

# *Child Labor in Social Media: Exploring a Decade of YouTube Data*

Yingying Zhang Zhang  
*International University of Japan*

Chun Yee Wong  
*International University of Japan*

Alessandro Comai  
International University of Japan

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IUJ Research Institute  
International University of Japan

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# **Child Labor in Social Media: Exploring a Decade of YouTube Data**

By Yingying Zhang-Zhang, Chun-Yee Wong, Alessandro Comai

## **Abstract:**

In this paper we explore the phenomenon of child labor, an important sustainability issue listed in the sustainable development goals (SDGs), via a novel approach by deploying machine learning tools of Python with data scrapped from popular social media YouTube. As a less investigated topic in the management field, our purpose of this study is to raise further awareness of child labor in the contemporary business context, with an issue largely omitted by international management and multinational companies, but profoundly rooted in developing countries and global supply chain. After the analysis of 11913 YouTube text data with Python machine learning tools, we deployed co-wording and squared multiple correlation technique to further explore the multiple variable relations for our further discussions of future research in this line.

Keywords: Child labor, YouTube, Python, Sustainability, multinational

## **Introduction**

Child labor is a phenomenon that calls attention of the society, policy makers and scholars. In a google search on September 20, 2022, it resulted 878 million of records. The International Labor Organization (ILO) estimates that about 10% of the world's child population (152 million children) are subject to child labor (United Nations, 2022). This attention is enhanced with the United Nations emphasis on the Sustainable Development Goals (SDGs), in which child labor is addressed in its target 7 of the SDG8 to “promote sustained, inclusive and sustainable economic growth, productive employment and decent work for all”.

Child labor is a critical issue, which is directly related to SDG 1 “No poverty”. In addition, SDG 8, which is to “promote sustained, inclusive and sustainable economic growth, productive employment and decent work for all”, specifically addresses child labor in its Target 7

As a well-studied topic in the field of economics specially in developing economies, child labor is less studied in management with limited awareness and related effects. In a video clip directed by Mistrati and Romano on the dark side of chocolate industry (BrethrenVoices, 2012), most of multinationals’ managers simply referred that they were unaware of this issue when being asked about their knowledge on child labor and any possible relation of their company with the matter. In contrary, there is a wider consciousness on the matter of racial and gender equality, and often it is incorporated into the human resource policy of the multinational corporations. In general, there are less understanding and transparency in child labor in management field. An executive in the food processing industry admitted that he had heard the issue of child labor, but he remained not doing anything like others as he didn’t know how to act when asked by one researcher.

As part of United Nations’ 2025 goals for sustainable development, child labor has slightly caught some increasing attention in business and industry. Some scant materials found are of case type and from labor and employment perspective (Bartlett, Dessain, & Sjöman, 2006; Nicholas, 1993; Kruse & Mahony, 2000; Mitchell & Clapp, 1980). A systematic approach to exhaustively explore child labor from management perspective could be Hindman and Smith’s (1999) cross-cultural ethics analysis, and Kolk and Van Tulder’s (2004) analysis of the code of conduct of multinational approaches to child labor.

Child labor in general is a less studied topic in the field of management. With the increasing interests of academics on the sustainability issue in management, child labor needs to be back in

the scenario of international management by multinational companies, not only treated as a labor issue, but moreover, a strategically important matter for sustainable development of the firm as a socially responsible action towards developing countries. Like greenwash or other sustainability façade, child labor runs the risk to become a lip talk to keep the corporate image, rather than an ethical action. Or, even worse, it is most times forgotten and largely omitted.

If academics and practitioners do not care, sustainability may become another hype in management like many others in the last decades with all kinds of stories and focuses. Along with gender, environmental and other sustainability issues that corporates need to face as challenges or as sustainable management for their ethics and social responsibility reports, child labor seems to receive less attention in management, probably as another past hype. Different from the fact that gender and environmental issues are gathering much attention by corporate executives, even management researchers have dug more on these topics, child labor seems to be just a troublesome topic for multinational corporations. Few scholars have intended to bring child labor into management like Doorey (2011) and Marshall et al. (2016) incorporated child labor as an example into supply chain strategy. At least ten companies have been enlisted again for “still use child labor” in 2019: Nestlé, H&M, Philip Morris, Microsoft, Sports Direct, British American Tobacco, Apple, New Look, Japan Tobacco International, and Hershey (Phillpott, 2019). Some other popular brand names have been the target of child labor scandal at least for some times though improvements have been carried out: Gap, Nike, Adidas, Victoria’s Secret, Kraft, Mars and IKEA (Smith et al., 2001; Kenyon., 2000; Khan et al., 2007).

## **Literature review**

While child labor is a social phenomenon attracted much attention of the society, management scholars have not paid sufficient interests on it yet. To illustrate that, we made a quick search on Google using “child labor” on September 20, 2022, and it resulted 439,000 items in 0.51 seconds. In an earlier literature search, we employed Web of Science search with “Child Labo\*r” on 19th June 2018, by using criteria of Social Science Citation Index, Languge (English), Web of Science Categories (Economics, Management, business and Industrial Relations Labor), Document Type (Academic Articles), Research Area (Business Economics), and found 1,166 articles after an initial result of 8,122. However, among these slightly more than one thousand articles, the majority (1049; 90%) are in the category of economics, and a decent proportion (204; 17.50%) in the category of industrial relations labor, and only a minority part is in the category of management (42; 3.60%), and business (33; 2.83%). Considering that one article can be located in more than one category, the sum of the category of management and business is only a few in reality. As the research interests is very much focused on the perspective of management and business, we then reduce the searching results only into the category of business and management, which gave us a final 58 articles. Among these, we have reviewed the title, abstract and full text, and only found 16 relevant in the core category. Among the identified research publications on child labor in management journals, Journal of Business Ethics is the principal journal of concern. Therefore, the search conducted on September 20, 2022 focused on the Journal of Business Ethics, and identified thirty-seven articles which mentioned child labor. The following review mainly focused on these identified publications after a brief understanding of the general study on the topic.

### **Child labor studies by economists**

Child labor is a study topic with multi-facets; while most think that of market work in developing countries, that is children employed in mines or factories or alike, it could be also works in house, household industries, agricultural employment, and family business (Levison, Moe, and Knaul, 2001; Nengroo and Bhat, 2017; Webbink, Smits and Jong, 2012). Moreover, this is not a phenomenon exclusive to developing countries but also could occur in developed countries or industrialized economies. Some illustrations could be Kruse and Mahony's (2000) study on the illegal child labor and Mitchell and Clapp (1980) on the impact of child labor laws in the United States, and Miller's (2012) corresponding works on Australian teenagers' works.

Albeit the exponential increase of empirical works on child labor in the field of economics since 1980, the definition and understanding of child labor still diversify and "researchers often avoid labeling any one activity as child labor" (Edmonds, 2008: p.3617). Some of these variations mainly go to the distinction between market and domestic work (e.g., Edmonds, 2008; Miller, 2012); others refer to the definition of minimum age for admission of employment even though most follow the standard of International Labor Organization's (ILO) C138 (ILO, 1973). The poorly defined child labor faces the challenges in statistical data collection and the ILO's Statistical Information and Monitoring Program on Child Labor's (SIMPOC) exact definition of child labor also vary over time (Edmonds, 2008). What is agreed by the most is that terminology of child labor concerns about the harmful work to the future well-being of children which could be in hazardous occupations or a "worst form" of child labor, or with less pay and working excessive hours (Edmonds, 2008; Kruse and Mahony, 2000).

ILO's (1999) C182 includes the worst forms of child labor as "work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety, or morals of children", which is also often labeled as "hazardous forms of child labor". Despite that, the

ambiguity exists as most definitions are based on the characteristics of the work rather than the understanding of what the child might do in the absence of work, as Saving the Children claiming what is the most interested for children (Edmonds, 2008; Bartlett, Dessain and Sjöman, 2006). Researchers need to go further to explore the impacts and causes of that work in the real world. Laws, type of activities, occupation and industry of economic active children, gender differences, urban-rural differences, age patterns are some of these common variables explored by scholars when studying child labor (Edmonds, 2008; Mitchell and Clapp, 1980; Webbink, Smits and Jong, 2012).

In general, empirical evidences demonstrate that there is a gender difference on the type of economic activities conducted by children (Edmonds, 2008; Levison, Moe, and Knaul, 2001). Moreover, poor family may tend to scarify the education of girls in order to continue the schooling of the boys (Nicholas, 1993). Several family characteristics have also been highlighted such as the household income level (e.g. poverty level), residential location (e.g. urban or rural), size (e.g., big family) or household head's characteristics (e.g. single mother or illiteracy level) (Basu, Das, and Dutta, 2010; Dumas, 2013; Nengroo and Bhat, 2017). Educational factor is also key, especially for the sake of interests for children. As the time for a day is fixed, child time used for work would not be able to be deployed for study, schooling, or plat. Indeed, "the extent to which work affects schooling attendance, performance, and attainment is the second most researched questions" in the literature of child labor (Edmonds, 2008: 3640; Levison, Moe and Knaul, 2001).

### **Child labor in management**

In the literature of management, child labor is less studied with limited research specifically carried on the topic. Often, it is part of studies or mentions on social and ethical practices, for instance,

global supply chains (e.g., Alghababsheh and Gallear, 2021; Jiang, 2009; Lin-Hi and Blumberg, 2017; Strand, 2009), ethical consumer (e.g., Auger and Devinney, 2007; Auger et al., 2003; Freestone and McGoldrick, 2008), social issues' linkage to organizational impact (e.g., Deephouse and Heugens, 2009), fair trade (e.g., Balineau and Dufeu, 2010), morality of commercial life (e.g., Dubbink, 2018), (international) business ethics (e.g., Asgary and Mitschow, 2002; Galavielle, 2004), investors' information needs (e.g., Hummels and Timmer, 2004), social responsibility (e.g., Strand, 2009), its certification, marketing, and communication (Arvidsson, 2010; Miles and Munilla, 2004), international decision making (e.g., Jackson, 2000), labor standards (e.g., Moran, 2005; Yu, 2008), and children's rights in bridging business and society (e.g., Raufflet and do Amaral, 2007). These deployments of child labor in the manuscript are often along with a wide range of other practices and objects such as modern slavery (e.g., forced labor), health and safety issues, human rights, sustainable development, good governance, environmental protection (e.g., pollution), genetically-modified food, bribery, low-cost workers, poor working conditions (e.g., excessive working hours), and gender discrimination.

Many management studies on child labor seem to be related with the fact that multinational companies learn in the child labor scandal process and start to manage better their stakeholder relationships to protect or even strength their corporate reputation and brand image, like Gap, NIKE and IKEA (Smith et al., 2011; Edward, 2004), while others continue receiving criticism on child labor exploitation mostly involved in their global supply chains. Unlike gender issue, companies attempt to incorporate gender diversity as a positive source for effectiveness and performance management, child labor seems a more troublesome problem than creating positive outputs, often related to labour (Lin-Hi and Blumberg, 2017) or personnel management (Galavielle, 2004).

Some early publication on child labor in the field of management could be of Nicholas' (1993) case on the Timothy & Thomas's contracted supplier in Lahore, Pakistan, with comments from the president of global sourcing for Levi Strauss and other academics. The case comprehensively describes the factual reality that young Pakistani girls working in an international standard carpet manufacture, in comparison with other possible alternatives that may exist. Dilemmas are presented in applying multinational corporations' (MNCs) ethical guidelines, adjusting to the local reality, and increasing the supply chain cost, in addition to other contradictions and risks. The revised case of Barlett, Dessain and Sjoman (2006) on IKEA's Indian rugs outsourcing in 1995 presents similar situation with child labor and domestic contextual constraints for global sourcing challenges. Probably because of the high visibility but a lack of systematic discussions on the issue of child labor in the field of management, Hindman and Smith (1999) treat the global child labor grounded in the classical economics and recent human capital theories; by examining the historical contexts of the United States and Great Britain when they were industrializing, the newly industrializing countries may eventually abandon the practice of child labor.

A breakthrough research on child labor with management focus in the 21<sup>st</sup> century may be of Kolk and van Tulder (2002), which systematically analyzes codes of conducts on child labor issues on 55 international organizations including 40 MNCs. Complexity and dilemmas for top management perception of situational ethics in an international comparative context are also found, including child labor (Robertson et al., 2002). The concern on the MNCs' suppliers or subsidiaries in developing countries go on, and Hummels and Timmer (2004) continue with the illustration of information needs for stakeholders on the social, ethical, and environmental performance, with the cases of Unilever's Indian subsidiary, Hindustan Lever, which has minority share in Paras Extra

Growth Seed employing no less than 25,000 children; and the difficulty of Nike in managing its supply chain as eradicating child labor in countries such as Cambodia cannot be absolute assurance. Galavielle (2004) views an occurrence of process in which economic ethics has changed the side to become business ethics.

## **Methodology**

The shortage of child labor literature in the field of management gives the difficulty to explore the issue from a quantitative approach giving its immaturity. Therefore, we intend to approach it in a novel way with exploration nature. To resolve the child labor puzzle from the business and management perspective, we attempt to explore the phenomenon alternatively with social media data. Most economists' work on child labor have either comprehensively reviewed the definitions, or empirically tested causes and effects of child labor. International Labor Organization has also continuously published their annual and regional reports on child labor. Alternatively, we intend to comprehend the social media's reaction toward this topic, whereas the recent popular public expression space, representing the new electronic society and communities. Since social media is taking an explosive effect in intervening societal opinion and companies' public relationship, we adopted to focus on YouTube's video source. Social media has been increasing its impact exponentially with the progressively usage of internet, therefore, incorporating social media sources as research object has also become gradually appealing.

We first identified all YouTube videos related to child labor by using keywords "Child Labor", or "Child Labour" or "Child Worker" or "Child Slave" in the area of title, description and transcript. These keywords are inclusive with the plural format. So "Child labors" and so on are also included in the database. A software engineer assisted to develop computational program

employing YouTube’s free Active Protocol Interface (API) and scrapping techniques to query the database and to download contents and metadata from the source. As a result of this search, we obtained a dataset made of 11,913 videos contents (video title, description and the transcript when available) and metadata such as the name of the video producer /publisher, date of publication, number of views, likes, and dislikes on June 19<sup>th</sup> 2018, with videos of publication date ranging from September 10<sup>th</sup> 2007 to June 19<sup>th</sup> 2018. Within this dataset all videos have a title, 8,798 (73.85%) include a description and only 3,115 (26.15%) provide a full transcript. The identified 11,913 videos within the dataset contained a total of 13,639,886 views, 116,394 likes, 4,779 dislikes, and 21,583 comments (See Table 1 and Figure 1). We can observe an increasing tendency in the publications of child labor issues in the social media YouTube.

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Insert Table 1 & Figure 1 about here  
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In order to carry out further analysis of metadata, we identified in prior a list of keywords or key concepts organized into five different categories from various sources. In the category of countries, 93 countries related to child labor were obtained from the source of the International Labor Organization (2018). In the category of industries and its list of 136 goods as subsectors was sourced from the U.S. Department of Labor (2014), organized in three main sectors: Agriculture /Forestry /Fishing, Manufacturing, and Mining /Quarrying and others. The category of Multinational Brands consisted of the adjusted main brands or multinationals names associated to child labor by Kolk and Van Tulder (2004), which was reduced to 46 brands instead of initial 50 in the list due to the difficulty in recognizing certain brands as such from the text. The fourth

category of taxonomy “Concepts” was about relevant concepts extracted from literature, mainly from economics and labor field.

The dataset consisted of contents and metadata of videos produced by 9,570 authors, in which 79 countries, 102 sectors (51 from Agriculture 28 from Manufacturing and 23 Industry and Mining) and 11 multinational company’s brands were covered. Table 1 overviews the child labor most common concepts find in the video content and its metadata, obtained from YouTube. We ranked the top concepts appearing in the video content in each category, based on the viewed number. Though the data could also be filtered with other criteria such as the number of comments, videos, likes or dislikes, we adopted “views” to reflect the popularity among the YouTube audience in the interested areas. In addition, we tested the ranking order with other criteria. In general, there was a high correlation with the ranking order of “views” though some exceptions existed. However, we considered the changes were of low level of relevance after monitoring all them.

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Insert Table 2 about here  
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*Evolution of Child Labor in videos:*

While we can observe the overall ranking of keywords in terms of country, multinational brands, and literature concepts in Table 3, we divided the videos into three period of time for the evolutionary analysis, in order to observe potential trends in the video popularity with the social media population. The dataset was split into three periods made of four years each: 2007-2010,

2011-2014, and 2015-2018. Table 4 summarizes the descriptive data results of each period with a graphic representation of the data.

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Insert Table 3 & 4 about here

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From Table 4, we can observe a significant increase of child labor interest on the demand and offer (number of videos produced and published on YouTube) sides between the first and second period (212%), while this increase has been softened in the third period (48%). In term of country interest, India has been constantly listed as the number one in these three periods, while other countries came in and out from this top-ranking list. In terms of multinational brands have a much lower view frequency than other categories of keywords, partly due to the lower number of videos published. Among the multinational brands, Nike has called the most attention among the social media audience on the child labor issue as the top rank and Walmart the second, with other interests dispersed among the rest of other multinational brands. “gender”, “school age” and “family” has been constantly listed in the top five rank over the three periods, while these concepts have been interchanged the top rank in each period. Other concepts like “legal” have also been top listed in the first and the third period.

Though the periodical data distribution has been partially corresponding the data ranking of the overall distribution (see Table 3), we can notice the differences in recent trends in the third period demonstrated in the four categories in Table 4. The graphic representation (network graph) of each period also exhibits more intensified and numerous key concepts (nodes) in the third period in comparison with period one and two, in which fewer nodes with scale and clearer distance between certain keywords and others are marked.

## **Analysis of Child Labor Key Concepts Metadata**

### *Python Analysis:*

We deployed Python Sklearn library with machine learning tools, nondeterministic by default K-means algorithm, and Random\_state parameter in Kmeans () for reproduceable results. With the machine learning technique and a cluster number of 100, we clustered all items into 100 clusters. With the shown keywords of the clusters we identified similarity and further merged them into 68 clusters (See Figure 2). We identified the ranking of clusters in terms of production, audience, engagement to see the topic of interests in terms of cluster comparison.

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Insert Figure 2 about here  
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### *Co-Wording analysis:*

All keywords used in the analysis were extracted from several official sources. For instance, for sector we used the list provided by the DOL (US Department of Labor, 2014). The U.S. Department of Labor amplifies the list of sectors that have received particular attention such as carpets, leather footwear, soccer balls, tea, sporting goods and/or apparel (Kolk & Van Tulder, 2002a; US DOL, 1997; Wolfe & Dickson, 2002). The list of 93 countries and other concepts were obtained from the International Labor Organization (ILO, 2018). Concepts are specific topics or issues that are not included in the country and sector listed. A specific attention must be drawn to some alternative nouns that can be used when describing a concept. For instance, the concept

“female” is made by the following nouns: female\*, girl\*, woman and women. Finally, the total number of keywords related to brands are 46.

Concepts were analyzed using text mining analysis. Specifically, we used a tool which counted the number of videos that included the concepts (frequency) and the number of videos where two concepts appeared together (concurrency/co-wording). The frequency and concurrency were calculated based on the concepts detected in the title, description and or transcript.

Association rule to determine how strong a concept is associated with another one by assigning a level of confidence (Haroon and Zifeng, 2017); and cosine similarity to find how similar a concept is between another one in term of words concurrency. Cosine similarity analysis is the most used in text document clustering and measures the similarity between high-dimensional vectors which are based on a specific “bags of words”. In our study, vectors were built using combined terms and specifically these are highly concurrent with the specific concepts.

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Insert Figure 3 about here

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### *Squared multiple correlation analysis*

In order to better understand the key concepts, we ran the Stata to explore the correlations between different variables. Squared multiple correlation (SMC) was deployed to measure the variance each variable shared with the other variables assigned, with the 95% confidence intervals. The squared multiple correlation is the value of R-squared obtained from the multiple linear regression which represents the proportion of total variance in the regressand that is accounted for by a set of regressors. The SMC provides a measure of the variance share of one variable with other variables

in the matrix and hence can be used to identify the strength of correlation among the variables in a matrix. The value of SMC ranges between 0 and 1. If  $SMC=1$ , it implies that the variation in regressors perfectly explains the variability in the regressand, i.e., the regressand is perfectly correlated with the regressors. If  $SMC=0$ , it indicates that there is no correlation between the regressand and regressors.

To facilitate the SMC analysis, we first created five concept variables of Brand, Family, Education, Gender and Trust in our dataset. These variables are binary variables that indicate if a particular concept was involved in the content of a video. For instance, the variable of Brand takes the value of one if the content the video involves any multinational brand, and takes the value of zero otherwise. We then ran five multiple regressions to identify significant correlations among these five variables. The regression results together with the SMCs (i.e., the values of R-squared) are presented in Table 5.

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Insert Table 5 about here  
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Table 5 shows that the squared correlations among the five concept variables range between 3.4% and 36.4%. The concepts of Trust and Brand have the lowest correlations with other concepts - only 3.4% and 6.8% of the variances of Trust and Brand were correlated with other concept variables. On the other side, the SMCs of Family, Education and Gender are 36.4%, 29.9% and 26.7% respectively which indicates that these variables have the moderately strong correlations with other concept variables. The results in Table 3 also indicate that the SMCs for all concept variables are statistically significant.

In the matter of child labor as the common theme of these identified video data, family, gender, and education seem to be a classical issue. Often, the occurrence of forced child labor is due to the low income of family unit, which consequently brings the dilemma of education or work for the kids in such a family unit. If the composition of family kids has both male and female members, the dilemma of gender also emerges as girls tend to be sacrificed to work in order to support the economy of the family, in turn, the boys can continue receiving the education.

For multinationals, child labor employment is largely related to their global supply chain activities, at the same time affecting their global image, reputation and associated customer base and their purchasing decisions due to the increasing socially responsible awareness and sensitivity.

## **Conclusions and Discussions**

By employing the key concepts downloaded from the popular social media source-YouTube, we analyzed the child labor related video published and shared in this platform. The results show, on the one hand, YouTube data corresponds largely with the common concerns of the economists and laborites on child labor: family, education, and gender which are also significantly correlated with multinational brands. On the other hand, trust rose to the superficies and significantly correlate with multinational brands, which deserved further attention and investigations.

Child labor has a negative impact on the supply chain management and marketing aspects of a multinational. Recent call of scholars has been focusing on supply chain and included preventive measures against child labor with monitoring and eradicating practices albeit deemed as critical to a multinational's supply chain disclosure. Understandably, it has been taken from the perspective of supply chain. What should a multinational do with child labor at a higher strategic level? Could multinationals turn the negative impact of child labor into a positive source for

reputation and sustainable management? IKEA example illustrates that taking child labor as a strategic issue could bring the social responsibility and sustainability into the play rather than keeping it as a supply chain issue. The creation of IKEA Foundation to further reckon “what is the best for kids” as part of their social mission when dealing with child labor, instead of “simply saying no” not only create monitoring mechanism to prevent child labor, but aligning it with the corporate culture and actively contribute to the sustainable development of the business and economy in the region where child labor frequently occurs.

The most industries received attention on child labor have been “the production of carpets, leather footwear, soccer balls, tea, sporting goods and/or apparel” (Kolk & Van Tulder, 2002a; US DOL, 1997; Wolfe & Dickson, 2002). Many multinationals enlisted belong to the textile sector, corresponding the abovementioned categories. However, the YouTube data also highlights other top-ranked sectors related to alternative industries like bricks and cocoa, cotton, and so on. Probably these specific industry’s subsectors are less related to multinational brands and their supply chains (with the exception of cocoa), but the increasing globalization and interdependence between local and global economy requires more attention to all relevant elements for the sustainability of global business ecosystem. Sectors like construction, food processing and mining are also part of this global economic ecosystem. Further industry-specific research on Child labor and its impact on business management may deserve more attention.

The YouTube service was established in 2005, and this limited the data availability before this period of time. Through the increasing popularity of the social media like YouTube, it is logical that the related video amount augmented significantly, independent from the interests on the studied topic of child labor. Control data like the general video publishing number in YouTube would be necessary for further comparison of the increase ratio. Due to the technological limitation,

we couldn't access these data for further comparison. Additionally, the use of YouTube Google proprietor API may also change and affect further studies by using YouTube data in the future (Harron & Zifeng, 2012).

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Table 1 Overview of YouTube Scripted Data

Videos	Descriptions	Transcripts	Views	Likes	Dislikes	Comments
11,913	8,798	3,094	13,639,886	116,394	4,779	21,583

Table 2 Correlation Matrix of Views, Videos, Likes and Comments

Correlation Matrix of Intra-Clusters

	No. of Video	No. of Views	No. of Likes	No. of Comments
No. of Videos	1.0000			
No. of Views	0.9613	1.0000		
No. of Likes	0.9713	0.9742	1.0000	
No. of Comments	0.9608	0.9493	0.9951	1.0000

Correlation Matrix of Individual Videos

	No. of Views	No. of Likes	No. of Comments
No. of Views	1.0000		
No. of Likes	0.587	1.0000	
No. of Comments	0.4918	0.9371	1.0000

Table 3: Overview of YouTube concepts organized by views\* on child labor

Top Ranking	Country (#views)	Multinational brands (#views)	Concepts (#views)
1	India (3,156,631)	Nike (114,057)	Gender (7,739,612)
2	Guyana (536,396)	Walmart (58,591)	School Age (5,841,240)
3	Bangladesh (524,203)	Levi's Strauss (38,236)	Family (5,853,704)
4	China (415,353)	Nestlé (18,788)	Legal (4,065,567)
5	Ghana (265,320)	Chiquita (17,607)	Urban (2,653,800)
6	Pakistan (239,610)	Reebok (8,437)	Sustainability (2,248,611)
7	Nepal (235,399)	Russel Corporation (6,828)	Education (2,047,345)
8	Brazil (224,084)	Merck (4,924)	International (1,689,983)
9	Congo (215,454)	Puma (2,241)	Ethic (1,499,467)
10	Peru (207,937)	Converse (1,747)	Trust (701,163)

(\*) Number of total views of the videos where the concepts appeared.

Table 2: Evolution of top five countries, multinational brands and concepts about Child Labor in videos contents.

Period	# Views # Videos (%)*	Top 5 Keywords			Graphic Representation
		Country (#views)	Multinational Brand (#views)	Concepts (#views)	
2015-2018	12,259,753 (14.24%) 6,305 (48.42%)	1. India (645,232) 2. Bangladesh (445,680) 3. Congo (191,870) 4. Peru (179,961) 5. China (164,320)	1. Chiquita (16,533) 2. Nestlé (12,926) 3. Henned & Mauritz (11,273) 4. Nike (6,184) 5. Wal-Mart-Stores (4,318)	1. School Age (1,310,696) 2. Gender (1,723,320) 3. Family (1,121,548) 3. Urban (895,370) 3. Legal (671,900)	

2011-2014	10,732,036 (128.22%) 4,248 (212.35%)	<b>1. India</b> (1,807,745) <b>3. Ghana</b> (210,035) <b>2. Pakistan</b> (138,416) <b>4. Nepal</b> (65,129) <b>5. China</b> (73,457)	<b>1. Wal-Mart-Stores</b> (47,622) <b>2. Hened &amp; Mauritz</b> (35,208) <b>3. Levi Strauss</b> (36,256) <b>4. Nike</b> (18,237) <b>5. Nestlé</b> (4,496)	<b>1. Gender</b> (4,175,039) <b>2. School Age</b> (2,472,816) <b>3. Family</b> (2,368,620) <b>4. Legal</b> (1,925,081) <b>5. Sustainability</b> (1,591,230)	
2007-2010	4,702,531 (NA) 1,360 (NA)	<b>1. India</b> (703,654) <b>2. Guyana</b> (535,631) <b>3. Jordan</b> (180,683) <b>4. China</b> (177,576) <b>5. Brazil</b> (165,341)	<b>1. Nike</b> (89,636) <b>2. Wal-Mart-Stores</b> (6,651) <b>3. Merck</b> (3,944) <b>4. Reebok</b> (2,612) <b>5. Hened &amp; Mauritz</b> (1,816)	<b>1. Family</b> (2,207,614) <b>2. School Age</b> (2,057,728) <b>3. Gender</b> (1,841,253) <b>4. Legal</b> (1,018,938) <b>5. International</b> (798,278)	

Note: Graphic image color: Blue – Concept; Green – Country; Yellow – Subsector; Orange- Brand.  
 (\*) Changes of number of views and videos from the previous period.

**Table 5:** Regression results and Squared Multiple Correlation coefficients

	Brand	Family	Education	Gender	Trust
Family	0.070*** (0.006)		0.448*** (0.011)	0.445*** (0.013)	0.032*** (0.004)
Education	0.035*** (0.005)	0.318*** (0.008)		0.222*** (0.011)	0.021*** (0.003)
Gender	0.036*** (0.005)	0.248*** (0.007)	0.175*** (0.009)		0.006* (0.003)
Trust	0.080*** (0.016)	0.206*** (0.026)	0.189*** (0.031)	0.067* (0.035)	
Brand		0.186*** (0.017)	0.133*** (0.020)	0.170*** (0.022)	0.033*** (0.007)
Constant	0,002 (0.003)	-0.010** (0.004)	0.109*** (0.005)	0.266*** (0.005)	0 (0.002)
N	9532	9532	9532	9532	9532

R-squared	0,068	0,364	0,299	0,267	0,034
(95% CI of R-squared)	0,0587	0,3494	0,2841	0,2522	0,0266
	0,0778	0,3773	0,3125	0,2805	0,0407

Note: \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10% respectively.

Figure 1 YouTube Yearly Published Video Tendency

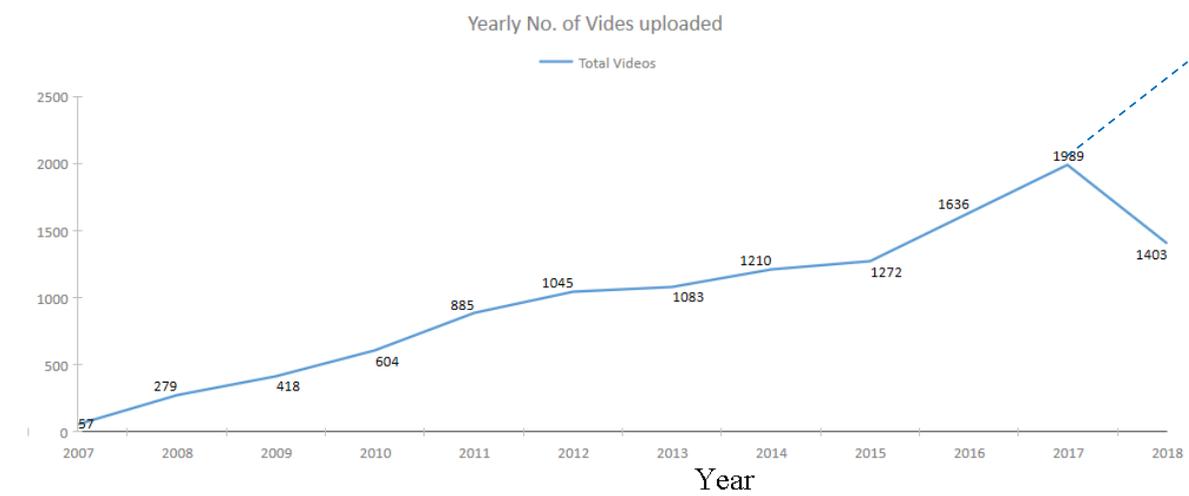
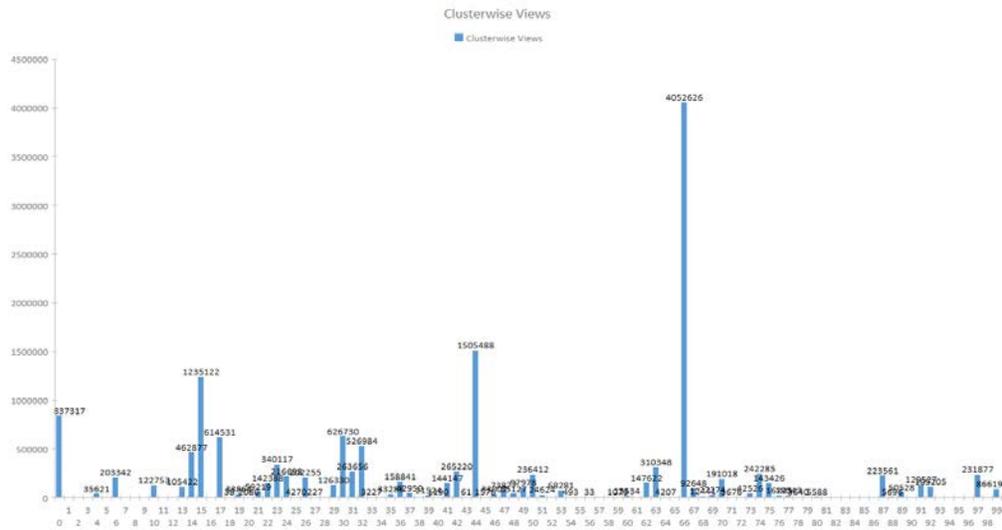


Figure 2: Python result of clustering



By Production:

Cluster	Cluster Name	nVideo
2	General videos on Child Labour	3935

52	Child Labor (India, drama, rights, projects, campaign, agriculture, poverty, Myanmar, America, Cambodia, Victoria)	2290
6	Stop Child Labour	384
3	World Day against Child Labour	380
9	Child Labor in India	276

#### By Audience

Cluster	Cluster Name	views
52	Child Labor (India, drama, rights, projects, campaign, agriculture, poverty, Myanmar, America, Cambodia, Victoria)	15092338
2	General videos on Child Labour	6102926
36	Short Film on Child Labour	2652376
61	Child Labour Song	2444464
10	Movies on Child Labour	1447551

#### By Engagement

Cluster	Cluster Name	likes
52	Child Labor ( India, drama, rights, projects, campaign, agriculture, poverty, Myanmar, America, Cambodia, Victoria)	147753
2	General videos on Child Labor	93944
16	Best Slogan/speech/song on Child related	40089
36	Short Film on Child Labor	17922
0	Child Labor Dance	11519

#### By Dislikes

Cluster	Cluster Name	dislikes
52	Child Labor (India, drama, rights, projects, campaign, agriculture, poverty, Myanmar, America, Cambodia, Victoria)	7832
2	General videos on Child Labor	3203
36	Short Film on Child Labor	1630
61	Child Labor Song	978
0	Child Labor Dance	848

By Comments:

Cluster	Cluster Name	comments
52	Child Labor (India, drama, rights, projects, campaign, agriculture, poverty, Myanmar, America, Cambodia, Victoria)	23289
2	General videos on Child Labor	13239
16	Best Slogan/speech/song on Child related	8475
8	Child Labor Laws	1167
36	Short Film on Child Labor	1096

Figure 3: Co-wording analysis of relevant key concepts

