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ASSIST – Relay industrial supply chain sustainability data

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Summary

ASSIST - Relay industrial supply chain sustainability data, is a feasibility study aimed to better understand the current situation of and needs and potential ways forward of collecting life cycle data and life cycle inventory data from suppliers. This is needed to improve the environmental performance of their products and services (over the life cycle), as well as increase their competitiveness. An efficient strategy of data collection is needed to respond to an increasing interest in life cycle assessment (LCA) and LCA data.

The methods used in the project were a literature review and an overview of ongoing initiatives, together with interviews and workshops with industrial companies.

LCA data collection is currently experienced for LCA, Environmental Product Declarations (EPD), Science Based Target Initiative (SBTI), CDP - Disclosure Insight Action and Traceability and recycled content. Today LCA data is collected from some suppliers and are managed manually and in the future this need to be managed at much less effort with an increased speed.

The project has developed the following vision, “In 2026, a clear line for the content and scope of a globally harmonized LCA data management has been established within companies that have an ambition to be at the forefront in terms of “sustainability”. So that it can provide sufficient confidence in the decisions based on statements about products and processes impacts on the environment and society along the value chain.”

And to reach this vision a collaboration project is needed and include the following option solutions; 1) Synergies and relationships, 2) Value-creating and cost-effective data management, and 3) Harmonization and standards.

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Project information

Project title

ASSIST - Relay industrial supply chain sustainability data

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Aim

The overall aim of working is this field is to improve and facilitate collection of reliable life cycle data. The objective of the project is to identify an industrially grounded map and plan for action areas and resources (technology, competence, funding) needed to meet near and future demands for supply chain sustainability data flow.

Project manager

Raul Carlsson, RISE Research Institutes of Sweden

Coordination of the project

The project has been coordinated by Swedish Life Cycle Center, a national center of excellence for the advance of credible and applied life cycle thinking in industry and other parts of society.

Project management team

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Time period

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Acknowledgements

We would like to thank all organizations and people who have contributed to this project.

About Swedish Life Cycle Center

Swedish Life Cycle Center is a collaboration platform for universities, industries, research institutes and government agencies for competence building and the exchange of experience to move the life cycle field forward. Current partners are Chalmers University of Technology (host of the Center), KTH Royal Institute of Technology, Swedish University of Agricultural Sciences, Swedish Environmental Protection Agency, Electrolux, Essity, Höganäs, Polestar, Vattenfall, Volvo Car Group, Volvo Group, IVL Swedish Environmental Research Institute, RISE Research Institutes of Sweden, Scania and CEVT. The Center hosts a dialogue group with nine Government agencies in Sweden. For more information about Swedish Life Cycle Center, please visit www.lifecyclecenter.se.

1. Introduction

Generally, focus on life cycle management has increased among companies due to awareness connected to the industrial production system´s effect on the planetary boundaries. The life cycle perspective ensure that decisions are managed without sub-optimisation and without environmental impact being moved along value chains.

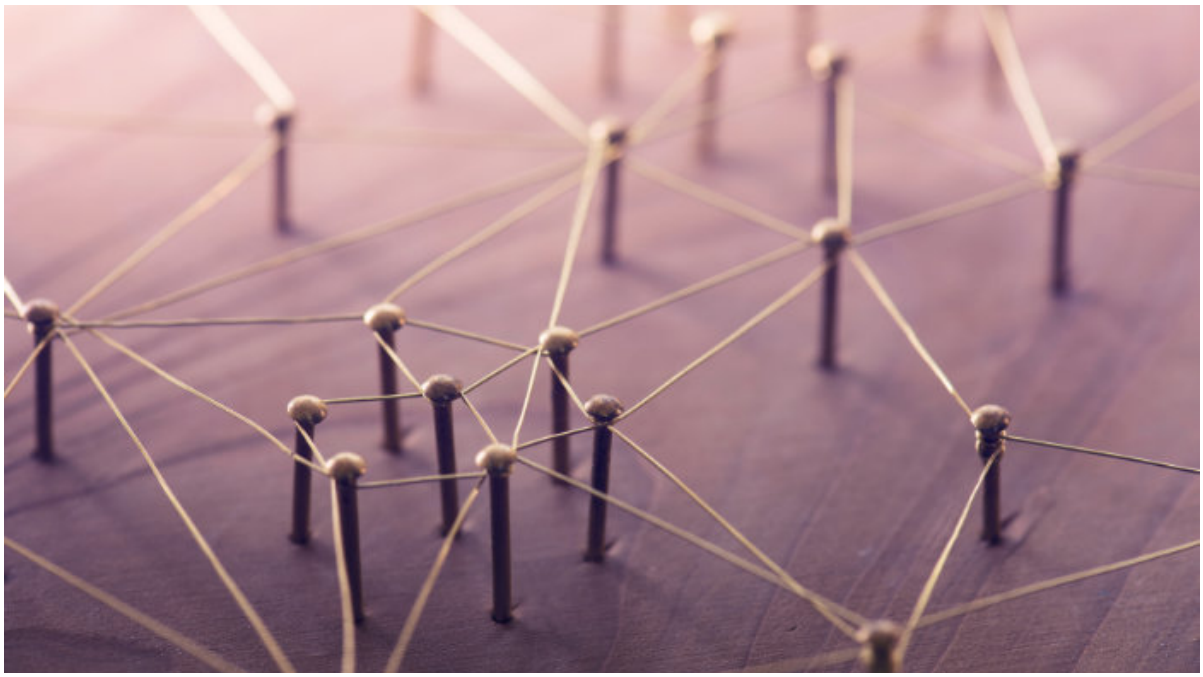
This perspective has led to pressure from end markets, new regulations and legislation. Also, investors via rating institutes focus on life cycle aspects regarding Environmental, Social and Governance (ESG) sustainability business risks. Companies now also work towards different goals were credible and reliable data is of outmost importance. Examples on activities connected to this are to:

- track the reduction of greenhouse gas (GHG) emissions from the supply chain
- rank suppliers based on component's embedded emissions
- inform potential and current customers
- feed R&D department with up-to-date primary life cycle data
- produce life cycle based Environmental Product Declarations (EPD)

Understanding the environmental performance of the value chain both upstream and downstream is necessary to identify and follow up the measures needed to help achieve companies' goals and strategies, as well as fulfilling customer's needs.

From workshops arranged by the Center and from individual interviews with experts working with life cycle data inside companies actively involved in the Center a common need was identified. Whereas background life cycle data is most often acquired from readymade databases, collection of specific supply chain data is made manually. This manual work increases in time as the demand for life cycle data increases Supply chains are complex, all suppliers do not have competence or capacity to provide the data needed. Personal contacts to explain adds to costs. In many cases there is also a reluctance to share data. Industry expresses a need for approaches that can be shared and harmonized throughout different supply chains and sectors, and that can be even standardized and scaled up. Life cycle data is used by many different roles in different organizational functions, such as supply chain management and purchasing, product development, manufacturing, different sustainability functions and sales. Therefore, the life cycle data must represent information that can be used for many different purposes.

This report is written to summarize outcomes and findings from the project ASSIST - Relay industrial supply chain sustainability data, to better understand needs and potential ways forward within the field of collecting life cycle data and life cycle inventory data from suppliers.



"The project has illustrated how complex and challenging the field of LCA data is"

Project participant, May 2022.

"We have learnt how other industries are working with and manage LCA data collection from suppliers"

Project participant, June 2022.

2. Method

ASSIST was a feasibility study between a range of companies interested in how to improve the collection of life cycle assessment data from suppliers, identified from a couple of workshops within the Swedish Life Cycle Center.

A team of researchers with much experience and knowledge from life cycle data together with a facilitator was set up to manage the project and its work packages, including 1) Inventory of current and future expected practice; 2) Outlook analysis of trends in business and society; 3) Analysis of gaps and challenges; and 4) Synthesis and design of solution options and action plan.

The study was carried out in collaboration with representatives from the different business functions in the participating companies actively involved in the Center; Research & Innovation, Product development, Sustainability & LCA and Purchasing.

2.1 Outlook analysis of trends in business and society

Trends in society and business was investigated by means of search in literature and through established networks. A review was carried out over upcoming legal requirements, voluntary agreements and technical innovations about sustainability information communication. This will include scanning through on-going research projects regarding data sharing and data relaying also in related areas of potential importance, such as Artificial Intelligence and machine learning.

2.2 Inventory of current and future expected practice

All project partners were interviewed to acquire knowledge, requirements and experiences in industry, regarding the company's current practice and experienced characteristics relating to producing and relaying value chain sustainability data. This study was performed to better understand obstacle and challenges with data management.

Together with the interviews and the interviewees two workshops were held virtually to discuss the outlook analysis, the diverse needs, challenges and their vision for a future mode of action of data flow and expected and foreseeable obstacles to overcome.

2.3 Gap analysis and design of solution options

Based on current and future needs and obstacles and a gap analysis, the team of researchers developed a vision and design of solution options for a common implementation project. This idea has been communicated with companies both inside the project partners and with other companies and result in an upcoming application for a joint research project.

3. Trends and initiatives

There are many drivers for an organization to have a stronger control over the sustainability performance of their entire supply chain.

3.1 Drivers due to existing or upcoming regulation

This section summarizes drivers for why the industry need to have better sustainability related data throughout their supply chains. We look at current trends and drivers that induce industries to have more transparent and available sustainability related data.

Here are specified different regulations, first related to Circular economy such as Circular economy action plan, ongoing work in standardisation of Circular economy standards (within the International Organization for Standardizations, ISO and The European Committee for Standardization, CEN). The standards express a circularity responsibility to some extent, which implies some information exchange.

Circular economy action plan
Circular economy action plan Subclause 6.3. Driving the transition through research, innovation and digitalisation states:
"Digital technologies can track the journeys of products, components and materials and make the resulting data securely accessible. The European data space for smart circular applications referred to in section 2 will provide the architecture and governance system to drive applications and services such as product passports, resource mapping and consumer information." (European Commission, 2020)

Circular economy standards (ISO, CEN)
ISO standards on circular economy will include circular product data sheet, compiling circularity related facts to be exchanged between actors of product value chains. The ISO standards on circular economy will also formulate how a circularity responsibility will imply some information exchange.

Digital Product Passport
Circular economy related information for products. EU Digital Product Passport will come to demand which detailed information to disclose about the composition and handling of goods on the European market to assist reuse, recycling and long lifetime (European Commission, 2022).

Waste regulation
Different legislation regarding waste management also provides detailed requirements for modelling the environmental impacts of the flows of material/energy and the emissions and waste streams associated with a product or an organisation throughout the life cycle. One specific example is the extended producer responsibility for the management of electrical and electronic waste.

European Platform on Life Cycle Assessment (Joint Research Centre, JRC)
"The Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF) are the EU recommended Life Cycle Assessment (LCA) based methods to quantify the environmental impacts of products (goods or services) and organisations.

The overarching purpose of PEF and OEF information is to enable to reduce the environmental impacts of goods, services and organisations taking into account supply chain activities (from extraction of raw materials, through production and use to final waste management). This purpose is achieved through the provision of detailed requirements for modelling the environmental impacts of the flows of material/energy and the emissions and waste streams associated with a product or an organisation throughout the life cycle." (European Platform on LCA)

Extended producer responsibility (WEEE)
EU Directive 2012/19/EU for the management of electrical and electronic waste, e-waste (European Union, 2012)

Emissions Trading System (EU) & Carbon Boarder Adjustment Mechanism (import to EU)
EU Emissions Trading System (ETS) and Carbon Border Adjustment Mechanism (CBAM) also set requirements on making information about Green House Gas (GHG) emissions available both for EU countries and countries outside EU that import products to the EU. ETS makes information about GHG emissions available. CBAM in principle makes information about GHG emissions outside EU available (Scope 1* at least). (European Commission, 2021).

*"*Scope 1 emissions are direct emissions from owned or controlled sources. Scope 2 emissions are indirect emissions from the generation of purchased energy. Scope 3 emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions." (Greenhouse Gas Protocol)*

EU Green finance Taxonomy
The EU taxonomy drives data generation too and establishes a list of environmentally sustainable economic activities and play an important role helping the EU scale up sustainable investment and implement the European green deal (European Commission, b).

Other LCA related regulations (e.g. Eco-design Directive for Energy-related Products (ErP) 2009/125/EC)
Other LCA related regulation is e.g., eco-design for

sustainable products, which is important for dealing with products, from the perspective of policy making, consumption, supply chain management. In this regulation the life cycle perspective and life cycle assessment are highlighted as important approaches. “(13) The approach set out in the Commission’s Communication of 18 June 2003 entitled ‘Integrated Product Policy — Building on Environmental Life-Cycle Thinking’, which is a major innovative element of the Sixth Community Environment Action Programme, aims to reduce the environmental impacts of products across the whole of their life cycle, including in the selection and use of raw materials, in manufacturing, packaging, transport and distribution, installation and maintenance, use and end-of-life. Considering at the design stage a product’s environmental impact throughout its whole life cycle has a high potential to facilitate improved environmental performance in a cost-effective way, including in terms of resource and material efficiency, and thereby to contribute to achieving the objectives of the Thematic Strategy on the Sustainable Use of Natural Resources. There should be sufficient flexibility to enable this factor to be integrated in product design whilst taking account of technical, functional and economic considerations.” (European Commission, 2009).

REACH - Chemicals - Environment - European Commission

The REACH Regulation, having the slogan of "No data no market", places responsibility on industry to manage the risks from chemicals and to provide safety information on the substances (europa.eu).

ELV Directive 2000/53/EC for automotive industry

The last one, the Directive on end-of-life vehicles ELV Directive 2000/53/EC sets the requirements for better sustainability related data specifically for automotive industry.
“EU rules aim to make the dismantling and recycling of end-of-life vehicles more environmentally friendly.” (European Commission, 2000)

3.2 Drivers due to industrial innovation and change

After we emphasize the drivers due to industrial innovation and change that induce industries to have much better LCA data. In this group of drivers, we highlight Industry 4.0 that can enable more transparency regarding production performance and the way companies manufacture, improve and distribute their products.

This section exemplifies why the industry needs to or wants to have much better LCA data.

Industry 4.0

Industry 4.0 refers to the transformation of industry through the intelligent networking of machines and processes with the help of information and communication technology (ICT).

Industry 4.0 will enable more transparency regarding production performance, such as energy use and waste generation.

Circular business models for materials, components and full products

Due to Circular economy trend, circular business models should be implemented and adjusted in companies and thus more data from producers will be needed and more data need to be supplied to customers due to circular economy.

Life Cycle /Supply chain resilience

Some unexpected external events (pandemic, any conflicts between and inside countries) and the ability of a supply chain to handle and response to these risk events induce industries to provide and have much better LCA data (is known as supply chain resilience). A resilient supply chain can manage to respond and recover quickly to such disruptions by either returning to its original state or a more desirable one and increase financial performance.

Life Cycle/Supply chain resilience is not only about broken machinery and logistics, but also about wasteful resource management and sustainability and criticality risks.

Automotive industry’s shift from combustion to electric (shift to life cycle)

Specifically for the automotive industry, the tendency of shifting from combustion to electric vehicles create new life cycle data requirements due to batteries and other electric vehicle parts.

More advanced materials

There are reasons to believe that for example production or recycling of new (light weight or high performance) materials have different environmental life cycle performance that need to be considered when making material choices.

3.3 Potential ways forward for life cycle data acquisition and reporting

Here are specified potential vehicles for life cycle data acquisition and reporting so any kind of methodologies, tools and principles that can help to get better LCA data.

Industry 4.0 Digitalization (sharing production, product and logistics data over supply chains)

Any kind of digital technologies, such as Information of Material (IoM), blockchain*, Artificial Intelligence, Internet of Things can help to track the journeys of products, components and materials and make the resulting data securely accessible. Such advancements in technology can also help to foster sustainable supply chain initiatives that can maximize economic gains, reduce environmental impacts and contribute to social development.

* A *blockchain is a decentralized ledger of all transactions across a peer-to-peer network.*

Environmental product declarations

Any strategies or requirements related to Environmental Product Declaration (Product Category

Rules (PCR)), Product Environmental Footprint Category Rules (PEFCR)), European Committee for Standardization (CEN) such as e.g. CEN 15804 (CEN - EN 15804 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products), Carbon footprint or similar helpful methodologies and tools may be used as drivers for supply chain data acquisition.

Material Flow Cost Accounting (MFCA) 14051, 14052
Material Flow Cost Accounting is the method that can be used by to help and improve the material efficiency of businesses and can be used to both material efficiency and to find gains from sharing environmental data with suppliers. ISO 14051:2011 Environmental management — Material flow cost accounting — describing the General framework of MFCA and ISO 14052 Environmental management — Material flow cost accounting — provides guidance for practical implementation of …. in a supply chain. To increase efficiency and decrease costs, methods like MFCA can be used to both material efficiency and to find gains from sharing environmental data with supplier (Tier 1, 2, 3 etc.).

Scope 3 (based on scope 1/scope 2 and requirements)
Scope 3 (ISO 14067) Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification of Carbon footprint of products may be considered as chains of Scope 1/Scope 2 data (ISO 14064-x), with the addition of correct allocation.

Science based targets (SBT)
Science-based targets provide companies with a clearly defined path to reduce emissions in line with the Paris Agreement goals (sciencebasedtargets.org).

International Material Data System (IMDS)
The International Material Data System (IMDS), the automobile industry's material data system, that works as a sector common data exchange between suppliers and automotive Original Equipment Manufacturers (OEM) (mdsystem.com).

International Dismantling Information System (IDIS)
International Dismantling Information System (IDIS) is an information system for dismantling of End of Life Vehicles (ELV). It covers more than 70 international automotive manufacturers in 31 languages (Idis2.com).

3.4 Obstacles to sharing LCA data

This section summarizes a draft interpretation of why LCA-data acquisition is not yet sufficiently solved in industry. The draft is not complete but gives some indications.

- Lack of understanding of LCA and life cycle data
- Investment costs for solutions have not been compared with benefits from having solved the challenges.
- LCA data has relatively low priority and has not had a strategic value.
- The investments that have been made to solve the challenges with harmonizing and standardizing life cycle data collection throughout and across industrial sectors and value chains have not been enough. Either they have been too geographically local (Sweden, Japan, Korea, etc.), too narrow in view life cycle methodology (such as ILCD (EU International LCA Data network), lacking in business and industrial perspective and operations (such as GLAD (UNEP Global LCA Data Access network), or combination of these.
- No benefit from sharing LCA data and no punishment from not doing it.
- Sensitive business data or trade secrets may be revealed if detailed sustainability data is shared openly.
- Business risk to have bad performance and do not want to reveal it.
- Lack of good methods and/or competence for acquiring and updating data in each organization throughout supply chain
- Methodological difficulties with requesting and exchanging LCI production data, with regards to allocation, recycling, cut-offs, correct time averages.
- LCI data is not well integrated in other business data exchange and reporting schemes.
- Different structures and nomenclatures for data in different sectors and organizations.

3.5 Different initiatives

Catena X
Catena-X sees itself as a rapidly scalable ecosystem in which all participants in the automotive value chain participate equally. The goal of the initiative is to provide an environment for the creation, operation and collaborative use of end-to-end data chains along the entire automotive value chain (catena-x.net).

Drive@Sustainability
The vision of Drive Sustainability initiative is to lead the transformation towards a circular and sustainable automotive value chain (drivesustainability.org).

Science Based Target Initiative
The Science Based Targets initiative (SBTi) drives ambitious climate action in the private sector by enabling organizations to set science-based emissions reduction targets according to the Paris Agreement goals (sciencebasedtargets.org).

Trace4Value
The Trace4Value: Traceability For Sustaiable Valuechains research projects on data exchange for circular economy that brings together partners from several industries to tackle the complex challenge of sustainable system transformation and the shift to climate-neutral and circular production with resource-efficient and resilient value chains (trace4value.se).

Internet of Materials standardization
The Internet of Materials standardization is a standardization initiative from RISE Research Institutes of Sweden and Swedish Institutes for Standards (SIS) to establish sector independent data exchange and

material/product traceability (diva-portal.org).

TraceMet
The project TraceMet – Traceable metals for a sustainable future aimed to demonstrate how to trace materials and forward sustainability information from mining to OEM using blockchains (svemin.se).

CERA - EU project
The project CERA Certification of Raw Materials intended to develop how to certify mining and trace materials and forward sustainability information from mining to later life cycle stages by the use of blockchains (eitrawmaterials.eu).

Aluminium stewardship initiative
The initiative is a system to certify statements and take life cycle responsibility of a material category (aluminium-stewardship.org).

3.6 Industry's experiences and literature review summarises problems to solve

It is understood that life cycle sustainability data is used for many different purposes in industry, in basically all sectors and companies. But the acquisition and handling of data has been given a very limited interest with regards to technical or administrative development. Most of the data work is made manually, which has many weaknesses, such as:

- Very time consuming and requires much expert competence.
- The existing formal standards are seldom utilized, and instead a number of different software and standard formats compete with a multitude or creative solutions, making the work very complex and unstable.
- Lack of standard compliance and the consequential misunderstandings leads to insecurity, errors, and consequential lack of trust in the data.

4. Current situation and future needs

4.1 Current situation

The studied companies all have some, but to varying extent, collection of environmentally relevant performance data for their operations and value chains. The rationale for collecting data comes from several different origins and serve different purposes. The main drivers for compiling life cycle relevant data are both internal and external and sometimes a mixture of the two:

Life Cycle Assessment (LCA) is for most operators an approach to learn about their own role in the value chains and to gain understanding of the hot spot in the life cycle of their products. Frequently, this is used for internal product development purposes, e.g. for material choice, and dialogue with suppliers of main material types.

Environmental Product Declarations (EPD) is a specialized form of LCA intended for external communication. Some companies have long experience in doing and issuing EPD and EPD generation is an integrated part of the information management work related to product performance communication.

Science based targets initiative (SBTI) has become an important driver recently. SBTI is an initiative which allows companies to benchmark their performance to their peers while still maintaining a certain level of non-disclosure on detailed level. Being a member and following the protocol is considered giving an appropriate structure for managing performance data (so far on climate aspects) and also a brand-strengthening factor. The data collection follows the GHG protocol.

CDP Disclosure Insight Action (initially Carbon Disclosure Project) is similarly to SBTI an international collaborative effort within which companies can commit to certain goals and actions. Being a member is considered a brand-strengthening factor, but in addition gives access to other members' disclosures, which may provide information to one's own value chain performance assessment.

Traceability and Recycled content. While many drivers are related to climate aspects, there is also a significant drive to keep track of upstream value chains from a traceability point of view, for which the business ethics dimension is important, e.g. to track potentially contentious upstream suppliers, for which also legal requirements are important. When following the value chains upstream, it also provides the basis to track the recycled content in the final product.

The relative importance of one driver versus another is different form company to company. One aspect that forms a structural difference is the company's location in the value chain. Business-to-business (B2B) companies will have, at least slightly, different drivers and rationales for data collection.

Table 1 outlines a few common and diverging practices relating to ongoing data collection in companies.

Table 1. Main aspects and their common or diverging practices relating to ongoing data collection in companies.

Aspects considered	Common practices among companies	Diverging practices
Data from own operations	Collected on plant level	Monitored/Collected on product /activity level
Data from suppliers	Collected for some, focus on most prominent materials, e.g. steel Generic data to complete LCA or footprint	Few selected, vs many Using external agent as data host and manager
Integration of data collection across sustainability aspects (economic, environmental, social)	Not much implemented Not seen as very convenient or even possible	Different opportunities depending on company

4.2 Anticipated future needs

A common opinion among the interviewees is that the requirements for data will increase in the future. The speed of this increase varies significantly. Clearly, there is also a drive to minimize the effort to collect data. It could be formulated in a way to say that collection and application of sustainability data is predominantly a hygiene factor, and not a marketing advantage factor. Exeptions exist but are relatively rare. In our discussions with companies, this has been formulated, among others, in the following way:

- ”Complete CO2e emissions for every product needs to be ready soon to meet demand”
- “would be amazing to be able to get, in an easy way, data from suppliers, in a system, and verified”

A way of illustrating this development towards more data at less effort is depicted in Figure 1.

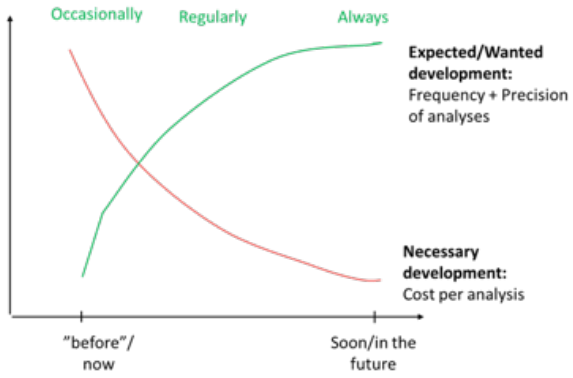


Figure 1. Illustration of the increased need of data at less effort.

5. Vision of efficient LCA data collection from suppliers

In 2026 the roadmap towards content and scope of their globally harmonized LCA data management lay clear for companies with a "sustainability forefront" ambition. This will imply that those companies have sufficient confidence in their decision making, disclosures and strategies concerning the sustainability impacts of their products and operations over their value networks.

To reach the vision the following activities are needed

1) Synergies and relationships

A better understanding is needed of ongoing activities influencing the way of working with Life cycle assessment and life cycle data. Stronger relationships need to built with important initiatives to acquire knowledge, to contribute and to impact.

2) Value-creating and cost-effective data management

A better understanding is needed about how LCA data is used in decision making activities and in disclosure requirements within the companies and of what different data requirements these uses imply.

3) Harmonization and standards

To achieve effectiveness and credibility a harmonized way of data sharing is needed within the LCA fields, including for example different upcoming footprints and circular economy related requirements.

6. What is needed to get there?

Several pieces need to be at place for effective environmental data handling. These pieces are described above and they need to be made to fit together in proper ways.

Inside companies one may start with identifying which **type of data** is necessary for different activities, such as primary data or data found in databases such as Ecoinvent. What data is needed for Environmental Product Declarations, environmental labeling, sustainability reporting, LCA for comparing different material in a product development phase etc. The last activity can for example connect to comparing different suppliers of material, then of course primary data is of utmost importance.

Along value chains one may start to investigate **how to collect** primary data from suppliers and how to act as supplier when data is requested, in which forms and in which formats. Here many alternatives exist, from the simplest forms of questionnaires, such as excel sheets to more advanced digitalization efforts to support design, manufacturing and even AI solutions for enhanced decision making. Many of these solutions exist in other parts of the companies and should be investigated if they can be of help here as well. This also connects to **communication** within the companies and also with the suppliers so that they understand which data is needed. Here also **future environmental data** must be considered, not only carbon footprint, for example recycled materials content, water footprint, land use, toxicity and other impact categories as well as data for social impact.

In parallel the legal platform is already existing and new legislation is continuously being developed. This may both set additional requirements, as well restrict both contents and forms of data.. What **directives and legislation** are coming where new data is needed for sustainability analysis and decision taking on product development for sustainability?

The continual monitoring of **ongoing and finished research projects/initiatives** concerning data collecting and certification is also needed. Also the possibility for **standardization** is important to investigate and here already standards in other areas might be of help. Through standardization the obstacles around data gathering as also described above might be overcome.

7. Results and solution options

The project has come up with three target areas of the utmost importance to continue working on to move towards a more efficient LCA data flow along the value chain.

7.1 Synergies and relationships

There are several different initiatives and forces that totally or partially, and directly or indirectly affect the development towards the expressed vision. In order to make maximum use of synergies and to avoid duplication and disagreement, such initiatives need to be identified and analyzed and, if necessary, relevant relationships established. Examples of what is going on now are Catena X, Drive @ Sustainability, the EU's work with Digital Product Passports, the development of the forthcoming ISO standard ISO 59040 Product Circularity Data Sheet (PCDS), Science based target initiative (SBTi) and others.

7.2 Value-creating and cost-effective data management

Based on the practical insight that each player in the value chain has its own relationship to how LCA data is used within its own organization and by whom, there is a need to build a value-creating and cost-effective management for production and compilation of such data.

'Value creation' means focusing on how each individual player in the value chain can benefit from LCA data management, through their own decision-making or by assisting stakeholders in better decisions. 'Cost-effective' means increasing the understanding of what data and what data quality is needed for different types of decisions and reporting and optimizing this for a good balance between actor and system level. This work will need to challenge existing ways of looking at LCA and life cycle data, which is why we believe that an innovation process will be needed in this step.

The result of this work is a description of clear and unambiguous working methods and checklists, with the aim of being able to cerate knowledge and spread the knowledge in the form of webinars, web video guides and reports and 'guidelines'.

7.3 Harmonization and standards

Based on the synergies and relationships that are created, and with a focus on value-creating and cost-effective working methods, establish and methodically disseminate formal standards required to exchange data along value chains. The focus is on which data is relevant, what this data means, how data is to be named and documented, and what requirements are placed on data verifiability*.

The Swedish Life Cycle Center (formerly CPM) has an early methodological history of strategically and effectively contributing to the development of international standards for LCA data management, including the collection of LCA data in the value chain. Two formal international standards have been developed for this work, ISO 14048 - Data documentation format (technical format to facilitate data sharing) and ISO 14033 - Quantitative environmental information (framework for easy production of verifiable environmental / LCA data). In addition, over the years a large amount of knowledge contributions have been made to the design of e.g. the commercially available LCA database Ecoinvent, to the official European data format International Reference Life Cycle Data System (ILCD), to UNEP's Global LCA Data Access Network (GLAD), and to method reports on LCA data generation/production and sharing.

** ISO 14065: 2020 General principles and requirements for bodies that validate and verify environmental information.*

7.4 Expected outcomes

An implementation project could give the following expected results and outcomes for participating companies and support their work towards strategic sustainability targets and meet the internal and external requirements of sustainability performance and transparency.

- Better understanding of ongoing initiatives and learn from other.
- Impact and support ongoing international initiatives.
- Identify synergies where LCA data can be managed.
- Better understanding of which data needed for different types of decisions/functions within the company.
- Better relationship and communication with suppliers with increased trust, collaboration and knowledge exchange.
- Better internal communication and management of LCA data.
- Clear and harmonized way of sharing data (guidelines, documentation, communication).
- Better prepared for an increased interest and demand of LCA data.
- Better insights in requirements for data sharing systems for real time data, verification, confidentiality).

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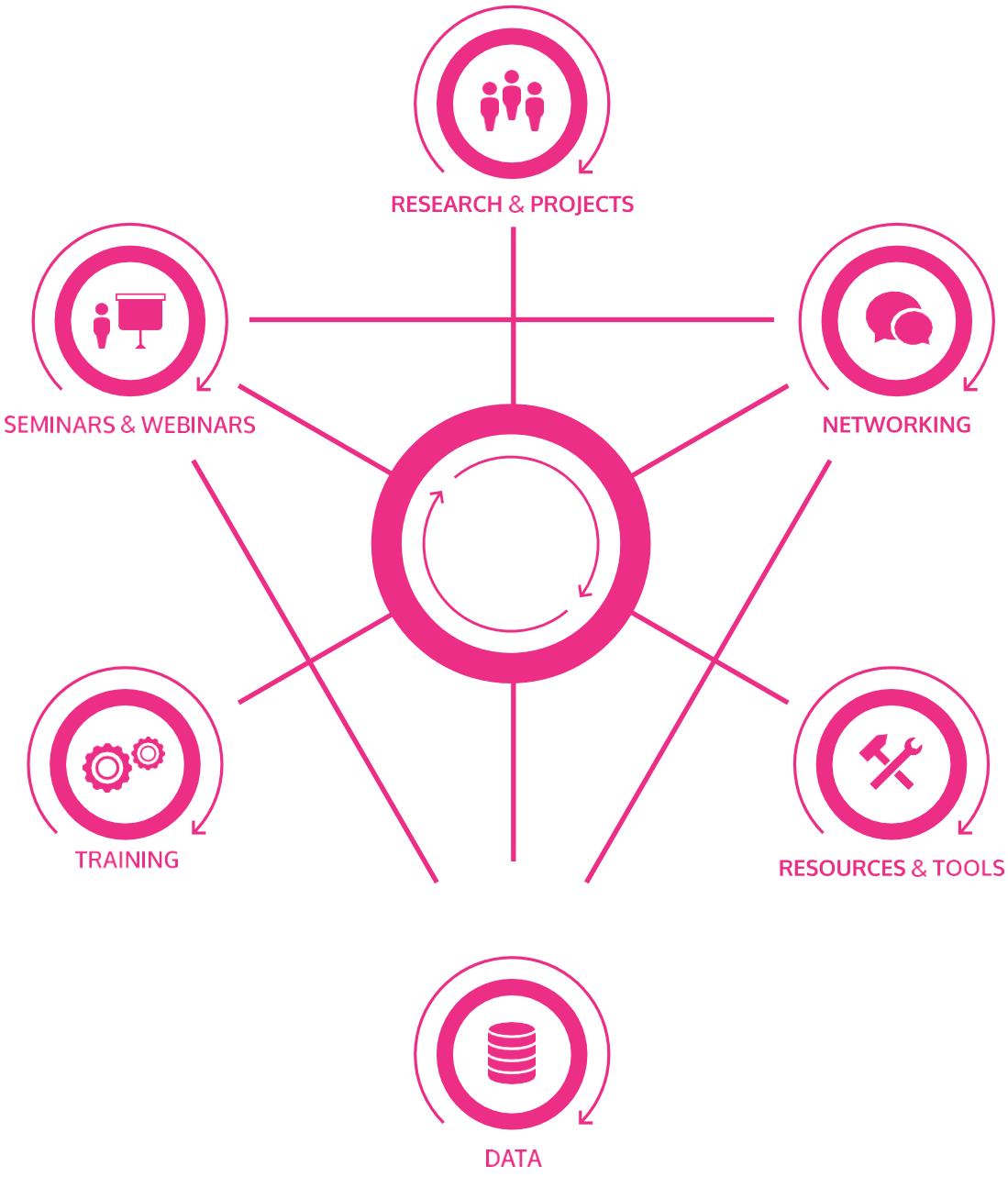

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