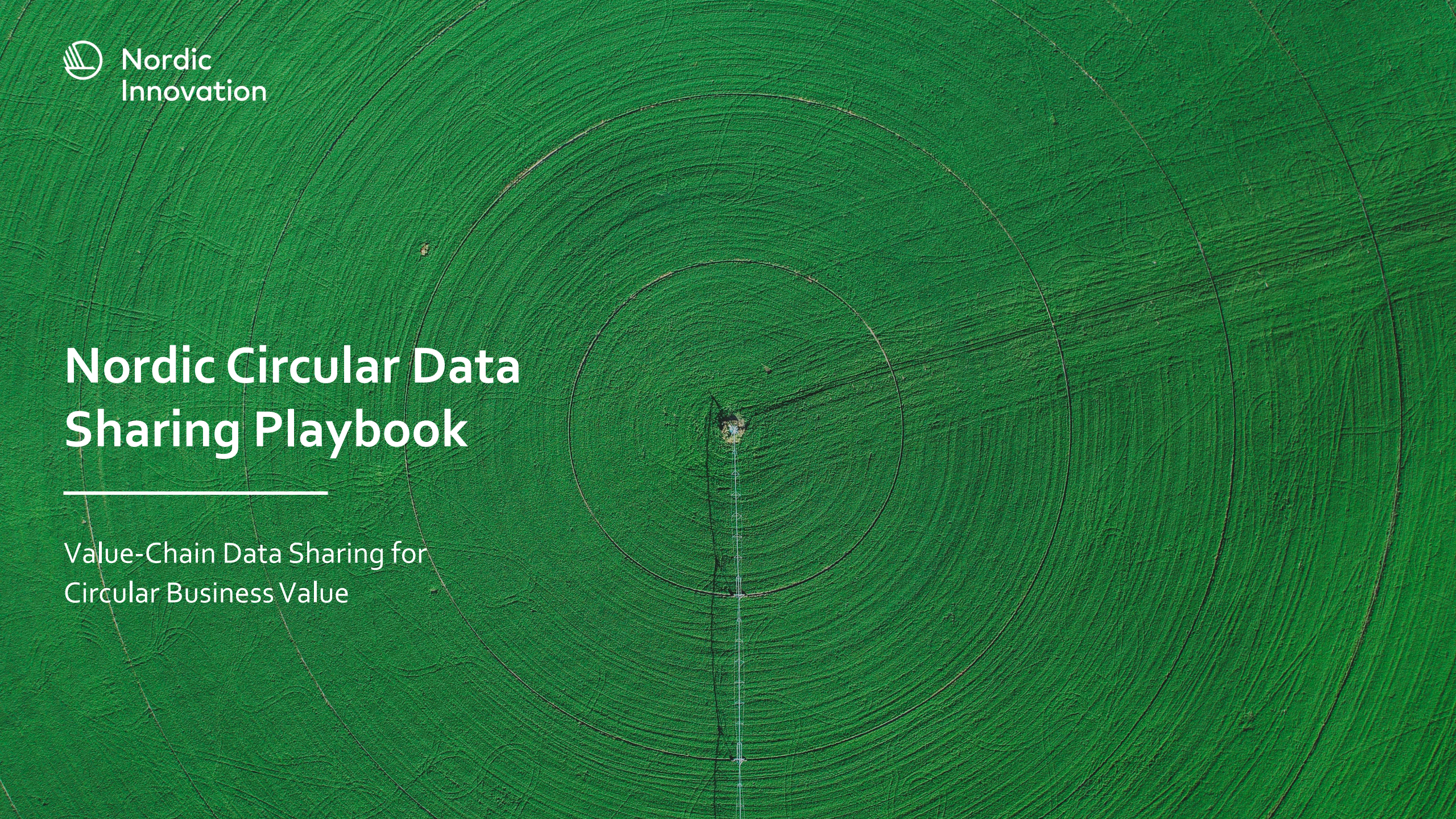
Nordic Innovation

Nordic Circular Data Sharing Playbook

Value-Chain Data Sharing for Circular Business Value



Introduction to the playbook

The traditional "take, make, waste" approach of production and consumption offered by the traditional linear economy is unsustainable given the fast-rising consumption rate and declining resources. **The circular economy redefines the concept of waste as a valuable resource – offering a sustainable alternative.**

To realize the potential of circular economy, businesses need a deeper understanding of their value chains – and this requires collaborative data efforts. While companies can optimize their operations individually, only systemic data sharing can scale circular solutions and realize their full value.

This playbook serves as a comprehensive guide on circular data sharing. It is primarily designed for Nordic businesses, providing practical guidance and inspiration for organizations at **different stages of their circular transformation**—whether they are just beginning to explore data-driven strategies or looking to scale collaborative data-sharing ecosystems.

The Playbook builds on insights generated in the **Nordic Circular Accelerator** – a one-year program led by **Nordic Innovation** and **Accenture.** The program brought together **key industry players, subject matter experts, and solution providers** to provide Nordic businesses with the tools, knowledge, and strategies to leverage data sharing as a key driver of circularity. Accenture is responsible for the content of the Playbook and multiple of frameworks introduced herein.

"This playbook is a **toolkit for your company** and your business partners to **boost circular business development by effective data sharing**."

– Hanna Törmänen, Nordic Innovation

"The circular economy is not a distant ideal, but a **natural extension of our goals** for efficiency and waste reduction. By democratizing data, removing uncertainty, and fostering cross-functional collaboration, we can **transform ecosystems, uncover core opportunities**, and drive sustainable change together."

– Anna B. Töndevold, Accenture

Key input providers to the playbook

The Nordic Circular Accelerator Program was conducted with 10 selected collaborations, spanning a diverse range of industries, with a strong presence in manufacturing, textiles, and construction.

These collaborations explored various use cases for data sharing across the value chain, from circular design and sustainable inputs to resource efficiency, recovery, and Digital Product Passports.

This playbook features detailed case studies, showcasing key learnings and best-practice examples from these collaborations – in addition to best practice examples from the industry.

Additionally, industry experts and public sector leaders contributed with valuable insights to the playbook, covering Data & Technology, Innovation, and Finance, ensuring a comprehensive approach to circular data sharing.

Nordic Circular Accelerator participants

Axfoundation, Filippa K, GS1 Sweden
Industry and circular use case: Textile I Traceability, Resell Business Model

Grundfos and Danfoss
Industry and circular use case: Manufacturing I Circular Design, Product Use Extension, Circular Metrics & Measurement

CGI, Fujitsu, Cisco Systems, Thales Group, Netapp, Lenovo, 3stepIT
Industry and circular use case: Electronics, Energy I Circular Design, Product Use Extension, Traceability

IOXIO, SIX Mobile Work Machines cluster, Sandvik, Kalmar
Industry and circular use case: Manufacturing, Battery, Logistics I Traceability

Telia, Eltel, Transtema, Ericsson Connected Recycling and Boliden
Industry and circular use case: Telecommunications I Traceability, Resource recovery

Mirka, [Kierto, Suomen Erityisjäte]
Industry and circular use case: Manufacturing I Traceability, Resource Recovery

SKF AB, Sandvik Coromant, Wolfram
Industry and circular use case: Manufacturing I Product Use Extension, Resource Recovery

Sogn Biohub (Sogn Næring, Sogn Utvikling, ViteMeir, Simas, Lerum, Sogn Grønt, Sogndal kommune, Balholm AS, etc.)
Industry and circular use case: Bioindustry I Circular Design, Product Use Extension, Resource Recovery

Vattenfall, KTC, Uppsalahem, Region Uppsala, Akademiska hus
Industry and circular use case: Construction, Energy I Resource Efficiency & Optimization

FREYR Battery, Cognite
Industry and circular use case: Battery I Traceability, Product Use Extension, Circular Design

Other key input providers

- Hanna Törmänen, Nordic Innovation
- Marthe Haugland, Nordic Innovation
- Peter Munch-Madsen, Nordic Innovation
- Anna B. Töndevold, Accenture
- Trygve Lie, Accenture
- Wesley Spindler, Accenture
- Isabel Rath, Accenture
- Karoline Landbo, Accenture
- Miodrag Mitic, Accenture
- Joshua Curtis, Accenture
- Angela Soh, Accenture
- Sofia Broderick, Accenture
- Staffan Olsson, GS1
- Heikki Aura, Sitra
- Catherine Barth, Nordic Circular Hotspot
- Markus Bjerre, Danish Business Authority
- Conny Svensson, AI Sweden
- Petra Hakamo, Evli
- Dagur Ingi Olafsson, IceTec
- Iben Kinch Sohn, Dansk Industri
- Ida Langborg, Vinnova
- Michael Hanf, VTT
- Christian Hudson, GIZ

Contents in this playbook

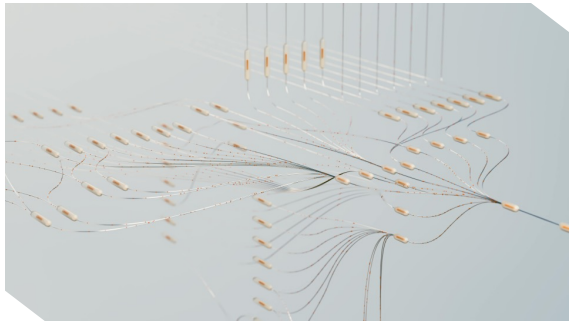
1 WHY

Why should businesses share data across the value chain?

Are you new to value chain data sharing?

Then click here to explore:

- The challenges of linear business models and the shift towards circularity
- The role of value chain visibility and data-sharing ecosystems to enable circularity
- Key business value drivers and opportunities to unlock through data sharing



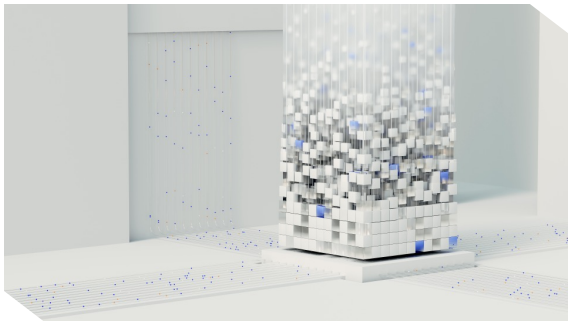
2 WHAT

What use cases for data sharing exist and what type of data to share?

Do you want to learn about what data to share?

Then dive in here for:

- An introduction to circular data-sharing use cases and how they drive impact, i.e.,
  - Digital Product Passports
  - Resource Efficiency & Recovery
  - Product Use Extension & As-a-Service Business Models



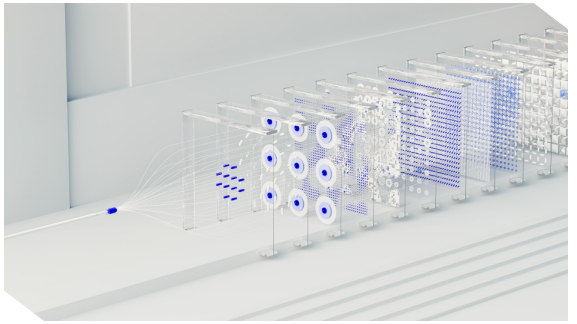
3 HOW

How to build the right capabilities and kick-start a circular data sharing journey?

Do you want to build a data sharing ecosystem?

Find guidance, tools and exercises in the toolkit here:

- An Interactive maturity assessment to evaluate readiness
- A step-by-step guidance with tools, frameworks and exercises to develop the required capabilities for your maturity level



1

WHY SHOULD BUSINESSES SHARE DATA ACROSS THE VALUE CHAIN?

"

To drive circularity, we need to foster collaboration, data sharing, and transparency across the value chain. Then we can reduce environmental impact, optimize resource utilization, and advance sustainability.

– Ericsson, Nordic Circular Accelerator participant

KEY TAKE-AWAYS FROM THIS CHAPTER:

1. **Traditional business models need to be replaced by circular thinking** – to future-proof businesses, value creation must be redefined and disconnected from consumption

2. **The new business reality requires end-to-end value chain visibility** for businesses to make informed business decisions and move the needle on sustainability efforts

3. **With end-to-end visibility companies will understand the impacts, risks, and opportunities for change in their supply chain** – they will know what their value chain truly looks like

4. **End-to-end value chain visibility cannot be achieved in silos** but requires value chain actors to come together in data sharing ecosystems to share circular data and drive systemic change

5. **The winners will be the boundary-less enterprises who collaborate across the value chain** to reap the benefits ranging from regulatory compliance to optimizing the business and generating growth

Traditional business models in transition - there will not be sufficient material supply to meet demand in a cost effective and sustainable way

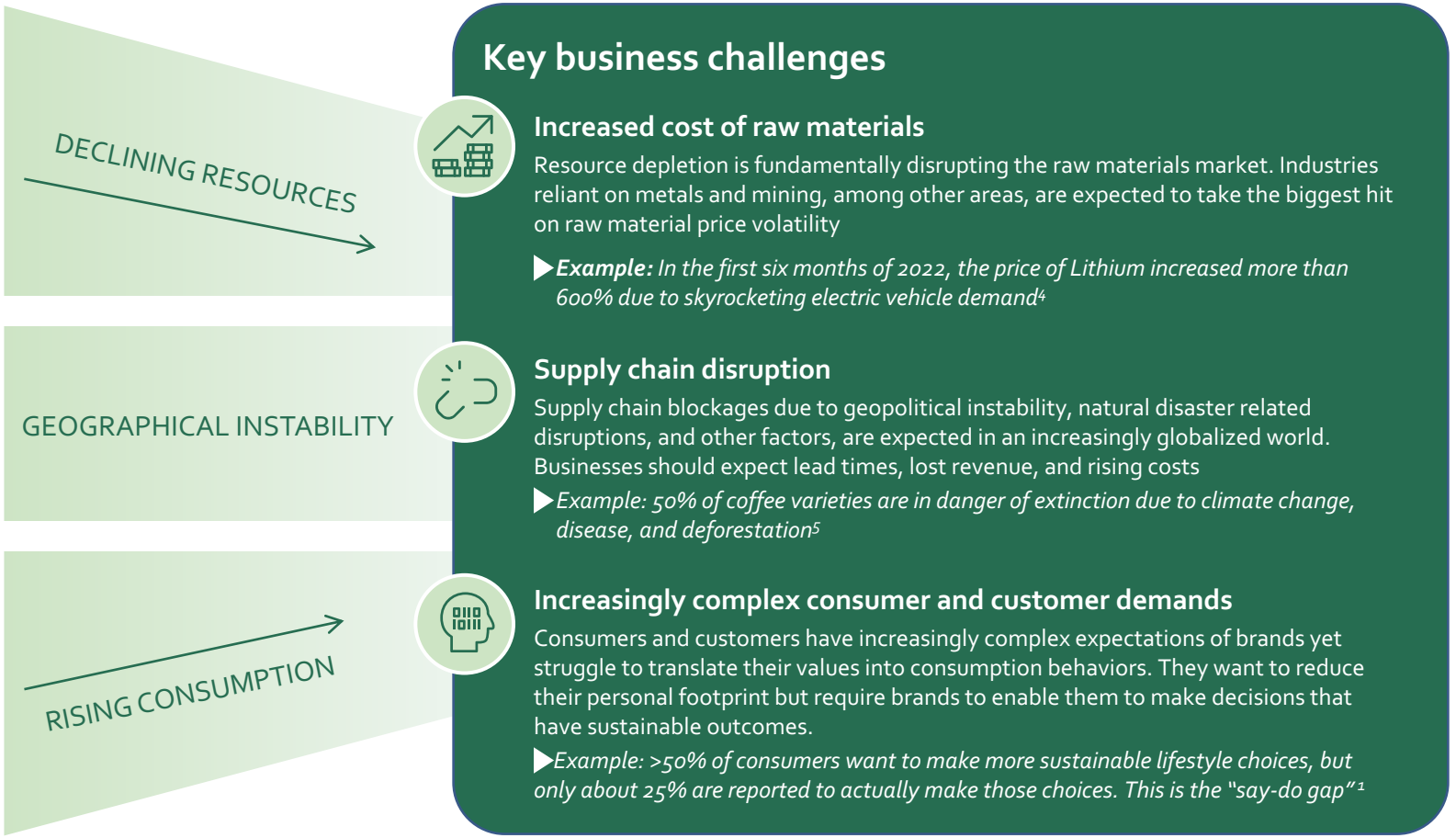
Humanity is consuming 60% more resources than Earth can sustain[1]. This is bad behavior, but it is also bad business.

Human consumption is growing at almost unprecedented rates, and we now consume twice as much as we did during the 'Great Acceleration' after World War II[1]. And the growth is expected to continue. In 2050, material extraction and use are expected to double relative to 2015 levels. Without strategies to reduce the amount of material we use and products we consume, the UN has warned of 'total societal collapse'[1].

This negatively impacts our planet and wellbeing. Additionally, it is damaging to business.

We are facing high price volatility in raw materials, supply chain disruptions, and unmet market demand. Additionally, there is increased geographical instability, affecting our supply chains[2].

Traditional business models are no longer effective. Companies need a new approach for cost-competitive resilience to redesign value chains while maintaining their competitive advantages[3].

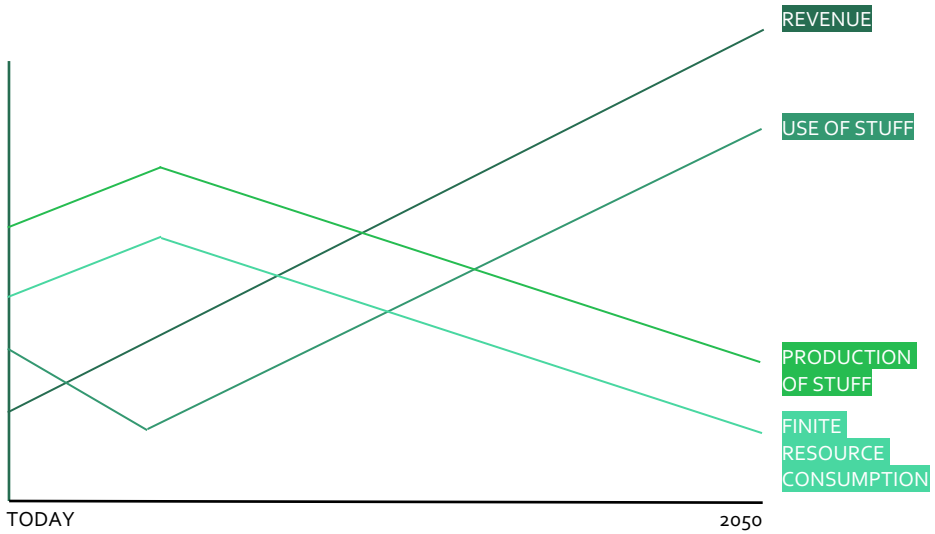


Sources: [1] Accenture Research; [2] WEF (2025), Global Risks Report 2025; [3] Brookings (2022), A data-sharing approach for greater supply chain visibility; [4] International Energy Agency (2022), Global EV Outlook 2022; [5] WEF (2019), Many coffee species are threatened with extinction

We need to redefine value creation, disconnecting it from consumption

To future-proof businesses, it is necessary to redefine value creation and disconnect it from consumption. This involves reconsidering traditional value chains and the methods used to deliver products and services. It involves adopting circular thinking.

In a circular economy, the money flows without the production of net-new products (and the baggage that comes with it). This approach allows us to meet people's needs using only 70% of the materials we currently use [1]. By reducing the use of virgin materials, producing cleaner products, prolonging the product lifecycle, and using materials again, we can decouple economic value from consumption. **This will not only drive sustainability impact but create business value.**



Value drivers in the circular economy[1]

Lower costs
- Designing leaner products
- Sourcing non-virgin materials
- Improving forecasting to reduce unsold products
- Producing more efficiently

New sources of revenue
- Brand differentiation and market share
- Premium pricing in some industries
- Monetization of waste and by-products

VALUE ADDITION

e.g., $500B value addition through lean design, sourcing circular materials, improved forecasting, and efficient production[2]

New markets
- Alternative products (e.g. EVs in automotive)
- Alternative services (e.g., as-a-service offerings)
- Platforms (e.g., second-hand markets)

VALUE MIGRATION

e.g., $400B value migration driven by growth in alternative products and secondary markets[2]

Sources: [1] Accenture Research; [2] Accenture (2020), The Circular Economy Handbook: Realising the Circular Advantage; Nordic Innovation & Accenture (2021), Nordic Circular Economy Playbook – Circular business models for the manufacturing industry

End-to-end visibility of value chains powered by collaboration on data is essential to drive systemic change and transformation

Illustrative

This new business reality requires end-to-end value chain visibility.

To enable a circular economy, we must first understand our value chains—and that requires collaboration on data. No company has full visibility across the lifecycle of materials, products, and impacts. By sharing data on material flows, product performance, and emissions, value chain partners can drive systemic progress together.

Design & Sourcing

How might we leverage value chain data to optimize design decisions for business & environmental impact?

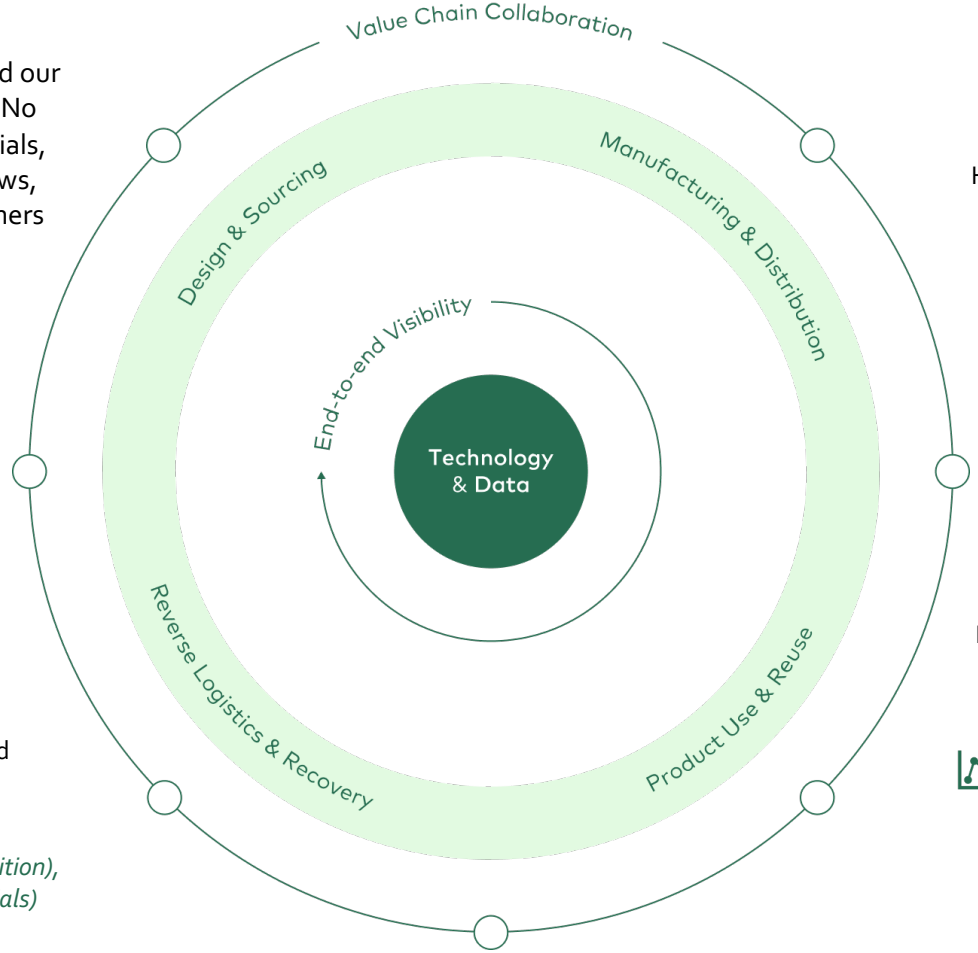
How might we transition away from virgin, non-renewable materials cost competitively?

Data examples: *Environmental impact and carbon footprint data (e.g., LCA), product & lifecycle data (e.g., product lifespan)*

Reverse Logistics & Recovery

How might we collaborate to recover and use the embedded materials or energy at the end of a product's use?

Data examples: *Recovery data (e.g., end-of-life return options), product & material data (e.g., material composition), secondary demand data (e.g., pricing for recycled materials)*



Manufacturing & Distribution

How might we maximize value while minimizing waste in production/ manufacturing?

How might we work with suppliers to source materials that focus on utilizing resources as long as possible?

Data examples: *Waste & residual material data (e.g., waste classification), product & material data (e.g., material composition), production data (e.g., energy use)*

Product use, Reuse & Service

How might we design, implement, run and scale profitable innovative business models such as resale, rental, and repair in collaboration with other value chain actors?

Data examples: *Performance data (e.g., usage & product condition data), warranty & service data (e.g., product ownership), maintenance & repair data (e.g., repair history)*

Sources: Nordic Innovation & Accenture (2021), Data Sharing for a Circular Economy in the Nordics

Regulators try to incentivize value chain collaboration, but proactive business engagement is needed to move the needle

Non-exhaustive

European regulators are pushing for end-to-end visibility and data sharing. But it is not enough.

Sustainability cannot be achieved in silos, and European regulators are enforcing laws to ensure cross value chain cooperation and data sharing. These mandate companies to report ESG data, product lifecycle information, and traceability details based on supply chain data. As an example, ESPR's Digital Product Passport (DPP) is a digital identity card for products, tracking information from materials used to repairability at the end of use.

Achieving these disclosures is difficult – and impossible without value chain collaboration and data sharing. Yet collaboration is often hindered by competition, lack of standardized systems, and limited resources, making companies hesitant to share data. **Companies must be proactive and facilitate the end-to-end transformation of the value chain—ensuring consistent implementation across the industry in the face of ever-evolving regulations.**

EU regulation[2]	Description
Corporate Sustainability Reporting Directive (CSRD)	Requires companies to disclose information on their environmental, social, and governance (ESG) impacts to enhance corporate transparency and accountability
Corporate Sustainability Due Diligence Directive (CSDDD)	Requires companies to report on how they identify, assess and mitigate social and environmental risks across the supply chain
Eco-design for Sustainable Products Regulation (ESPR)	Requires companies to report on a product level to ensure that products sold in the EU meet certain sustainability criteria
Digital Product Passport (DPP)	Requires companies to adopt digital product passports – a digital identity card for products, components, and materials, to store information supporting products' sustainability
EU Battery Regulation & Battery Passport	Require batteries sold in the EU to meet sustainability, safety, and recycling standards while ensuring traceability through a digital record
Extended Producer Responsibility (EPR)	Requires producers to take responsibility for the entire lifecycle of their products to minimize environmental impact and promote circular practices
EU Deforestation Regulation (EUDR)	Requires companies to ensure that products like soy, palm oil, beef, and timber sold in the EU do not contribute to forest degradation

Data sharing incentive

To comply with current and future EU regulations, companies are required to collaborate across the supply chain to collect and disclose relevant environmental, social, and governance (ESG) data, product lifecycle information, and traceability details – both on a corporate level (e.g., CSRD) and on a product level (e.g., DPP). These regulations are accelerating the need for companies to digitalize systems and share data across organizational boundaries. The data sharing can also be used to create additional business value.

Sources: [1] Sitra (2024), Data-driven competitiveness; [2] European Commission

The winners in this new reality are boundary-less enterprises, that collaborate across the value chain to optimize and grow their business

The value realization cannot be achieved by individual companies alone – a complete value chain reinvention and cross-company data sharing will be required.

Companies must move away from the "four walls mentality" that hinders both internal and external data collaboration, or they will fall behind those who embrace agility and ecosystem approaches[1]. In circular data-sharing ecosystems, networks of organizations collaborate and partner to create an enabling environment for collective transformation, making it possible for entire value chains to progress towards more resilient, sustainable, and financially viable systems.

Delivering on this potential requires a fundamental shift in mindset—moving from maximizing short-term profits to enhancing long-term value; and from relying solely on internal R&D to embracing open innovation and data sharing.

Ultimately, the boundaryless enterprise will outperform the rest—everyone has a piece of the puzzle, and progress depends on collaborating on data across the value chain.

"Circularity calls for a transformation that requires us to stop solving issues as isolated islands but partner up and embrace the challenges together."

– Grundfos, Nordic Circular Accelerator participant

Aspirational Case in Point: Kalundborg Symbiosis

Kalundborg Symbiosis is an industrial symbiosis project located in Kalundborg, Denmark, and is the first industrial symbiosis in the world with a circular approach to production.

In a network of 17 companies, the residual flow in one company becomes a resource in another – benefiting both the environment and business financials.

The project aims to create a circular economy by leveraging data sharing to optimize resource utilization, reduce waste, and promote collaborative practices among participating industries.

Every year the symbiosis saves 4 million m^3 ground water, 586.000 tons CO_2 and 62.000 tons of residual materials are recycled.

Sources: [1] Accenture Research

Successful corporations will not only comply with regulation, but unlock benefits from optimized operations and drive new growth

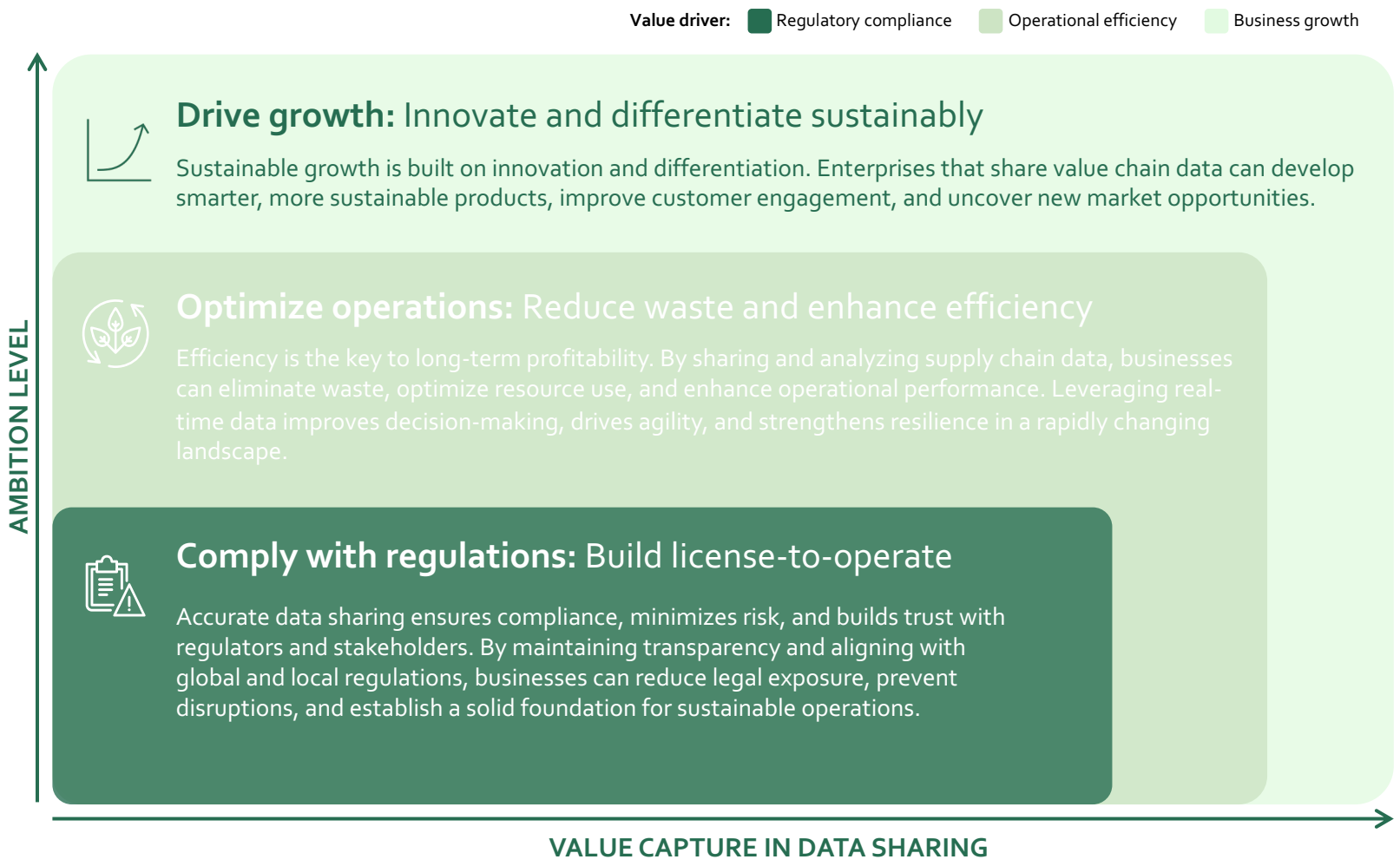
Organizations that embrace value chain data sharing unlock a spectrum of benefits depending on their ambition level and appetite for change.

By leveraging shared circularity data, businesses enhance transparency, optimize resource use, and build resilience in a rapidly evolving market.

At the foundational level, the key value driver is **regulatory compliance**. Aligning with global and local regulations through accurate data sharing helps mitigate risks, avoid fines, and build stakeholder trust.

As companies mature their circular data-sharing capabilities, **operational efficiency** becomes central. Access to real-time supply chain data enables waste reduction, better resource utilization, and agile decision-making.

At the highest ambition level, **business growth** is unlocked by using end-to-end data visibility to drive innovation, develop smarter and more sustainable products, and uncover new revenue opportunities.



2

WHAT USE CASES FOR DATA SHARING EXIST AND WHAT TYPE OF DATA TO SHARE?

"

Start your data sharing journey by identifying key use cases and the most valuable data for the entire value chain and product life cycle. Then move forward with practical proof-of-concepts generating business value for the entire ecosystem.

– IOXIO, Nordic Circular Accelerator participant

KEY TAKE-AWAYS FROM THIS CHAPTER:

1. **Circular data sharing ecosystems should be created around use cases** that drive real business and sustainability impact across the value chain

2. **This Playbook focuses on data sharing for three use cases within circularity** that were selected based on their widespread adoption in the Nordic region;

   - ✓ **The Digital Product Passports** aim at providing a complete digital record of a product (e.g., materials, recyclability) and requires actors to share data such as material composition, product carbon footprint, repair instructions, etc.

   - ✓ **Resource Efficiency & Recovery** aims to optimize the use and flow of resources in the value chain, and requires actors to share data such as resource usage, product lifecycle, waste material, secondary material demand, etc.

   - ✓ **Product Use Extension & As-a-Service Business Models** aim to extend product lifetime and optimize capacity use, and requires actors to share data such as product performance data, warranty and service data, recovery data, etc.

Data sharing ecosystems should be created around use cases that drive impact across the value chain

Non-exhaustive

A well-defined use case allows the data sharing ecosystem to work in a purposeful and focused manner, efficiently driving real impact and value.

Companies must identify value-driven use cases to guide them on who to include in the ecosystem, what data to share, and how to collaborate.

A use case is a systematic description of a situation in which a product or service is tested in practice and can help to understand the functional requirements[1].

A clear use case sets objectives, engages stakeholders by showing value, and ensures relevant data is shared.

This Playbook focuses on three circularity use cases:

- D **Digital Product Passports**
- R **Resource Efficiency & Recovery**
- P **Product Use Extension & As-a-Service Business Models**

The use cases were selected based on their widespread adoption in the Nordic region[2] and their potential to drive business value and enable regulatory compliance.

D Digital Product Passports

Digital Product Passports enable seamless sharing product data across the value chain to:

- Drive regulatory compliance with ESPR
- Enhance supply chain transparency
- Develop new services & revenue streams

R Resource Efficiency & Recovery

Data sharing of product lifecycle and material composition across the value chain to:

- Adhere to regulation on waste management, e.g., EPR
- Build resilient supply chains & reduce supply chain risks
- Generate revenue by selling recycled materials or residual waste

P Product Use Extension & As-a-Service Business Models

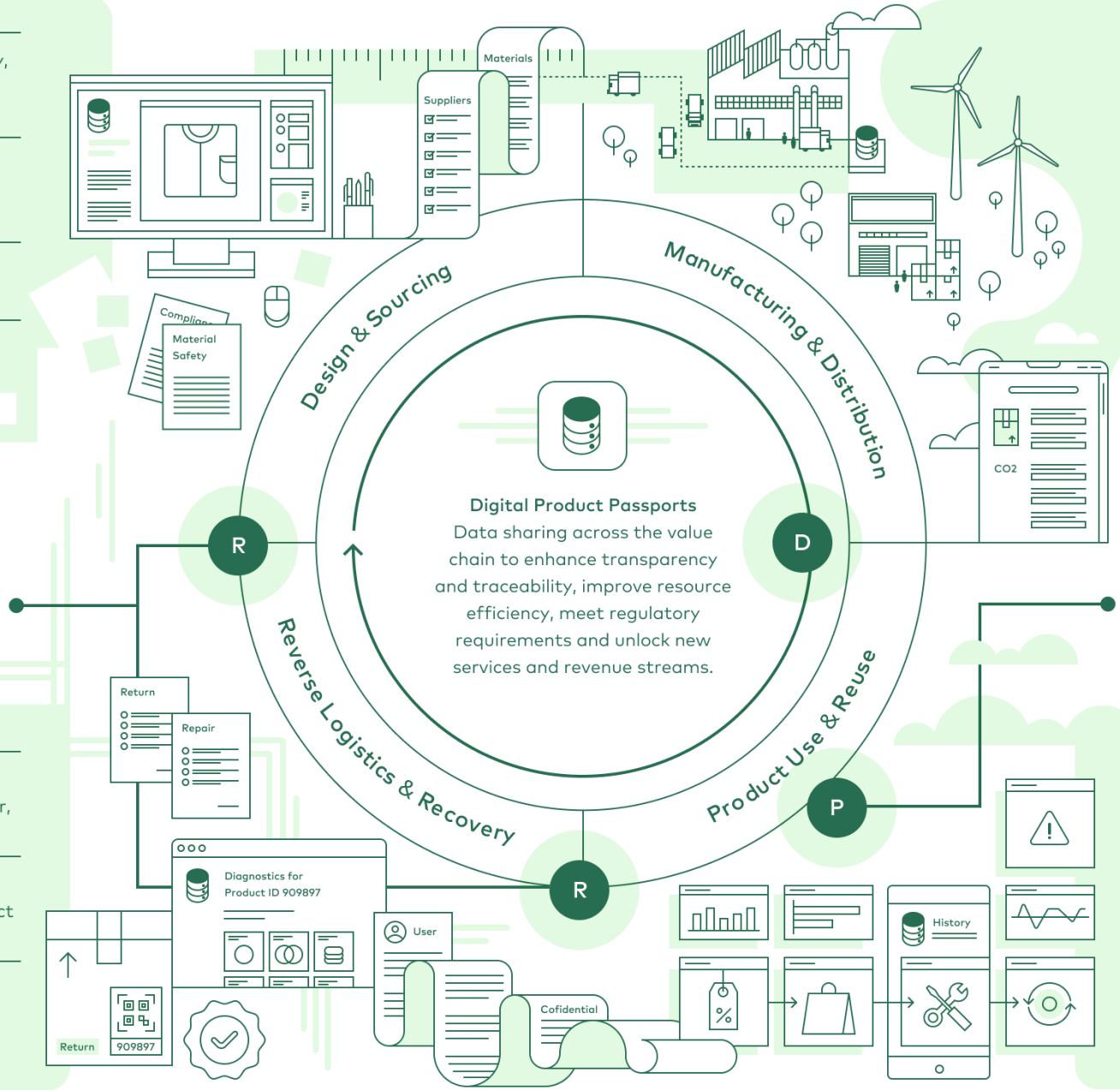
Data sharing of product and component performance data across the value chain to:

- Optimize a product's usage and extend through repairs and remanufacturing
- Provide upgrades and resale on secondary market

Sources: [1] Sitra (2024), Data-driven competitiveness; [2] Accenture Research

Value driver: Regulatory compliance | Operational efficiency | Business growth

Data Needs	Material origin, recyclability, quality, environmental impact etc.
	Supplier certifications and sustainability performance data
	Compliance and material safety documentation
Data Challenges	Harmonizing data from multiple suppliers



Data Needs	Material composition, specs, & emissions data
	Logistics & packaging optimization data
Data Challenges	Inconsistent reporting standards across production sites

Resource Efficiency & Recovery
Data sharing of product lifecycle and material composition to enable smart design, use of renewable inputs, and recovery of value from waste or by-products.

Product Use Extension & As-a-Service Business Models
Sharing performance data to optimize product use, enable repairs and remanufacturing, and support upgrades and resale in secondary markets.

Data Needs	Product condition and diagnostics for reuse, repair, or recycling
	Unique product IDs and traceability data for product return and collection
Data Challenges	Sensitive data linked to product usage or personal information

Data Needs	Maintenance and repair history
	Product usage and performance data (e.g. wear, failures)
Data Challenges	Limited visibility of product usage for correct upgrade, resell or repurpose

Digital Product Passports explained

Mandated by the EU Eco-design for Sustainable Products Regulation (ESPR), the **Digital Product Passport (DPP)** aims at providing a complete view of the product to ensure that:

- Actors along the value chain can easily access product information relevant to them
- Facilitate the verification of product compliance by national authorities
- Improve the traceability of products along the value chain and facilitate resource efficiency

DPPs can be introduced as 'Digital Product Labels' – a consumer-facing version that highlights key sustainability information, helping guide purchasing decisions through greater transparency.

VALUE DRIVERS

Regulatory compliance: ESPR mandates that nearly all physical products sold in the EU, excluding food, animal feed, and medical products, possess a DPP by 2030

Enhanced supply chain transparency: DPPs enable companies to monitor products throughout their lifecycle, leading to improved traceability and operational efficiency

Meeting consumer demand for transparency: DPPs provide detailed product information, enabling consumers to make informed choices, thereby enhancing brand trust and potentially increasing sales

Development of new services and revenue streams: Access to comprehensive product data through DPPs paves the way for innovative business models, such as repair services and recycling or resell programs, offering additional revenue streams

TYPICAL ECOSYSTEM STAKEHOLDERS

- SUPPLIER
- MANUFACTURER
- DESIGNER
- TECH PROVIDER
- RESELLER

TYPICAL DATA POINTS

- UNIQUE PRODUCT IDENTIFIER
- INSTRUCTIONS FOR USE, REPAIR, AND end-of-life
- MATERIAL COMPOSITION DATA (e.g., recycled content)
- ENVIRONMENTAL IMPACT AND CARBON FOOTPRINT DATA
- SECONDARY DEMAND DATA (e.g., pricing for refurbished products)
- COMMERCIAL / SALES DATA (e.g., price)

Sources: Accenture Research

Value driver: Regulatory compliance | Operational efficiency | Business growth

Case in point

Click here to watch a movie about the Fiber Traceability Initiative or learn more about the ReValue project here

FIBER TRACEABILITY INITIATIVE

GS1 Sweden · FILIPPA K · AXFOUNDATION

"This project serves as a springboard for brands that are preparing for the upcoming legislation. ***Traceability and transparency also provide business advantages*** *and contribute to sustainable market structures."*

- Stina Behrens, Project Manager Future Materials, Axfoundation

The issue

The fashion industry produces 100 billion garments annually, with half discarded within 12 months, contributing to massive waste. Traceability remains a major challenge, with wool tracking often limited to the country of origin and no certification for sustainability or animal welfare. Most garments rely on virgin, fossil-based synthetic fibers, worsening environmental impact. While new EU regulations promote responsible production, companies struggle with practical implementation and data-sharing across the value chain.

The solution

Axfoundation, Filippa K, GS1 Sweden and VirtualRoutez established The Fiber Traceability Initiative (FTI) to investigate how Digital Product Passports (DPPs) may drive positive change in the fashion industry. The project has implemented digital data collection and sharing based on GS1 data standards throughout the entire production chain – from sheep farms in South Africa to scouring plants and knitting factories in Europe. The solution is a beta version of a digital product passport, preparing all actors for upcoming EU legislation regarding digital product passports.

Through a new project called 'ReValue - Clothing Resale through Digital Product Passports' the organizations explore how increased transparency via DPPs enables new business models, specifically the fashion resale model.The project aims to pilot a minimum viable product technical implementation of a Resale DPP with a selection of ecosystem partners.

Results

- Achieved full traceability and transparency throughout the wool value chain for selected Filippa K products
- Implemented a standardized, digital business language through GS1 standards throughout the value chain
- Paved the way for companies to implement DPPs in alignment with upcoming EU legislation
- Confirmed a clear profitability case for both marketplaces and brands, as well as environmental benefits of integrating DPPs into resale ecosystems to drive value from resell business models

Resource Efficiency & Recovery explained

Resource efficiency & recovery aims to optimize the use and flow of resources across the value chain and strengthen overall supply chain resiliency , and includes examples like:

- Optimizing product design to reduce material needs
- Using bio-based or renewable material inputs to reduce resource consumption
- Recovering value in waste or by-products from own or other's operations

TYPICAL ECOSYSTEM STAKEHOLDERS

- SUPPLIER
- SUPPLY CHAIN PARTNER
- UTILITY COMPANY
- RECYCLER
- MANUFACTURER

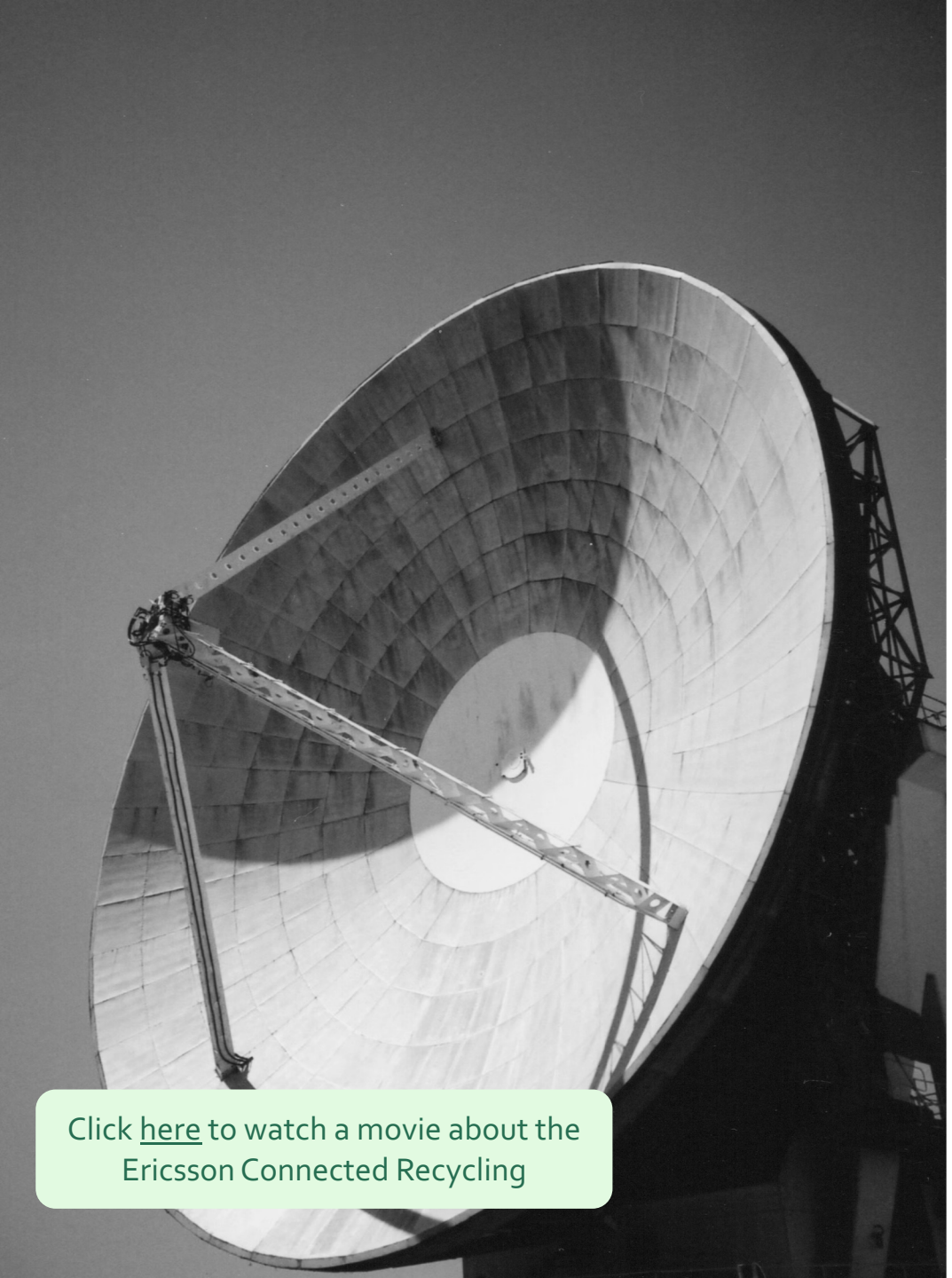
VALUE DRIVERS

- **Regulatory compliance:** Increased resource efficiency will help companies adhere to waste management regulations, such as the Extended Producer Responsibility (EPR) which requires companies to take responsibility for the entire lifecycle of their products
- **Reduced material and waste costs:** Recycling materials and using bio-based materials will drive down costs on raw materials and waste management
- **Streamlined and resilient supply chains:** By driving efficiency across the supply chain, companies will build resilience in a time of high global uncertainty
- **Recover value from waste streams:** Companies can generate revenue by selling recycled materials or residual waste as input for other value chain actors

TYPICAL DATA POINTS

- MATERIAL COMPOSITION DATA (e.g., recycled content)
- WASTE & RESIDUAL MATERIAL DATA (e.g., waste classification)
- PRODUCT & LIFECYCLE DATA (e.g., product lifespan)
- SECONDARY MATERIAL DEMAND (e.g., pricing for recycled materials)
- WASTE APPLICATION DATA (e.g., info on potential usage)

Sources: Accenture Research



Click here to watch a movie about the Ericsson Connected Recycling

ERICSSON CONNECTED RECYCLING

BOLIDEN · Telia Company · ELTEL · ERICSSON · TRANSTEMA

"The world is surprisingly focused on emissions only – but the environment is so much more. Water, biodiversity, scarcity of raw materials. ***With this platform we plan to enable fact-based decision making considering both environmental and business impact."***

- Sophia Fahlen, Ericsson

The issue

The telecom industry faces numerous sustainability challenges, yet progress in addressing these issues has been slow[1]. One significant challenge is the lack of material traceability and the inability to provide accurate data on the amount of waste produced and recycled. Traceability and recycling efforts are crucial for telecom that relies on several critical resources and minerals (e.g., cobalt), and simultaneously contributes to the rising generation of electronic waste (e-waste). There is an urgent need for robust collaborations to lead initiatives in tracing resource usage and advancing towards a more sustainable and resource-efficient industry.

The solution

Boliden, Ericsson, Telia, Transtema & Eltel collaborated to introduce digital platforms that improve material traceability, encourage reuse and recycling, and facilitate data-driven decision-making in the telecom industry. This initiative aims to enhance circularity, minimize environmental impact, optimize resource utilization, and promote sustainability.

The solution leverages Ericsson Connected Recycling, an end-to-end digital platform that enhances data sharing and traceability of end-of-life materials across global value chains. The SaaS solution combines IoT, a mobile app, an analytics platform, and marketplaces to ensure traceability and monetize waste materials efficiently.

Results

- Designed circularity-driven digital platform to enable data sharing and value chain traceability
- Defined standardization structures (e.g., material traceability framework) and best practices (e.g., circular economy guidelines for suppliers)
- Piloted a model to validate data sharing processes, identify gaps, and measure financial and business impact
- Established cross-industry collaboration model between telecom provider, manufacturer & recyclers

Sources: [1] BCG (2024), Why the Telecom Industry's Slow Progress on Sustainability Is Risky Business

Product Use Extension & As-a-Service Business Models explained

Product use extension and as-a-service business models aims to extend product lifetime and optimize capacity use with optimized products and new service models, including examples like:

- Leveraging product usage data to optimize product design and materials
- Offering product repairs and component reconditioning to extend product lifecycle
- Creating innovative business services and models such as secondary resale or sharing services

VALUE DRIVERS

- **Reduced resource consumption and costs:** By maximizing the product lifespan, companies will see a reduction in manufacturing and raw material costs
- **New revenue streams through verticalization:** To extend the use of products, companies can offer repair services and secondhand sales and thereby capture more of their existing value chain
- **Revenue decoupled from consumption:** Introducing as-a-service business models will drive revenue uplift, and decouple business growth from resource consumption
- **Enhance business reputation:** Building durable products and offering new customer services such as repair-services will enhance the brand value and increase customer loyalty and retention

TYPICAL ECOSYSTEM STAKEHOLDERS

- SUPPLIER
- SERVICE PROVIDER
- DESIGNER
- RECYCLER
- MANUFACTURER

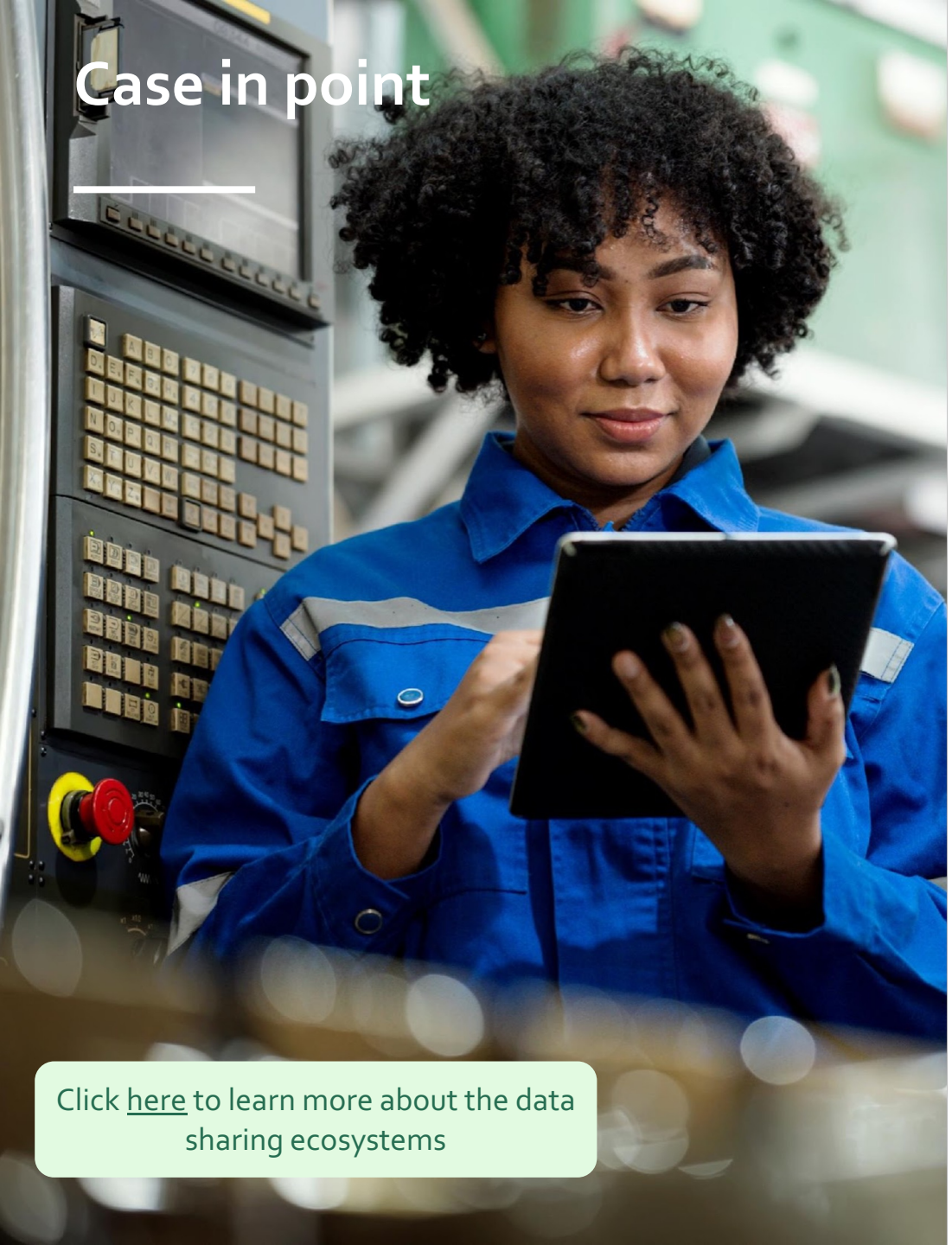
TYPICAL DATA POINTS

- PRODUCT & MATERIAL DATA (e.g., material composition)
- WARRANTY AND SERVICE DATA (e.g., product ownership)
- PERFORMANCE DATA (e.g., usage & product condition data)
- MAINTENANCE & REPAIR DATA (e.g., repair history)
- SECONDARY DEMAND DATA (e.g., pricing for refurbished products)
- RECOVERY DATA (e.g., end-of-life return options)

Sources: Accenture Research

Value driver: Regulatory compliance | Operational efficiency | Business growth

Case in point



Click here to learn more about the data sharing ecosystems

IOXIO & DAPONET | IOXIO & BESPORT

"The BESPORT collaboration has helped us to make data sharing easy for all stakeholders in logistics chains and how we and our customers can get value from the data shared. The project has also helped to open up new circular business models.

Pekka Yli-Paunu, Research Director, Kalmar Finland Oy

The issue

The logistics and manufacturing sectors face mounting pressure to decarbonize operations, comply with ESG regulations, and meet green transition objectives. While sustainability reporting and traceability are vital, companies also need new models for creating value – ones that support greener production and better customer outcomes. At the same time, siloed data and incompatible systems across logistics and manufacturing supply chains prevent the kind of visibility and optimization needed to address these challenges.

The solution

Two cross-industry clusters DAPONET (mining & manufacturing) and BESPORT (port & logistics) are pioneering data sharing ecosystems to enable extended product use, predictive maintenance, and digital services

- BESPORT is focusing on real-time data sharing across cargo corridors to improve operational efficiency and enable service innovation for port users and operators.
- DAPONET is concentrating on a product lifecycle data sharing across mining equipment suppliers to support product-as-a-service models, maintenance planning, and material circularity.

Results

DAPONET (mining & manufacturing)

- ✓ Developing a scalable product lifecycle data model to extend equipment use, and improve ESG reporting and product quality
- ✓ Enabling new "as-a-service" business models by leveraging shared equipment and component data for predictive operations

BESPORT cluster (port & logistics):

- ✓ Enabling real-time data sharing to build digital corridors for seamless and sustainable logistics , service performance, and predictive operations
- ✓ Advancing port decarbonization and electrification through data-driven, performance-based logistics services

3

HOW TO BUILD THE RIGHT CAPABILITIES AND KICK-START A CIRCULAR DATA SHARING JOURNEY?

"

Leveraging the diverse expertise of a circular data-sharing ecosystem enhances the capacity to address technical challenges and promote sustainability.

– Sogn Biohub, Nordic Circular Accelerator participant

KEY TAKE-AWAYS FROM THIS CHAPTER:

1. **Mastering six core data capabilities** will enable you to gain value from your data sharing ecosystem – and this chapter outlines how
2. **These capabilities evolve in complexity and impact as ambition increases** from compliance to operational efficiency and business growth
3. **The process can be divided into three steps**, regardless of the ambition level, i.e., designing, building, and scaling a data-sharing ecosystem
    - ✓ **Assess & define:** This phase establishes the foundation for a data-sharing ecosystem by defining the vision, ambition, and value proposition. It also involves identifying and screening key ecosystem partners to ensure alignment and collaboration.
    - ✓ **Setup & manage:** The focus here is on structuring and operationalizing the ecosystem by defining partner roles, standardizing data-sharing frameworks, and ensuring interoperability. Strong data governance, security, and compliance measures are implemented to maintain trust and integrity.
    - ✓ **Evaluate & scale:** This phase emphasizes monitoring, refining, and expanding the ecosystem through scalable technology and platforms. Data analytics and insights are leveraged to assess impact, optimize processes, and drive continuous improvement.

Mastering six core data capabilities will enable you to gain value from your circular data-sharing ecosystem

CAPABILITY	
Data sharing vision, ambition & value casing	Developing a shared vision, ambition, and value proposition for data sharing that aligns with the business strategy and is anchored in concrete use cases, ensuring all partners derive clear benefits from the collaboration
Partner screening & ecosystem setup	Identifying partners and establishing ecosystems to enable secure and effective data sharing, ensuring alignment with clearly defined use cases that drive impact across the value chain
Data standardization & requirements	Setting a strong data foundation with standardized data formats to enable seamless interoperability, accuracy, and consistency across the ecosystem and identifying opportunities and requirements for data sharing
Data management, governance & security	Implementing governance frameworks, access controls, and security mechanisms to ensure secure, compliant, and responsible data management and sharing
Data sharing model, technology & platforms	Defining a secure and scalable infrastructure that enables seamless data exchange, system interoperability, and integration with existing technologies
Data analytics & insights	Using AI and advanced analytics to generate actionable insights from shared data and support data-driven decision making across the ecosystem

Sources: Accenture Research

These capabilities evolve in complexity and impact as ambition increases from compliance to operational efficiency and business growth

	Comply with regulations	Optimize operations	Drive business growth
Data sharing vision, ambition & value casing	Shared vision for data sharing, focused on regulatory compliance and risk mitigation	Aligned vision of data-sharing initiatives with partner's operational efficiency goals	Shared vision to use data sharing to enable new business models, foster innovation and differentiation
Partner screening & ecosystem setup	Minimum viable data-sharing partners to meet compliance requirements	Expanded ecosystem to optimize operations and integrate data flows across supply chains	Fully interoperable and collaborative data-sharing network
Data standardization & requirements	Basic data-sharing processes and standards to ensure regulatory compliance, and preventing data misuse	Interoperable, automated data-sharing frameworks that enable operational efficiencies	Real-time data standardization and dynamic models to support predictive decision-making and new business models
Data management, governance & security	Basic IT infrastructure to facilitate essential data exchanges for compliance purposes	Interoperable systems that ensure secure and responsible data exchange at scale	Fully integrated governance frameworks supporting capturing business value from data
Data sharing model, technology & platforms	Basic IT systems enabling minimal data transfer for compliance reporting	Integration of real-time platforms to support automated and scalable data exchange	Collaborative platforms enabling seamless data integration and innovation across partners
Data analytics & insights	Limited analytics focused on compliance reporting and audit support	AI-driven analytics to improve operational performance, waste reduction, and efficiency	Predictive and prescriptive analytics to drive innovation, and enable circular business models

Sources: Accenture Research

Regardless of the ambition level, designing, building, and scaling a circular data-sharing ecosystem can be divided into three steps

ASSESS & DEFINE

This phase establishes the foundation for a data-sharing ecosystem by defining the vision, ambition, and value proposition. It also involves identifying and screening key ecosystem partners to ensure alignment and collaboration.

SETUP & MANAGE

The focus here is on structuring and operationalizing the ecosystem by defining partner roles, standardizing data-sharing frameworks, and ensuring interoperability. Strong data governance, security, and compliance measures are implemented to maintain trust and integrity.

EVALUATE & SCALE

This phase emphasizes monitoring, refining, and expanding the ecosystem through scalable technology and platforms. Data analytics and insights are leveraged to assess impact, optimize processes, and drive continuous improvement.

Capabilities in focus

Data sharing vision, ambition & value casing	Data standardization & requirements	Data sharing model, technology & platforms
Partner screening & ecosystem setup	Data management, governance & security	Data analytics & insights

Sources: Accenture Research

Discover your data-sharing maturity level with a quick assessment and unlock tailored insights to accelerate your circularity journey

Click here to take a test and assess your maturity

EMERGING

Your organization is in the early stages of developing circular data-sharing capabilities. Early steps such as internal discussions, initial partner engagement, or pilot exchanges may already be underway.

This stage is characterized by growing awareness and interest in aligning on shared goals and building the foundations for collaboration.

Continued progress will come from clarifying your collective ambition, identifying mutual value across the ecosystem, and developing structured approaches to support long-term data-sharing efforts.

Go to 'Assess & define'

ESTABLISHING

Your organization is actively shaping the foundations needed for effective circular data sharing.

Early work may include defining initial use cases, exploring standardization approaches, or considering governance needs. These steps reflect a growing commitment to structuring how data is shared and managed across the ecosystem.

Focusing on aligning data standards, clarifying sharing requirements, and establishing governance and security frameworks will help unlock greater value and trust in your ecosystem.

Go to 'Setup & manage'

SCALING

Your organization is actively scaling its data-sharing capabilities.

Platforms and infrastructure are in place, with growing interoperability and automation. Analytics and insights are increasingly embedded into decision-making processes, supporting more strategic and predictive use of shared data.

Continued focus on integration, automation, and advanced analytics will help maximize value across the ecosystem and position you to lead in circular data sharing at scale.

Go to 'Evaluate & scale'

Discover your data-sharing maturity level with a quick assessment and unlock tailored insights to accelerate your circularity journey

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Data sharing vision, ambition & value casing

Partner screening & ecosystem setup

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Click here to start your learning journey!

For each capability, this chapter summarizes real-life learnings, best-practice examples, and tangible approaches on how to get started

Introduction & key learnings

Introduction to the capability and key learnings

Approach & framework

Framework to guide you in how to set up the capability

Best-practice example

Real-life examples from Program participants or other relevant cases

Exercise

Interactive exercise for you to leverage the learnings in practice

Assess & define

Data sharing vision, ambition & value casing

Why a shared vision?

It is essential to define a shared vision and value case at the outset of your collaboration to establish a common focus, a clear scope, and spark continuous engagement throughout the collaboration. The vision and value case must provide value to all participant and be closely linked to your respective corporate strategies as well as the pre-defined data-sharing use case.

Vision & objectives

The vision defines the purpose of the ecosystem work clearly. Questions to consider include: "Why do we share circularity data in this ecosystem?" The reasons may vary from achieving regulatory compliance collectively, answering to new customer demands, or other aspirations. The vision is supported by objectives that guide your collaboration towards its vision.

Where the vision can be set by asking 'Why' the objectives are defined by asking 'how'. "How will we collectively achieve our vision?". You should aim at setting 2-3 key objectives that will contribute to reaching the vision.

Value case

Ensuring mutual benefits for all ecosystem actors is crucial to maintain engagement and foster trust within the collaboration. The aim should be to create a 'win-win-win' scenario that addresses the interests of all parties involved. Value should be assessed across multiple dimensions, including financial and sustainability considerations.

"The purpose of circular data sharing is for everyone in the value chain to perform better, make better choices, and optimize the production efficiency – done right, it's a source of value."

- Roundtable participant in the Nordic Circular Accelerator

Key learnings

- Define a shared problem statement and clear objectives at the outset of the collaboration to later inform the data requirements and technology choices – not the other way around
- Establish a common denominator to motivate everyone - the act of data sharing must deliver tangible benefits to everyone in the collaboration (e.g., reduced inefficiencies, improved market competitiveness) or else you risk losing momentum and engagement
- Quantify and balance the benefits of data sharing (e.g., risk mitigation by regulatory compliance) with the costs of data sharing (e.g., data generation) to understand the net value
- Make sure the value case outweigh the common barriers to share data, e.g., fear of losing ownership of data, security and competition concerns, lack of data sharing capabilities and frameworks
- Be transparent with the needs and incentives of everyone in the collaboration when defining the shared goals to build a strong foundation for continuous collaboration and engagement
- Take an explorative approach when defining the scope: Start with a set scope, open it up for exploration to finally realign the scope with the new findings

Get started with your data sharing vision, ambition & value casing

Steps to follow

1 Define the shared vision for the data sharing ecosystem

Establish why data sharing is important for your collaboration. Clarify its purpose and intended impact, drawing inspiration from common use cases in the Nordics (Chapter 2, p. xx). A strong shared vision ensures alignment and commitment from all stakeholders.

2 Agree on the ambition level of the collaboration

Determine how bold and transformative you want your collaboration to be. This includes defining the scope, scale, and level of commitment required to achieve your goals. Use the ambition levels outlined in Chapter 1 (p. xx) as a reference to position your collaboration effectively.

3 Outline 2-3 key objectives

Identify specific objectives that will guide your collaboration towards achieving its vision. These should be SMART—Specific, Measurable, Achievable, Relevant, and Time-Bound—to ensure clarity and accountability.

4 Build a value framework [link to exercise]

Define how the collaboration will create value for all stakeholders involved. This includes economic, environmental, and social benefits, ensuring alignment with broader impact measurement frameworks such as The Business Impact Framework (p. 31).

Key questions to ask your collaboration in this step:

- What is the purpose of sharing data in our collaboration?
- What outcomes do we want to achieve together?
- Which use cases best align with our vision?

- How transformative do we want this collaboration to be?
- Are we aiming for incremental improvements or systemic change?
- What level of commitment and resources are we willing to invest?

- What are the most critical objectives that will drive impact?
- How can we make these objectives SMART?
- How will we measure success and track progress?

- How will this collaboration create value for all stakeholders?
- What economic, environmental, and social benefits can we achieve?
- How can we align our efforts with existing impact measurement frameworks?

Using the Business Value Framework will help you to outline the value dimensions of your circular data sharing collaboration

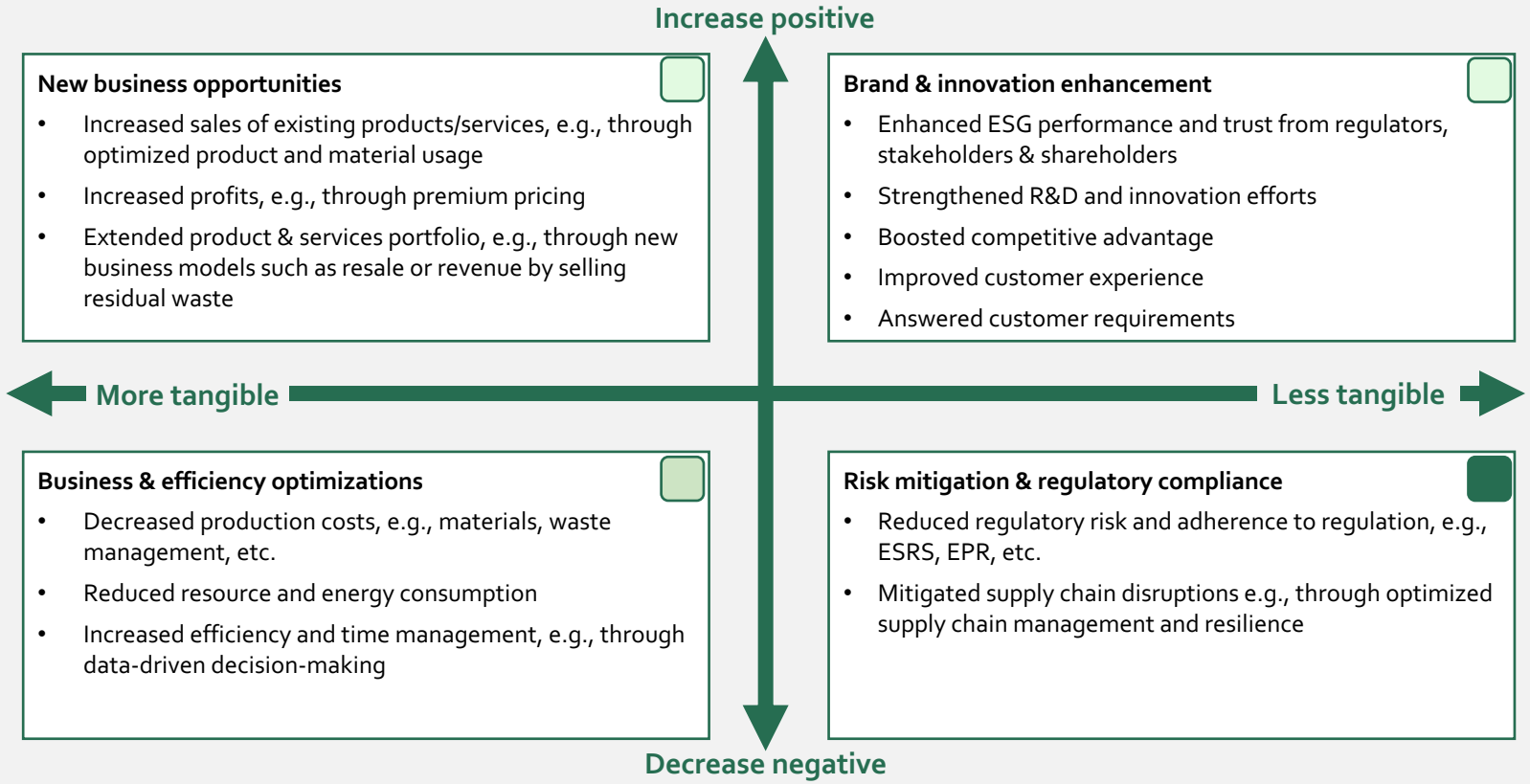
To articulate the value of your data-sharing collaboration, drawing up a Business Value Framework can be useful.

A business value framework helps companies identify and communicate the expected value of a potential business initiative by outlining key value levers across pre-defined dimensions.

The example business value framework displayed here categorizes business value by whether it increases positive outcomes or decreases negative ones (y axis) and according to the level of tangibility (x axis). This creates four dimensions (quadrants): New business opportunities, Brand & innovation enhancement, Business & efficiency optimizations, and Risk mitigation & regulatory compliance.

Tip! Take inspiration from the Business Value Framework but tailor it to the specific context of your data-sharing collaboration.

BUSINESS VALUE FRAMEWORK



Value driver: Regulatory compliance | Operational efficiency | Business growth

Case in point

Axfoundation, Filippa K & GS1

Axfoundation, Filippa K & GS1 Sweden developed a value-driven approach to assess how data sharing through Digital Product Passports (DPPs) can enable profitable and sustainable fashion resale.

At the outset of the collaboration, the actors worked together to define a clear value narrative and have this inform their pilot planning.

They took the following steps:

1. Identify key financial, operational, and sustainability value drivers
2. Validate value assumptions through data collection and interviews
3. Define pilot scope and scaling plan in accordance with value drivers

This approach ensured that the DPPs were positioned as a business enablers for circular fashion, rather than just a regulatory requirement.

GS1 Sweden | FILIPPA K | AXFOUNDATION

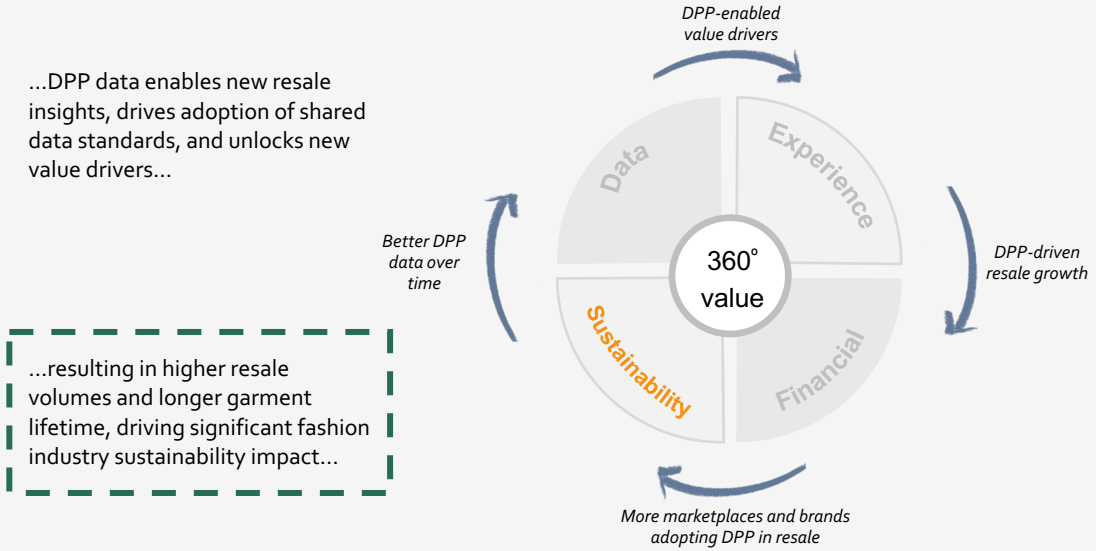
"DPPs are not just a compliance tool – they open new revenue opportunities for brands while driving circularity."

– Stina Behrens, Project Manager Future Materials, Axfoundation

VALUE CASE FOR DIGITAL PRODUCT PASSPORT (DPP) IMPLEMENTATION

VALUE ACROSS THE RESALE JOURNEY

RESALE PROCESS	Seller initiates process and provides garment details	Garment listing is published to marketplace	Buyer finds and purchases garment	Seller packages and ships the garment to the buyer	Payment and claim handling
BUSINESS OUTCOME	DPP-driven volume boost	Increased sell-through rate Reduced manual inspection time	Higher average resale price	Reduced shipping costs	Reduced costs due to claims/disputes/returns



Exercise

5-10 participants

1.5 hrs

Print your worksheet

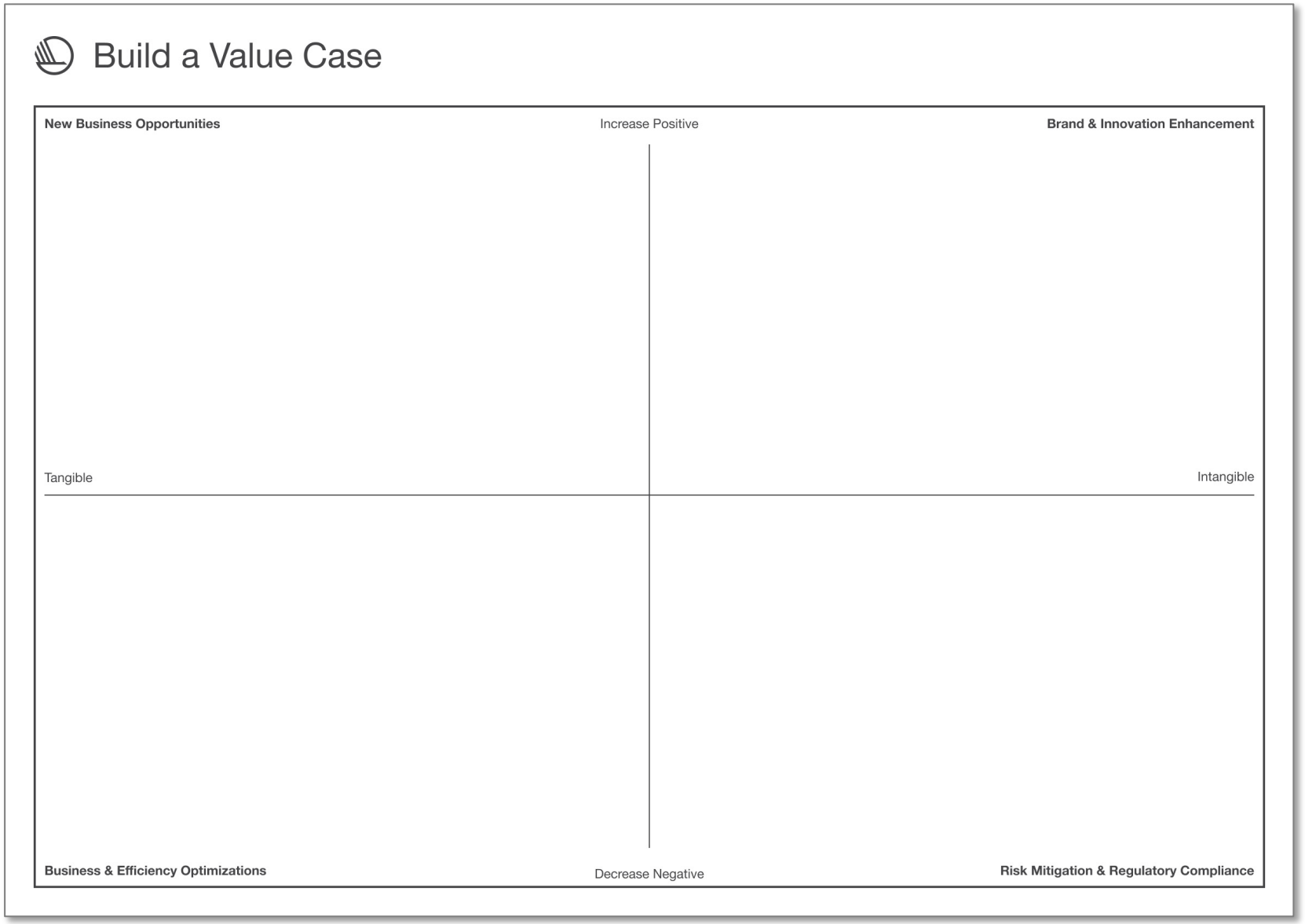
Instructions

Individually or in smaller groups, brainstorm potential value drivers related to circular data sharing. Use the provided framework and its axes to guide your thoughts. Add your insights on post-it notes to place on the exercise poster.

Once everyone has contributed, reconvene as a full group and share your post-it notes in turn. Cluster the post-it notes to pinpoint 3-5 primary value drivers for each quadrant.

Next steps

Identify the cost drivers associated with data sharing to create a comprehensive value case for your collaboration.



Partner screening & ecosystem setup

Why work together in a data-sharing ecosystem?

In a circular data-sharing ecosystem value chains actors collaborate on data sharing to collectively shift from linear to circular ways of doing business. By combining the resources, expertise, and insights of different actors, you create value chain visibility, advance decision-making, and drive systemic change that individual actors cannot achieve alone.

Partner screening

The first step to a successful data-sharing ecosystem is partner screening. The process involves identifying and engaging appropriate partners to form a primary ecosystem that can later be scaled into a broader network. Consider who are 'need-to-have' partners to kick-off the data-sharing project, and who are 'nice-to-have' partners to involve later to scale the work.

Choose partners ready for immediate implementation to test the collaboration but who are also aligned with the long-term strategic vision.

Ecosystem setup

A successful data-sharing ecosystem requires multi-stakeholder collaboration and effective leadership to overcome traditional barriers such as lack of cooperation and action. Strong partnerships include by-design mechanisms to enable joint ownership and foster synergetic incentives that make key stakeholders generate greater value from participation and progress. The ecosystem thrives when common practices promote trust and fairness in the digital environment, ensuring all stakeholders benefit from shared resources, knowledge, and capacity.

> ***"We shared insights that we typically keep internal, and it immediately created a better collaborative environment."***
>
> - Vattenfall, *Nordic Circular Accelerator participant*

Key learnings

- Develop ecosystem partnerships with intention and shared strategic goals at the center – your ecosystem needs to have a clear raison d'être
- Design your collaboration for scale, with priority foundational partners, but flexibility to grow the ecosystem through more value-adding partnerships
- Prioritize partners with a strong track record of collaboration and data transparency – this helps building a trustworthy and efficient ecosystem
- Involve potential partners early on and make sure there is a common understanding of what is important, and why each partner is important to reach joint success – ownership should be anchored early on and across the ecosystem to create a sense of commitment
- Include a good orchestrator when setting up your partner ecosystem – you need a (neutral) champion that will drive the mission relentlessly
- Make sure mutually favorable outcomes are at the forefront of decision-making and focus on progress to motivate continuous partner engagement

Get started with your partner screening & ecosystem setup

Steps to follow

1 Cluster business stakeholders [link to exercise]

Consider your full business stakeholder landscape, and cluster the stakeholders into subgroups, such as outlined in the Circular Business Stakeholder framework (p. 36). Now mark the stakeholders that could be in scope for your circular data sharing ecosystem, pending on your use case.

2 Define partnership criteria

Determine your criteria for partnership selection. These may focus on common circularity goals and commitments, technical interoperability, market reach, industry focus, value chain roles etc.

3 Assess potential partners against criteria

Conduct an analysis of your existing business partners (outlined in step 1) and potentially a broader market scan to score potential partners against your selection criteria. Base your analysis on publicly available materials and interviews.

4 Set up your data sharing ecosystem

Rank your potential partners according to their score against your criteria and do a pre-liminary partner selection. Meet with your partners to validate feasibility, define pilot scope, and align on next steps.

Key questions to ask your collaboration in this step:

- What does our full business stakeholder landscape look like?
- How might we segment the stakeholders into relevant groups?
- Who do we need to team up with on data sharing to achieve our circular and business goals?

- What capabilities and/or data do we need our partners to share?
- What are common traits we want our ecosystem partners to have?
- What are the business and technical requirements we need our partners to fulfill?

- Who within our business network fulfill our partner criteria?
- Do we need to go beyond our immediate stakeholder landscape to find new partners?

- What is the feasibility of teaming up with desired partners?
- How might we work together in a data sharing ecosystem going forward?
- How might we design a pilot scope?

Grouping your stakeholder landscape can help you select the right foundational partners for your ecosystem

Identifying the right partners for your collaboration is a crucial first step towards shared success.

Establishing a data-sharing ecosystem with priority partners, while already considering potential partners for future scaling, allows you to start now and remain flexible.

Grouping stakeholders based on their proximity to your core business can help you dissect your stakeholder landscape to identify essential actors for your partner screening. Whether you include multiple stakeholders from the same group or a range of actors across groups depends on your use case and ecosystem ambition.

Tip! Once key stakeholder groups have been identified, try to define key partnership criteria (e.g., data interoperability, market reach, and commitment to circular business principles) to guide your screening.

CIRCULAR BUSINESS STAKEHOLDERS

A CORE DATA PARTNERS

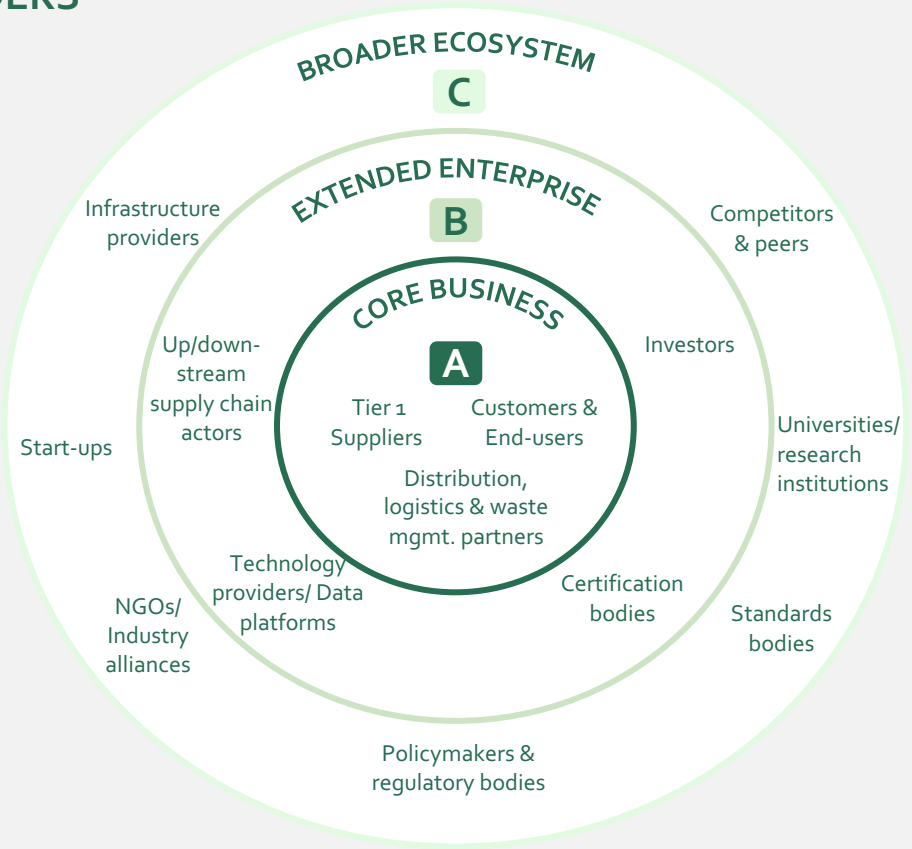
Actors directly involved in your product or service delivery who also contribute or depend on circularity-related data flows

B EXTENDED DATA NETWORK

Actors in your wider value chain or business network who influence or enable data availability, quality, and use across the lifecycle

C BROADER ECOSYSTEM

Actors beyond your immediate value chain that shape the enabling environment for circular data exchange



Successful partner ecosystems are set up on several foundational pillars which enable progressive advancement and collective impact

For a data-sharing ecosystem to work, all participants need to collaborate and remain engaged.

The collective impact framework summarizes the five conditions that together produce true alignment and lead to powerful results

When setting up the ecosystem, you should first establish a shared vision, value case, and measurement strategy to maintain focus on the objectives and progress (see 'Data sharing vision, ambition & value casing').

The data-sharing activities should be designed to complement each other and create synergistic incentives between actors.

Throughout the collaboration, communication and guidance by an impartial party is key.

Tip! Include a neutral party to act as 'orchestrator' – this will help you overcome barriers in the collaboration.

COLLECTIVE IMPACT FRAMEWORK[1]

COMMON VISION	SHARED MEASUREMENT STRATEGY	MUTUALLY REINFORCING ACTIVITIES	CONTINOUS COMMUNICATION	BACKBONE SUPPORT
Establish a shared vision and value case for all actors to agree on the primary goals of the partnership	Agree on a shared methodology to continuously track progress and measure business impact	Integrate data-sharing activities undertaken by each actor to ensure they support each other and the common vision	Establish communication mechanisms to foster trust and progress among participants	Ensure ongoing support and facilitation from a dedicated (and often neutral) orchestrator

Source: [1] Kania & Kramer (2011), Collective Impact

Case in point

Sogn Biohub

Sogn Næring, ViteMeir, Simas, and other industrial partners are collaborating to develop a pyrolysis plant in Kaupanger, transforming regional biological waste into biochar and renewable energy.

The initiative aims to reduce greenhouse gas emissions and optimize resource efficiency by stabilizing carbon in biochar. The plant generates 22 GWh of renewable energy annually, fostering sustainability and regional economic growth.

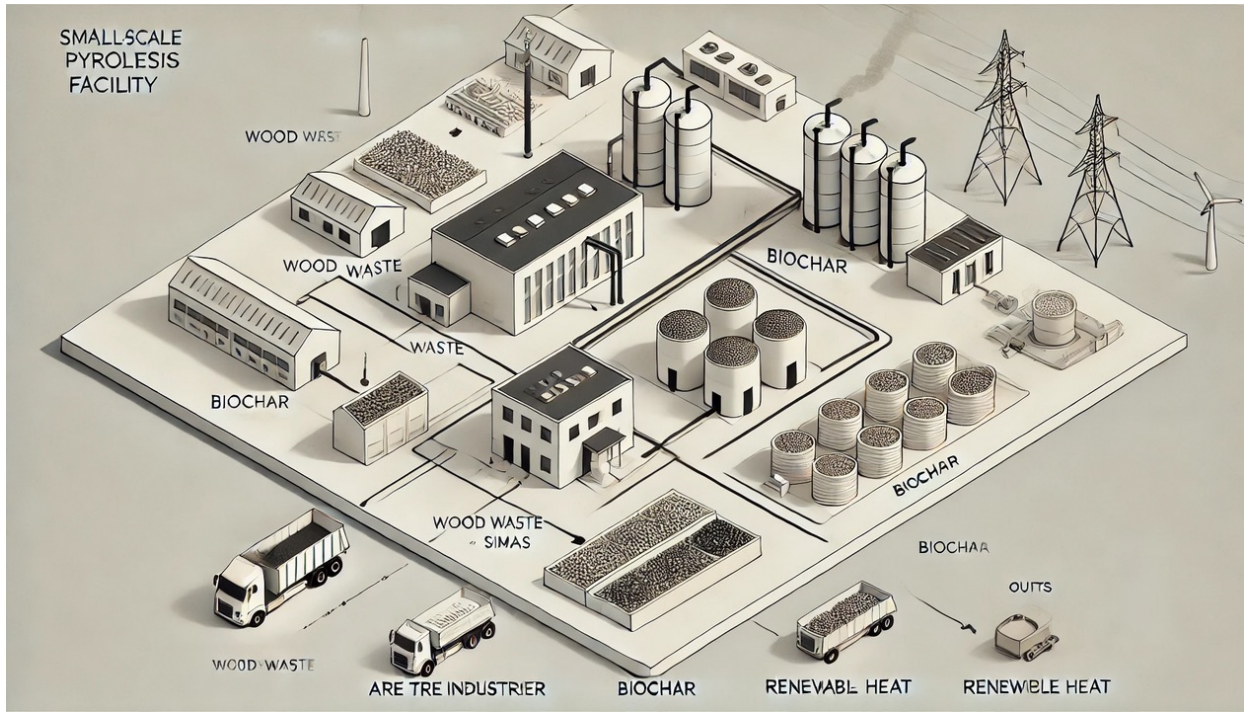
A key learning for the project has been to involve partners early in the process and to anchor the ownership across ecosystem actors for everyone to feel committed to invest time and funding during the entire collaboration.

Sogn Biohub

"Ensuring that each partner's capabilities and objectives align with the project's goals is crucial for effective collaboration and success."

– Sogn Biohub, Nordic Circular Accelerator participant

INDUSTRIAL ECOSYSTEM TRANSFORMING WASTE INTO VALUE



Each partner's unique role strengthens the project's capacity to handle technical challenges and ensure sustainability:

- SIMAS and SIRKLA for waste management,
- Are Treindustrier for production infrastructure, Sogneprodukt for workforce inclusion, and
- Sogn Næring facilitates business networking, connecting various stakeholders and promoting collaboration.

Sogn Næring | simas Ressursar på rett veg | sirkla ressurs | ARE | Treindustrier KAUPANGER | Lerum

Exercise

5-10 participants

1 h

Print your worksheet

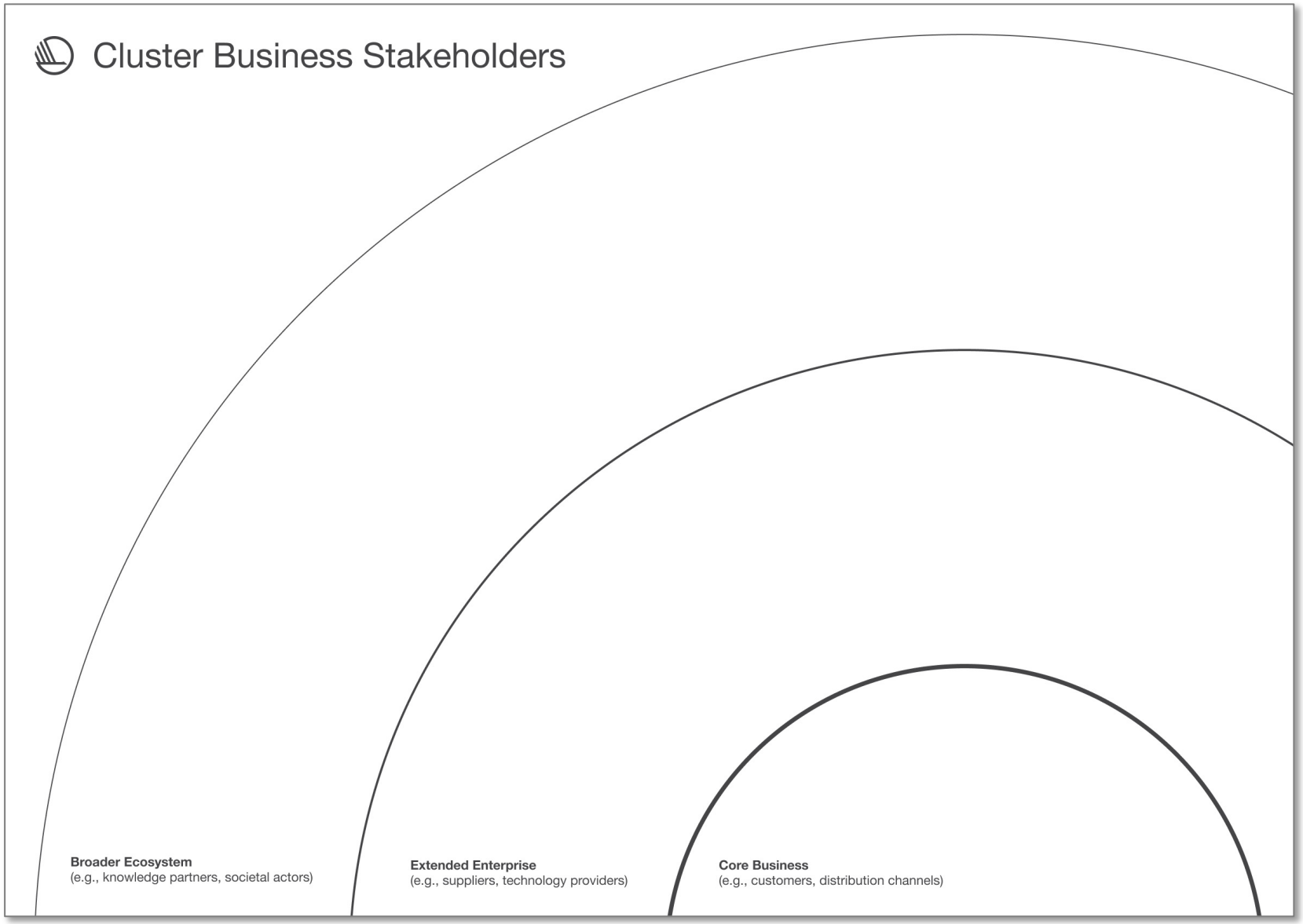
Instructions

Divide the participants into three groups, assigning each one to a specific category (part of the circle). Within these groups, outline the pertinent business stakeholders for the category assigned to you. Add your reflections on post-it notes on the worksheet.

Share your insights with the larger group and let others contribute to the various categories to develop a comprehensive landscape of business stakeholders.

Next steps

Establish key criteria for partnerships and evaluate your business stakeholders based on those criteria to conduct your partner screening.



Setup & manage

Data standardization & requirements

Why standardize data?

Before defining your data requirements, it is essential to establish a common terminology and methodology. Standardizing your data sharing practices will ensure consistency and comparability, enhance trust by improving data quality and accuracy, and drive scalability.

Data standardization

Data standardization involves establishing a common language that facilitates cross-organizational data sharing and interoperability. This can include shared data terminologies (e.g., consistent terms for describing data), data formats (e.g., uniform units or structures), and data methodologies (e.g., consistency in calculation logic and assumptions). It is important to strike a balance – standardization should not be too superficial, as this would impede comparability, nor excessively detailed, as overly stringent standardization could lead to generic analysis and results.

Using recognized data standards like ISO, GS1, or UN/CEFACT can simplify and speed up your data standardization.

Data requirements

Data requirements are the specific data that must be shared to achieve success with your use case and fulfill your value case. Here it is key to differentiate between "nice-to-have" data and "need-to-have" data. Prioritize the collection of essential, measurable data points that facilitate decision-making and deliver impact throughout the value chain. Data sharing is a journey, and to get started you need to understand your basic data needs. Maturity can be developed over time.

"Data collection should always answer the 'so what' question, providing actionable insights rather than unnecessary complexity."

- Roundtable participant in the Nordic Circular Accelerator

Key learnings

- Establish common data formats and standards before outlining the data needs – this simplifies partner integration, enhances real-time collaboration and creates system interoperability
- Start small and expand your data needs over time – the need for more data is a never-ending excuse for not getting started
- Consider your level of ambition and use case when defining your data requirements – what are you solving for and what data do you as a minimum need to get there?
- Make sure there is a clear linkage between the value drivers of your collaboration and your data requirements – how will the data give you the insights needed to drive business value?
- Identify and prioritize high-impact data points, such as waste volumes, energy output and carbon reduction to maximize the value of data sharing
- Consider using common data standards (e.g., ISO, GS1, UN/CEFACT) created by recognized organizations and governing bodies to comply with relevant regulations

Get started with your data standardization & requirements

Steps to follow

1 Establish common data definitions and frameworks

Build a common language for data sharing by defining shared data terminologies, data formats, and data methodologies for your collaboration. Make sure to document your harmonization practices.

2 Explore existing data standards

Map out the existing landscape of circularity data standard (e.g., ISO, GS1, UN/CEFACT) and regulatory standards (e.g., ERSR) and consider if your collaboration can use these to standardize your circularity data and data sharing activities. Make sure to use standards that are relevant to your industry.

3 Define data and insight requirements [link to exercise]

Revisit the vision, use case, and value drivers of your collaboration to outline key questions needed to answer to fulfill your goals. Outline the data needed to answer your questions and summarize your data requirements, using the worksheet on p. 46

4 Identify data sources

Consider the data requirements and map them to the different actors of the value chain to understand the sources of your data. Discuss who will be responsible for quality assuring and sharing the data.

Key questions to ask your collaboration in this step:

- How might we define key elements of our data? (e.g., 'recyclability')
- How will we structure and label our core data and meta data?
- What are the assumptions we base our calculations on? (e.g., LCA)

- What are recognized standards for circular data sharing? Which ones are relevant for our industry? Will we work with open or protected standards?
- How might we standardize to comply with relevant regulations? (e.g., the Corporate Sustainability Reporting Directive)

- What are the key questions we need to answer for our use case and to generate business value for value chain data sharing?
- What is the "need-to-have" data needed to answer the key questions?
- What is the "nice-to-have" data needed to answer the key questions?

- Who contributes what type of data in the collaboration?
- What are potential blockers of sharing the data and how will you overcome these?

Adopting universal data standards such as ISO can facilitate the harmonization of data sharing and alignment with regulations

Various standards from industry bodies and standardization organizations can help streamline your data sharing for circularity. Choosing the right standard will depend on your industries' standardization body.

- **ISO**

  Global standardization organization offering more that 25,000 different business standards

- **GS1**

  Global standardization organization in supply chain and product traceability, esp. in Retail

- **GRI**

  Global standardization organization with a focus on sustainability and impact

- **ESRS**

  European Sustainability Reporting Standards introduces with the Corporate Sustainability Reporting Directive (CSRD)

- **UN/CEFACT**

  Intergovernmental body of the United Nations that develops electronic business standards

ZOOMING IN ON THE ISO 59000[1]

Non-exhaustive

The ISO 59000 family of standards offers a global consensus on circular economy definition and principles. These standards provide a comprehensive toolkit for implementation, covering vocabulary, strategies, business models, value networks, measurement, and evaluation.

ISO 59004
Vocabulary, principles, and guidance for implementation

- **ISO 59010** — Guidance on transition of business models and value networks
- **ISO 59020** — Measuring and assessing circularity performance
- **ISO 59040** — Product circularity datasheet
- **ISO 59014** — Sustainability & traceability of secondary material recovery

Source: [1] ISO (2024), Circular economy — Vocabulary, principles and guidance for implementation

Case in point

Grundfos & Danfoss

With bold circularity ambitions of both Grundfos and Danfoss, the parties set out to define an industry standard for circular products – determining when a product is "circular enough" to claim that it is circular.

In the process of standardizing their definition of 'circularity', Grundfos & Danfoss made several learnings.

One reflection was to include multiple metrics when determining the "circularity degree" of a product to allow for coverage of various product types. One key measurement is weight when it comes to resource minimization, but combined with e.g., costs or carbon emissions the circularity scoring of components changes completely.

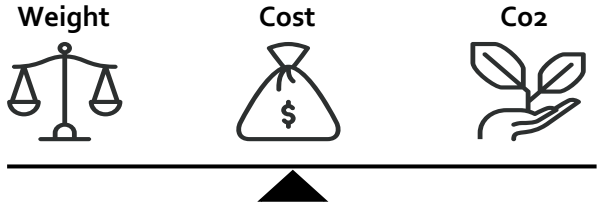
The collaboration is now iterating and exploring the metrics, before moving towards a shared taxonomy and metrics definition for product circularity in the pump industry.

"This collaboration was all about sharing information and insights to be able to establish and industry definition of circular products."

– Grundfos, Nordic Circular Accelerator participant

JOINTLY EXPLORING THE DEFINITION OF A 'CIRCULAR PRODUCT'

The collaboration discussed the impact of using weight, cost and/or CO2 as metrics to define the circularity of a product.



"A pump can reach 50% circularity by weight more easily than an electronic product, where more components must be recirculated to meet the same threshold — and where CO_2 emissions are often higher."- *Grundfos, Nordic Circular Accelerator participant*

Insights from the collaboration:

- ✓ Weight is a useful starting point, but often insufficient on its own
- ✓ Combining weight with cost or CO_2 helps reflect real circularity performance
- ✓ Different product types require different approaches – one metric may not fit all
- ✓ More concrete guidelines are needed from standards bodies on circular metrics
- ✓ Terms like remanufactured, refurbished, and reused should be defined with clear thresholds or ranges

Case in point

IOXIO & DAPONET

In collaboration with IOXIO, the DAPONET cluster is working together on circular product data sharing.

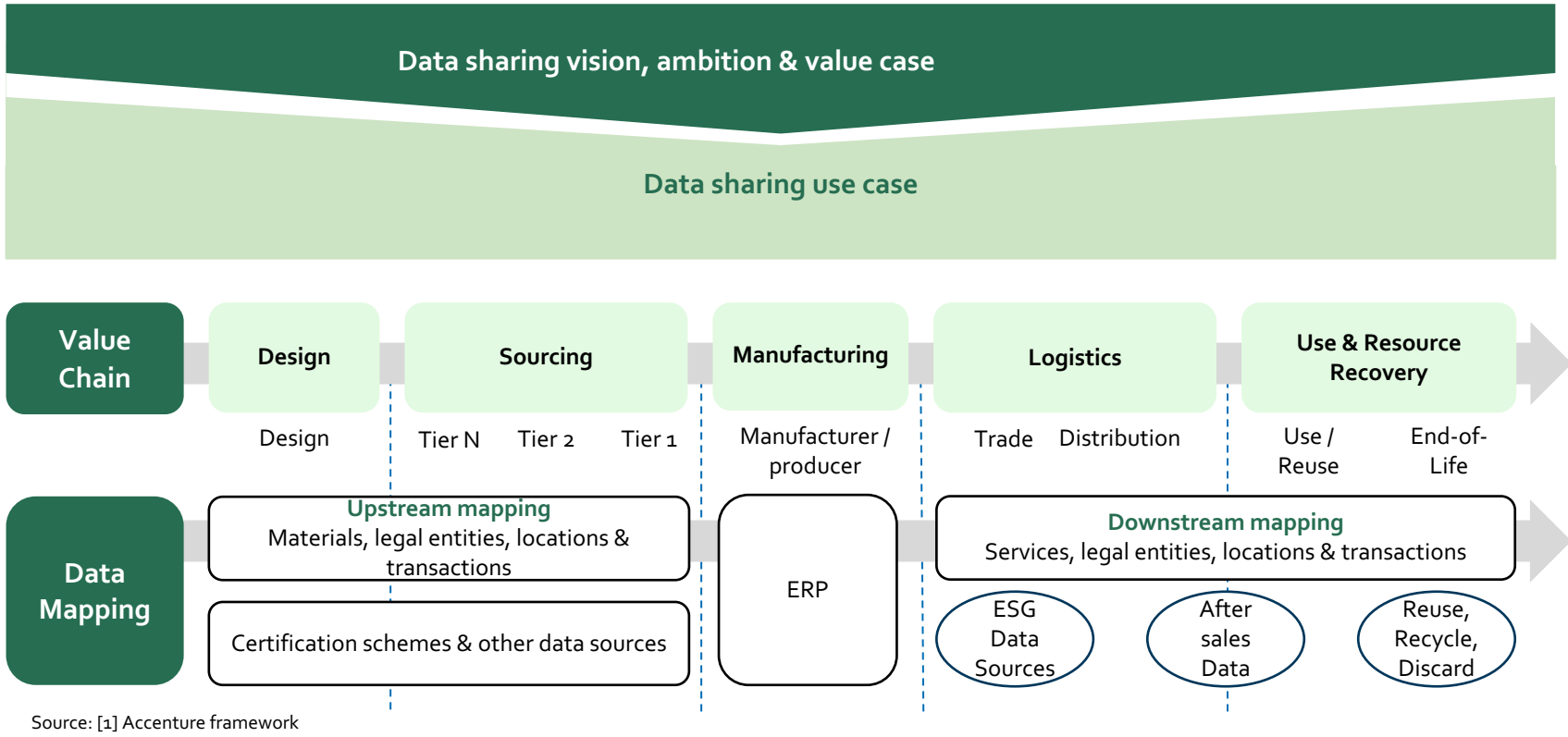
1. Map out the value chain for the selected business case
2. Outline key information flows in the selected value chain based on the defined use case
3. Discover relevant regulations and industry standards
4. Define the data needed to share across multiple parties according to regulatory requirements and industry standards
5. Identify the key data sources and users to define how data will be shared in practice outlining the responsibilities and workflows needed to deliver new value in collaboration

SANDVIK, ITANORDIC, nomet, HANZA, TASOWHEEL, ITA CONNECTION, IOXIO

"Not all data brings value – at least not from day 1. Focus on the most important data rather than sharing data for the sake of it."

- IOXIO, *Nordic Circular Accelerator participant*

DATA MAPPING TO IDENTIFY DATA REQUIREMENTS[1]



Source: [1] Accenture framework

Exercise

5-10 participants

1 h

Print your worksheet

Instructions

Divide participants into three groups and assign each one a value category (e.g., new business opportunities).Start by copying the relevant value drivers from your value case onto post-its.

Then, capture the key questions you need to answer to unlock that value—and the specific data points that need to be shared to answer those questions.

Wrap up by sharing your group's input with the full team to co-create a shared view of the data sharing requirements across the collaboration.

Next steps

Review data requirements and define data sources, availability and quality.

Define Data Requirements

Refer to answers from "Build a Value Case" exercise
or Business Value Framework in Data sharing vision, ambition & value casing

	New Business Opportunities	Brand & Innovation Enhancement	Business & Efficiency Optimizations	Risk Mitigation & Regulatory Compliance
Value Drivers	List the value drivers of your collaboration, as outlined in your value case*	List the value drivers of your collaboration, as outlined in your value case*	List the value drivers of your collaboration, as outlined in your value case*	List the value drivers of your collaboration, as outlined in your value case*
Key Questions	List the questions you have to answer to realize the value.	List the questions you have to answer to realize the value.	List the questions you have to answer to realize the value.	List the questions you have to answer to realize the value.
Data Requirements	List the data points needed to answer the questions above.	List the data points needed to answer the questions above.	List the data points needed to answer the questions above.	List the data points needed to answer the questions above.

Data management, governance & security

Why establish shared and secure data management practices?

Effective data management ensures the foundational capabilities necessary to govern, organize, secure, and utilize data efficiently, setting the foundation to enable efficient data sharing with third parties in a circular economy. In this way, successful data management is a critical precondition for generating value from your circular data sharing.

Data management

Data management refers to the process of collecting, storing, organizing, maintaining, and using circularity data in a way that optimizes its value and minimizes risks. It is your day-to-day operations to successfully manage and share data in your collaboration. It includes principles such as data governance, meta data management, and data security.

Data governance

Data governance is about how you govern and manage all data in your collaboration. Compared to data management, it focuses on the overarching structures, underlying principles, and contractual elements needed to be in place for successfully sharing circularity data.

Data security

Data security involves using policies, procedures, and technologies like access controls and encryption to prevent unauthorized access, use, or disclosure of data. It is crucial in cross-organizational collaboration, as lack of trust is a major barrier. Further, it is essential for regulatory compliance. Key frameworks include the EU Data Governance Act and the EU Data Act, which clarify how businesses can unleash the opportunities of shared data, while ensuring fair access and data protection.

"Data governance is almost as important as the problem you are solving – if you can't trust the data, you can never trust the solution that is built on top."

- Cognite, *Nordic Circular Accelerator participant*

Key learnings

- Build your data management and governance on established regulatory frameworks (e.g., EU Data Act) to create a strong and secure foundation for your collaboration
- Ensure data management practices are aligned with existing business practices of the participating actors to avoid data sharing activities to run in parallel
- Spend time setting up the right governance model – without proper data governance you risk non-reliable data, especially within sustainability
- Write down your data-sharing principles as a foundational contractual element in the early days of your collaboration to foster trust and transparency
- Seek to decentralize and distribute data-sharing responsibility in the ecosystem to ensure actors can manage and control their own data while still allowing for efficient data sharing
- Consider culture, change management, and upskilling as part of your data governance – data sharing with third parties is unnatural to most people

Get started with your data management, governance & security

Steps to follow

1 Define roles and responsibilities

Design the collaboration structure of your ecosystem by establishing clear roles and responsibilities. Consider how you will split the ownership and accountability of various data within the collaboration.

2 Draft data sharing policies and principles

Create rulebooks[1] aligned with European data sharing policies (e.g., EU's Data Governance Act and Data Act) on how you will use, store, retain, and protect data.

3 Outline privacy and security measures [link to exercise]

Consider what privacy and security mechanisms you will integrate in your collaboration and way of working with data to drive safety. Outline the measures you will take before and during your collaboration, leveraging the Data Privacy and Security Framework (p. 51)

4 Build and enforce a data sharing culture

Discuss how you will communicate and socialize in the ecosystem to ensure continuous engagement in the collaboration, increase share of learnings and best practices, and encourage a culture of ownership and progress.

Key questions to ask your collaboration in this step:

- How will we organize ourselves within the data sharing ecosystem?
- Who will be the orchestrator / facilitator of the collaboration?
- What actors are responsible for providing and securing what data?

- Who has access to what data under what conditions?
- What are the restrictions and conditions for using data shared in our collaboration?
- How might we comply current and future data regulations?

- How might we implement privacy and security measures by design?
- How might we collaborate in a way that drives privacy and security?
- How might we monitor and mitigate our privacy and security measures?

- How will we communicate and meet in the ecosystem?
- How might we encourage a culture where individuals take responsibility for the quality of the data they handle?
- How might we document and share our learnings?

Notes: [1] Take Inspiration from the "Rulebook model for a fair data economy" by Sitra

Establishing a Data Governance Framework will ensure standardized, efficient, and secure data sharing in your collaboration

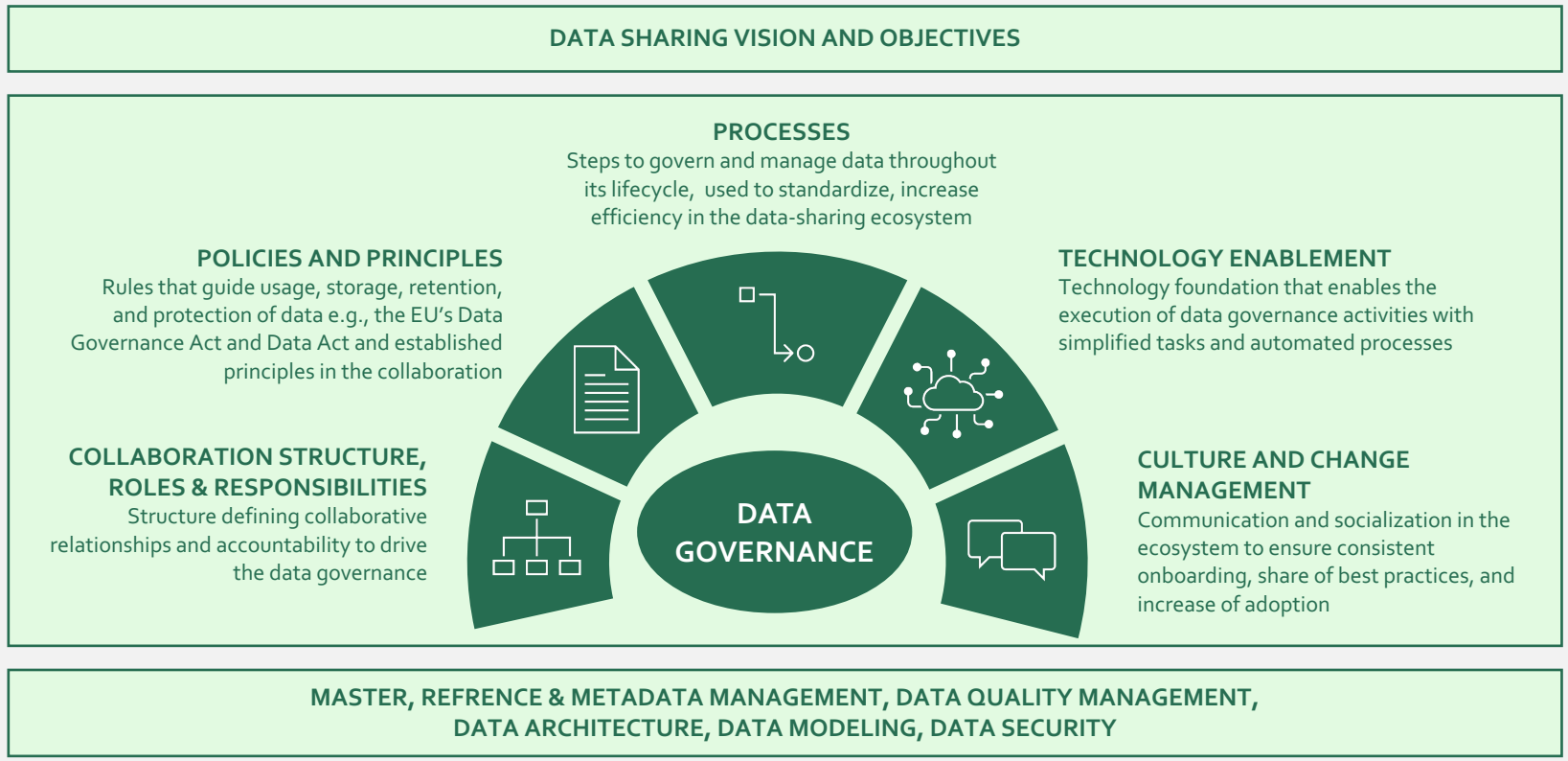
A strong data governance framework establishes a common ground of shared practices for data sharing.

A data governance framework is a set of rules, practices, and processes that defines how to share data in the ecosystem. By creating a data governance framework in your collaboration, you establish a common ground for the data sharing to ensure data will be shared in a streamlined, efficient, and secure manner.

The framework should be informed by the vision and objectives of your data sharing ecosystem and will inform how data is managed in the collaboration.

Tip! Revisit your data sharing vision, ambition, and value case (p. 29) when designing your data governance to ensure alignment.

DATA GOVERNANCE FRAMEWORK[1]



Source: [1] Accenture framework

Case in point

IOXIO & BESPORT

In collaboration with IOXIO, the BESPORT cluster is developing digital corridors for cargo to enable sustainable and profitable logistics chain.

The BESPORT cluster is creating new value by sharing operational, terminal and logistics data across stakeholder in the port. Data remains in its original systems, with full control retained by the data holders.

Through trusted data-sharing service, standardized formats enable seamless exchange between cargo handling machines and systems, supporting use cases like cargo turnaround optimization and electrification planning.

Data sharing is governed by clear and fair rules, ensuring responsible, legally compliant data use that strengthens the entire ecosystem.

"For data sharing to become a success, the legal and contractual premises must be in place and applied on a practical level."

- IOXIO, Nordic Circular Accelerator participant

ENSURING DATA INTEROPERABILITY AND TRUST THROUGH DATA SHARING PRINCIPLES

In our ecosystem, data sharing is...

CONTROLLED

Data stays within the original systems and the holders retain control over how their data is shared

STANDARDIZED

Data is in common formats and standards to ensure seamless exchange between systems

TRUSTED

Clear rules on data access, usage, and governance are established to build trust

FAIR

Data sharing is based on voluntary agreements and fair conditions

RESPONSIBLE

Participants must act responsibly and adhere to contractual and legal obligations

Addressing privacy and security early in the collaboration will help overcome data sharing barriers

By establishing comprehensive privacy and security mechanisms you can derisk data sharing and foster trust in your collaboration.

Privacy and security concerns are significant barriers for companies to engage in data sharing and should be addressed throughout any data sharing collaboration.

Integrate privacy and security mechanisms by design (e.g., clear data policies aligned with current regulations and minimal data collection) to build a secure foundation.

Foster trust throughout your collaboration by enforcing secure ways of working (e.g., anonymized or levelized data, secure data sharing platforms).

Continue to monitor and mitigate potential threats (e.g., with periodic risk assessments and risk response plans).

Tip! Seek to simplify the data requirements – you may not need to share as much as you think.

DATA PRIVACY AND SECURITY FRAMEWORK[1]

Design

Establish clear policies
Define shared rules on how data is collected, stored, processed, and shared, aligned with existing regulations

Integrate privacy early
Incorporate privacy considerations into the design of the data sharing ecosystem

Minimize data collection
Design for minimal collection of data to only collect data necessary for the collaboration

Collaborate

Use a secure data platform
Ensure all data shared between external stakeholders is shared in a safe manner (e.g., data space)

Control access
Implement role-based access controls to limit data access to authorized people only

Anonymize data
Use techniques to anonymize data wherever possible to protect sensitive business information

Monitor

Conduct regular audits
Regularly monitor systems and conduct security audits to identify and address security threats

Assess risks
Conduct periodic risk assessments to identify and mitigate potential risks

Prepare response plan
Develop and maintain an incident response plan to address data breaches promptly

Source: [1] VTT (2025), Data privacy and security framework)

Case in point

Catena-X

One way to practically implement data governance is through European 'data spaces' – and Catena X is a prime example.

A Data Space is a framework that supports data sharing within a data ecosystem by providing a clear structure for participants to share, trade, and collaborate on data assets. The EU commission strongly recommends the use of data spaces and is helping with initial funding for sector specific Common European Data Spaces to make more data available for access and reuse.

Catena-X is an advanced data space within the automative industry. Here it was found that a data space was a mean to share primary data securely and self-sovereignly along the value chain. The self sovereign identity mechanism enables trusted partner identification, and the access & usage policies define who is allowed to see which part of your data.

Catena-X Automotive Network

Network companies, among others: BMW, BASF, SAP, Mercedes-Benz, Volkswagen, Cofinity-X, Henkel, ZF, Siemens, T, accenture, Schaeffler

COMMERCIAL DATA SPACE IN THE AUTOMOTIVE INDUSTRY

Catena-X is a fundamental element for our recycling business. We benefit from much better access to secondary materials and a reliable source of qualitative primary data on the materials we purchase.

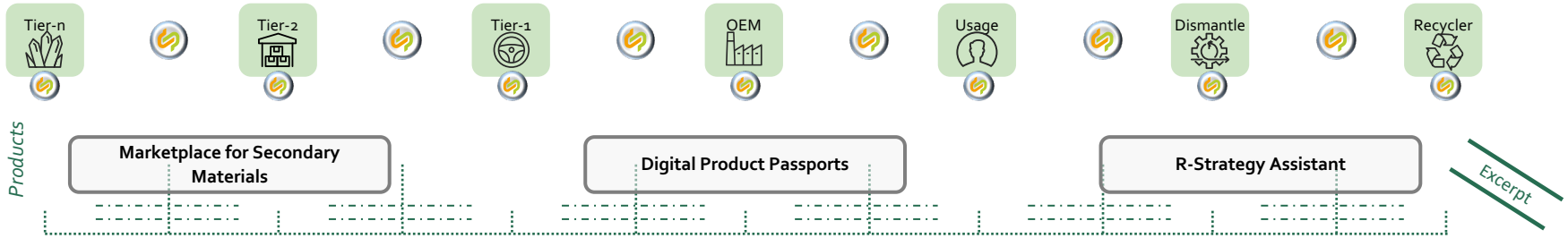
Global Chemicals Producer

Catena-X is essential for sovereign data exchange in the automotive industry. Without this platform and network, sustainability simply isn't possible—we can't do it alone.

Global Automotive Manufacturer

The secondary marketplace and product pass greatly simplify purchasing, giving us upfront material value and a leaner end-of-life process through better information.

Automotive Recycler



The 'one up, one down' principle ensures data privacy and security

Self-sovereign identity lets value chain actors store circularity data locally and share it securely, one step at a time, with direct value chain partners—reducing the risk of unauthorized access and ensuring better control over sensitive information. Note: This principle can also be applied to other data sharing models, e.g., a decentralized network model.

Exercise

5-10 participants

45 min

Print your worksheet

Instructions

Divide the group into two teams to brainstorm privacy and security initiatives for each category listed on the worksheet. Write your thoughts on post-it notes and place them on the worksheet.

Then, reconvene as a larger group to share your insights and engage in a discussion.

Cluster the post-it notes to identify 3-5 key initiatives for each category.

Next Steps

Make sure that the privacy and security initiatives are integrated into the collaboration (e.g., draft a rule book) and remember to review the list regularly during the collaboration.

Outline Privacy and Security Measures

Design How might we implement privacy and security measures by design?	**Collaborate** How might we collaborate in a way that drives privacy and security?	**Monitor** How might we monitor and mitigate our privacy and security measures?

Automate & scale

Data sharing model, technology & platforms

Why use technology to share data?

Technology plays an essential role in the success of data-sharing collaborations. It enhances efficiency and can bolster security through various safety measures.

Data sharing model

Before selecting technologies, you must agree on a data sharing model. A data sharing model is an abstract model that outlines how data is shared between actors in the collaboration. Where a *data model* organizes different types of data and how they connect, a *data sharing model* focuses especially on the sharing across actors and is crucial for a data sharing ecosystem to work. Various methods exists and are detailed on page xx.

Technology solutions

Various technology solutions enable circular data sharing. Data marketplaces let participants buy and sell data, data lakes store and process large amounts of data securely, blockchain facilitates secure decentralized data sharing with a distributed ledger, and data platforms handle the full process from data collection to business insights extraction.

Data platforms

There are multiple types of data platforms e.g., shared platforms and standalone platforms. A quality data platform collects multiple data from multiple sources in multiple formats through multiple carriers, then ingests, filters, and aggregates the data before exporting it for business purposes. Understanding the value chain scope and data requirements of your collaboration is crucial in selecting the appropriate data sharing platform.

"Focus on using technology to solve a problem – not the other way around. If you start with technology in search of a problem, you will end up with a useless solution."

- Cognite, Nordic Circular Accelerator participant

Key learnings

- Seek to automate wherever possible, reducing human intervention to mitigate human errors and the need for manual work
- Define key selection criteria up front in the collaboration (e.g., type of data model, budget, level of integration) to inform your technology choice(s)
- Consider your desired output (i.e., types of analytics and insights) when choosing a data-sharing technology solution
- Avoid focusing too early on technical details (e.g., latency, data replication) as this can delay and complicate project progress - rather ensure your technology solution is flexible and fit for the future
- Do not underestimate the cost and difficulty in scaling a data sharing solution – existing tech debt and legacy systems might make the technical scaling more cumbersome
- Consider your existing technology solutions (e.g., ERP system) and make sure any data sharing technologies of the collaboration integrates smoothly with your existing setup

Get started with your data sharing model, technology & platform

Steps to follow

1 Choose a data sharing model

Evaluate the various data sharing models (p. 57) and select the one that best suits the use case and data requirements of your collaboration.

2 Agree how to share data between your organizations

Consider how you will enable data sharing between your organizations and internal systems by outlining necessary integration methods (e.g., APIs) and carriers (e.g., product identification numbers).

3 Evaluate your existing technology setup

Assess your current technology infrastructure to determine if it – for now – can support your use case and data sharing activities. This will help you keep technical complexity low and allow you to get started.

4 Select data sharing solution [link to exercise]

If the existing setup does not accommodate your data sharing needs – or you aim to scale your efforts on the short term – refer to the types of data sharing platforms (p. 58) to determine the most suitable data sharing technology for your collaboration. Decide if you want to build a platform or pick an off-the-shelf solution from the market.

Key questions to ask your collaboration in this step:

- What should be our data sharing model in both the short and long term (considering pilot programs versus full-scale implementation)?
- How will our data sharing model meet our data needs and support our intended use case?

- How will data be exchanged among participants? What degree of integration will be involved?
- How will we guarantee interoperability across our different systems?
- How will we tackle privacy and security considerations from a technical perspective?

- How might we leverage existing tools to kick off the data sharing?
- How can we ensure the right access and roles through an existing setup?
- How might we scale our data sharing ambitions and activities over time – and what technology will we then need to support us?

- What data sharing tools could accelerate and scale the future data sharing efforts of our collaboration?
- What are key selection criteria for us when deciding on our data sharing solution (e.g., value chain coverage, budget)?
- Who are the potential vendors, and how can we partner with them?

Defining the data sharing model informs the selection of your data sharing platform – and the technology choices of your collaboration

Successful circular data sharing requires a suitable data sharing model and an appropriate platform.

There are four types of data sharing models:

(1) One step up, one step down: Circularity data is stored locally and shared when requested with immediate value chain actors

(2) Cumulative: Circularity data is generated upstream and moved forward alongside the product flow

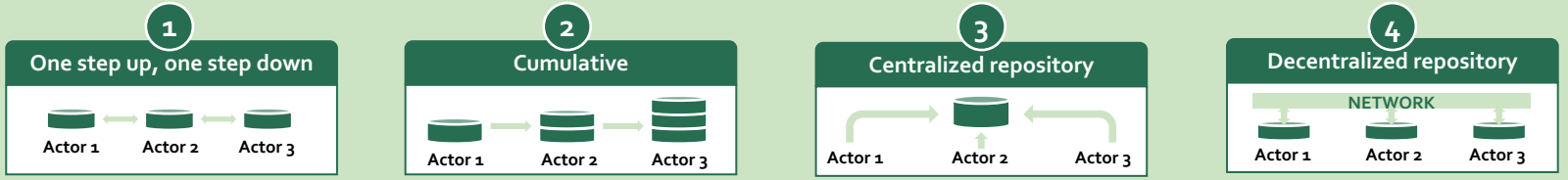
(3) Centralized repository: Circularity data is stored and shared through a central system

(4) Decentralized repository: Circularity data is kept in local systems and shared via a decentralized network as responses to queries

Tip! Detail the internal data models of the value chain actors before deciding on the shared data model.

CHOOSING THE RIGHT DATA SHARING MODEL[1]

Types of data sharing models



Types of data sharing platforms

A – OEM own platform
- (+) Low complexity
- (−) Uncertain adoption beyond tier 1

B – OEM consortium with its suppliers
- (+) Medium complexity
- (−) Upstream adoption beyond Tier-2 uncertain

C – OEM consortium with other OEMs and shared suppliers
- (+) Economy of scale
- (−) High complexity
- (−) Upstream adoption beyond Tier-2 uncertain

D – Consortium with other OEMs and open to all suppliers
- (+) Economy of scale
- (−) Very high complexity

E – Independent third-party governed open platform
- (+) Suppliers publish data once to share it multiples
- (+) Low complexity, low barriers to adoption
- (−) Constraints on platform control

Source: [1] Accenture framework

Your data sharing model should be decided based on desired value chain coverage, value chain interaction, and ease of ERP integration

Data sharing platforms offer pros and cons – specifying your needs will assist you to select the right one.

To minimize complexity and get started, we recommend beginning with your existing technology setup. If your current setup is not sufficient, there are several methods for establishing a data sharing platform, such as creating a new one, or utilizing an independent third-party governed platform. Each has advantages, e.g., lower complexity levels, and disadvantages, e.g., difficulty in encouraging suppliers to use the solution for data sharing.

When choosing the appropriate type of platform, there are three main factors to consider:

(1) The level of value chain coverage desired

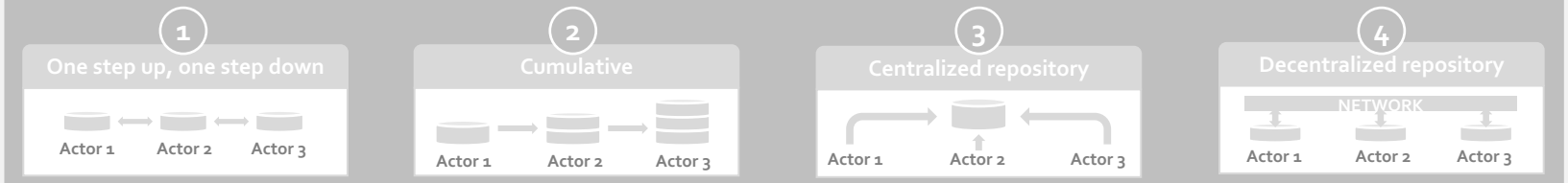
(2) The way the platform will interact with the value chain (e.g., proprietary versus open standard)

(3) The ease of integrating data from the platform into the existing ERP system

Other considerations could include budget, skills available to operate the platform, etc.

CHOOSING THE RIGHT DATA SHARING PLATFORM[1]

Types of data sharing models



Types of data sharing platforms

A – OEM own platform (new or existing)
- + Low complexity
- − Uncertain adoption beyond tier 1

B – OEM consortium with its suppliers
- + Medium complexity
- − Upstream adoption beyond Tier-2 uncertain

C – OEM consortium with other OEMs and shared suppliers
- + Economy of scale
- − High complexity
- − Upstream adoption beyond Tier-2 uncertain

D – Consortium with other OEMs and open to all suppliers
- + Economy of scale
- − Very high complexity

E – Independent third-party governed open platform
- + Suppliers publish data once to share it multiples
- + Low complexity, low barriers to adoption
- − Constraints on platform control

Source: [1] Accenture framework

Case in point

Boliden, Ericsson Connected Recycling, Telia, Transtema & Eltel

Boliden, Ericsson, Telia, Transtema & Eltel collaborated to use the existing Ericsson Connected Recycling (ECR) platform to drive material traceability, encourage reuse and recycling, and facilitate data-driven decision-making in the telecom industry.

The platform enables the sharing of structured data on material composition, volumes, and movement across the telecom value chain – from waste generators to recyclers and back to manufacturers. APIs and smart devices are integrated to automate data capture and reporting. This supports traceability, helps validate circular material loops, and guides process optimization.

One major challenge was aligning data formats and ownership across multiple stakeholders. The use of a common digital platform helped establish a shared framework and governance for data input, access, and use. Workshops and pilot site visits were key to defining system needs, identifying technical gaps, and co-creating digital solutions tailored to real operational flows.

BOLIDEN Telia Company ELTEL ERICSSON TRANSTEMA

"Our vision is to become the world's most climate-friendly and respected metal provider. To achieve this, we must lead in innovation and digitalization. The collaboration with Ericsson is essential for enabling enhanced circularity and for supporting our vision."

- Raymond Langevoort, Director Raw Materials at Boliden

ENABLING CIRCULAR TELECOM VALUE CHAINS THROUGH SHARED DATA PLATFORMS

- ECR enables **secure, real-time data sharing across the telecom value chain** to track materials from end-of-life to reuse
- Smart devices and APIs automate data collection and feed directly into a **unified portal for visibility and reporting**
- A **co-created governance model** ensures data ownership, and interoperability across manufacturers, recyclers, and telcos

Exercise

5-10 participants

2 hrs

Print your worksheet

Instructions

Decide the criteria for selecting a data sharing tool for your collaboration and document them on the worksheet.

Next, list potential data sharing tools by considering both existing and new options. Add these on post-its on the worksheet. Use the selection criteria to narrow down to three tools. List them on the short list section of the worksheet and detail the pros and cons of each.

Next Steps

Identify the necessary steps to determine a technological solution (e.g., develop a business case, assess technical feasibility) and rank them in a prioritized roadmap.

Select Data Sharing Tool

List of data sharing tools	What are data sharing tools/solutions you consider using to share data in your collaboration?

Tool selection criteria	What are the factors for you to consider when choosing the data sharing tool for your collaboration?

Reduced list of data sharing tools	
Data sharing solution #1	Pros
	Cons
Data sharing solution #2	Pros
	Cons
Data sharing solution #3	Pros
	Cons

Data analytics & insights

Why are data analytics & insights important in a data sharing collaboration?

Circularity data insights are what enable you to capitalize on your investment in data sharing capabilities, thereby maximizing both environmental and business value. Without these insights, no real progress can be made, and sharing data is pointless. These insights empower proactive future planning rather than reactive responses.

Data analytics

To get to the insights you perform data analytics. Here you move from the "where are we" to the "what do we need to do" by discovering patterns from the data. Depending on the maturity of your collaboration, you can use algorithms and AI tools to unlock the insights from vast interconnected data sets, such as machine learning to predict maintenance patterns to extend product lifespans or GenAI to propose alternative materials for improved recyclability.

Data insights

Analytics offer many narratives, but insights direct your focus. They enable you to move from circular data sharing to sustainability and business actions. Insights are often presented in a user-friendly dashboard to simplify the understanding of the insight and visualize the expected business impact. Typically, dashboards are developed internally or within individual business units. However, sharing circularity data can facilitate the distribution of insights across the ecosystem, ensuring that all stakeholders have access to the information necessary to make informed business and environmental decisions.

"Utilizing circularity data and insights enables us to create new customer value, increase profitability, and drive sustainability."

- IOXIO, Nordic Circular Accelerator participant

Key learnings

- Get the data model right – the more time you spend on modelling the data correctly, the quicker you can derive actionable insights and realize value
- Focus on data quality and reliability as it is the paramount for any data analytics and insights – if you torture bad data enough, and it will confess to anything
- Be smart about the investment in AI tools – when applied effectively, they will accelerate and enhance your data analytics, but it is possible to start on a smaller scale without them
- Seek insights that can influence decision-making and foster business growth, rather than merely focusing on compliance and reporting tasks
- Create feedback mechanisms that connect insights back to the original vision and value proposition of the collaboration, ensuring that the collaboration continues to produce value over time
- Establish a culture focused on data beyond collaboration to integrate business knowledge, sustainability expertise, and data insights throughout the entities within the ecosystem

Get started with your data analytics & insights

Steps to follow

1 Collect, clean & analyze data

Consolidate data from value chain partners relevant to your agreed use case. Harmonize definitions, formats, and quality to ensure insights can be trusted and compared.

2 Design & set up user-friendly frontend data visualizations

Use tools like Power BI to create a shared dashboard that visualizes key insights for your use case. Ensure the dashboard reflects multiple stakeholder perspectives—enabling joint decision-making on the defined use case.

3 Test with partners & iterate together

Validate the dashboard with users from each partner organization. Gather feedback on clarity, usability, and relevance to the use case—then iterate the design and data logic together to improve adoption and value creation.

4 Close the loop by revisiting the shared value case [link to exercise]

Close the loop by using insights to revisit the original purpose and ambition of the collaboration. Assess progress against the shared value case (see the chapter on Data sharing vision, ambition & value casing), and calibrate expectations and goals where alignment is lacking

Key questions to ask your collaboration in this step:

- Are we collecting the most relevant and high-quality data for our chosen use case?
- What data gaps or inconsistencies are limiting our ability to generate insights?

- Does the dashboard provide actionable insights tailored to our use case?
- Is the dashboard user-friendly and aligned with stakeholder needs?
- Are all partners able to access and interpret the insights based on their roles and decisions?

- Are partners finding the dashboard useful for collaborative action?
- What friction points or misalignments are emerging?
- How can we implement improvements to support shared impact?

- How effectively are insights supporting delivery on both the shared value case and the specific use case?
- What's working well – and where do we need to adapt, e.g., introduce new KPIs?
- How to utilize the insights now for decision making?

Data analytics and insights extract sustainability impact and business value from your data sharing collaboration

Data analytics transforms your circularity data into actionable insights – aligning your data sharing objectives with business value.

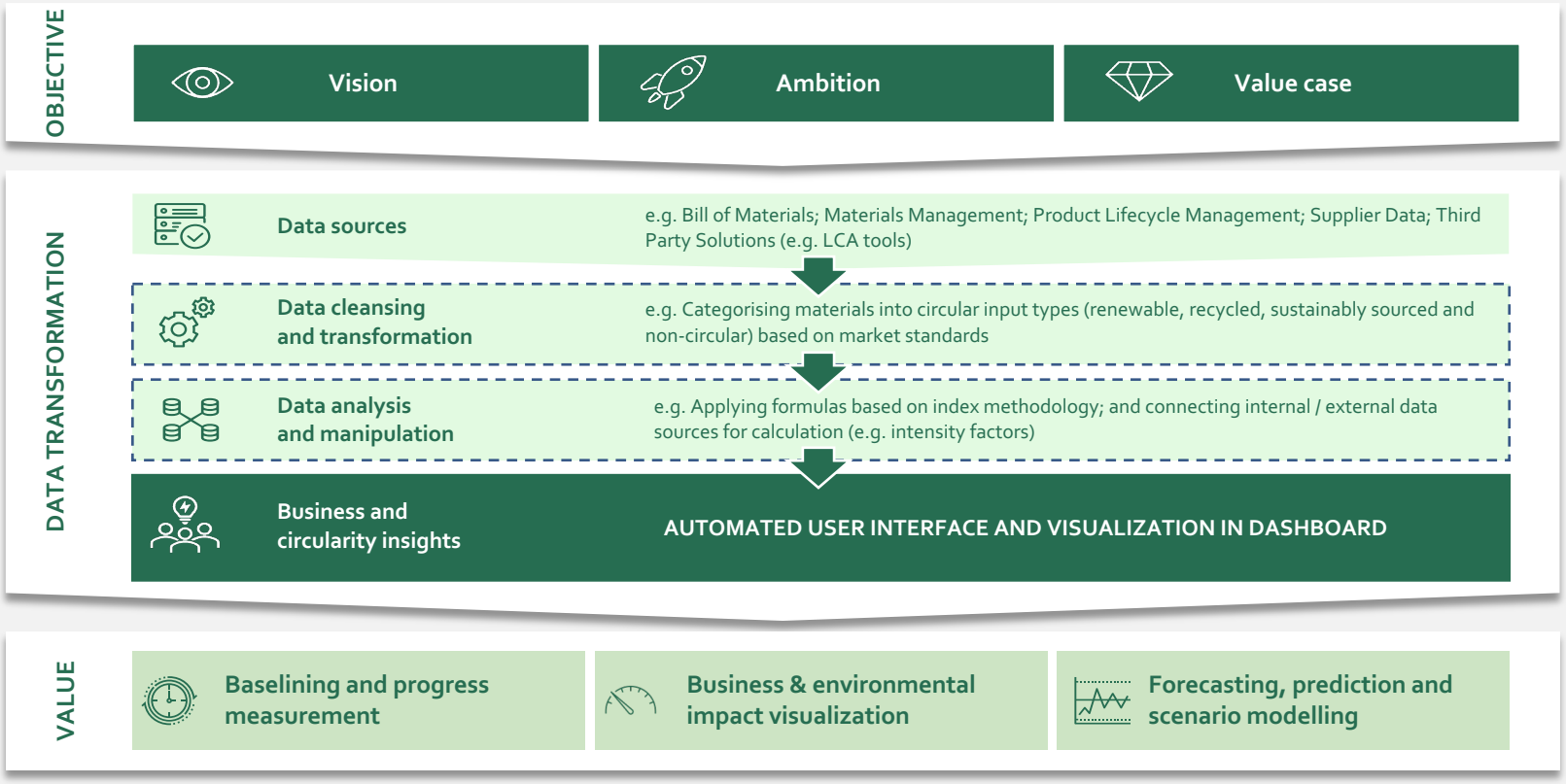
Establishing data analytics and insights capabilities is the final phase of establishing a successful data sharing ecosystem.

With a clear understanding of the collaboration purpose, data and data sources are identified and analyzed to produce insights that will guide actions across the value chain and generate business value and impact.

Keep in mind – different stakeholders and partners will need different types of insights depending on their roles, decisions, and data maturity. These should be clarified early and revisited as collaboration evolves.

Tip! Use feedback loops to understand if the data collected, shared, and analyzed generates the expected value as established in the original value case.

FROM DATA SHARING TO BUSINESS VALUE[1]



Source: [1] Accenture framework

Case in point

Sandvik Coromant, SKF and Wolfram

With an established customer recycling business for used carbide tools, **Sandvik Coromant** teamed up with **SKF** (customer) and **Wolfram** (recycling partner) to create a customer facing dashboard to visualize the value provided by recycling.

The key objectives included identifying data and customer needs, developing a proof-of-concept, and exploring the recycling value stream.

A key enabler of the project was in-person collaboration, including site visits and hands-on research. This made it possible to trace the product's journey in real life and clearly identify the data required.

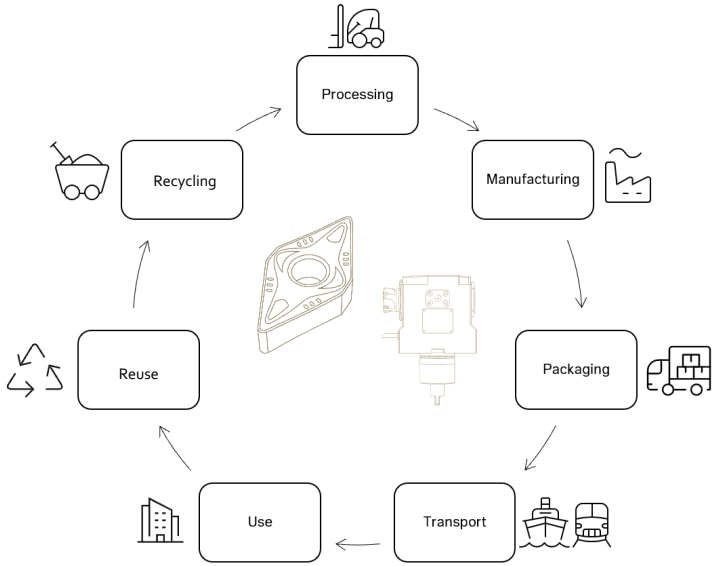
Key learnings from the project showed that while accessing raw data was relatively straightforward, challenges remained around data handling, security, and formatting. Over time, the perceived value of recycling also shifted – from an initial focus on financial outcomes to a greater emphasis on sustainability data and its relevance to the customer.

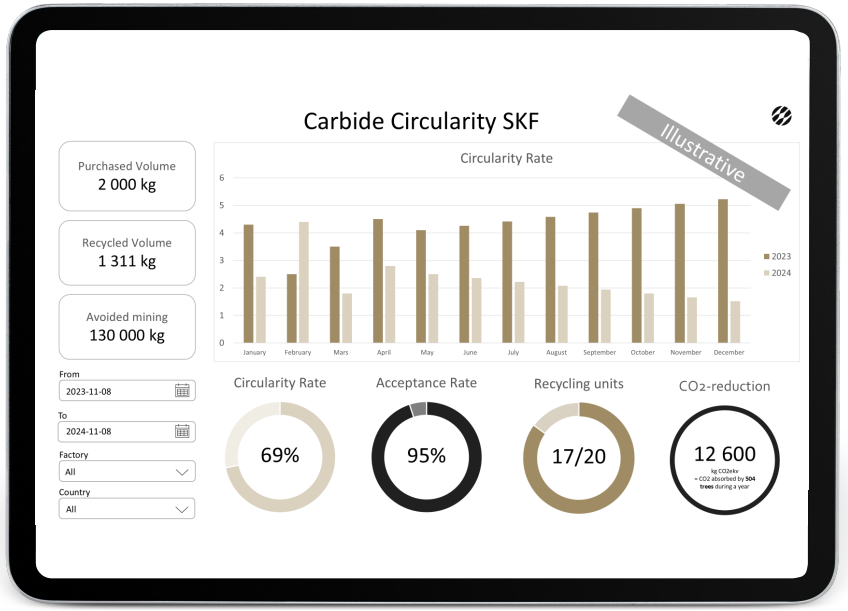
SANDVIK Coromant SKF wolfram

"Through collecting and analyzing data, we realized the critical importance of high-quality, reliable data – especially when it comes to sustainability."

Sandvik Coromant, participant in the Nordic Circular Accelerator

A SOLUTION TO DEMONSTRATE THE VALUE OF TOOL RECYCLING TO CUSTOMERS





- The project involved analyzing data from recycling flows
- Specific data points included customer return patterns, and material recovery rates
- This data was used to map value creation, enable traceability, and support sustainability reporting
- Visualization and insights are being developed using Power BI

Exercise

5-10 participants

1 hrs

Print your worksheet

Instructions

Build on the value drivers and data points from earlier exercises. In small groups, define how to measure progress for each value category.

Use post-its to capture: a) KPIs that reflect progress toward your circularity use case and value case; b) Targets that match the ambition level of your collaboration. Then, come together as a full group to share and cluster ideas. Aim to align on 2–3 key KPIs and targets per category.

Next steps

Use the agreed KPIs and targets to inform dashboard development and track progress. Revisit them regularly to stay aligned with your shared goals and evolving use case.

Define KPIs and Targets

This exercise is a continuation of "Define Data Requirements"

	New Business Opportunities	Brand & Innovation Enhancement	Business & Efficiency Optimizations	Risk Mitigation & Regulatory Compliance
VD	Value drivers from "Define Data Requirements"	Value drivers from "Define Data Requirements"	Value drivers from "Define Data Requirements"	Value drivers from "Define Data Requirements"
IN	Insights from "Define Data Requirements"	Insights from "Define Data Requirements"	Insights from "Define Data Requirements"	Insights from "Define Data Requirements"
DR	Data requirements from "Define Data Requirements"	Data requirements from "Define Data Requirements"	Data requirements from "Define Data Requirements"	Data requirements from "Define Data Requirements"
KPIs	How will your measure progress?	How will your measure progress?	How will your measure progress?	How will your measure progress?
Targets	What are your targets?	What are your targets?	What are your targets?	What are your targets?

Reference list and further readings

References

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- Various legislations from the European Commission
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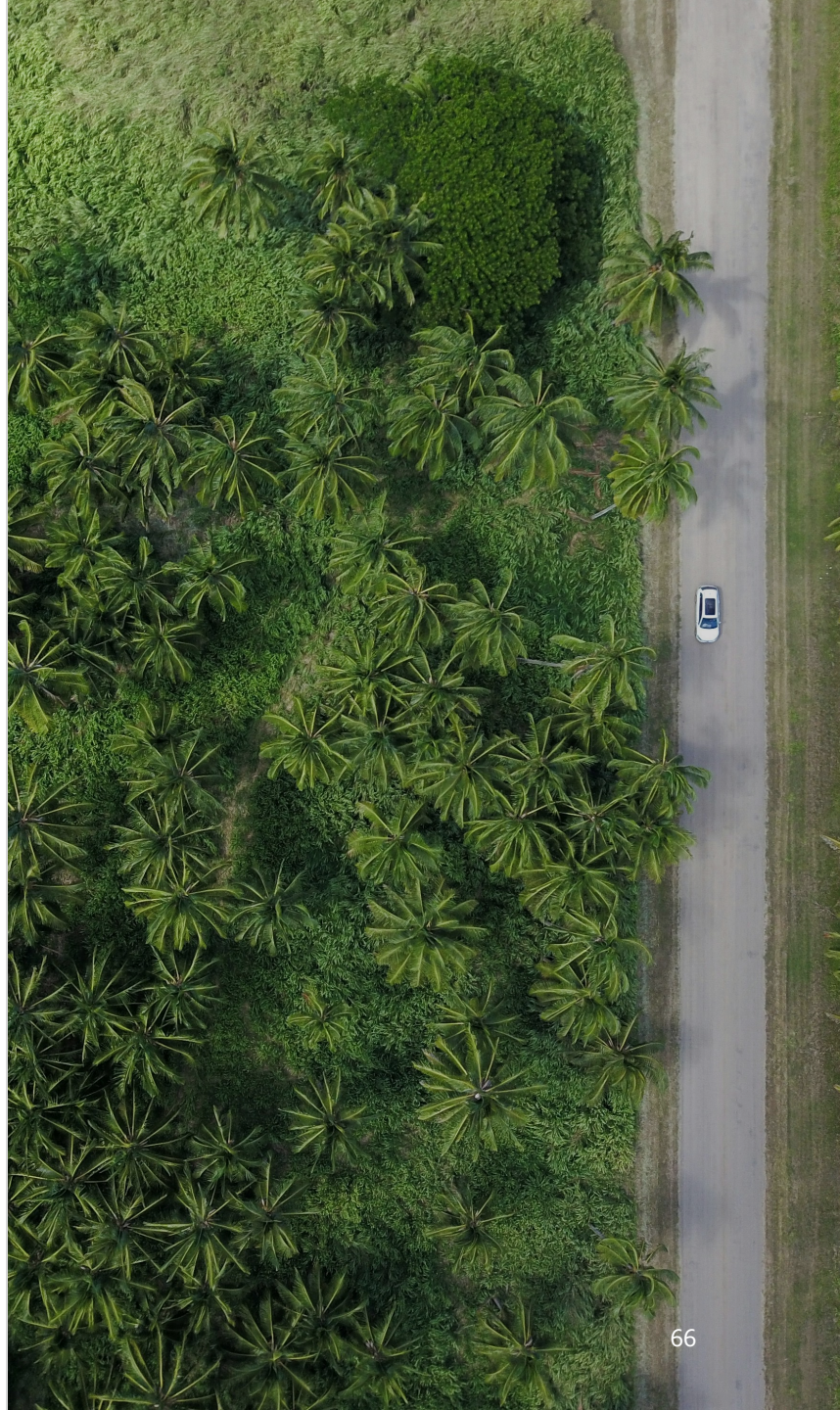
Want to learn more?

Nordic Innovation & Accenture have a long-standing partnership, fostering thought leadership on circular economy and data sharing. Find more relevant materials on Nordic Innovation's website, such as:

- **Nordic Circular Economy Playbook**
- **Nordic Circular Economy Playbook 2.0**
- **Data Sharing for a Circular Economy in the Nordics**



About this publication

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- Value-Chain Data Sharing for Circular Business Value

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