and discrimination.⁹

In developing or low- to middle-income countries, active government neglect and tense labor conflicts can forcibly silence collective bargaining and harm workers' rights. One common cause of lax labor standards is the lack of unionization. The persecution and violent restraint of workers and unionists is a persistent trend in the Asia-Pacific region.¹⁰ Research has



Trade union members leading a protest march

Credit: Stilgherrian

long shown that unionization is vital in safeguarding workers' rights. Unions advocate for fair labor practices, negotiate for better wages, improve working conditions, and prevent discrimination based on gender and race.¹¹ Governments contribute to an environment where workers are more susceptible to exploitation by discouraging or suppressing unionization. This is another form of government indifference that actively harms workers, as certain governments are more willing to shut down unions than support them. This is also an issue that can be identified within Cambodia.

Today, Cambodia is one of the leading suppliers in the garment industry, mostly due to its lack of strict labor law enforcement.¹² In September 2023, Cambodia released a new road map to rebuild its garment, footwear, and travel goods industry to be more environmentally sustainable and competitive. The road map aims to upgrade production models, diversify raw material sources, expand to other markets, and increase productivity.¹³ The absence of strict enforcement measures allows for cost-cutting practices that, while economically beneficial in the short term, come at the expense of workers' rights. This makes Cambodia an attractive destination for manufacturers seeking to minimize production expenses. While this has undeniably contributed to the country's economic growth and competitiveness in the short term, it has also raised ethical concerns for workers' rights. Despite the need to improve labor standards, government indifference in Cambodia has led to a deterioration of workers' rights. Countries like Cambodia must find a balance between economic development and the protection of workers' rights to ensure sustainable growth. However, this cannot be achieved without the active participation of governments in enabling workers to protect their rights and voice their concerns.

As of December 2023, most countries included in the GRI have prevented collective bargaining or any collective efforts to protect workers' rights. Further, nine out of ten countries violated the right to strike.¹⁴ This infringement seriously threatens workers' rights to voice their concerns. The systematic violation of the right to strike shows a more significant trend where workers' ability to voice their concerns is being harmed globally. In September 2023, Starbucks Corporation was found to violate United States federal labor laws. The company increased wages and offered new perks to non-union employees without providing those same benefits to unionized staff.¹⁵ Earlier in the year, Starbucks was also accused of firing more than 100 unionized workers, which a federal judge banned through a national injunction in February 2023. This shows certain corporations' willingness to suppress workers' voices and attempts at unionization. Paired with government indifference, these actions from corporations can severely impact workers' security. For example, countries with more lax standards tend to either ignore such violations or do not have the governmental capacities to conduct such audits on companies that operate informal labor practices. Thankfully, Starbucks' violation was quickly noticed and caught as workers were well aware of their rights.

However, advocating for protection may be more difficult in countries where educating workers on their rights is not a priority. Unionization and labor strikes happen less frequently within these countries due to illiteracy and a lack of awareness about workers' rights. As a result, labor standards are the worst in countries such as Vietnam, where only 10.2 percent of the population has a higher education.¹⁶ Workers in the Middle East and North Africa experienced some of the worst rights abuses recorded in 2023, with the Asia-Pacific region being the

11 Aurelia Glass, "How Labor Unions Help Reduce the Pay Gap," *CAP 20*, December 5, 2023, <https://www.americanprogress.org/article/how-labor-unions-help-reduce-the-pay-gap-for-disabled-workers>.

12 Arif Uz Zaman, "An overview of Cambodian apparel," *Textile Today*, October 17, 2023, <https://www.textiletoday.com.bd/an-overview-of-cambodian-apparel-footwear-and-travel-goods-industry>.

13 *Cambodia- Garment Footwear and Travel Goods (GFT)*, (Phnom Penh: EuroCham, September 2023), https://commerce-cambodia.com/wp-content/uploads/2023/09/GFT-BULLETIN-ISSUE-2_FA.pdf.

14 "Global Rights Index 2023: Violations," International Trade Union Confederation, accessed December 2023, <https://www.globalrightsindex.org/en/2023/violations>.

15 Nick Robertson, "Starbucks violated labor law," *The Hill*, September 30, 2023, <https://thehill.com/business/4231618-nlr-judge-starbucks-violated-labor-law-in-offering-pay-raises-benefits-to-nonunion-workers/>.

16 Einar H. Dyvik, "20 countries worldwide with the lowest share of population," Statista, October 26, 2023, <https://www.statista.com/statistics/1346262/countries-world-lowest-share-bachelors-degree/>.

second worst.¹⁷ Africa and Asia are also where 75 percent of the world's 781 million illiterate adults are found.¹⁸ In contrast, strikes often occurred in labor disputes in France and other European states. In 2022, 83.3 percent of French people over 25 were found to have upper secondary education.¹⁹ A strong correlation can be observed between access to education and the improvement of labor standards through unionization. While workers with higher education more actively advocate for their rights, illiterate workers without sufficient education are more prone to exploitation, workplace abuse, and dangerous working conditions. An active government is vital in ensuring that proper education programs are carried out and that workers know their rights and protections.

The consequences of government indifference can also influence workplace safety. Since governments are responsible for establishing and enforcing safety regulations, a lack of comprehensive safety standards can threaten workers.²⁰ Workers can be exposed to potential dangers without proper guidelines for prevention. Furthermore, the role of government agencies in conducting regular inspections and oversight to ensure workplace compliance with safety regulations is undermined. In neglecting labor issues, governments may allocate insufficient resources to regulatory bodies responsible for monitoring workplace safety. This creates an environment where unsafe practices can persist. Without rigorous monitoring, employers may be less motivated to uphold safety standards, prioritize preventative measures, or invest in necessary safety equipment.

Private Regulations and Labor Standards

When discussing regulations across all industries, it is important to distinguish between public and private forms of regulations. Public regulation includes laws created by governments to ensure certain public conditions.²¹ In the context of labor, public regulations may include government-mandated minimum wages or workplace safety regulations. On the other hand, private regulation includes rules set by private corporations and entities themselves.²² These private regulations may go beyond those set by governments. For example, businesses across many industries develop labor standards, such as working hours, wages, and health and safety conditions.²³ Companies often work to ensure these standards can create potential for internal development.

Although private regulations are not intended to be harmful, they may prevent improving labor standards. This is because private regulation is voluntary, and companies are very selective about what to implement. This selectivity often leads to important regulations not being implemented. For example, in the United States healthcare industry, the gender pay gap is wide despite women performing 77 percent of the work in the industry.²⁴ This shows how private labor regulations in the United States healthcare industry fail to address fair compensation for women. In light of situations like this, companies often paint positive images of themselves despite the lack of fair regulations. This is known as “social washing,” which is a business making itself appear more socially responsible than it is.²⁵ However, this does not necessarily

17 International Trade Union Confederation, “Global Rights Index 2023.”

18 Ivette Maria Contreras-González, Gbemisola Oseni, Amparo Palacios-Lopez, Janneke Pieters, and Michael Weber, “Less-educated workers among the most affected,” The World Bank, November 15, 2022, <https://blogs.worldbank.org/developmenttalk/less-educated-workers-among-most-affected-covid-19-pandemic-evidence-sub-saharan>.

19 “Share of those aged 25 and over with upper secondary education,” Statista Research Department, December 21, 2023, <https://www.statista.com/statistics/434842/france-adults-with-upper-secondary-or-tertiary-education-attainment/>.

20 “Death on the Job: The Toll of Neglect,” AFL-CIO, April 25, 2023, <https://aflcio.org/reports/death-job-toll-neglect-2023>.

21 Elizabeth Bailey, “Public Regulation,” *MIT Press*, March 2003, <https://mitpress.mit.edu/9780262524032/public-regulation>.

22 Jean-Christopher Graz, “Private Regulation in the World Economy,” *Academic Foresights*, March 2012, https://www.academic-foresights.com/Private_Regulation.

23 Ryan Bourne and Brad Subramaniam, “Private Sector Labor Regulation,” Cato Institute, December 15, 2022, <https://www.cato.org/publications/facilitating-personal-improvement-private-sector-labor-regulation>.

24 Hunter Boyce, “Gender pay gap in health care continues despite women performing 77% of all jobs,” *The Atlanta Journal Constitution*, January 12, 2024, <https://www.ajc.com/pulse/gender-pay-gap-in-health-care-continues-despite-women-performing-77-of-all-jobs/CDJRKA3UBBHIBGU4ELN6DJVH24/>.

25 Emma Williams, “What are the Risks of Social Washing?” *Morningstar*, August 19, 2022, <https://www.morningstar.com/sustainable-investing/what-are-risks-social-washing>.

mean the disclosed information or data is an accurate and complete representation of how labor standards are affecting workers.²⁶

As mentioned, a major issue across every industry is the gender pay gap. This is because gender gaps are often overlooked in datasets and analyses of wages. Globally, the gender pay gap is estimated to be around 20 percent.²⁷ A prime example of this can be found in the apparel industry. As of November 2023, 80 percent of global apparel workers are female. However, the majority of their supervisors are male. This leads to a large wage gap between the men and women in this industry.²⁸ As of September 2023, Levi Strauss & Co. stopped reporting wage or pay equity data for its supply chain.²⁹ Further, Patagonia, a well-known brand for its reputation as a leader in women's rights issues, published an annual summary of its suppliers' living wage data. Patagonia's report was not divided by gender, which means women who work for Patagonia's suppliers are not properly accounted for in terms of their wages earned. H&M also provides data on the country-average wages of their factories but not on gender-specific pay.³⁰ These are all

examples of private corporations withholding certain data from labor reports, seemingly pointing to an attempt to hide gender-specific differences in compensation and work. Private regulations fail to address the proper and fair reporting of such components. Gender-specific data is crucial for companies to pinpoint the roots of issues causing wage gaps and discrimination. Without it, industries such as garment and footwear that are dominated by women but plagued with gender disparities are unable to address issues that affect millions. Whether intentional or not, companies are not always transparent with their data and fail to consider the many factors that affect fair wages and work discrimination. When disproportionately affected groups of people are not properly represented in labor assessments, it can lead to their exploitation and an undermining of their equal rights. The lack of transparency on gender disparities for workers exemplifies the weaknesses of private regulation regarding voluntary self-reporting.

In November 2023, the European Union (EU) released an end-of-the-year update on the effectiveness of their Transparent and

²⁶ Williams, "What are the Risks of Social Washing?"

²⁷ United Nations, "International Equal Pay Day," accessed January 2024, <https://www.un.org/en/observances/equal-pay-day>.

²⁸ Isadora Bratton-Benfield, Sarosh C. Kuruvilla, and Jason Judd, "Gender Discrimination in Fashion Supply Chains," *Sourcing Journal*, November 8, 2023, <https://sourcingjournal.com/topics/thought-leadership/gender-discrimination-pay-gap-apparel-factories-levi-strauss-cornell-university-464585/>.

²⁹ Bratton-Benfield, Kuruvilla, and Judd, "Gender Discrimination in Fashion Supply Chains."

³⁰ Ria Ivandić and Anne Sophie Lassen, "Gender gaps from labor market shocks," *Labour Economics* 83, no. 102394 (August 2023), <https://doi.org/10.1016/j.labeco.2023.102394>.

Child Labor
Credit: Maurizio Costanzo



Predictable Working Conditions Directive. The goal of this directive is to guarantee all workers in the EU have the right to full information on the most essential parts of their work. It also aims to place preventative measures against workplace abuse and grant workers modernized rights.³¹ The most notable improvement was the greater inclusion of different groups of workers in policies. Now, labor laws protect two to three million more workers in the EU than before. To elaborate, workers in the informal economy or nonstandard workers were usually not included in policies, which prevented them from accessing the benefits that applied to traditional workers. This was partially due to the non-inclusive language in labor policies that excluded domestic or on-demand workers.³² The Transparent and Predictable Working Conditions Directive addresses the need for transparency between employers and workers. Communication between both parties regarding parental leave, wages, and flexible working conditions is crucial when improving workers' rights. The directive's notion that workers should be guaranteed the right to fully understand their working conditions applies to workers of all industries. This effort exemplifies what must be addressed in legislative language going forward. Furthermore, it shows how certain public regulations can address what private regulations do not.

The most significant flaw of private regulation is its limited coverage of global supply chains. Private regulation must apply to a company and the suppliers from which it sources its inventory. The complex supply chains make it difficult for companies to monitor and enforce effective labor standards.³³ Suppliers, however, frequently do not follow labor standards. This leaves workers in uncertain situations. For example, child labor is commonly used by suppliers. Currently, 152 million children are engaged in child labor around the world.

Additionally, 25 million adults and children are in forced labor, much of which occurs in global supply chains.³⁴ This is unacceptable, and such forms of labor must not be permitted anywhere. One example of an effort against this is Canada's 'Forced and Child Labor in Supply Chains Act,' which took effect in January 2024. The policy will require all Canadian companies to effectively report on and eliminate all forms of child labor in their practices.³⁵ This also applies to foreign companies operating in Canada for an extended period, which will help extend protection to more workers.³⁶ This is another example of government legislation addressing what private entities do not.

Assessing the effectiveness of labor standards is a difficult task in the private sector. Social audits are mainly done for this purpose. This process involves checking a company's documentation and records to ensure they comply with regulations.³⁷ However, auditing companies have limited resources for monitoring and enforcing labor standards. Therefore, many corporations continue to get away with non-compliance. As of January 2024, premium Swiss chocolate company Lindt & Sprüngli was accused of using child labor in their cocoa supply chain.³⁸ Research by Swiss TV and Radio news program Rundschau shows illegal child labor practices by Ghanaian cocoa farmers whose harvests allegedly go to Lindt & Sprüngli. Lindt & Sprüngli has a presence in over 120 countries, which makes these allegations particularly concerning.³⁹ This is why effective private auditing is important. These firms must have the resources to operate at full capacity.

For many suppliers, the only incentive they have to comply with labor standards is the fear that a global buyer would stop

31 "Transparent and Predictable Working Conditions," European Commission, accessed December 8, 2023, <https://ec.europa.eu/social/main.jsp?langId=en&catId=1313>.

32 European Commission, "Transparent and Predictable Working Conditions."

33 Richard M. Locke and Monica Romis, "Improving Work Conditions in a Global Supply Chain," *MIT Sloan Management Review*, January 1, 2007, <https://sloanreview.mit.edu/article/improving-work-conditions-in-a-global-supply-chain/>.

34 *Ending child labour, forced labour and human trafficking in global supply chains*.

35 White and Case LLP, "Preparing for Canada's New Anti-Forced Labour Supply Chain Law," *JDSupra*, November 29, 2023, <https://www.jdsupra.com/legalnews/preparing-for-canada-s-new-anti-forced-5067614/>.

36 White and Case LLP, "Preparing for Canada's New Anti-Forced Labour Supply Chain Law."

37 *Labour Standards in Global Supply Chains* (Geneva: International Labour Organization, 2019), https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/documents/instructionalmaterial/wcms_725761.pdf.

38 Anthony Myers, "Lindt & Sprüngli hit with child labor allegations in cocoa supply chain," *Confectionery News*, January 17, 2024, <https://www.confectionerynews.com/Article/2024/01/17/Lindt-Spruengli-hit-with-child-labor-allegations-in-cocoa-supply-chain>.

39 Myers, "Lindt & Sprüngli hit with child labor allegations in cocoa supply chain."

sourcing goods from them.⁴⁰ As a result, bare minimum labor standards are imposed and loosely enforced within supply chains. Since suppliers typically source goods to companies worldwide, they must adhere to different laws within each region.⁴¹ Despite this, a handful of global buyers continuously source their goods from suppliers in countries that do not maintain strong labor practices, such as Vietnam, Cambodia, China, and India.⁴² Therefore, private regulation is only effective when both the supplier and the buyer demonstrate an equal commitment to upholding labor standards. Unfortunately, this is rarely the case.

Responsibility must begin at the top of supply chains. However, it also requires full transparency and effective assessment of suppliers. This cannot be achieved without recognizing the flaws of private regulation and the dangers that come with relying on it for supply chain management. Under private regulation, enforcing labor standards is extremely difficult due to the lack of proper assessment of suppliers. Large corporations continue to exploit children, women, and other vulnerable groups of people by using subcontractors as a shield from social and legal responsibility.

Conclusion

Given the complex nature of labor standards, it is not surprising that progress has been slow in many parts of the world. However, addressing the factors that stand in the way, such as government indifference and inadequate private regulations, is important. While regional and local actions have been taken to proactively improve labor standards, workers in countries with indifferent governments cannot voice their concerns. In countries like Cambodia that emphasize economic growth, the government has turned away from fair working conditions.⁴³ Private regulations must also be analyzed, particularly within supply chains. Current regulations leave room for unfair practices such as child labor.⁴⁴ To truly protect unfairly treated workers and misrepresented groups, it is crucial that the

international community works around these barriers when improving global labor standards.

With a rapidly evolving and intertwined global economy, delegates should be aware of the many layers to creating strong labor policies. Countless factors feed into obstacles preventing the improvement of labor standards. While this Update Paper has discussed a few of these obstacles, such as government indifference, private regulations, gender disparities, migrant workers, and education, delegates need to expand on what has already been mentioned. Each country brings a unique perspective to the committee, which will be key when protecting labor standards in our ever-evolving and interconnected global economy.

⁴⁰ Sarosh Kuruvilla, *Private regulation of labor standards in global supply chains: Problems, progress, and prospects* (Ithaca: ILR Press, 2021).

⁴¹ Sarosh, *Private regulation of labor standards in global supply chains: Problems, progress, and prospects*.

⁴² "Global Severance Pay Program Outlined," ILR Global Labor Institute, March 20, 2023, <https://www.ilr.cornell.edu/global-labor-institute/research-0/global-severance-pay-program-outlined>.

⁴³ *Cambodia- Garment Footwear and Travel Goods (GFT)*.

⁴⁴ Myers, "Lindt & Sprüngli hit with child labor allegations in cocoa supply chain."



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TOPIC B:

SUSTAINABLE MANUFACTURING AND WASTE MANAGEMENT

Photo Credit: Cezary p

Introduction

Much of the global economy is reliant on industrialization. Industrialization is how a country's economy transitions from primarily agricultural to manufacturing.¹ While industrialization has improved the affordability and accessibility of important resources, it negatively affects the environment. These effects include the release of greenhouse gasses from fossil fuels that are used for many industrial processes. The emission of greenhouse gasses contributes to global warming. It is estimated that by 2050, the global temperature will rise by 1.5 degrees Celsius.² In recent years, experts have become increasingly alarmed as the rise in temperature has contributed to rising sea levels and a general imbalance in the ecosystems that exist on our planet.³ This can mean reduced access to fresh water, flooding, wildfires, lower crop yield, and more.⁴

Sustainable manufacturing must be developed to combat global warming. Historically, fossil fuels have supported industrialization, which has created unhealthy levels of air pollution and chemical waste.⁵ The key to improving these industrial processes lies in changing their infrastructures. For example, countries could switch from fossil fuels to renewable energy sources. They could also reduce raw material consumption and reuse resources whenever possible, supporting a circular economy.

Inclusive and sustainable development is a critical priority to many Sustainable Development Goals (SDGs). Specifically, Goal 9: Industry, Innovation, and Infrastructure, highlights the important role of industrialization and innovation for economic social growth.⁶ However, while many countries recognize the importance of sustainable manufacturing and waste management, the transition proves much more difficult. The required changes are costly and require support on both a local and global scale.

The United Nations Industrial Development Organization (UNIDO) is crucial in implementing a global circular economy. To increase the sustainability of manufacturing and waste management, it is important to look to newly-industrialized

countries that are still developing the infrastructure for such processes. It is these countries that are most economically and socially sensitive to the implementation of sustainable infrastructure. Furthermore, delegates in UNIDO must consider emerging technologies that help ease the transition to more sustainable industrial models. The transition to sustainable practices is necessary to achieve many SDGs and can only be done with the collaboration of the international community.

Sustainable Industrialization in Developing Countries

Industrial growth is important in the social and economic advancement of developing countries. Engaging in rapid industrialization is one of the most effective ways to boost the economy of a country. However, current industrial processes are unsustainable. As stated by the United Nations Secretary-General António Guterres, “without the means to invest in sustainable development...developing countries are falling even further behind.”⁷ This demonstrates the importance and urgency of sustainable development, specifically for developing countries. Sustainable manufacturing and waste management

1 “Industrialization: What It Is, Examples, and Impacts on Society,” Investopedia, last modified September 28, 2023, <https://www.investopedia.com/terms/i/industrialization.asp>.

2 “COP 28,” United Nations Climate Change, accessed December 27, 2023, <https://unfccc.int/event/cop-28>.

3 Rebecca Lindsey and Luann Dalhman, “Climate Change: Global Temperature,” *Climate.gov*, January 18, 2023, <http://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature>.

4 “Consequences of Climate Change,” European Commission, accessed December 28, 2023, https://climate.ec.europa.eu/climate-change/consequences-climate-change_en.

5 Investopedia, “Industrialization: What It Is, Examples, and Impacts on Society.”

6 “Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation,” United Nations, accessed December 27, 2023, <https://www.un.org/sustainabledevelopment/infrastructure-industrialization/>.

7 United Nations, “New green industrial age can be the breakthrough for Sustainable Development Goals,” *2023 Financing For Sustainable Development Report*, April 5, 2023, <https://www.un.org/sustainabledevelopment/blog/2023/04/press-release-un-new-green-industrial-age-can-be-the-breakthrough-for-sustainable-development-goals/>.

are two of the most important factors to consider should a country wish to industrialize sustainably.

Developing countries have many barriers to sustainable waste management. First, these countries often lack proper environmental policies and regulations. This means that organizations are not incentivized or required to implement sustainable practices.⁸ Second, there could be a lack of space for sustainable waste management facilities. Waste is often dumped in various locations without following standard procedures. This means that it is not recycled or processed properly, which harms the environment.⁹ Last, the recycling process requires a lot of resources and energy. For example, water, petroleum, and other forms of energy may be required in the recycling process. This may not always be economically feasible for developing countries, so they may opt for the cheaper waste-burning process.¹⁰

Bangladesh is a developing country facing a large plastic pollution issue. Of the almost one million tons of plastic consumed in Bangladesh, only 31 percent is recycled.¹¹ The rest ends up as litter in cities and rivers, which clogs drainage and results in flooding. By 2025, the amount of solid waste produced is expected to double compared to 2023.¹² Without tangible action, Bangladesh will continue to pollute the planet, preventing progress on key SDGs.

In September 2023, the Bangladesh government approved a five-year plan to develop their plastic industry. It hopes to grow the domestic plastic industry from around USD four billion to USD 20 billion by 2030.¹³ While the government hopes to create over 500,000 jobs by 2028 within the plastic industry, there is still no proper management of plastic

waste.¹⁴ Waste collection only reaches around 50 percent of urban populations, while the rest have to burn waste.¹⁵ This is ultimately due to a lack of investment in equipment for improved waste collection and transportation. As a developing country, Bangladesh prioritizes supporting its economy over implementing sustainable waste management. The international community must provide support to developing countries so that they can focus on sustainable industrialization without sacrificing economic growth.

The International Labor Organization (ILO) and UNIDO have recently reinforced their working agreement to accelerate sustainable development. This agreement was first established when the Director-Generals of the organizations met to establish ground rules for the overlapping nature of the organizations' domains. The original agreement was heavily focused on human resource development, vocational training, small-scale enterprises, working conditions, and technology. The focus areas of the original agreement were also more concerned with building infrastructure in developing countries and less on sustainable development. In November 2023, this agreement was revised with new focus areas, ranging from sustainable supply chains to rural entrepreneurship for jobs and food security.¹⁶ These focus areas are more geared towards sustainable manufacturing as climate change worsens.

The updated working agreement emphasizes Goal 8: Decent Work and Economic Growth and Goal 9: Industry, Innovation, and Infrastructure.¹⁷ These SDGs are important because they highlight the importance of sustainable economic development. Furthermore, these goals lay the groundwork for climate- and industry-related actions.¹⁸ Both the Director-

8 Binoy Debnath, "Modelling the barriers to sustainable waste management in the plastic-manufacturing industry: An emerging economy perspective," *Sustainability Analytics and Modeling* 3, (2023): 100017, <https://doi.org/10.1016/j.samod.2023.100017>.

9 Debnath, "Modelling the barriers to sustainable waste management," 100017.

10 Debnath, "Modelling the barriers to sustainable waste management," 100017.

11 Mohammed Hasan, "Implementation Of Circular Economy Principles In Bangladesh Basis Current Scenario," *Asia Business Outlook*, accessed January 14, 2023, <https://www.asiabusinessoutlook.com/industry-experts/implementation-of-circular-economy-principles-in-bangladesh-basis-current-scenario-nwid-5755.html>.

12 Anirban Sarker, "Household solid waste management in a recently established municipality of Bangladesh: Prevailing practices, residents' perceptions, attitude and awareness," *World Development Sustainability* 4, (June 2024): 100120, <https://doi.org/10.1016/j.wds.2023.100120>.

13 Beatriz Santos, "Plastic industry poised for growth in Bangladesh," *Sustainable Plastics*, January 2, 2024, <https://www.sustainableplastics.com/news/plastic-industry-poised-growth-bangladesh>.

14 Monira Munni, "Govt frames plastic industry policy to create jobs, market," *The Financial Express*, January 1, 2024, <https://thefinancialexpress.com.bd/trade/govt-frames-plastic-industry-policy-to-create-jobs-market>.

15 Hasan, "Implementation Of Circular Economy Principles In Bangladesh Basis Current Scenario."

16 International Labour Organization, "ILO/UNIDO Reinforce Their Cooperation," *ILO News*, November 21, 2023, https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_902966/lang--en/index.htm.

17 "The 17 Goals," United Nations, accessed December 27, 2023, <https://sdgs.un.org/goals>.

18 "Sustainable Development Goals," Practical Action, accessed December 29, 2023, <https://practicalaction.org/sustainable-development->



Waste Sorting Plant in Tehran
 Credit: Mostafameraji

Generals of UNIDO and ILO stress the importance of collaboration, especially on climate-related issues.

Since this initiative is relatively new, limited action has been taken thus far. The first planned step in this partnership is the Skills for Sustainable Industrial Transformation in Africa (SITA) initiative. This arrangement “targets enhancing lifelong learning systems in Africa to drive industrial transformation” while supporting a “just transition.”¹⁹ The scope of a just transition can vary for each country. Primarily, it focuses on easing the shift to more sustainable practices, including waste management and manufacturing. Additionally, rather than focusing on corporations, there is a focus on workers and enhancing their skills for a more sustainable industrial system. While these skills will vary depending on specific jobs, they will all include a general understanding of the equipment related to a sustainable economic transition. Talks with potential partners are scheduled for early 2024, with the actionable steps towards furthering this initiative beginning in late 2024.²⁰ This agreement between the ILO and UNIDO demonstrates the importance of cooperation within the international community to implement sustainable change.

The United Nations Framework Convention on Climate Change (UNFCCC) annually hosts the Conference of Parties (COP) to discuss climate change initiatives. Each year, attendants at COP reflect on climate-related actions and outcomes of the past year while setting goals for the coming years. COP28 occurred from November 30 to December 12, 2023, in Dubai, United Arab Emirates (UAE).²¹ This conference was attended by over 70,000 delegates, including UN member-states, business leaders, journalists, and industry and climate experts. COP28 covered a wide range of topics, from the immediate impacts of climate change to financial models for developing countries’ efforts in combating climate change.

COP28 also included the first global stocktake. In this process, stakeholders of the Paris Climate Agreement evaluated their progress in meeting the goals set in 2016 at the Paris Climate Conference.²² This process showcased that while progress has been made to reduce greenhouse gas emissions, it is insufficient. Immediate change is needed to ensure the global temperature does not rise to detrimental levels.²³ Considering that industrial processes are one of the largest contributors to

goals/.

¹⁹ International Labour Organization, “ILO/UNIDO Reinforce Their Cooperation.”

²⁰ International Labour Organization, “ILO/UNIDO Reinforce Their Cooperation.”

²¹ “About COP 28,” United Nations Climate Change, December 27, 2023, <https://unfccc.int/process-and-meetings/conferences/un-climate-change-conference-united-arab-emirates-nov/dec-2023/about-cop-28>.

²² United Nations Climate Change, “About COP 28.”

²³ “Why the Global Stocktake is Important for Climate Action this Decade,” United Nations Climate Change, accessed December 27,

greenhouse gasses, COP28 delegates discussed methods to improve sustainable industry practices.

For example, the President of Kenya, William Ruto, launched the green manufacturing initiative for Africa.²⁴ This initiative results from a collaboration between over 10 African countries and the COP28 President, Sultan Ahmed Al Jaber. Ruto shared that this program aims to harness the continent's resources to accelerate green industries and businesses across Africa. However, this program has faced resistance from certain African countries that rely on fossil fuels for over 90 percent of their exports. For example, Angola and Nigeria fear that a drastic switch to sustainable practices would severely damage their economies. Other countries, such as Ghana and Uganda, anticipate mini-financial crises if they completely abandon their fossil fuel investments. Nonetheless, most African countries are ready to use innovations to optimally and efficiently use natural resources. This transition may also assist in achieving global climate goals discussed at COP28.²⁵

At COP28, the importance of collaboration to fight climate change was stressed. This was highlighted in the Global Goal on Adaptation framework, which was agreed upon by the parties that attended the conference. This framework highlights the importance of providing technological and financial support to developing countries.²⁶ In these locations, COP28 delegates recognized that transitioning to sustainable practices has been the most difficult. Specifically, these countries lack the proper funds and resources to implement sustainable manufacturing and other industrial infrastructure.

The importance of the phasing out of fossil fuels in relation to sustainable manufacturing was also discussed. Many manufacturing plants rely on fossil fuels as their main power source, leading to large carbon emissions.²⁷ Discussions of

phasing out fossil fuels have been ongoing since COP27, but this goal has not been reached due to the lack of funding for developing countries and the lack of effort from larger carbon emitters. At COP28, the Loss and Damage Fund was created. This fund requires larger and wealthier countries that have significantly contributed to fossil fuel emissions to donate a larger portion of their GDP than previously established towards this fund. For developing countries, this transition would be incentivized, not penalized.²⁸ This fund supports countries to develop sustainable infrastructure and transition away from fossil fuels.

There is a lack of clear solutions to promoting sustainability within sustainable manufacturing and waste management. At COP28, a "green zone" was created. This allowed communities of young people, businesses, and artists to discuss solutions and steps that they believe must be taken to mitigate climate change.²⁹ In this way, COP28 included youth and other citizens in important decision-making.³⁰ Different perspectives may be the key to finding effective solutions to reduce carbon emissions and curb rising temperatures.

Pursuing sustainable industrialization in developing countries is a crucial step towards achieving many SDGs. By understanding and addressing the unique challenges faced by developing countries, delegates in UNIDO can ensure that sustainable practices are implemented. In doing so, these countries can minimize ecological impacts and foster a more sustainable future.

Applications of New Technologies

Many emerging technologies promote sustainable alternatives to current industrial processes. Many of these technologies have come with the Fourth Industrial Revolution.

2023, <https://unfccc.int/topics/global-stocktake/about-the-global-stocktake/why-the-global-stocktake-is-important-for-climate-action-this-decade>.

24 Sami Hegazi, "African leaders launch initiative for green manufacturing, sustainable development," *Daily News Egypt*, December 4, 2023, <https://www.dailynewsegypt.com/2023/12/04/african-leaders-launch-initiative-for-green-manufacturing-sustainable-development/>.

25 Hegazi, "African leaders launch initiative for green manufacturing, sustainable development."

26 COP28 President, Glasgow-Sharm el-Sheikh work programme on the global goal on adaptation referred to in decision 7/CMA.3, (December 11, 2023), https://unfccc.int/sites/default/files/resource/Global_goal_on_adaptation_1.pdf.

27 United Nations Climate Change, "About COP 28."

28 Shawna Ambrose, "What COP28 Means For the World of Climate Finance," *Rainforest Action Network*, December 13, 2023, https://www.ran.org/press-releases/what-cop28-means-for-the-world-of-climate-finance/?gad_source=1&gclid=Cj0KQiA4Y-sBhC6ARIsAGXF1g5EFU2EHZGYLrB-dnGUF4GV_TAM-C49mCr5Zy1muS9j5BrRfgYoeD4aAppiEALw_wcB.

29 United Nations Climate Change, "About COP 28."

30 "Visit COP28 Green Zone," COP28 UAE, accessed December 29, 2023, <https://www.cop28.com/en/green-zone>.

Technologies from the Fourth Industrial Revolution will allow scientists and policymakers to imagine manufacturing and waste management sustainably.³¹ These technologies include artificial intelligence (AI), deep learning, and other smart technologies.³² The usage of these technologies is key in making the shift to a sustainable world. Additionally, these technologies will help achieve the circular economic model, which focuses on the reusability of goods rather than their immediate disposal.³³

Companies in many industries have added AI to their business models. Platforms supporting second-hand clothes sales have become increasingly popular in the fashion industry. One example of this is ThredUp. This is a second-hand clothing retail platform that uses AI to assist consumers in finding clothing items that they like. As the secondhand apparel market will grow from USD 177 billion in 2022 to USD 350 billion in 2027, ThredUp hopes its technology will promote

31 Jackie Jung, “Fourth Industrial Revolution Tech Can Help Save the Planet,” *Western Digital*, January 8, 2024, <https://www.informationweek.com/it-sectors/fourth-industrial-revolution-tech-can-help-save-the-planet-sponsored->.

32 Jung, “Fourth Industrial Revolution Tech Can Help Save the Planet.”

33 Chris Knight, “What is the linear economy?” European Investment Bank, August 2, 2023, <https://www.eib.org/en/stories/linear-economy-recycling>.

34 Scot Case, “5 ways retailers are building the circular economy,” National Retail Federation, last modified September 11, 2023, <https://nrf.com/blog/5-ways-retailers-are-building-circular-economy>.

35 Shirley Lu and George Serafaim, “How AI Will Accelerate the Circular Economy,” *Harvard Business Review*, June 12, 2023, <https://hbr.org/2023/06/how-ai-will-accelerate-the-circular-economy>.

36 “Zero Waste. Zero Compromise,” SXD Zero Waste, accessed January 17, 2023, <https://www.shellyxu.design/sxd-zero-waste/>.

37 Lu and Serafaim, “How AI Will Accelerate the Circular Economy.”

38 Josh Templeman, “How AI Recycling Technology Can Transform The Circular Economy,” *Resource.Co.*, November 15, 2023, <https://resource.co/article/how-ai-recycling-technology-can-transform-circular-economy>.

the reuse of products so that they do not end up in landfill.³⁴ Another company in the fashion industry that uses AI is SXD Zero Waste. They use AI to create garment mockups that generate less waste during production.³⁵ This results in zero fabric waste in its fabric. Most garment companies generate 10 to 30 percent of waste in fabric.³⁶ This boosts sustainable manufacturing efforts and reduces SXD Zero Waste’s costs by 55 percent.³⁷ SXD Zero Waste demonstrates how companies can implement AI in the stages of production to promote sustainability and lessen expenses.

Another example is Recycleye, a London-based AI company that uses robots to enhance the sorting of mixed recyclables in waste recovery facilities.³⁸ Recycleye’s robots can recognize certain materials based on their properties and determine their usability. These robots are accurate and can differentiate between various materials, such as aluminum and foil.

Recycleye currently has 59 robots across Europe. These

Thred Up Website
 Credit: Jernej Furman



robots work best in material recovery facilities, where mostly dry materials are found. However, there is potential to move beyond dry recyclables and tackle other waste streams, including wet waste. The main concern associated with these robots is their cost and usability. In the long term, these robots are expected to reduce the cost of the sorting process in waste management plants. This is because their usage can greatly reduce labor costs. However, these robots are also associated with high startup costs. Furthermore, as with the installation of any new technology, there must be training for those who will operate them.³⁹ Still, implementing such robots can improve the recyclability rate of materials otherwise considered waste. This could help slow the consumption of raw materials and ensure the greater reusability of materials.

After materials have been sorted and their usefulness has been evaluated, the next step is their redistribution. An example of a company that fulfills this need is Safi, which connects the buyers and suppliers of recycled materials.⁴⁰ Safi also helps transport the materials and ensures they are of good quality. For these quality checks, Safi uses AI. Safi currently has clients in 15 countries. Furthermore, as of November 2023, Safi has raised USD 19.5 million from investors.⁴¹ Overall, Safi has implemented a circular economic model within waste management that is feasible and realistic.

The ability to gather data regarding effective waste management is essential. The company Greyparrot has recently fulfilled this need as of September 2023. Greyparrot is a hardware-agnostic AI system. This means that it can insert AI vision models into waste management facilities.⁴² These vision models are placed on various parts of the waste management process, such as crucial conveyor belts. These vision models then gather data on many factors of the waste flow system,

such as quality control, residue lines, and infeed. By gathering this data, Greyparrot can pinpoint any shortcomings within the waste management system and monitor them as solutions are applied. For example, Greyparrot found that 1.6 million pounds of materials were lost in one plastic recovery facility a year. By correcting these shortcomings, Greyparrot allows for the transition to more effective waste management models.⁴³

Experts in the waste management field are also pushing for the inclusion of deep learning technology into their systems. This technology is applied to help sort and identify challenging and possibly hazardous materials.⁴⁴ Deep learning is a subset of AI consisting of a neural network of more than three layers. This allows it to imitate the behaviors of the human brain.⁴⁵ Thus, deep learning models can learn from advanced and large datasets to produce accurate and helpful suggestions for management.⁴⁶ One material that is difficult for traditional AI models to sort is polymers. Products containing polymers, such as plastics, are often not designed to be recycled. Therefore, it is difficult to determine whether they are safe to reuse in items such as food containers. However, deep learning systems can distinguish between materials that should and should not be reused, such as polymers, which makes them incredibly useful in promoting safe and sustainable recycling.⁴⁷ Some companies currently employing this technology include EverstLabs, RubiCon, Recycleye, TrueCircle, and BIN-e.⁴⁸ This can help boost sustainable waste management and prevent materials that would have been disposed of if believed to be hazardous.

While there has been much progress towards transitioning to a circular economy, financial challenges remain. Implementing a circular economy could cost up to USD 93 million annually.⁴⁹ Despite the onset of these challenges, many managers are considering adding improved technology to waste

39 Templeman, "How AI Recycling Technology Can Transform The Circular Economy."

40 Amy O'Brien, "A new wave of founders are turning from fintech to climate tech," *Sifted*, November 28, 2023, <https://sifted.eu/articles/founders-turning-from-fintech-to-climate-tech>.

41 O'Brien, "A new wave of founders are turning from fintech to climate tech."

42 "Rise of the machines: Waste management technology," *Circular*, September 18, 2023, <https://www.circularonline.co.uk/features/rise-of-the-machines-waste-management-technology/>.

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44 TOMRA and PolyPerception, "New collaboration for AI-powered material analysis technology," *Waste Management World*, December 16, 2022, <https://waste-management-world.com/resource-use/new-collaboration-for-ai-powered-material-analysis-technology/>.

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46 "What is Deep Learning?," IBM, accessed January 2, 2024, <https://www.ibm.com/topics/deep-learning>.

47 TOMRA and PolyPerception, "New collaboration for AI-powered material analysis technology."

48 "Top 10 Startups Developing AI for Waste Sorting," AI Startups, accessed January 5, 2024, <https://www.ai-startups.org/top/wastesorting/>.

49 *Potential Economic Pay-off of a Circular Economy* (Sydney: KPMG Economics, April 2020), <https://assets.kpmg.com/content/dam/kpmg/au/pdf/2020/potential-economic-pay-off-circular-economy-australia-2020.pdf>.

management systems. Beyond the clear sustainability-related benefits, many of these models can save waste management plants millions of dollars in labor and raw material costs in the long run. After the initial installation of these technologies, the machines are relatively self-sufficient, and the maintenance costs are minimal.⁵⁰ Furthermore, the machines aim to find reusable materials to be reused or sold to other companies and industries for profit.⁵¹ When developing solutions, delegates should highlight and consider new technological processes.

Conclusion

There are many new factors to consider when discussing manufacturing and waste management. These include youth engagement at conferences, such as COP28, and technological advances, such as AI.⁵² This provides hope to those looking to sustainably develop waste management systems.

However, a move towards sustainable processes comes at a cost.⁵³ Therefore, international cooperation ensures every country can access sustainable processes. This will require much compromise but will pay off in the long run. Delegates must consider the effectiveness, ease of use, and general accessibility of recent innovations. Sustainable manufacturing and waste management can be achieved through informed debate, active listening, and compromise efforts.

⁵⁰ *Potential Economic Pay-off of a Circular Economy.*

⁵¹ *Potential Economic Pay-off of a Circular Economy.*

⁵² United Nations, "COP 28"; O'Brien, "A new wave of founders are turning from fintech to climate tech."

⁵³ *Potential Economic Pay-off of a Circular Economy.*

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