

GreenDelta

sustainability consulting + software

Data quality in Social LCA studies

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Data quality in Social LCA studies

1. Data quality in Social LCA
2. Data quality in a Social LCA database, PSILCA
3. A case study
4. Outlook



1 Data quality in Social LCA

Data Quality in Social LCA

(From the not-so-long history of Social LCA method development and studies it is well known that:)

- Information for social LCA is often taken from many different sources
- Social LCA data can change more quickly than data for environmental LCA (change in management, different company policy, ...)
- Social data is often inherently subjective → triangulation as a tool to deal with different and conflicting sources

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- Information for social LCA is often taken from many different sources
 - Social LCA data can change more quickly than data for environmental LCA (change in management, different company policy, ...)
 - Social data is often inherently subjective → triangulation as a tool to deal with different and conflicting sources
- **NEED for data quality assessment in social LCA**

One Proposal for Data Quality in Social LCA: Adaptation of the pedigree matrix

Originally Weidema & Wesnaes 1996 for LCA, adapted by Ciroth & Franze 2014

| Score | 1 | 2 | 3 | 4 | 5 |
|-------------------------------|---|--|---|---|--|
| Indicator | | | | | |
| Reliability of the source(s) | Statistical study, or verified data from primary data collection from several sources | Verified data from primary data collection from one single source or non-verified data from primary sources, or data from recognized secondary sources | Non-verified data partly based on assumptions or data from non-recognized sources | Qualified estimate (e.g. by expert) | Non-qualified estimate or unknown origin |
| Completeness conformance | Complete data for country-specific sector/ country | Representative selection of country-specific sector / country | Non-representative selection, low bias | Non-representative selection, unknown bias | Single data point / completeness unknown |
| Temporal conformance | Less than 1 year of difference to the time period of the dataset | Less than 2 years of difference to the time period of the dataset | Less than 3 years of difference to the time period of the dataset | Less than 5 years of difference to the time period of the dataset | Age of data unknown or data with more than 5 years of difference to the time period of the dataset |
| Geographical conformance | Data from same geography (country) | Country with similar conditions or average of countries with slightly different conditions | Average of countries with different conditions, geography under study included, with large share, or country with slightly different conditions | Average of countries with different conditions, geography under study included, with small share, or not included | Data from unknown or distinctly different regions |
| Further technical conformance | Data from same technology (sector) | Data from similar sector, e.g. within the same sector hierarchy, or average of sectors with similar technology | Data from slightly different sector, or average of different sectors, sector under study included, with large share | Average of different sectors, sector under study included, with small share, or not included | Data with unknown technology / sector or from distinctly different sector |

| Score | 1 | 2 | 3 | 4 | 5 |
|-------------------------------|---|--|---|---|--|
| Indicator | | | | | |
| Reliability of the source(s) | Statistical study, or verified data from primary data collection from several sources | Verified data from primary data collection from one single source or non-verified data from primary sources, or data from recognized secondary sources | Non-verified data partly based on assumptions or data from non-recognized sources | Qualified estimate (e.g. by expert) | Non-qualified estimate or unknown origin |
| Completeness conformance | Complete data for country-specific sector/ country | Representative selection of country-specific sector / country | Non-representative selection, low bias | Non-representative selection, unknown bias | Single data point / completeness unknown |
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| Geographical conformance | Data from same geography (country) | Country with similar conditions or average of countries with slightly different conditions | Average of countries with different conditions, geography under study included, with large share, or country with slightly different conditions | Average of countries with different conditions, geography under study included, with small share, or not included | Data from unknown or distinctly different regions |
| Further technical conformance | Data from same technology (sector) | Data from similar sector, e.g. within the same sector hierarchy, or average of sectors with similar technology | Data from slightly different sector, or average of different sectors, sector under study included, with large share | Average of different sectors, sector under study included, with small share, or not included | Data with unknown technology / sector or from distinctly different sector |

2 Data Quality in a Social LCA database

Data Quality in a Social LCA Database

- The PSILCA database.. 

(comprehensive database for social LCA, transparent, for 196 countries, > 50 indicators, almost 16,000 sectors, reference year 2013, created by GreenDelta 2013-2016, released beginning of 2016)

..contains a data quality (DQ) assessment

- DQ is assessed for every “elementary flow” in the database (i.e., social aspect)
- On each process alone, all indicators have a data quality assessment result, in the five dimensions of the pedigree matrix

Data Quality in a Social LCA Database

- DQ is assessed for every “elementary flow” in the database (i.e., social aspect)

| | | 1 | 2 | 3 | 4 | 5 |
|-----------------------------|-------------------------------|---|---|---|---|---|
| Reliability of source | Reliability of the source(s) | | | | | |
| | Completeness conformance | | | | | |
| Conformance of the data set | Temporal conformance | | | | | |
| | Geographical conformance | | | | | |
| | Further technical conformance | | | | | |
| | | | | | | |

Representative selection of c

Data Quality in a Social LCA Database

- On each process alone, all indicators have a data quality assessment result, in the five dimensions of the pedigree matrix

Social aspects: Advertising

Social assessment

| Name | Raw value | Risk level | Activity variable | Data quality | Comment | Source |
|---------------------------------|----------------------|----------------|-------------------|--------------|---------------------|--------------------|
| ▼ Society | | | | | | |
| ▼ Contribution to economic | | | | | | |
| ▲ Literacy rate, male | 0.7166100000000000 | Very low risk | 0.011087183017... | (2-2;3-1) | Data from 2012... | UNESCO 201... |
| ▲ Literacy rate, total | 0.8443199999999999 | Very low risk | 0.011087183017... | (2-2;3-1) | Data from 2012... | UNESCO 201... |
| ▲ Public expenditure on e | 6.21 [% of GDP] | Medium risk | 0.011087183017... | (2-1;4-1) | Data from 2012... | World Bank... |
| ▲ Youth literacy rate, tot | 0.24431 [% of ...] | Very low risk | 0.011087183017... | (2-2;3-1) | Data from 2012... | UNESCO 201... |
| ▲ Literacy rate, female | 0.9646000000000000 | Very low risk | 0.011087183017... | (2-2;3-1) | Data from 2012... | UNESCO 201... |
| ▲ Youth literacy rate, m | 0.3338999999999999 | Very low risk | 0.011087183017... | (2-2;3-1) | Data from 2012... | UNESCO 201... |
| ▲ Youth literacy rate, for | 0.3304999999999999 | Very low risk | 0.011087183017... | (2-2;3-1) | Data from 2012... | UNESCO 201... |
| ▼ Health and Safety (Society) | | | | | | |
| ▲ Health expenditure, pu | 82.5 [% of total] | Very low risk | 0.011087183017... | (2-1;3-1) | Data from 2012... | World Bank... |
| ▲ Health expenditure, ou | 9.8 [% of GDP] | Very low risk | 0.011087183017... | (2-1;3-1) | Data from 2012... | World Bank... |
| ▲ Health expenditure, est | | No data | 0.011087183017... | (2-1;3-1) | | |
| ▲ Health expenditure, tot | 94 [% of GDP] | Medium risk | 0.011087183017... | (2-1;3-1) | Data from 2012... | World Bank... |
| ▼ Workers | | | | | | |
| ▼ Freedom of association an | | | | | | |
| ▲ Right of Collective Barg | 3.0 [Score] | No risk | 0.011087183017... | (2-3;4-4) | Data from 2011... | ICTWSS 2013 |
| ▲ Right of Association | 3.0 [Score] | No risk | 0.011087183017... | (2-3;4-4) | Data from 2011... | ICTWSS 2013 |
| ▲ Trade union density | 25.807314453... | High risk | 0.011087183017... | (2-3;4-4) | Data from 2012... | ILOstat 2014... |
| ▲ Right to Strike | 3.0 [Score] | No risk | 0.011087183017... | (2-3;4-4) | Data from 2011... | ICTWSS 2013 |
| ▼ Child labour | | | | | | |
| ▲ Children in employer | 0.0 [% of male c... | No risk | 0.011087183017... | (4-2;1;n.a.) | Data from 2014... | Eisfeldt, F. 20... |
| ▲ Children in employer | 0.0 [% of femal... | No risk | 0.011087183017... | (4-2;1;n.a.) | Data from 2014... | Eisfeldt, F. 20... |
| ▲ Children in employer | 0.0 [% of child... | No risk | 0.011087183017... | (4-1;1-4) | Data from 2014 | World Bank... |
| ▼ Health and Safety (Worker) | | | | | | |
| ▲ DALYs due to indoor an | 0.8792320207... | Very low risk | 0.011087183017... | (2-1;1-4) | Data from 2004... | WHO 2006... |
| ▲ Workers affected by ne | 0.04121944816... | Very low risk | 0.011087183017... | (2-1;2-4) | Data from 2014... | EM-DAT 201... |
| ▲ Rate of non-fatal accid | 23.94 [9/yr and ...] | Very low risk | 0.011087183017... | (2-3;2-2) | Data from 2013... | ILOstat 2014... |
| ▲ Rate of fatal accidents | 0.05 [9/yr and 1... | Very low risk | 0.011087183017... | (2-3;2-2) | Data from 2013... | ILOstat 2014... |
| ▲ Presence of sufficient s | 7.677161254296... | Very low risk | 0.011087183017... | (2-4;1-2) | Data from 2014... | USDOL 2013... |
| ▼ Forced Labour | | | | | | |
| ▲ Frequency of forced lab | 1.5 [%] | Very low risk | 0.011087183017... | (2-4;3;n.a.) | Data from 2012... | ILO 2012; For... |
| ▲ Trafficking in persons | 1.0 [Ttr] | Very low risk | 0.011087183017... | (2-1;1-4) | Data from 2014... | U.S. Depart... |
| ▲ Goods produced by for | | No data | 0.011087183017... | | | |
| ▼ Discrimination | | | | | | |
| ▲ Gender wage gap | 30.18232062501... | Very high risk | 0.011087183017... | (2-1;2-4) | Mean value of s... | ILOstat 2014 |
| ▼ Fair Salary | | | | | | |
| ▲ Living wage, per month | 872.5 [USD] | High risk | 0.011087183017... | (2-2;1;n.a.) | Calculated with... | Wageindex... |
| ▲ Sector average wage, p | 4554.594800092... | Very low risk | 0.011087183017... | (2-2;1-1) | Risk level refer... | ILOstat 2014 |
| ▲ Minimum wage, per m | 1655.0 [USD] | High risk | 0.011087183017... | (2-1;4-1) | Data scope: cou... | Quandt 2010 |
| ▼ Working time | | | | | | |
| ▲ Weekly hours of work | 38.57 [h] | Medium risk | 0.011087183017... | (2-1;2-1) | Data from 2013... | ILOstat 2014 |
| ▼ Social benefits, legal issues | | | | | | |
| ▲ Social security expend | 14.5675 [% of G... | Medium risk | 0.011087183017... | (2-1;1-4) | Mean value over... | ILO 2013; Sa... |
| ▲ Evidence of violations | 3.2817895044168... | Medium risk | 0.011087183017... | (2-1;1-2) | Data from 2015... | USDOL 2015... |
| ▼ Local Community | | | | | | |
| ▼ Safe and healthy living con | | | | | | |
| ▲ Drinking water coverag | 100.0 [%] | Very low risk | 0.011087183017... | (2-2;3-1) | Data from 2012... | JMP 2012; Dr... |
| ▲ Pollution level of the cr | 35.9 [Index] | Low risk | 0.011087183017... | (3;2-1) | Data from 2014... | Numbeo 201... |
| ▲ Sanitation coverage | 100.0 [%] | Very low risk | 0.011087183017... | (2-2;3-1) | Data from 2012... | JMP 2012; L... |
| ▼ Access to material resource | | | | | | |
| ▲ Level of industrial wast | 2.914869586394... | Low risk | 0.011087183017... | (1-1;4-1) | Data from 2010... | FAO 2014; W... |
| ▲ Level of industrial wast | 32.88 [% of total] | High risk | 0.011087183017... | (2-2;1-1) | Data from 2007... | FAO 2014; W... |
| ▲ Extraction of ore | 0.8036 [t/cap] | Very low risk | 0.011087183017... | (2-1;4-1) | Data from 2011... | SERU/WU Via... |
| ▲ Extraction of biomass | 694.3065 [t/km²] | High risk | 0.011087183017... | (2-1;4-1) | Data from 2011... | SERU/WU Via... |
| ▲ Extraction of biomass | 2.2488 [t/cap] | Low risk | 0.011087183017... | (2-1;4-1) | Data from 2011... | SERU/WU Via... |
| ▲ Extraction of fossil fuel | 3.4033 [t/cap] | Very low risk | 0.011087183017... | (2;n.a;4-1) | Data from 2011... | SERU/WU Via... |
| ▲ Certified environments | 15.04110859378... | Low risk | 0.011087183017... | (2-1;2-1) | normalised wt... | ISO 2013; CE... |
| ▲ Extraction of industrial | 4.355 [t/cap] | Low risk | 0.011087183017... | (2-1;4-1) | Data from 2011... | SERU/WU Via... |
| ▼ Migration | | | | | | |
| ▲ International migrant v | 4.703819617457... | Medium risk | 0.011087183017... | (2-3;1-2) | Data from 2002... | ILO 2010; M... |
| ▲ International Migran | 5.1236245146984... | High risk | 0.011087183017... | (2-1;2;n.a.) | Data from 2013... | UN-DESA 20... |
| ▲ Net migration rate | 2.56 [%] | Low risk | 0.011087183017... | (2-1;1;n.a.) | Data from 2014... | World Facts... |
| ▼ Respect of indigenous rig | | | | | | |
| ▲ Presence of indigenous | 1.0 [V/N] | Medium risk | 0.011087183017... | (3-1;4-1) | Data from 2011... | Wikipedia 20... |
| ▲ Human rights issues fa | 3.0 [Score] | Medium risk | 0.011087183017... | (3-1;1-1) | Rectification of... | ILO 1989; Ind... |
| ▼ Local Employment | | | | | | |
| ▲ Unemployment rate in | 7.5 [%] | Low risk | 0.011087183017... | (2-1;2-1) | Data from 2013... | ILOstat 2015... |
| ▼ Value Chain Actors | | | | | | |
| ▼ Fair Competition | | | | | | |
| ▲ Presence of anti-comp | 0.023677979479... | Very low risk | 0.011087183017... | (2-2;1-2) | Value is extrapo... | |

Social assessment

| Name | Raw value | Risk level | Activity variable | Data quality | Comment |
|---------------------------------|-------------------------------|----------------|-------------------|----------------|----------------------|
| ▼ Society | | | | | |
| ▼ Contribution to economic | | | | | |
| 👤 Illiteracy rate, male | 0.716610000000... | Very low risk | 0.011087183017... | (2;2;3;1) | Data from: 2012. |
| 👤 Illiteracy rate, total | 0.8443199999999... | Very low risk | 0.011087183017... | (2;2;3;1) | Data from: 2012. |
| 👤 Public expenditure on e | 6.2 [% of GDP] | Medium risk | 0.011087183017... | (2;1;4;1) | Data from: 2010. |
| 👤 Youth illiteracy rate, tot | 0.34357 [% of y... | Very low risk | 0.011087183017... | (2;2;3;1) | Data from: 2012. |
| 👤 Illiteracy rate, female | 0.964460000000... | Very low risk | 0.011087183017... | (2;2;3;1) | Data from: 2012. |
| 👤 Youth illiteracy rate, me | 0.3338399999999... | Very low risk | 0.011087183017... | (2;2;3;1) | Data from: 2012. |
| 👤 Youth illiteracy rate, fer | 0.3530499999999... | Very low risk | 0.011087183017... | (2;2;3;1) | Data from: 2012. |
| ▼ Health and Safety (Society) | | | | | |
| 👤 Health expenditure, pul | 82.5 [% of total] | Very low risk | 0.011087183017... | (2;1;3;1) | Data from: 2012. |
| 👤 Health expenditure, out | 9.9 [% of total] | Very low risk | 0.011087183017... | (2;1;3;1) | Data from: 2012. |
| 👤 Health expenditure, ext | | No data | 0.011087183017... | | |
| 👤 Health expenditure, tot | 9.4 [% of GDP] | Medium risk | 0.011087183017... | (2;1;3;1) | Data from: 2012. |
| ▼ Workers | | | | | |
| ▼ Freedom of association an | | | | | |
| 👤 Right of Collective barg | 3.0 [Score] | No risk | 0.011087183017... | (2;3;4;1) | Data from: 2011. |
| 👤 Right of Association | 3.0 [Score] | No risk | 0.011087183017... | (2;3;4;1) | Data from: 2011. |
| 👤 Trade union density | 25.82072814453... | High risk | 0.011087183017... | (2;3;3;1) | Data from: 2012. |
| 👤 Right to Strike | 3.0 [Score] | No risk | 0.011087183017... | (2;3;4;1) | Data from: 2011. |
| ▼ Child labour | | | | | |
| 👤 Children in employer | 0.0 [% of male c... | No risk | 0.011087183017... | (4;2;1;1;n.a.) | Data from: 2014. |
| 👤 Children in employer | 0.0 [% of femal... | No risk | 0.011087183017... | (4;2;1;1;n.a.) | Data from: 2014. |
| 👤 Children in employer | 0.0 [% of childr... | No risk | 0.011087183017... | (4;1;1;1) | Data from: 2014 |
| ▼ Health and Safety (Worker | | | | | |
| 👤 DALYs due to indoor an | 0.879252302207... | Very low risk | 0.011087183017... | (2;1;5;1) | Data from: 2004. |
| 👤 Workers affected by na | 0.041210424816... | Very low risk | 0.011087183017... | (2;1;2;1) | Data from: 2014. |
| 👤 Rate of non-fatal accid | 25.34 [#/yr and ... | Very low risk | 0.011087183017... | (2;3;2;1) | Data from: 2013. |
| 👤 Rate of fatal accidents | 0.05 [#/yr and 1... | Very low risk | 0.011087183017... | (2;3;2;1) | Data from: 2013. |
| 👤 Presence of sufficient c | 7.6210124296... | Very low risk | 0.011087183017... | (2;4;1;2) | Data from: 2014. |
| ▼ Forced Labour | | | | | |
| 👤 Frequency of forced lab | 1.5 [%] | Very low risk | 0.011087183017... | (2;4;3;n.a.) | Data from: 2012. |
| 👤 Trafficking in persons | 1.0 [Tier] | Very low risk | 0.011087183017... | (2;1;1;1) | Data from: 2014. |
| 👤 Goods produced by for | | No data | 0.011087183017... | | |
| ▼ Discrimination | | | | | |
| 👤 Gender wage gap | 30.18252062501... | Very high risk | 0.011087183017... | (3;1;2;1) | Mean value of s... |
| ▼ Fair Salary | | | | | |
| 👤 Living wage, per month | 872.5 [USD] | High risk | 0.011087183017... | (2;2;1;n.a.) | Calculated with... |
| 👤 Sector average wage, p | 4554.594900092... | Very low risk | 0.011087183017... | (2;2;2;1) | Risk level referi... |
| 👤 Minimum wage, per m | 1655.0 [USD] | High risk | 0.011087183017... | (2;1;4;1) | Data scope: cou... |
| ▼ Working time | | | | | |
| 👤 Weekly hours of work p | 38.557 [h] | Medium risk | 0.011087183017... | (2;1;2;1) | Data from: 2013. |
| ▼ Social benefits, legal issues | | | | | |
| 👤 Social security expendit | 14.5675 [% of G... | Medium risk | 0.011087183017... | (2;1;5;1) | Mean value ove... |
| 👤 Evidence of violations c | 3.817865044168... | Medium risk | 0.011087183017... | (2;1;1;5) | Data from: 2015. |
| ▼ Local Community | | | | | |
| ▼ Safe and healthy living con | | | | | |
| 👤 Drinking water coverag | 100.0 [%] | Very low risk | 0.011087183017... | (2;2;3;1) | Data from: 2012. |
| 👤 Pollution level of the c | 35.9 [Index] | Low risk | 0.011087183017... | (3;3;2;1) | Data from: 2014. |
| 👤 Sanitation coverage | 100.0 [%] | Very low risk | 0.011087183017... | (2;2;3;1) | Data from: 2012. |
| ▼ Access to material resourc | | | | | |
| 👤 Level of industrial wate | 2.914965986394... | Low risk | 0.011087183017... | (1;1;4;1) | Data from: 2010. |
| 👤 Level of industrial wate | 32.89 [% of total] | High risk | 0.011087183017... | (2;2;5;1) | Data from: 2007. |
| 👤 Extraction of ores | 0.0036 [t/cap] | Very low risk | 0.011087183017... | (2;1;4;1) | Data from: 2011. |
| 👤 Extraction of biomass (i | 694.3065 [t/km ²] | High risk | 0.011087183017... | (2;1;4;1) | Data from: 2011. |
| 👤 Extraction of biomass (i | 2.6988 [t/cap] | Low risk | 0.011087183017... | (2;1;4;1) | Data from: 2011. |
| 👤 Extraction of fossil fuel: | 3.4283 [t/cap] | Very low risk | 0.011087183017... | (2;n.a.;4;1) | Data from: 2011. |
| 👤 Certified environmen | 15.04110859378... | Low risk | 0.011087183017... | (2;1;2;1) | normalised wit... |
| 👤 Extraction of industrial | 4.355 [t/cap] | Low risk | 0.011087183017... | (2;1;4;1) | Data from: 2011. |
| ▼ Migration | | | | | |
| 👤 International migrant w | 4.703819617457... | Medium risk | 0.011087183017... | (2;3;5;1) | Data from: 2002. |
| 👤 International Migrant S | 12.39245146984... | High risk | 0.011087183017... | (2;1;2;1;n.a.) | Data from: 2013. |
| 👤 Net migration rate | 2.56 [%] | Low risk | 0.011087183017... | (2;1;1;1;n.a.) | Data from: 2014. |
| ▼ Respect of indigenous righ | | | | | |
| 👤 Presence of indigenous | 1.0 [Y/N] | Medium risk | 0.011087183017... | (3;1;4;1) | Data from: 2011. |
| 👤 Human rights issues fa | 3.0 [Score] | Medium risk | 0.011087183017... | (3;1;1;1) | Ratification of l... |
| ▼ Local Employment | | | | | |
| 👤 Unemployment rate in | 7.5 [%] | Low risk | 0.011087183017... | (2;1;2;1) | Data from: 2013. |
| ▼ Value Chain Actors | | | | | |
| ▼ Fair Competition | | | | | |
| 👤 Presence of anti-comp | 0.023677979479... | Very low risk | 0.011087183017... | (2;2;5;1) | Value is extrapol... |

- E.g. Advertising, UK (screenshot from openLCA)

017... (4;1;1;1;4)

017... (2;1;5;1;4)

017... (2;1;2;1;4)

017... (2;3;2;1;2)

017... (2;3;2;1;2)

017... (2;4;1;2;2)

017... (2;4;3;3;n.a.)

017... (2;1;1;1;4)

Overall distribution of DQ Assessment results in the PSILCA database, currently

| Column | Data | | | | | | | | | | |
|--------|------|---|---|---|--|---|---|---|---|---|---|
| 1 [6] | 0 | 1 | 2 | | | | | 3 | 4 | 5 | |
| 2 [6] | 0 | | 1 | | | | 2 | | 3 | 4 | 5 |
| 3 [6] | 0 | 1 | 2 | 3 | | 4 | | 5 | | | |
| 4 [6] | 0 | | 1 | | | | | 2 | 3 | 4 | 5 |
| 5 [6] | 0 | | | 1 | | | 2 | 3 | 4 | | 5 |

- Overall ca. 4,500,000 entries

1 Source

2 Completeness

3 Time

4 Geography

5 Further technology

E.g. Advertising in the UK; DALYS due to indoor and outdoor air pollution

Flow

| Contribution | Process | Amount |
|--------------|---|-------------|
| 100.00% | Advertising - GB | 5.14893E-13 |
| > 38.40% | Manufacture of perfumes and toilet preparations - GB | 1.97728E-13 |
| > 36.34% | Manufacture of pharmaceutical preparations - GB | 1.87103E-13 |
| > 05.03% | Banking - GB | 2.59238E-14 |
| > 03.44% | Wholesale of non-agricultural intermediate products, waste and scrap - GB | 1.77145E-14 |
| > 02.99% | Building societies - GB | 1.54159E-14 |
| > 02.12% | Gambling and betting activities - GB | 1.09400E-14 |
| > 01.60% | Wholesale of household goods - GB | 8.24569E-15 |
| > 01.53% | Wholesale of computers, office machinery and equipment, mining, construction an... | 7.87085E-15 |
| > 01.45% | Wholesale of food, beverages and tobacco - GB | 7.46049E-15 |
| > 01.41% | Architectural and engineering activities and related technical consultancy - GB | 7.25723E-15 |
| > 01.15% | Freight transport by road - GB | 5.90328E-15 |
| > 01.06% | Business and management consultancy activities - GB | 5.46097E-15 |
| > 01.03% | Activities of travel agencies and tour operators; tourist assistance activities n.e.c. - GB | 5.31419E-15 |
| > 00.69% | Sale of motor vehicles - GB | 3.57239E-15 |

Subcategory Workers

E.g. Advertising in the UK; data quality index “reliability of the source”, indoor and outdoor air pollution

Flow

| Contribution | Process | Amount |
|--------------|---|-------------|
| 100.00% | Advertising - GB | 1.85988E-11 |
| > 23.91% | Manufacture of perfumes and toilet preparations - GB | 4.44624E-12 |
| > 22.68% | Manufacture of pharmaceutical preparations - GB | 4.21739E-12 |
| > 13.52% | Wholesale of non-agricultural intermediate products, waste and scrap - GB | 2.51525E-12 |
| > 06.28% | Wholesale of household goods - GB | 1.16778E-12 |
| > 05.99% | Wholesale of computers, office machinery and equipment, mining, construction and civil ... | 1.11467E-12 |
| > 05.68% | Wholesale of food, beverages and tobacco - GB | 1.05621E-12 |
| > 04.11% | Banking - GB | 7.64171E-13 |
| > 03.18% | Activities of travel agencies and tour operators; tourist assistance activities n.e.c. - GB | 5.91086E-13 |
| > 03.14% | Architectural and engineering activities and related technical consultancy - GB | 5.83760E-13 |
| > 02.44% | Building societies - GB | 4.54659E-13 |
| > 02.38% | Freight transport by road - GB | 4.42992E-13 |
| > 01.45% | Software consultancy and supply - GB | 2.69028E-13 |
| > 01.28% | Gambling and betting activities - GB | 2.37227E-13 |
| > 00.89% | Business and management consultancy activities - GB | 1.64730E-13 |
| > 00.67% | Other business activities n.e.c. - GB | 1.24612E-13 |
| > 00.59% | Sale of motor vehicles - GB | 1.10273E-13 |
| > 00.40% | Manufacture of tobacco products - GB | 7.39341E-14 |

Subcategory Workers

Flow

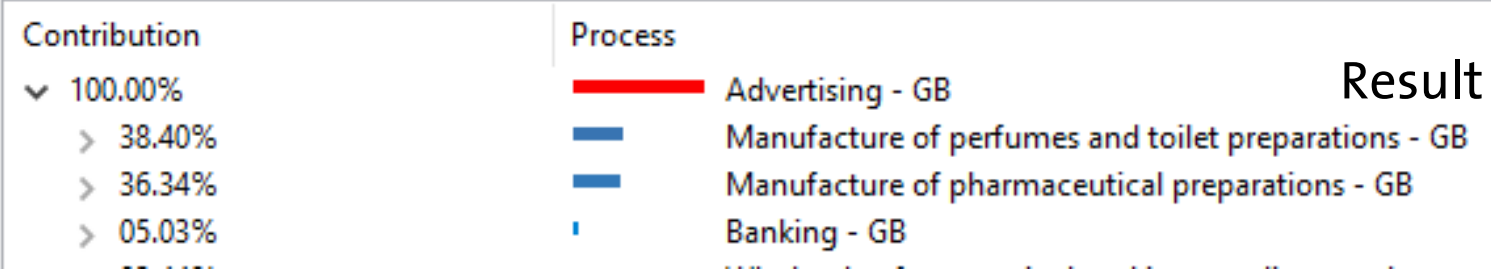
| Contribution | Process | Amount |
|--------------|---|-------------|
| 100.00% | Advertising - GB | 5.14893E-13 |
| > 38.40% | Manufacture of perfumes and toilet preparations - GB | 1.97728E-13 |
| > 36.34% | Manufacture of pharmaceutical preparations - GB | 1.87103E-13 |
| > 05.03% | Banking - GB | 2.59238E-14 |
| > 03.44% | Wholesale of non-agricultural intermediate products, waste and scrap - GB | 1.77145E-14 |
| > 02.99% | Building societies - GB | 1.54159E-14 |
| > 02.12% | Gambling and betting activities - GB | 1.09400E-14 |
| > 01.60% | Wholesale of household goods - GB | 8.24569E-15 |
| > 01.53% | Wholesale of computers, office machinery and equipment, mining, construction an... | 7.87085E-15 |
| > 01.45% | Wholesale of food, beverages and tobacco - GB | 7.46049E-15 |
| > 01.41% | Architectural and engineering activities and related technical consultancy - GB | 7.25723E-15 |
| > 01.15% | Freight transport by road - GB | 5.90328E-15 |
| > 01.06% | Business and management consultancy activities - GB | 5.46097E-15 |
| > 01.03% | Activities of travel agencies and tour operators; tourist assistance activities n.e.c. - GB | 5.31419E-15 |
| > 00.69% | Sale of motor vehicles - GB | 3.57239E-15 |

Result

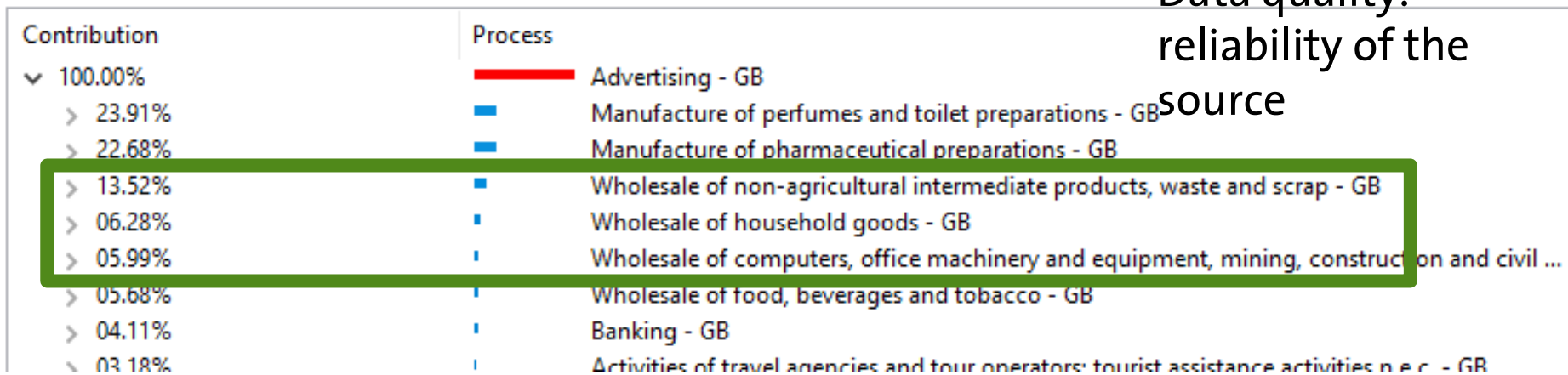
Flow

| Contribution | Process | Amount |
|--------------|---|-------------|
| 100.00% | Advertising - GB | 1.85988E-11 |
| > 23.91% | Manufacture of perfumes and toilet preparations - GB | 4.44624E-12 |
| > 22.68% | Manufacture of pharmaceutical preparations - GB | 4.21739E-12 |
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| > 06.28% | Wholesale of household goods - GB | 1.16778E-12 |
| > 05.99% | Wholesale of computers, office machinery and equipment, mining, construction and civil ... | 1.11467E-12 |
| > 05.68% | Wholesale of food, beverages and tobacco - GB | 1.05621E-12 |
| > 04.11% | Banking - GB | 7.64171E-13 |
| > 03.18% | Activities of travel agencies and tour operators; tourist assistance activities n.e.c. - GB | 5.91086E-13 |
| > 03.14% | Architectural and engineering activities and related technical consultancy - GB | 5.83760E-13 |
| > 02.44% | Building societies - GB | 4.54659E-13 |
| > 02.38% | Freight transport by road - GB | 4.42992E-13 |
| > 01.45% | Software consultancy and supply - GB | 2.69028E-13 |
| > 01.28% | Gambling and betting activities - GB | 2.37227E-13 |
| > 00.89% | Business and management consultancy activities - GB | 1.64730E-13 |
| > 00.67% | Other business activities n.e.c. - GB | 1.24612E-13 |
| > 00.59% | Sale of motor vehicles - GB | 1.10273E-13 |
| > 00.40% | Manufacture of tobacco products - GB | 7.39341E-14 |

Data quality:
reliability of the
source



Result



Data quality: reliability of the source

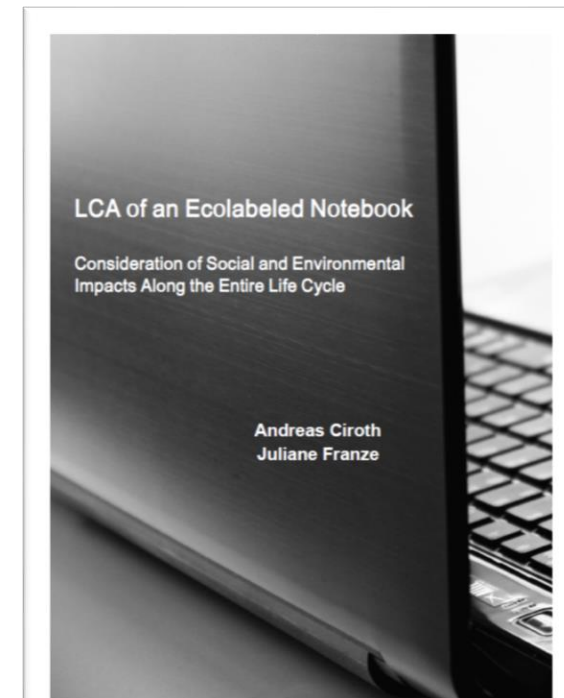
How the calculation results are obtained

- So far, quite simple. Data quality indicators (DQIs) simply taken and aggregated, per DQI
- Not yet merged with results (to obtain relative results e.g.)
- Planned but not yet implemented: overlay of different results

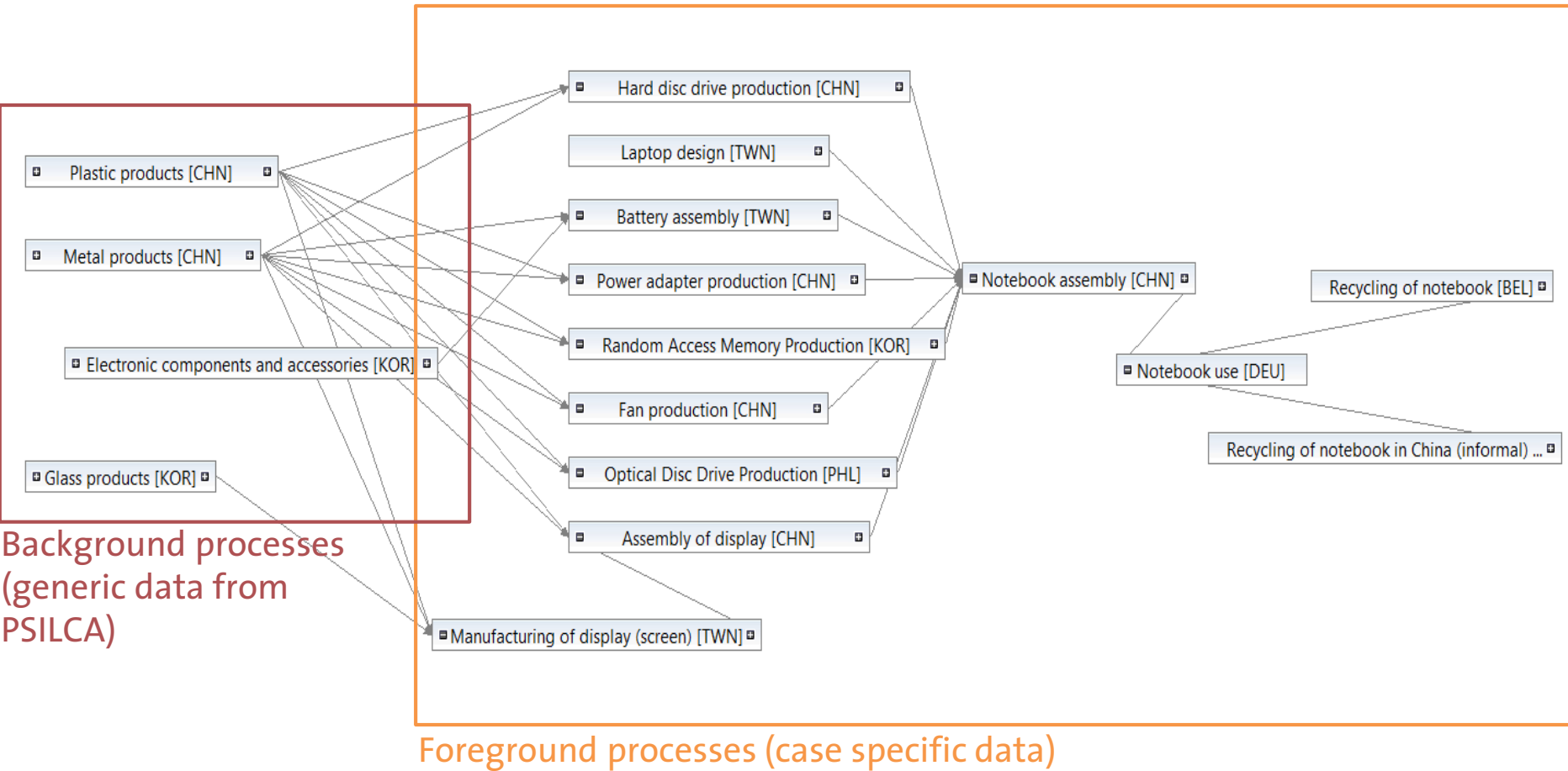
3 Case study

Case study

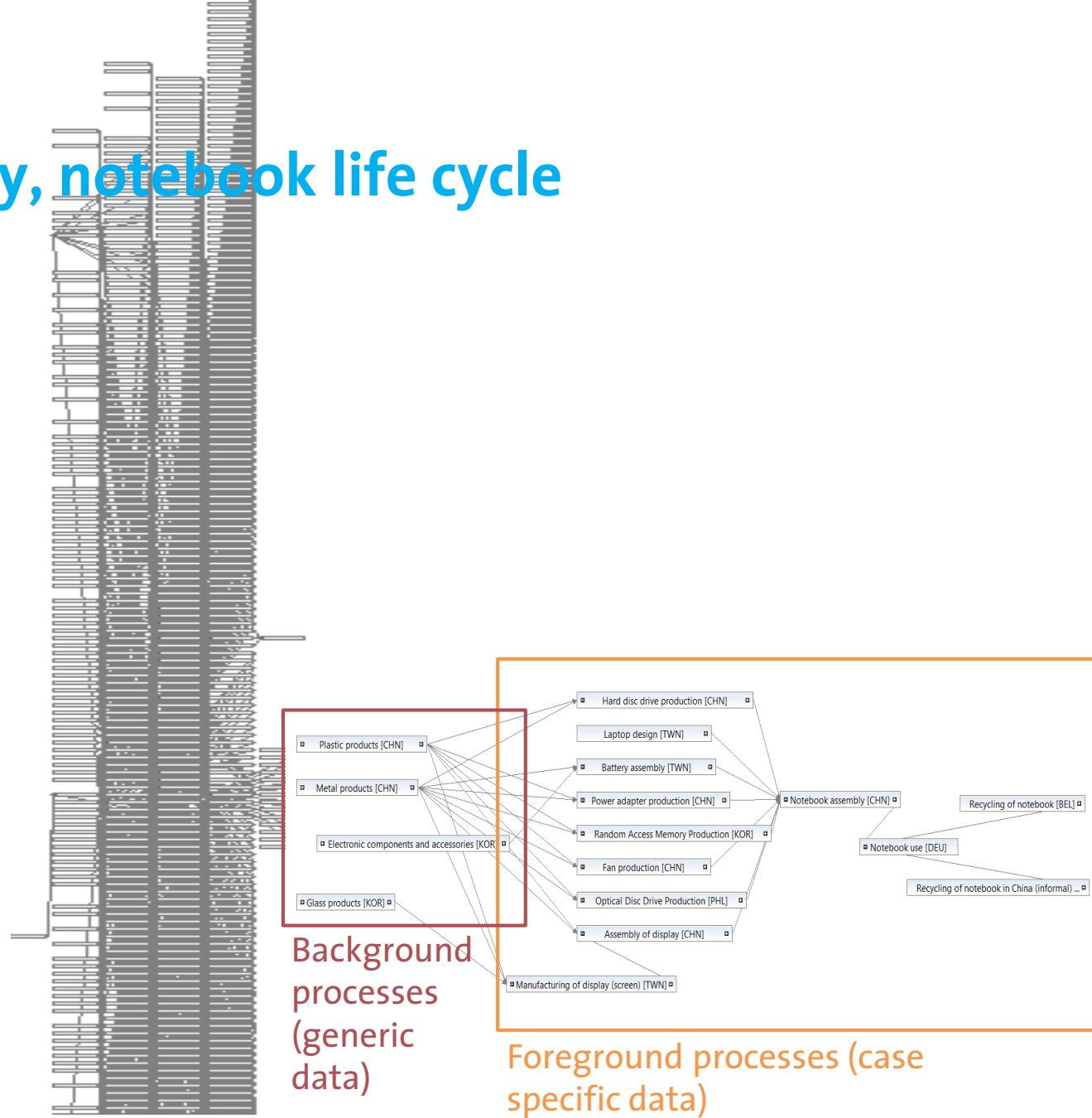
- **Latex, Malaysia** (mentioned in abstract) case study delayed → results later
- Instead: refactoring of “classic” notebook study (Ciroth, Franze 2011: LCA of an ecolabelled notebook computer)
- Idea: for the foreground system, data quality is better and relevance is higher



Case study, notebook life cycle



Case study, notebook life cycle



Case study, notebook data quality

▼ Social assessment

| Name | Raw value | Risk level | Activity variable | Data quality | Comment | Source |
|---|---|---|--|--|--|---|
| <ul style="list-style-type: none"> Workers <ul style="list-style-type: none"> Fair Salary <ul style="list-style-type: none"> Sector average wage, per month Living wage, per month Minimum wage, per month Social benefits, legal issues <ul style="list-style-type: none"> Social security expenditures Forced Labour <ul style="list-style-type: none"> Goods produced by forced labour Frequency of forced labour Trafficking in persons Health and Safety (Workers) <ul style="list-style-type: none"> DALYs due to indoor and outdoor air and water pollution Workers affected by natural disasters Discrimination <ul style="list-style-type: none"> Gender wage gap Child labour <ul style="list-style-type: none"> Children in employment, male Children in employment, total Children in employment, female Local Community <ul style="list-style-type: none"> Migration <ul style="list-style-type: none"> International Migrant Stock International migrant workers in the sector Net migration rate Value Chain Actors <ul style="list-style-type: none"> Fair Competition <ul style="list-style-type: none"> Presence of anti-competitive behaviour or violations | 196.95 - 227.25 [USD] Minimum wage does not living ... 139.38 [USD] | High risk Low risk Very high risk | 1.6269573686413064 [h, Working...] 1.6269573686413064 [h, Working...] 1.6269573686413064 [h, Working...] | (2;1;2;1) (2;1;2;n.a.) (2;1;1;2) | China has no uniform minimum... China has no uniform minimum... China has no uniform minimum... | Ciroth, Franze, 2011: LCA of a... Ciroth, Franze, 2011: LCA of a... Ciroth, Franze, 2011: LCA of a... |
| 6 [% of GDP] | High risk | 1.6269573686413064 [h, Working...] | (2;2;2;1) | China invests around 6% of GDP... | Ciroth, Franze, 2011: LCA of a... | |
| <ul style="list-style-type: none"> Goods produced by forced labour Frequency of forced labour Trafficking in persons | | | | (2;1;2;1) (2;1;2;1) (2;1;2;1) | So called labour camps are wide... So called labour camps are wide... So called labour camps are wide... | Ciroth, Franze, 2011: LCA of a... Ciroth, Franze, 2011: LCA of a... Ciroth, Franze, 2011: LCA of a... |
| <ul style="list-style-type: none"> DALYs due to indoor and outdoor air and water pollution Workers affected by natural disasters | | | | (2;1;2;1) (2;1;2;2) | China has a DALY rate of 16, whi... data from PSILCA | Ciroth, Franze, 2011: LCA of a... EM-DAT 2015: Natural disasters |
| <ul style="list-style-type: none"> Gender wage gap | | | | (2;1;2;1) | Ratio of salary of women to wag... | Ciroth, Franze, 2011: LCA of a... |
| <ul style="list-style-type: none"> Children in employment, male Children in employment, total Children in employment, female | | | | (2;1;2;1) (2;1;2;1) (2;1;2;1) | There are no official statistics ab... There are no official statistics ab... There are no official statistics ab... | Ciroth, Franze, 2011: LCA of a... Ciroth, Franze, 2011: LCA of a... Ciroth, Franze, 2011: LCA of a... |
| <ul style="list-style-type: none"> International Migrant Stock International migrant workers in the sector Net migration rate | | | | (2;1;2;1;n.a.) (2;3;2;1) (2;1;2;1) | data from PSILCA "Similar to other companies in t... -0.3 migrants/1,000 inhabitants i... | UN-DESA 2013: International ... Ciroth, Franze, 2011: LCA of a... Ciroth, Franze, 2011: LCA of a... |
| <ul style="list-style-type: none"> Presence of anti-competitive behaviour or violations | | | | (2;2;2;1) | Lite-On was sued by reason of b... | Ciroth, Franze, 2011: LCA of a... |

Minimum wage, per month

Raw value: USD

Activity variable (Working hours): h

Risk level:

Source:

Comment:

Data quality:

| | | | | | |
|-------------------------------|---|---|---|---|---|
| Reliability of the source(s) | 1 | 2 | 3 | 4 | 5 |
| Completeness conformance | | | | | |
| Temporal conformance | | | | | |
| Geographical conformance | | | | | |
| Further technical conformance | | | | | |

OK Cancel

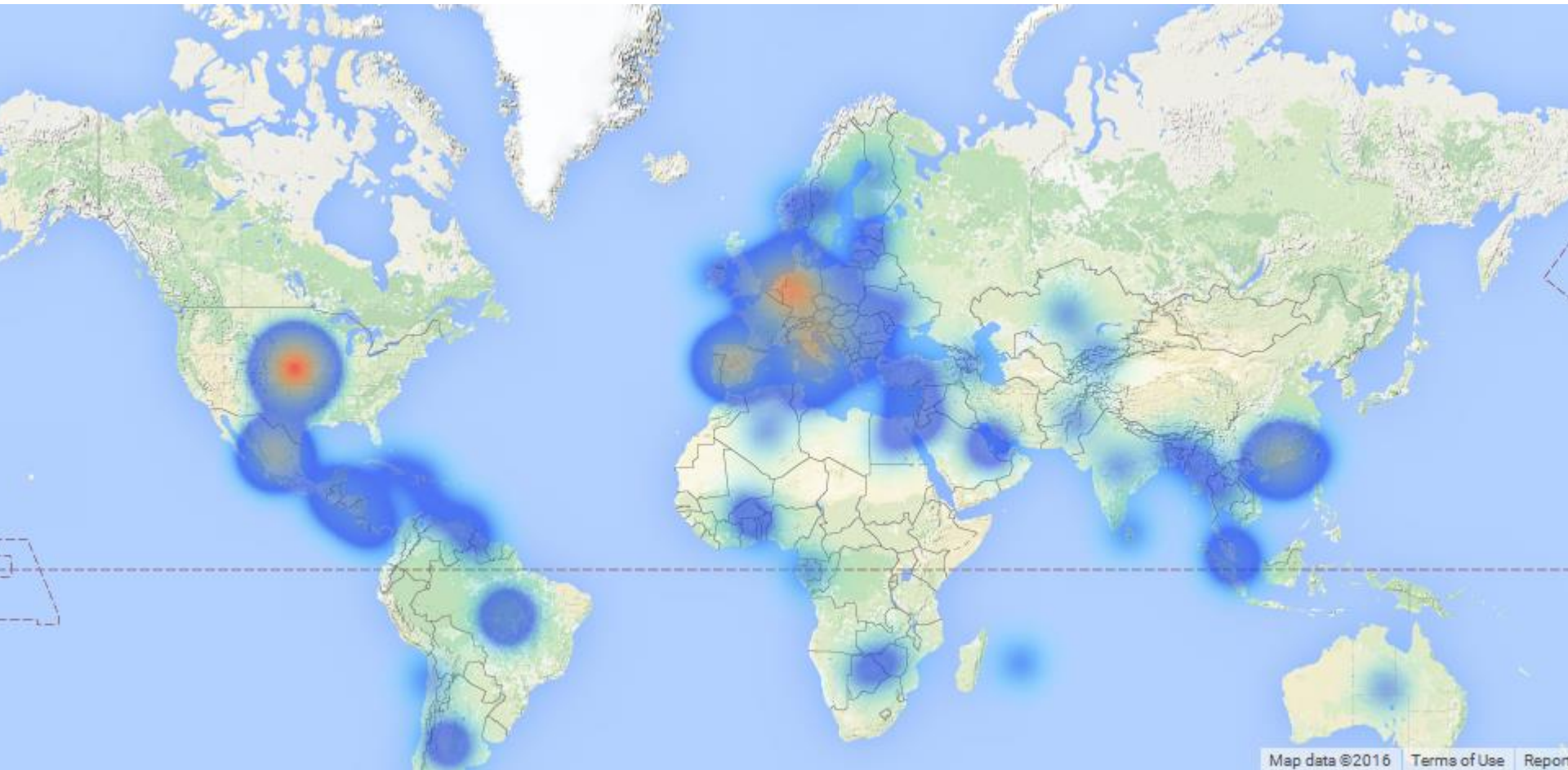
Case study, notebook data quality

- Issue (as always in hybrid studies): link database to foreground system. Indicators slightly different, PSILCA database has more indicators → 30 ca. remain
- Data quality for your foreground system is typically better (and should be)

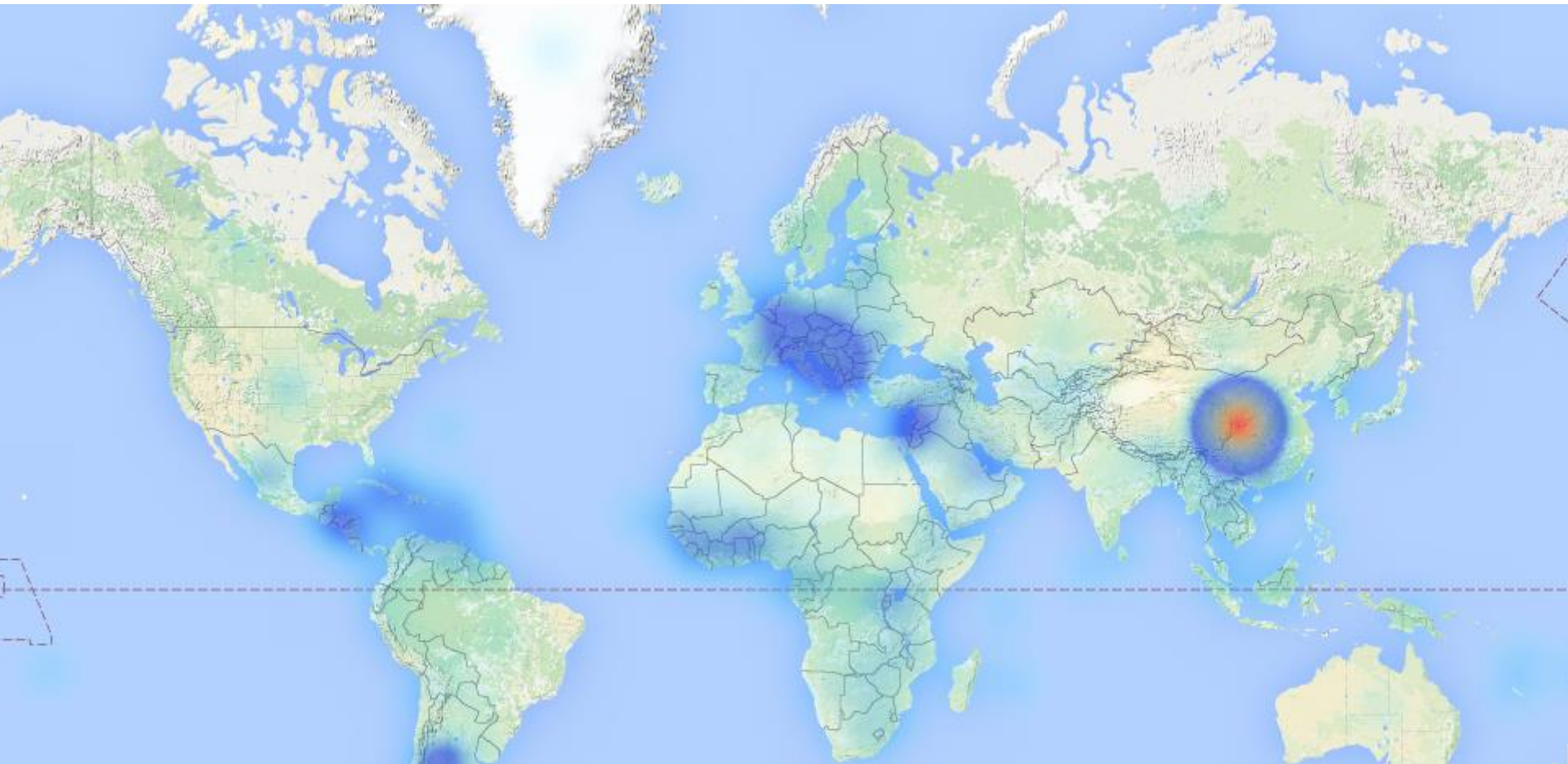
The screenshot displays a software interface for social assessment data quality. A table lists various indicators with their raw values, risk levels, activity variables, data quality, comments, and sources. A dialog box is open for the indicator 'Minimum wage, per month', showing its raw value (139.38 USD), activity variable (1.6269573686413064 h), and risk level (Very high risk). The dialog also includes a comment field with a detailed note about China's minimum wage policy and a data quality grid.

| Name | Raw value | Risk level | Activity variable | Data quality | Comment | Source |
|---|-----------------------|----------------|-----------------------------------|---------------|-----------------------------------|----------------------------------|
| Workers | | | | | | |
| Fair Salary | | | | | | |
| Sector average wage, per month | 196.95 - 227.25 (USD) | High risk | 1.6269573686413064 (h, Working... | (2-1;2-1) | China has no uniform minimum... | Croth, France, 2011; LCA of a... |
| Living wage, per month | | | 1.6269573686413064 (h, Working... | (2-1;2;2;n.a) | China has no uniform minimum... | Croth, France, 2011; LCA of a... |
| Minimum wage, per month | 139.38 (USD) | Low risk | 1.6269573686413064 (h, Working... | (2-1;1;2) | China has no uniform minimum... | Croth, France, 2011; LCA of a... |
| Minimum wage, per month | 139.38 (USD) | Very high risk | 1.6269573686413064 (h, Working... | (2-1;1;2) | China has no uniform minimum... | Croth, France, 2011; LCA of a... |
| Social benefits, legal issues | | | | | | |
| Social security expenditures | 6 [%] of GDP | High risk | 1.6269573686413064 (h, Working... | (2;2;2;2) | China invests around 6% of GDP... | Croth, France, 2011; LCA of a... |
| Forced Labour | | | | | | |
| Goods produced by forced labour | | | | | | |
| Frequency of forced labour | | | | | | |
| Trafficking in persons | | | | | | |
| Health and Safety (Workers) | | | | | | |
| DALYs due to indoor and outdoor air and water | | | | | | |
| Workers affected by natural disasters | | | | | | |
| Discrimination | | | | | | |
| Gender wage gap | | | | | | |
| Child labour | | | | | | |
| Children in employment, male | | | | | | |
| Children in employment, total | | | | | | |
| Children in employment, female | | | | | | |
| Local Community | | | | | | |
| Migration | | | | | | |
| International Migrant Stock | | | | | | |
| International migrant workers in the sector | | | | | | |
| Net migration rate | | | | | | |
| Value Chain Actors | | | | | | |
| Fair Competition | | | | | | |
| Presence of anti-competitive behaviour or... | | | | | | |

Case study, notebook data quality, temporal conformance, non-fatal accidents



Case study, notebook data quality, indicator value, non-fatal accidents



4 Outlook

Results

Data quality indicators following a pedigree matrix have been integrated into the PSILCA social LCA database

Information on

- **reliability of the source,**
- **completeness,**
- **temporal,**
- **geographical,**
- **and technological conformance**

is thus available for all processes in a life cycle, for all social indicators per process.

Results

This can be used to

- **understand the data quality of the life cycle model and the overall “stability” of the result**
- **identify weaknesses and hotspots for data quality in the life cycle to make modeling more efficient**

Outlook

Display of data quality information over the life cycle will be made available in openLCA

(exact way not yet fully determined; feedback welcome)

One step towards better data quality management, and to better support decision making, with the two extremes:

- additional data collection or modeling required,**
- or**
- safe to take a decision based on the results**

GreenDELTA

sustainability consulting + software

Merci!

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www.greendelta.com