Code 8.7 Symposium: Using Tech-Driven Data to Address Child Labour
Alice, Eckstein, Project Director - Delta 8.7
1 March 2022

The United Nations declared 2021 the [International Year for the Elimination of Child Labour](#), a year that was to be critical to the achievement of SDG Target 8.7 and the goal of ending child labour by 2025. As a member of the Organizing Committee for Code 8.7, Delta 8.7 convenes this Symposium to explore how the employment of AI, machine learning, computational science and other frontier technologies can address child labour. Researchers from three Code 8.7 member organizations — [HACE: Data Changing Child Labour](#); the [Ministry of Labour and Social Security of Brazil](#); and the [Centre for Data Science](#), School of Mathematical Sciences at Queensland University of Technology (QUT) — explored the challenges and opportunities available through data and novel technologies to increase knowledge of prevalence and analyse efficacy of measures taken to end child labour.

Representing HACE, Elizabeth Burroughs, Anahad Kaur Khangura and Eleanor Harry examine the complexities of the data itself: to create accurate modelling and analyses of child labour, frontier technologies require accurate and standardized data. Using data collected in Bangladesh as an example, they illustrate the first challenge faced by researchers: of creating comparable data from different sources for accurate and consistent analysis. Disconnects in data within and between national sources and international measurements and standards can be found in how age categories are grouped, how activities were defined over time and variations in regional grouping. These inconsistencies present a challenge for developing rigorous analysis of how the prevalence and nature of child labour is changing over time, as (for example) during the COVID-19 pandemic.

In the leadup to 2021, stakeholders were invited to make a pledge as part of the International Year for the Elimination of Child Labour. In response, the Labour Inspection Subsecretariat of Brazil (SIT) entered a pledge titled *"Aprimorar e fortalecer a Inspeção do Trabalho Brasileira no Combate ao Trabalho Infantil***"** ("[Enhancing and Strengthening the Brazilian Labour Inspection to Combat Child Labour](#)"). Luiza Carvalho Fachin and Roberto Padilha Guimarães from the Brazilian Ministry of Labour and Social Security discuss how action was taken in 2021 to achieve this goal, specifically focusing on the development of an innovative online platform to analyse, classify and manage reports of child labour.

Prior to becoming a PhD Candidate at the Centre for Data Science, School of Mathematical Sciences at Queensland University of Technology (QUT), Adriana Bora worked with The Future Society and Walk Free to develop [Project AIMS](#) (Artificial Intelligence Against Modern Slavery). In her contribution to the Symposium, she considers the challenge of analysing and learning from the thousands of modern slavery statements emerging from companies subject to reporting under the United Kingdom and Australian Modern Slavery Acts. Project AIMS uses technologies including natural language processing to read and analyse

modern slavery statements. The project demonstrates the capacity for frontier technology to sort through and assess public information at the rate necessary to inform policy and consumer decisions. As Bora's article proposes, such insights can also support the private sector by offering the opportunity to strengthen response to child labour within supply chains and increase their business sustainability as a result.

Emerging from the International Year for the Elimination of Child Labour, it is clear there are significant challenges to achieving SGD Target 8.7 goal of ending child labour by 2025. The rate of child labour was already increasing prior to the pandemic and is projected to rise further as a result of economic and social shocks. The articles contributed to this Symposium clearly demonstrate how the use of innovative technology can support stakeholders across sectors to take meaningful and effective action to accelerate progress in this critical period.

All of the contributions to the Symposium can be found below:

The Importance of Standardized Child Labour Data to Machine Learning and AI
Elizabeth Burroughs, Anahad Kaur Khangura, and Eleanor Harry, HACE
2 March 2022

Ipê Trabalho Infantil (Ipê Child Labour) System
Luiza Carvalho Fachin, Roberto Padilha Guimarães, Ministry of Labour and Social Security of Brazil
3 March 2022

What Are Companies Doing? Using Data to Analyse Corporate Statements on Child Labour in Supply Chains
Adriana Bora, Centre for Data Science, School of Mathematical Sciences at Queensland University of Technology (QUT)
4 March 2022

All these contributions culminated in a virtual panel held on 7 March 2022. The full recording of this event can be found here.

The Importance of Standardized Child Labour Data to Machine Learning and AI
Elizabeth Burroughs, Head of Data, HACE
Anahad Kaur Khangura, Lead Social Data Researcher, HACE
Eleanor Harry, Managing Director, HACE
2 March 2022

Machine learning and AI require consistent, reliable data in order to produce analyses for effective policy to eradicate child labour. Data on child labour is collected by many governmental and international sources, such as the national statistical offices, the International Labour Organization and UNICEF-MICS. However, variables are not measured or collected consistently throughout repeated, longitudinal surveys, and they are not standardized between different sources. HACE uses AI and machine learning to generate cross-sectoral analyses of child labour; but to do so, we must standardize secondary data and produce our own time series models which are appropriate for machine learning. During this standardization process, we see the following problems repeated across data sources and across time, using as an example the collection of child labour data in Bangladesh.

Age groups

Child age is important in identifying the severity and nature of child labour, as seen in the ILO Minimum Age Convention 138, national laws and private sector policies. However, data is often collected in a way that makes this confirmation of child labour and its severity impossible. To use an example, the Census of Agriculture 2008 for Bangladesh does not provide data in the appropriate age ranges from which child labour can be analysed. In the census, the age ranges for children engaged in agricultural work are 0-10 years, 10-14 years, and 15+ years which does not correspond to the internationally known age groupings for child labour (5-11 years, 12-14 years and 15-17 years). This means that analysis of permissible work versus child labour in this example is not possible, as children of 14 years are allowed to work more hours than a child of 13 years, as per Bangladesh national law, yet they are collected in the same group in the census.

For the sake of accurate data analysis, it is therefore essential to collect discrete ages instead of age groupings; for example, a child should be recorded as 7 years old, not 6-11 years old. The discrete ages can later be aggregated to suit the analytical needs of whichever actor or machine learning algorithm is using them. Additionally, international age groups on child labour range from 5-17 years, despite the prevalence of child labour in the 0-5 age group (see Figure 1), and the severity of the Occupational Safety and Health risks associated with children under 5 years old.

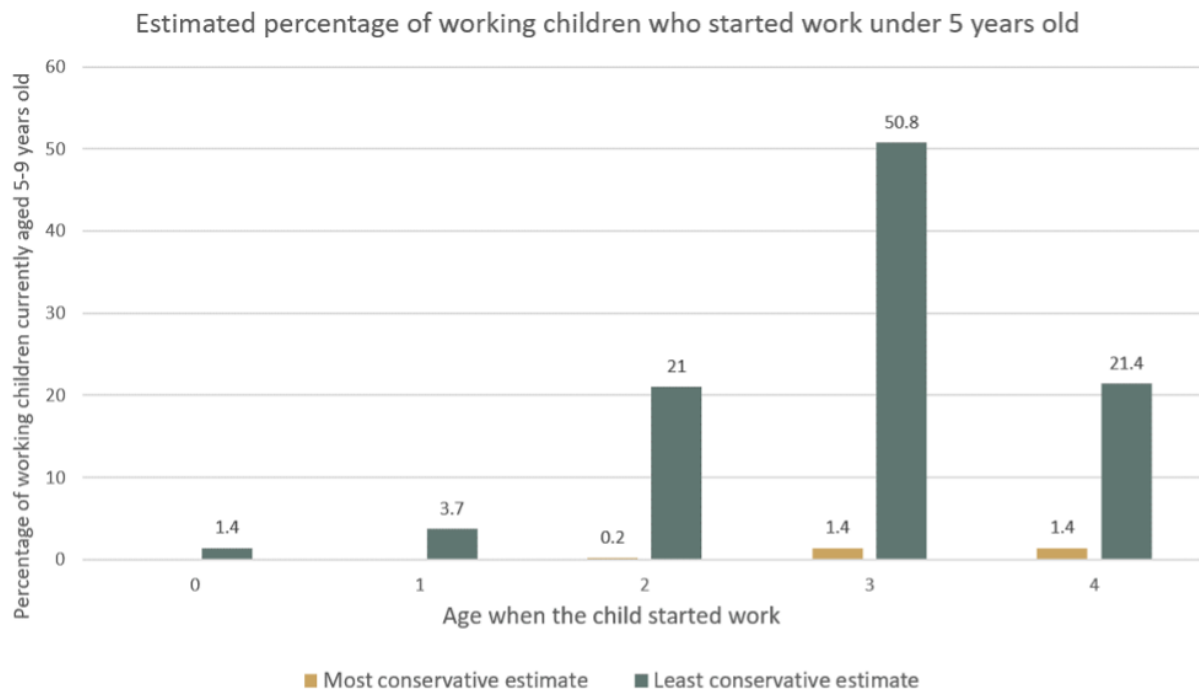Estimated percentage of working children who started work under 5 years old

Figure 1: Estimated ages working children (child labour by international definition) started work. "Most conservative estimate" describes a scenario where every child from the interviewed group of children aged 5-9 years old was 9 years old. "Least conservative estimate" describes a scenario where every child from the interviewed group of children aged 5-9 years old was 5 years old. We can assume the true prevalence is somewhere between the two estimates. Adapted from [Bangladesh Child Labour Survey 2002-03](#).

Types of activity

Since 2000, UNICEF has collected data on child labour in more than 50 Multiple Indicator Cluster Surveys (MICS) following a standard module questionnaire. In 2010, the [MICS definition for child labour](#) was revised to align with international standards, with the guidance of the ILO. Therefore, early MICS data is incomparable to data collected in the following rounds of surveys because "child labour" no longer includes hazardous working conditions, which is now a separate indicator. This limitation is often acknowledged by UNICEF-MICS, but beyond acknowledgement, there appear to be few mitigating actions taken to address impact on data analysis.

Time series

Intervals between data collection on child labour are variable between countries and sources. In the example of UNICEF-MICS, timing of the surveys [varies based on how often other surveys are carried out](#) in the country as they aim to supplement governmental data. This is logical and should work, but the lack of standardization of child labour definitions regarding age groupings

and types of activities between government surveys and UNICEF-MICS data renders much of the data incomparable and leads to various half-formed time series. There are issues with consistency of data collection. For example, the 2012-13 MICS for Bangladesh is missing data on child labour, despite it being a set MICS indicator[1]. A lack of standardization in collection of indicators impairs formulation of a time series for the purpose of analysis.

Variation in regional groupings

The various international regional groupings provided in the *Child Labour Global Estimates 2020; Trends and the Road Forward* report (ILO regions, SDG regions and UNICEF regions; see Table 1) are not standardized across organizations and therefore across surveys and data collection. This means that forming a longitudinal time series of global trends and any accurate disaggregation of data into countries is challenging.

ILO regions	SDG regions	UNICEF regions
Sub-Saharan Africa	Sub-Saharan Africa	Sub-Saharan Africa
Africa	Northern Africa and Western Asia	Middle East and North Africa
Arab States	Eastern and South-Eastern Asia	South Asia
Europe and Central Asia	Central and Southern Asia	Europe and Central Asia
Americas	Europe and Northern America	North America
Latin America and the Caribbean	Latin America and the Caribbean	Latin America and Caribbean
Asia and the Pacific		East Asia and Pacific

Table 1: *Different regional groupings by the ILO, SDG and UNICEF; adapted from Child Labour Global Estimates 2020; Trends and the Road Forward*

Effect on understanding the impact of COVID-19

In the absence of standardization measures, it is difficult to see the impact of COVID-19 on child labour. Incomparable data adversely impact the formulation of any time series and thus impairs any analysis and machine learning mechanisms. It is difficult to determine the impact on child labour of COVID-19 without standardized data on child labour from before, during and after the pandemic.

The impact of COVID-19 on child labour is difficult to ascertain, particularly so when we see the prevalence of child labour in all wealth index quintiles, including higher income households (see Figure 2). Only the holistic consideration of all potential drivers of child labour can help determine the impact of the pandemic on child labour. In the *Child Labour Global Estimates 2020: Trends and the Road Forward* report, the ILO explores drivers of child labour during COVID-19 as school closures, food insecurity and a lack of legal youth employment

opportunities. However, as there is limited data on these variables before and after the pandemic, it is impossible to measure how a change in these factors caused by COVID-19 had subsequent effects on increased child labour.
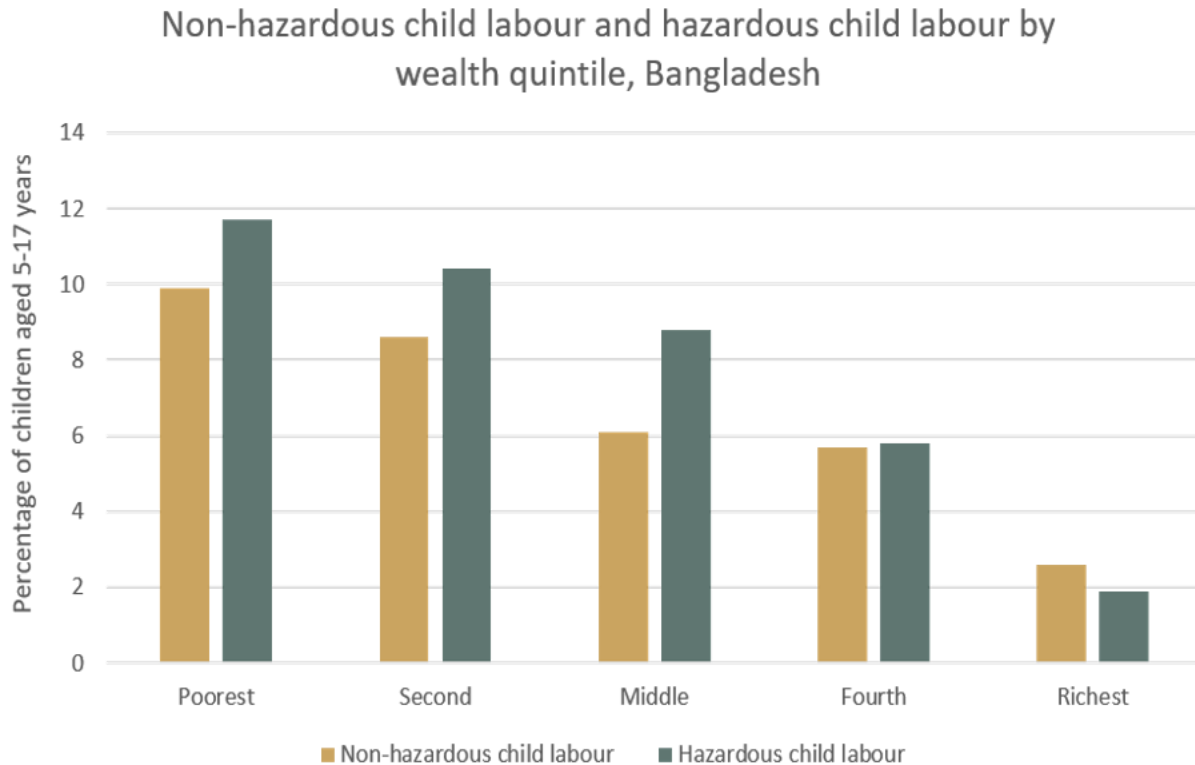

Figure 2: *Non-hazardous and hazardous child labour by wealth index quintile; adapted from [Bangladesh MICS 2019](#).*

A road forward

Standardizing or improving previous data is challenging without open access to raw data and collaboration between leading organizations in the field. In general, we should improve standardization of data measurement and collection through collaboration. This can be achieved in various ways, which include ensuring consistent collection of standardized child labour data, collecting data on discrete ages, and maintaining one set of regional groupings to make country disaggregation easy for the purpose of analysis and time series.

By standardizing data on child labour and its related variables, we can better examine the trends in child labour and therefore use AI and machine learning to combat the issue. As child labour is a complex issue and a unique form of labour, it should be collected and analysed through a purely child labour lens by child labour data experts, not as a subset of modern slavery or from an adult labour force perspective. The limitation of utilizing machine learning and AI solutions to tackle child labour is not yet a data science problem; it is a data problem.

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[1] Missing child labour data from Bangladesh MICS 2012-13 may be explained by the Bangladesh Bureau of Statistics Child Labour Survey 2013, as UNICEF-MICS is designed to work around governmental surveys already in place.

Ipê Trabalho Infantil (Ipê Child Labour) System
Luiza Caravalho Fachin, Labour Tax Auditor, Ministry of Labour and Social Security of Brazil
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3 March 2022

The United Nations declared 2021 as the International Year for the Elimination of Child Labour, an important moment for the development of concrete and effective actions to ensure a child-labour-free region. In Brazil, the Labour Inspection Subsecretariat (SIT) since its inception 130 years ago, and especially after the 1988 Constitution, has significantly contributed to the reduction of child labour, and is currently among the most important government organs to manage the problem. SIT thus added its own promise to take concerted action to the virtual platform that the International Labour Organization (ILO), in conjunction with Alliance 8.7, developed for the "International Year for the Elimination of Child Labour". The promise of action titled, *"Aprimorar e fortalecer a Inspeção do Trabalho Brasileira no Combate ao Trabalho Infantil***"** (in English: "[Enhancing and Strengthening the Brazilian Labour Inspection to Combat Child Labour](#)") is intended, among many things, to drive the development of performance instruments and tools to enhance the efforts of the Labour Inspection in its fight against child labour. Among the projects developed, the "Ipê Trabalho Infantil" System is an online platform whose purpose is the collection, screening and management of child labour reports.

In this article, we will introduce the "Ipê Trabalho Infantil (Ipê Child Labour)" System, highlighting its goals, its functionality, as well as the benefits it is expected to provide to the Brazilian Labour Inspection's efforts to combat child labour.

1. The System

With technical support from the ILO, the Ipê Trabalho Infantil System was developed by the Labour Inspection Subsecretariat (SIT), which is part of the Secretariat of Labour at the Ministry of Labour and Welfare.

The System has the following goals:
- To serve as a channel for reports involving child labour for the Labour Inspection authorities;

- To screen and classify reports;
- To manage the influx of reports received by the Labour Inspection authorities; and to assist in the operational planning of the Labour Inspection's field actions to combat child labour.

The Ipê Trabalho Infantil System is in its final testing phase and is expected to begin operation in the next few months.

2. Collection and management of reports

The Ipê Trabalho Infantil System is an *online* platform through which reports pertaining to the incidence of child labour can be submitted. The System leads the user to a standard form to be completed with several questions related to the case being denounced. The purpose of this form is to screen the report based on the inclusion of elements that help in the investigation and management of the information. Once the report is entered, the System makes it possible to control and process the information received, including through the use of geo-referencing and algorithms that allow the screening of the information, which facilitates the planning of operations against child labour.

The flow of the reports begins when a member of the Child and Adolescent Protection Network accesses the Ipê Trabalho Infantil System and registers a report of a child labour situation they either found or heard about. The Labour Inspection Subsecretariat, by means of a specific profile, receives the report, carries out the screening (through predefined indicators in an automated system), and forwards it, through the Ipê System itself, to the relevant regional unit, in accordance with the geographic location of the reported situation. The specific regional unit then receives and investigates the reported case.

Hence, with the new System, it will be possible to increase the efficiency of the Labour Inspection's operations to combat child labour. The System's automatic screening process will enable SIT to quickly address the most urgent demands, such as those that include evidence of the worst forms of child labour. In addition, using algorithms that pre-qualify the severity, complexity and amount of information in each report will facilitate and expedite the triaging of the information, requiring less effort and fewer hours spent by the professionals serving at the Labour Inspection.

3. System recipients

Child labour is a complex social phenomenon with multiple causes, which include social, economic and cultural factors. Given this reality, addressing the issue adequately is only possible through the integrated action of the government with civil society, and the joint coordination of all different levels (federal, state and local) and sectors of the government (labour, education, social welfare, health, among others). One of the primary factors to enable and strengthen this integrated action is information sharing between agencies and entities

about cases where children and adolescents were found in forbidden labour situations. Information sharing will, in turn, supplement and guide the planning of the operations to combat child labour.

That said, at first, the Ipê System will only be available to members of the Child and Adolescent Protection Network, who can then submit child labour reports. Once launched, the System will be widely promoted among the members of the Network in each regional unit, especially the Social Assistance Offices, the Guardianship Councils and the Public Prosecutor's Office. As part of the efforts to promote the System, which will include presentations to the states and access to a Guide to provide instructions on how to enter reports, there will also be information detailing the System's features, emphasizing its importance as a tool to eradicate child labour. The expectation is that the System will facilitate and expedite the forwarding of child labour reports from the Child and Adolescent Protection Network to the Labour Inspection, as well as the response of the State to investigate such reports.

Final Considerations

The Ipê Trabalho Infantil System represents a significant progress in the receipt and screening of reports, as well as in the operational planning of the actions of the Brazilian Labour Inspection Subsecretariat. In addition, it significantly contributes to increase the efficiency and to increase inspection operations combat child labour by the Labour Inspection authorities.
This article has been prepared by Luiza Carvalho Fachin and Roberto Padilha Guimarães as a contribution to Delta 8.7. As provided for in the Terms and Conditions of Use of Delta 8.7, the opinions expressed in this article are those of the authors and do not necessarily reflect those of UNU or its partners.

**What Are Companies Doing? Using Data to Analyse
Corporate Statements on Child Labour in Supply Chains**
Adriana Eufrosina Bora, PhD Candidate at the Centre for Data Science, School of Mathematical Sciences at Queensland University of Technology (QUT)
4 March 2022

It is estimated that almost one in ten children worldwide, a total of over 160 million children, are in child labour globally. Over half of them are younger than 11 years old and working in hazardous conditions. Due to the COVID-19 pandemic, the United Nations predicts another 9 million children to be in this situation by the end of this year.

These shocking statistics and the recent crisis highlight the responsibility of both governments and companies to apply laws, implement due diligence and create transparency on the measures they are taking to eliminate and prevent child labour from supply chains.

For companies, addressing the issue of child labour in supply chains is not only an obligation but also an opportunity, as it can strengthen their response to the COVID-19 crisis as well as their business sustainability more broadly. To do so, companies should complement their immediate response to the short-term incidents with "*longer-term, systemic responses that make global supply chains more resilient, ethical and sustainable, and, concomitantly, more impervious to child labour and other human rights violations in future crises.*"

External actors such as governments, investors, consumers and even competitors in the same industry have been pressuring companies to track and report their progress. As a result, there has been a rise in mandatory requirements and voluntary disclosure concerning human rights and supply chain due diligence in recent years.

Globally, legislations are being passed requiring companies to respond to human rights abuses in their supply chains. Some legislations include transparency clauses asking companies to publish statements highlighting the steps they are taking in this regard.

For example, the introduction of the first national legal framework for combatting modern slavery, the 2015 Modern Slavery Act (MSA) in the UK, has been a helpful step toward supply chain transparency. It requires companies making over £36 million per annum to report on the actions they are taking to eradicate modern slavery from their operations and supply chains. As a result, businesses publish an estimated 16,000 modern slavery statements each year under the UK Act alone.Other countries and jurisdictions are quickly following suit with their own modern slavery-targeted legislation, causing a drastic increase in the number of corporate statements published each year.

Documenting the impact of new legislative acts is an indispensable tool for improving the effectiveness of these legislations and advancing business practice. As transparency in supply chains is gaining momentum, in recent years there has been a push for more third-party sustainability and due diligence indices and benchmarks that seek to analyse what companies are reporting and measure their performance vis-à-vis their supply chains due diligence obligation.

While indices have traditionally been focused on corporate social responsibility, there has been a shift towards human rights due diligence benchmarks, such as KnowTheChain, Fashion Revolution, the Corporate Human Rights Benchmark and the UK Modern Slavery Act Research Project.

While the publication of corporate statements has provided external parties a greater capacity to hold businesses accountable, it has presented a new challenge: external parties cannot comprehensively assess the large and increasing volume of statements.

The current analysis of the statements, done manually, is resource-intensive. It takes approximately one hour per statement, and even the most comprehensive benchmark, the UK

[Modern Slavery Act Research Project](#) run by [Walk Free](#) and [WikiRate](#), has been able to analyse only approximately 2,400 statements to date. This process leaves thousands of statements unanalysed and governments unable to assess actual levels of compliance. Thus, automating the process is the only way to achieve accountability at scale.

[Project AIMS (AI against Modern Slavery)](#) is a first attempt to answer this question. Project AIMS is an open-source solution that strives to build towards achieving accountability at scale by using data science and Artificial Intelligence (AI) methods such as Natural Language Processing (NLP) to analyse all the available statements. It builds initial explorations of machine-learning solutions designed to benchmark the UK MSA statements. All the data and the code developed so far are publicly available on the [GitHub repository.](#)

Yet, as presented in Table 1,out of the hundreds of legislations, initiatives and reference materials listed on the latest "[Compendium of relevant reference materials and resources](#) on ethical sourcing and prevention of trafficking in human beings for labour exploitation in supply chains," only a handful are asking companies to particularly address the issue of child labour in their supply chains.

TABLE 1: COMPENDIUM OF RELEVANT REFERENCE MATERIALS AND RESOURCES ON ETHICAL SOURCING AND PREVENTION OF CHILD LABOUR IN SUPPLY CHAINS- BY ORGANIZATION FOR SECURITY AND CO-OPERATION IN EUROPE (OSCE)

National Legislation, Policies and Other State Initiatives	International Treaties, Political Commitments, Reports and Other Initiatives by International Organizations	Civil Society, NGOs, Private Sector and Academia
NETHERLANDS • Child Labour Due Diligence Law	INTERNATIONAL LABOUR ORGANISATION (ILO) • How to do companies with respect for children's right to be free from child labour: ILO-IOE child labour guidance tool	NGOS AND CIVIL SOCIETY • Enable Training toolkit on addressing child labour and forced labour in agricultural supply chains • Supply Chain Risk Report – Child and forced labour in Canadian consumer products
NORWAY • NBIM Investor Expectations on Children's Rights implementation of the UN Guiding Principles • 504. Children's Rights. Expectations Towards Companies • Children's Rights Network	ORGANISATION FOR SECURITY AND CO-OPERATION IN EUROPE (OSCE) • Decision No. 7/17 Strengthening Efforts to Combat all Forms of Child Trafficking, Including for Sexual Exploitation, as well as Other Forms of Sexual Exploitation of Children	PRIVATE SECTOR • Achieving Reduction of Child Labor in Support of Education (ARISE)
UNITED STATES OF AMERICA • Executive Order 13126 – Prohibition of Acquisition of Products Produced by Forced or Indentured Child Labor • List of Products Produced by Forced or Indentured Child Labor • Child Labour Cocoa Coordination Group • Sweat & Toil: Child Labor, Forced Labor, and Human Trafficking Around the World • 2018 Findings on the Worst Forms of Child Labor • 2018 List of Goods Produced by Child Labor or Forced Labor • Harvesting the future: Piloting the USDA's Guidelines for Eliminating Child and Forced Labor in Agricultural Supply Chains	UNITED NATIONS CHILDREN'S FUND (UNICEF) • The Children's Rights and Companies Atlas • UNICEF's Child Rights and Mining Toolkit. Best practices for addressing children's issues in large-scale mining • Child Rights and Security Checklist	

The leading model, however, is the [Dutch Child Labour Due Diligence Law](#). This legislation requires Dutch companies or companies that sell products on the Dutch market to exercise due diligence, examine whether child labour occurs in their supply chain and develop and publish their action plan. The companies' statements will be [recorded in a public register yet-to-be designated](#). Nevertheless, a new legislation was recently proposed to replace the Child Labour

Due Diligence Act that was adopted by the Dutch Parliament in 2019 but has not entered into force yet, the Dutch Bill for Responsible and Sustainable International Business Conduct. Regardless of which legislation will come into effect, and companies start publishing their statements on the publicly available registry, similar data science and AI methods as those explored in Project AIMS can be outlined and adopted to systematically monitor companies progress towards eradicating child labour in the supply chains.

Yet, considering the urgent need to address child labour, until then, solutions can be re-designed to extract the most information possible what companies are already doing against child labour, from existing data sources, such as the UK and Australian statements as illustrated in the case study on Project AIMS's GitHub, accessible here.

Given the increased vulnerability and the expected rise in cases of child labour, new tools are needed to increase the impact and effectiveness of legislations and end child labour in all its forms by 2025. Collaborations between the legislators and the technology providers are key to accelerate progress and build accountability at scale.

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