

**Realising the Transition to the Circular Economy:
ReTraCE**

Report on Milestone M3 (M1.3)

Development and launch of questionnaire surveys for investigating (on a large-scale) risk and relationship management issues and their relationship to the circularity of supply chains



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Milestone M3 Overview

The Circular Economy (CE) has gained momentum among practitioners, policymakers, and scholars. It is a system of production and consumption that aims to keep products, components, materials, and energy in circulation over a long period in order to continue adding, recreating, and maintaining value (Esposito, Tse, & Soufani, 2018; Ghisellini, Cialani, & Ulgiati, 2016). Consequently, it requires significant changes in the design of Supply Chains (SCs), which so far have evolved as linear (based on a take-make-dispose approach) (De Angelis, Howard, & Miemczyk, 2018). Within this context, the implementation of the CE presents some challenges in terms of organisational, political, economic, and technological features (Genovese et al., 2017).

First, the emergence of Circular Supply Chains (CSCs) increases the complexity in operational decisions, hence offering opportunities for scholars to delve into the challenges managers may face. For instance, due to critical materials supply risks, supply chains (SCs) are likely to suffer disruptions. Although companies can search for less-critical alternatives to continue producing, an alternative in line with circular and closed-loop thinking relates to the development of products that can reduce environmental impacts across their life-cycles, and that are of good quality, repairable, and recyclable (Peck, Kandachar, & Tempelman, 2015). However, this process still depends on establishing reverse networks for end-of-life (EoL) and end-of-use (EoU) products, materials, and components, which face uncertainties in terms of quality, availability, and timing of returns (Werning & Spinler, 2020).

Second, in order to overcome such uncertainties, good relationships need to be managed among the SC partners. Hence, many scholars have accentuated that collaboration between organisations is essential to managing a CSC (Bressanelli et al., 2018; De Angelis et al., 2018). However, they barely discuss how to improve collaborations through actions. Focusing on the practices ensuring the



collaboration may assist in understanding the role of relationship management for the successful implementation of CSCs in managerial contexts. It is, therefore, necessary to unpack risk and relationship management issues in the context of CSCs and their relationship to more sustainable systems of production (Farooque et al., 2019).

Against this backdrop, the purpose of Milestone M3 is to develop a survey for investigating, on a large-scale, risk and relationship management issues in CSCs and their linkage to economic, environmental, and social dimensions of sustainability. It is noteworthy that Dillman, Smyth, and Christian's (2014) highlights were key on informing how to tailor sample surveys with a focus on reducing coverage, sampling, nonresponse, and measurement errors, which can undermine the quality of the data collected. Accordingly, the survey was developed based on well-known and reliable constructs from Supply Chain Resilience (Pettit, Croxton, & Fiksel, 2013); Supply Chain Collaboration (Chen et al., 2017); and Triple Bottom Line (TBL) literature (Dyllick & Hockerts, 2002). Besides, fewer questions to measure the constructs are considered, which means that a higher response rate can be expected (Flynn et al., 1990). The survey is attached in Appendix A.

References

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Appendix A

Overview and Objective

The Circular Economy has been proposed as an alternative system of production and consumption that enhances the natural capital and offers business opportunities. The application of the Circular Economy ideal in the business world can nevertheless evolve further issues that require scholarly attention. We, therefore, kindly invite you to respond to this survey. Your contribution is of great importance to accelerating the transition toward the CE, mainly when it comes to Supply Chains. It is essential to mention that our research group will securely and confidentially maintain your responses. This step ensures compliance to research ethical dimensions. Thank you in advance for your insightful participation.

ReTraCE Project Overview

Realising the **T**ransition to the **C**ircular **E**conomy, ReTraCE, is a research project funded by Horizon 2020 EU's Marie Skłodowska-Curie Innovative Training Networks and will support the implementation of the European Commission's Circular Economy strategy (grant agreement number 814247). Further information can be found on <http://www.retrace-itn.eu/>

Background Information

1. In which industry is your business?

- Construction
- Agriculture
- Pharmaceutical
- Electronics
- Automotive
- Other

2. Where is your company located?

- Germany
- The United Kingdom (UK)
- Belgium
- Greece
- Italy



- Netherlands
 - Sweden
 - Other
3. How long has the company focused on Circular Economy applications?
- Less than 1 year
 - 1-5 years
 - 5-10 years
 - More than 10 years
4. What is your position at your company?
- Top-level management
 - Middle-level management
 - Operational-level management

Part 1 – Resilience

In order to assess the challenges to the implementation of the Circular Economy in your company, you will be asked about potential **vulnerabilities**, which are factors that make business operations susceptible to risks. You will also be asked to assess the attributes that are enabled by your company to mitigate or prevent disruptions, called **capabilities**. Both vulnerabilities and capabilities are related to **resilience**, the ability of an enterprise to survive, adapt, and prosper in the face of constant changes and uncertainties.

Please indicate your agreement or disagreement from 1-5 (1 = Strongly Disagree, 5 = Strongly Agree)

Vulnerabilities

Turbulence: Environment characterised by frequent changes in external factors beyond your control.

1. Our products face unpredictable customer demand.
2. We depend on inputs and/or export markets that experience constant currency or price fluctuations.
3. Our facilities or markets are frequently exposed to natural disasters.



Deliberate Threats: Intentional attacks aimed at disrupting operations.

1. Our operations are frequently impeded by Special Interest Groups.
2. Our operations or products may face liability claims.

External Pressures: External Influences that create business constraints or barriers.

1. Our operations and/or products are subject to stringent and/or changing government regulations.
2. Our products face strong price competition or competitive innovation.
3. Environmental concerns influence how we design our products and/or conduct our operations.

Resource Limits: Constraints on output based on the availability of the factors of production.

1. We are often uncertain about the availability of product returns from suppliers or customers.
2. Recyclable materials for our products are scarce or in high demand.
3. Utilities are over-extended, and our utility infrastructure is poor.
4. We have difficulty recruiting and retaining highly skilled workers.

Sensitivity: Importance of carefully controlled conditions for product and process integrity.

1. We depend on the use of regulated or restricted materials.
2. The quality of our products is highly dependent on the quality of our inputs/supplies.
3. Our products require strict storage or handling controls to maintain their purity and/or integrity.
4. Our production operations are very complex.
5. Our workers sometimes operate in extreme or hazardous conditions.
6. Our suppliers or production facilities are geographically concentrated and/or co-dependent.

Connectivity: Degree of interdependence and reliance on outside entities.

1. Our supply chain has a large number of members.
2. Continuous information flow is critical to regular operations.

Supplier/Customer Disruptions: Susceptibility of suppliers and customers to external forces or disruptions.



1. Our suppliers frequently face significant disruptions.
2. Our customers frequently face significant disruptions.

Capabilities

Flexibility in Sourcing: Ability to quickly change inputs or the mode of receiving inputs.

1. Our finished goods use modular designs.
2. Our supply contracts can be easily modified to change specifications, quantities, and terms.
3. We have many alternate and reliable sources for key inputs.

Flexibility in Order Fulfilment: Ability to quickly change outputs or the mode of delivery.

1. We can quickly vary outsourced storage, distribution, and other services.
2. We have a sophisticated inventory management system that regularly computes both safety stock and cycle stock at all storage and retail locations.

Capacity: Availability of assets to enable sustained production levels.

1. We have reliable back-up utilities (electricity, water, communications).
2. We maintain access to duplicate or redundant facilities and equipment.

Efficiency: Capability to produce outputs with minimum resource requirements.

1. Our assets are effectively utilised with no limiting bottlenecks.
2. We consistently produce high-quality products with little waste.
3. We have effective preventative maintenance programs.

Visibility: Knowledge of the status of operating assets and the environment.

1. We have information systems that accurately track all operations.
2. We have a regular interchange of information among suppliers, customers, and other external sources.

Adaptability: Ability to modify operations in response to challenges or opportunities.

1. We use strategic gaming or simulations to design more adaptable processes.
2. We employ innovative technologies to improve operations.
3. We continually strive to reduce lead-times for our products.



Anticipation: Ability to discern potential future events or situations.

1. We effectively use demand forecasting methods.
2. We have formal risk identification and prioritisation process.
3. We recognise new business opportunities and take immediate steps to capitalise on them.

Recovery: Ability to return to normal operational state rapidly.

1. We can quickly organise a formal response team of key personnel, both on-site and at the corporate level.
2. We take immediate action to mitigate the effects of disruptions, despite the short-term costs.

Dispersion: Broad distribution or decentralisation of assets.

1. Our key inputs are sourced from a decentralised network of suppliers.
2. Our production facilities are distributed at various locations.
3. Our products are sold to customers in a variety of geographic locations.

Organisation: Human resource structures, policies, skills, and culture.

1. We encourage creative problem-solving.
2. We are a learning organisation, regularly using feedback and benchmarking tools.

Market Position: Status of a company or its products in specific markets.

1. Our brands have excellent customer recognition and a strong reputation for quality.
2. Our products command a significant share of the market.
3. Our customers can clearly differentiate our products from competitors' products.
4. Representatives of our firm communicate effectively with our customers.

Security: Defence against deliberate intrusion or attack.

1. We use stringent restrictions for access to facilities and equipment.
2. We effectively collaborate with government agencies to improve security.

Financial Strength: Capacity to absorb fluctuations in cash flow.

1. Our portfolio of businesses is very diverse.



2. We sell our products at a relatively high margin.

Part 2 – Relationship Management

Supply chain relationships are important for ensuring the circularity of Supply Chains. Different good practices assist in managing these relationships with different actors in the supply chains. Hence, we focus on the relationships managed internally and externally of your company.

Please indicate your agreement or disagreement from 1-5 (1 = Strongly Disagree, 5 = Strongly Agree)

Internal collaboration for sustainability in CSCs

1. We focus on internal process integration to improve process connectivity and simplify the processes.
2. We implement cross-functional coordination among different teams in the organisation.
3. We adopt environmental management systems to monitor the environmental performance of the organisation.

External collaboration for sustainability in CSCs

External vertical collaboration with suppliers/ customers

1. We monitor our suppliers by conducting activities such as audits, third-party certifications, etc.
2. We integrate environmental considerations into our purchasing policies.
3. We place trust on our supplier/customer organisations.

Supplier/customer integration

1. We share necessary information such as forecasts, production plans, etc. with our suppliers/ customers.
2. We frequently communicate with our suppliers/ customers.
3. We conduct supplier development programs to improve the sustainability performance.
4. We integrate our infrastructure with suppliers/ customers to improve sustainability performance.
5. We share our responsibility to recover products with our suppliers/customers.
6. We place penalties and incentives with our suppliers/customers for sustainability-related actions.



7. We make joint decisions with suppliers/ customers during product/process design/modifications to ensure sustainability performance.
8. We integrate our technological and logistical systems with our suppliers/customers.

External horizontal collaboration

1. We share our excess capacity with other manufacturers (e.g., independent parties/competitors) during operations such as distribution, recycling, etc.
2. We get together with interested parties such as NGOs and entrepreneurs to manufacture environmentally conscious products using recovered materials etc.
3. We work closely with NGOs to share/gain experience and knowledge relating to Circular Economy.
4. We work closely with governments and other authorities to share/gain experience and knowledge relating to Circular Economy.
5. We work closely with the community around us to share/gain experience and knowledge relating to Circular Economy.

Part 3 – Sustainability Performance

Please indicate your agreement or disagreement from 1-5

(1= Strongly Disagree, 5= Strongly Agree)

1. We have sufficient cash flow to guarantee liquidity.
2. We produce a persistent above-average return to our shareholders.
3. We only use raw materials that are consumed at a rate below the natural reproduction, or at a rate below the development of substitutes.
4. We do not cause emissions that accumulate in the environment at a rate beyond the capacity of the natural system to absorb and assimilate these emissions.
5. We are not engaged in activities that degrade the ecosystem.
6. Our company adds value to the communities within it operates by offering further training and opportunities.
7. Our social capital is managed in such a way that stakeholders can understand its motivations and can broadly agree with the company's value system.



*Thank you for your participation. Your contribution today is of great importance for improving the implementation of
Circular Supply Chains.*

