CASE STUDY

2019

Roundtable for Product Social Metrics

Product Social Impact Assessment

Lessons learned, and challenges faced while exploring social life cycle assessment data-bases

ArcelorMittal case study

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Version 1.0 – August 2019

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This case-study was executed as part of the work with the Product Social Metrics RoundTable. This report contains a public summary of the work done.

About Roundtable for Product Social Metrics

The Roundtable is a joined initiative of the following companies. More information can be found on www.product-social-impact-assessment.com

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CASE STUDY

1 Introduction

Over the years ArcelorMittal has developed expertise and knowledge on environmental life cycle assessments. As part of the sustainability journey, ArcelorMittal has explored social value of steel and is developing experience in the field of social life cycle assessments. During the phase 6 of the Roundtable, ArcelorMittal performed a case study intended to evaluate the two social life cycle assessment databases currently available on the market: Social Hotspot Database (SHDB) and Product Social Impact Life Cycle Assessment (PSIA) database. The main goal of the case study was to gain experience and develop working knowledge of the two databases. The intent was to develop an illustrative example that could be used to transfer the lessons learned to wider audience within ArcelorMittal, thus raising awareness within the company and initiating discussions.

For the study, SHDB 2016 and PSILCA version 2 were used in OpenLCA software. Since then, SHDB 2018 has been released (May 2019). We looked at a broader number of stakeholder groups than the ones presented in the Handbook 2018 in order to fully explore the features and capabilities of both databases. The databases enable practitioners to assess social risks associated with 4 stakeholder groups - workers, local community, society and value chain actors – and across a wide number of social issues.

2 Social life cycle assessment databases in a nutshell

The SHDB and PSILCA databases provide access to large amounts of social data on country-specific sector (CSS) level, which enables practitioners to assess social risks associated with certain sectors and product systems. The 2 main functions of these databases are to complete a study or provide screening of social risks prior to an indepth study i.e. identify hotspots that will be studied further.

SHDB and PSILCA databases are based on 3 main building blocks: An Input-Output model, a Worker-Hours model and a database on social aspects. However, it`s important to be aware of the differences. The Input-Output models underlying both social LCA databases differ: SHDB is based on GTAP Input-Output model but PSILCA is based on EORA/MIRO Input-Output model. Both databases have applied different methodologies for calculating worker-hour model. The main social data sources used to create social risk tables are shared among the databases, however, methodologies used to assign risks levels may differ. For example:

- In SHDB low risk level of child labor is assigned if less than 4% of children are engaged in child labor. Sector specific adjustments to risk levels are applied.
- In PSILCA low risks level of child labor is assigned if more than 2.5% and less than 5% of children engaged in child labor at specific country.

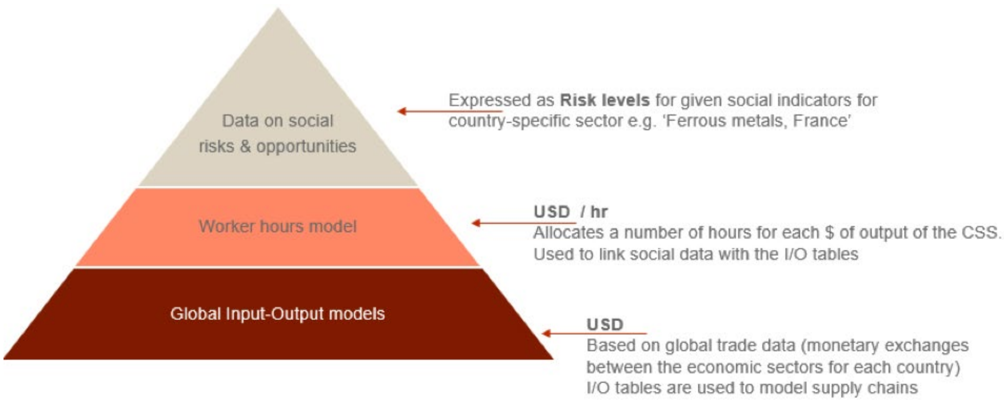

Figure 1 The main building blocks of social LCA databases

Social risks are expressed in terms of potential risk for stakeholders to be exposed to negative social conditions. SHDB and PSILCA measure social risks in medium risks hours that are calculated by scaling social risks levels by characterization factors, work hours and monetary values for each input (figure 2). The characterization or risk factors used to scale social risks in both databases differ. Thus, the results obtained from these databases should not be compared directly in medium risk hour. The general trends and the main hotspots can be compared and analyzed.

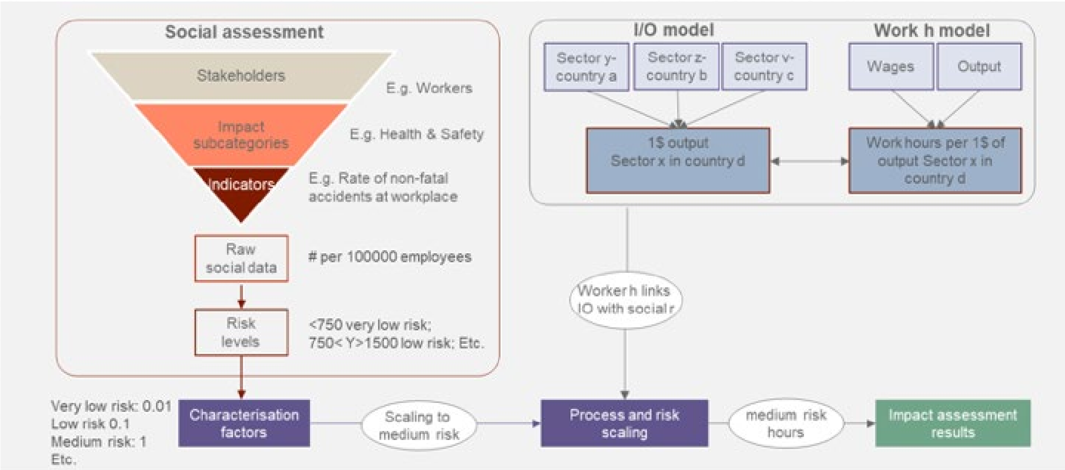

Figure 2 Overview of the main elements of social LCA databases (Inspired by (Mancini, et al., 2018))

3 Direct vs Indirect social risks

When working with the social life cycle assessment databases it is important to note that each country specific process addresses both direct and indirect (upstream) social risks associated with that activity. Direct social risks are linked to the production activity itself e.g. CSS Basic metal production in country A. Indirect social risks are linked to the surrounding product system - raw material inputs, equipment, services, infrastructure, etc. Figures 3 and 4 shows the share of direct and indirect impacts of 2 country specific processes – production of basic metals and coal mining for stakeholder group 'Workers'. It can be seen that the majority of social risks stem from the upstream processes necessary to produce the goods. Even for raw material extraction processes - i.e. coal mining -, a large share of the social risks is linked to upstream activities. The indirect social risks are modelled according to global economic flows i.e. the input-output tables, thus the 'background product systems' for similar CSS is SHDB and PSILCA databases can differ significantly. "

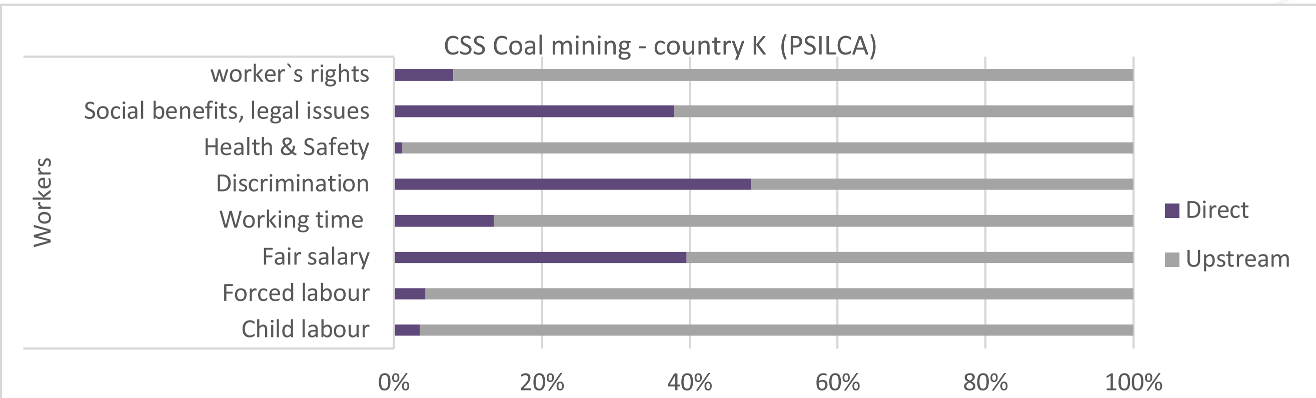

Figure 3 Distribution of direct and upstream social risks in CSS Coal mining (PSILCA)

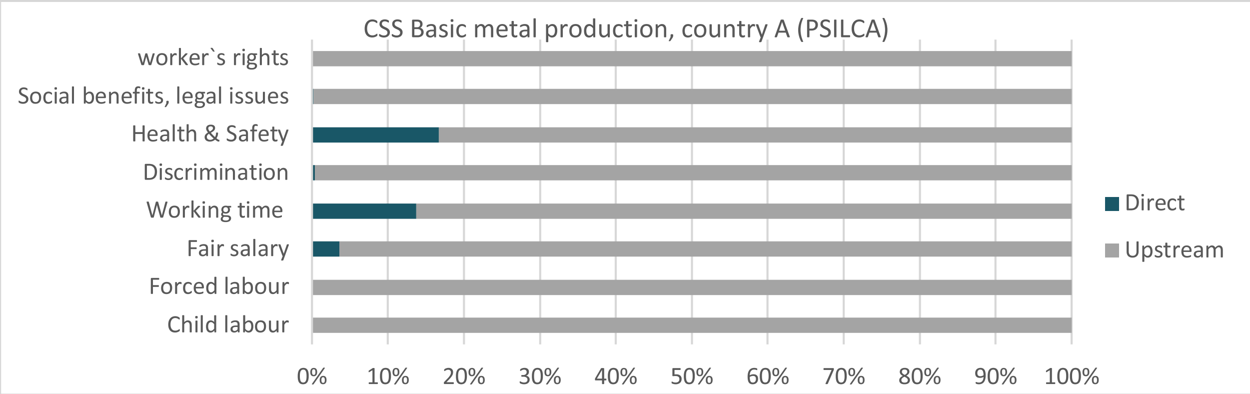

Figure 4 Distribution of direct and upstream social risks in CSS basic metal production (PSILCA)

At numerous occasions in our case study we looked only at direct impacts. For example, we evaluated the social risks associated with the working conditions in coal mining sector at world`s top coal production countries. Also, the direct social risks and working hours of existing CSS were used as a basis for modelling our specific processes and product systems e.g. Steel production at our sites with raw materials inputs modelled according to our supply chains.

Throughout the process we found that the results from both databases tend to identify different hotspots especially when the analysis is based on country-specific sectors that encompasses inputs from the upstream sectors supplying the CSS under the investigation. Analysis of direct impacts or more detailed product system models appear to identify similar hotspots in the results from both databases. Thus, the obtained results should be cross-checked with information from other sources (e.g. assessment of trends from SHDB & PSILCA, results from databases vs literature review).

4 The challenge of presenting and interpreting the results

Figure 5 below shows an assessment of similar country-specific sectors in SHDB and PSILCA databases for varying countries:
- CSS Ferrous metals in SHDB from countries A, B, C and D
- CSSs Manufacturing of steel/metals, ferro allows, etc. in PSILCA in countries A, B, C and D. Due to the different sector classification in PSILCA, CSS names and aggregation levels differ from country to country.

Figure 5 displays stacked social risks for each of the assessed countries. Countries are displayed on x-axis and the respective social risks for the separate countries are displayed in the stacked bars. The results were calculated medium risk hours per 1$. Both databases calculate social risk in medium risk hours, however, the results are not comparable due to use of different characterization factors and other methodological variances. (In this assessment, the stacked social risks for country C with SHDB amassed to 3.5 medium risk hours but with PSILCA - 21 medium risk hour.) Thus, for comparative purposes the results were not evaluated in terms of medium risks hours but general trends instead. Figure 5 displays normalized results where the highest stacked social risk is set as a baseline/100%.

The number and type of social issues addressed in SHDB and PSILCA are not the same. Thus, to compare the results, multiple social issues were combined in SHDB to obtain a similar set of social issues in both data-bases. For example, Social benefits and labor laws in SHDB were combined in one category to represent 'Social benefits, legal issues' category present in PSILCA database.

Both databases identify Child labor as the most significant hotspot in Country C, and the most significant overall hotspot among the evaluated CSS. In terms of cumulative social risks in the assessed countries, trends among both databases are similar: highest risks in country C and lowest in country D. However, the results showcase different relationships/relative importance among the assessed countries. PSILCA database tends to place a larger importance on worker`s rights – a social issue that includes freedom of association and collective bargaining – than SHDB database. Whereas in SHDB results, wage assessment and working time risks are more prominent.

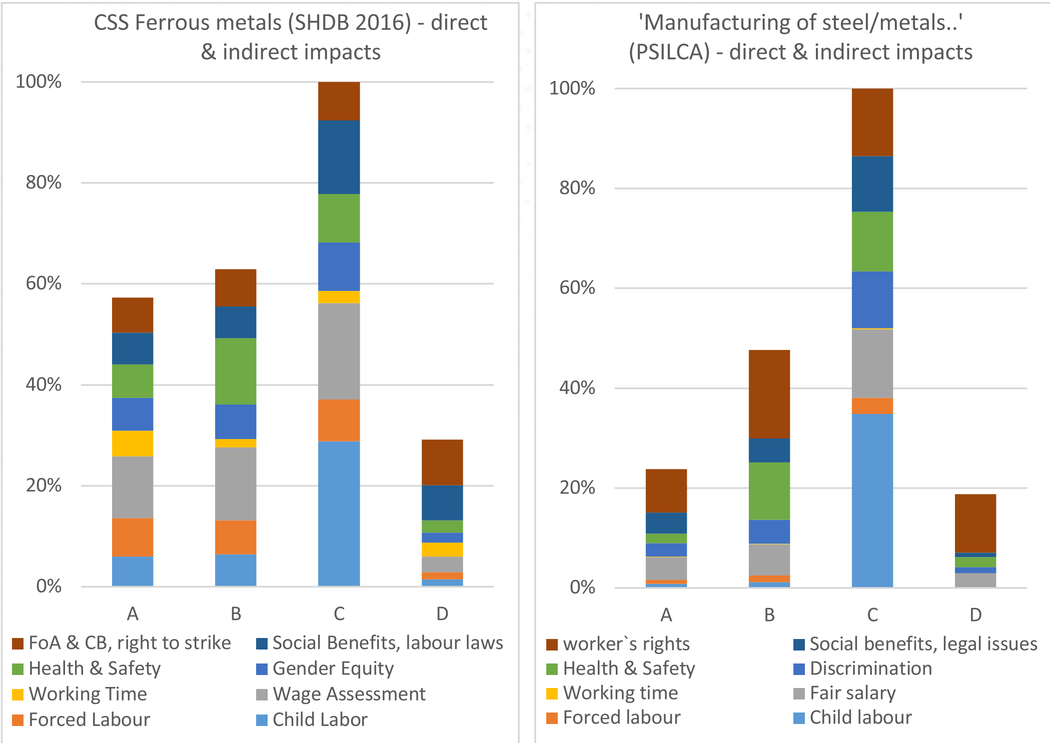

Figure 5 Comparison of stacked social risks at various countries – SHDB and PSILCA

Social databases enable practitioners to dig deeper into the results and analyze the main contributors to the identified hotspots or highest risk areas. Figure 6 below analyses the top 5 contributing processes to the hotspot 'Child labor in country C. It appears that the original country specific process 'Ferrous metals – C' and 'Commerce in country C' are the main causes of child labor in SHDB results. Contribution 'Other' represents smaller processes that amass to significant total contribution. Similar situation can be observed in PSIL-CA results. It is a trait of input-output databases that each country specific process is also the largest input within that process.

Overall, from these results it is difficult to determine what should be considered as hotspots and where are the social risks arising from. In the Product Social Life cycle assessment methodology, hotspot assessment intends to identify the supply chain steps, actors and social issues to be further investigated. Thresholds of medium risk hours or certain percentage of total medium risk hours would need to be developed in order to define hotspots within the studied product system.

Figure 6 – Contribution analysis of main processes contributing to child labour in country C from figure 5

5 Overall learnings

The main advantage of using social LCA database is that the entire economy is covered, which enables us to look at the whole product system. However, the high level of aggregation in country-specific sectors makes it difficult to a really model a specific product system as the primary data inputs have to be connected to existing country-specific sectors. Depending on country, PSILCA can be less aggregated than SHDB.

Accuracy of social data tables developed by both database providers can be questioned. Social data are frequently retrieved from international statistical agencies which is often available only on country-level. Thus, actually a fraction of the social risk levels available in the databases are sector-specific i.e. the social risks levels for each sector in one country will have the same values.

It has to be kept in mind that with social life cycle assessment databases, the results are very dependent on the timeframe of the assessment, since the social risks are scaled by cost. Indeed, the volatility of prices/costs affect the results as the same amount of money may not buy the same amount of raw materials today compared to a few months ago or when the input-output models were developed.

Linking the results from the databases with the Handbook methodology presents another set of challenges. Within the Handbook, results are scored on a five-point scale in accordance to the collected data. Data is collected for each performance indicator in yes/no format with evidence supporting the answers. Whereas, the databases provide results in medium risks hours. How can we link 0.5 medium risks hours of health & safety issues to PSIA methodology?

All in all, this study suggests the results from the databases can provide a good starting point for evaluating social risks associated with production of steel, different product systems, etc. Social life cycle database can complement the existing knowledge of social risks or highlight the areas that require further investigation. However, the raw results the social life cycle databases should be used with caution due to uncertainty derived from the input-output models, the social data used and use of worker-hours as an activity variable.

5.1 The road ahead

Going forward, ArcelorMittal aims to carry out a case study applying the full PSIA methodology and cross-check the hotspots identified by the databases with ArcelorMittal internal data sources. For the next phases of the Roundtable, it may be interesting to explore the different approach how one could link the hotspots identified in medium risk hours to the PSIA methodology.

References

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