



**International
Standard**

ISO 59010

**Circular economy — Guidance on
the transition of business models
and value networks**

*Économie circulaire — Recommandations relatives à la
transition des modèles d'affaires et des réseaux de valeur*

**First edition
2024-05**

STANDARDSISO.COM : Click to view the full PDF of ISO 59010:2024

STANDARDSISO.COM : Click to view the full PDF of ISO 59010:2024



COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Setting goals for the transition to a circular economy value creation model and its boundary	5
4.1 Goal definition.....	5
4.2 Understanding the current value creation model and value network of the organization.....	5
4.3 Mapping the value chain and networks of flows.....	7
4.4 Setting the boundary for addressing circularity.....	7
4.5 Understanding current circularity performance.....	8
4.6 Considering actions that contribute to a circular economy.....	9
4.6.1 General.....	9
4.6.2 Actions that create added value.....	9
4.6.3 Actions that contribute to value retention.....	12
4.6.4 Actions that contribute to value recovery.....	13
4.6.5 Actions to regenerate ecosystems.....	16
4.6.6 Actions to support a circular economy transition.....	16
4.6.7 Guidance for resource management actions.....	18
5 Determining a circular economy strategy	19
5.1 Identifying gaps and opportunities.....	19
5.2 Determining a circular economy strategy based on circular economy principles.....	20
5.3 Addressing economic rationalization.....	21
6 Transitioning the value creation model of an organization towards circularity	22
6.1 Developing a plan.....	22
6.2 Reviewing the elements of the value creation model in light of desired changes.....	22
6.2.1 General.....	22
6.2.2 Value proposition.....	22
6.2.3 Key activities.....	22
6.2.4 Key business resources.....	22
6.2.5 Customer segments.....	23
6.2.6 Customer relationships.....	23
6.2.7 Channels.....	23
6.2.8 Costs.....	23
6.2.9 Revenue streams.....	23
6.2.10 Key partners.....	24
6.2.11 Other elements.....	24
6.2.12 Other considerations.....	24
7 Transitioning a value network towards circularity	24
7.1 General.....	24
7.2 Establishing shared objectives, strategy and plan.....	25
7.3 Implementing appropriate value network governance.....	26
7.4 Leveraging or establishing shared infrastructures (physical and digital).....	26
8 Reviewing and monitoring for continual improvement	26
8.1 Measuring and assessing circularity performance.....	26
8.2 Improving the value creation model of the organization.....	27
8.3 Improving the value network.....	27
Annex A (informative) Supplementary examples	28
Bibliography	35

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 323, *Circular economy*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

0.1 Background

The global economy is “linear” as it is mainly based on extraction, production, use and disposal. This linear economy leads to resource depletion, biodiversity loss, waste and harmful losses and releases, all of which collectively are causing serious damage to the capacity of the planet to continue to provide for the needs of future generations.^[23] Moreover, several planetary boundaries have already been reached or exceeded.

There is an increased understanding that a transition towards an economy that is more circular, based on a circular use of resources, can contribute to meeting current and future human needs (welfare, housing, nutrition, healthcare, mobility, etc.). Transitioning towards a circular economy can also contribute to the creation and sharing of more value within society and interested parties, while natural resources are managed to be replenished and renewed and in a sustainable way, securing the quality and resilience of ecosystems.

Organizations recognize many potential reasons to engage in a circular economy (e.g. delivering more ambitious and sustainable solutions; improved relationships with interested parties; more effective and efficient ways to fulfil voluntary commitments or legal requirements; engaging in climate change mitigation or adaptation; managing resource scarcity risks, increasing resilience in the environmental, social and economic systems), while contributing to satisfying human needs.

The ISO 59000 family of standards (see [Figure 1](#)) is designed to harmonize the understanding of the circular economy and to support its implementation and measurement. It also considers organizations, such as government, industry and non-profit, in contributing to the achievement of the United Nations (UN) Agenda 2030 for Sustainable Development^[24].

ISO 59004, *Circular economy — Vocabulary, principles and guidance for implementation*

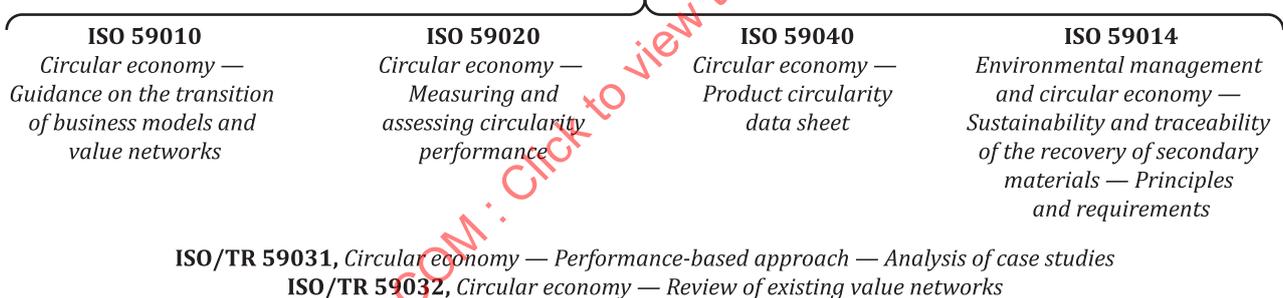


Figure 1 — ISO 59000 family of standards

0.2 Relationship between ISO 59004, this document and ISO 59020

ISO 59004, this document and ISO 59020 are interconnected, as shown in [Figure 2](#), and support organizations in implementing a transition towards a circular economy.

ISO 59010:2024(en)

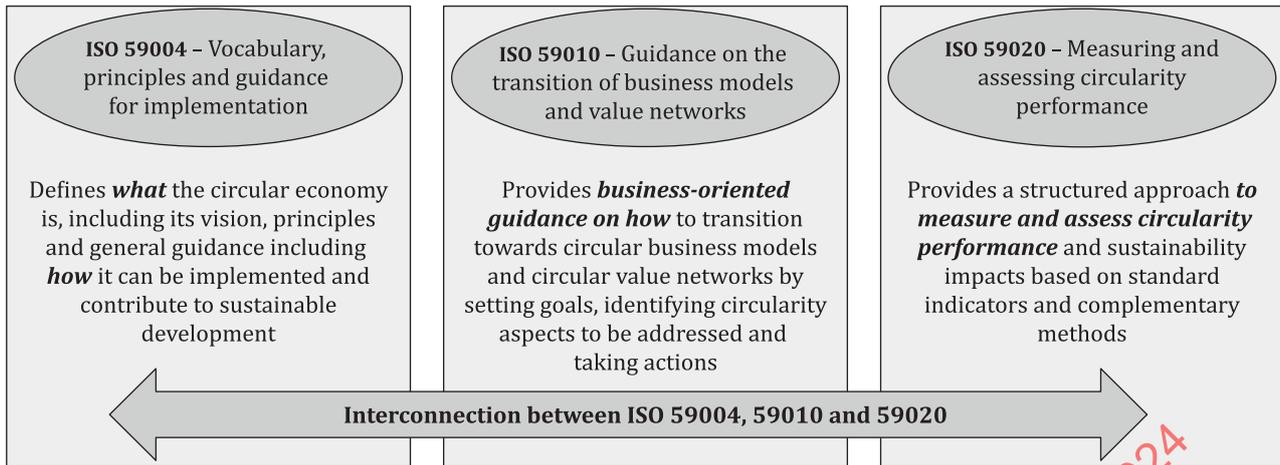


Figure 2 — Relationship between ISO 59004, this document and ISO 59020

0.3 Purpose and the outline of this document

Today's predominant linear economy-based value creation models are being increasingly scrutinized from social, environmental and business perspectives. As a result, diverse responses such as landfill closures, material bans and extended producer responsibility (EPR) policies are being implemented. Furthermore, environmental degradation during extraction, production, use, end-of-life treatment and related pollution are now commonly acknowledged as severe risks for businesses and societies, all of which depend on ecosystem services. Besides the increasing operational risks posed by the degradation of environmental ecosystems, the failure to protect them can negatively impact an organization's reputation.

In addition to these market risks, organizations anticipate continuous regulatory and reputational challenges as governments seek to address pollution and climate change. In this context, a circular economy and related value creation models have emerged as a promising strategy, gaining increased attention and support in society. Circular value creation models provide many more sustainable opportunities than existing linear models. During the development of this document, a survey was conducted to gather examples of changes in value creation models and value networks, and the results are provided in ISO/TR 59032.

Circular value creation models continuously improve their resource management practices and contributions to a circular economy and more sustainable business pathways. Circular value creation models establish measurable indicators (see ISO 59020) which can track resource use and losses over time, and monitor their impacts on and benefits to society and the natural environment.

In addition to its potential environmental benefits, studies show that a circular economy offers opportunities worth trillions of United States dollars, including job creation, which builds resiliency in national and international economies.^[26] These findings have propelled momentum towards a global circular economy, and as a result, organizations have begun the transition to take advantage of these many opportunities.

However, transitioning from a linear to a circular value creation model can be challenging because it typically demands that an organization's value creation models and value networks be restructured. Accordingly, this document gives guidance for organizations wishing to transition their linear value creation models and value networks to circular ones.

This document is divided into eight clauses, of which [Clauses 4](#) to [8](#), including their subclauses and interrelationships, are shown in [Figure 3](#).

ISO 59010:2024(en)

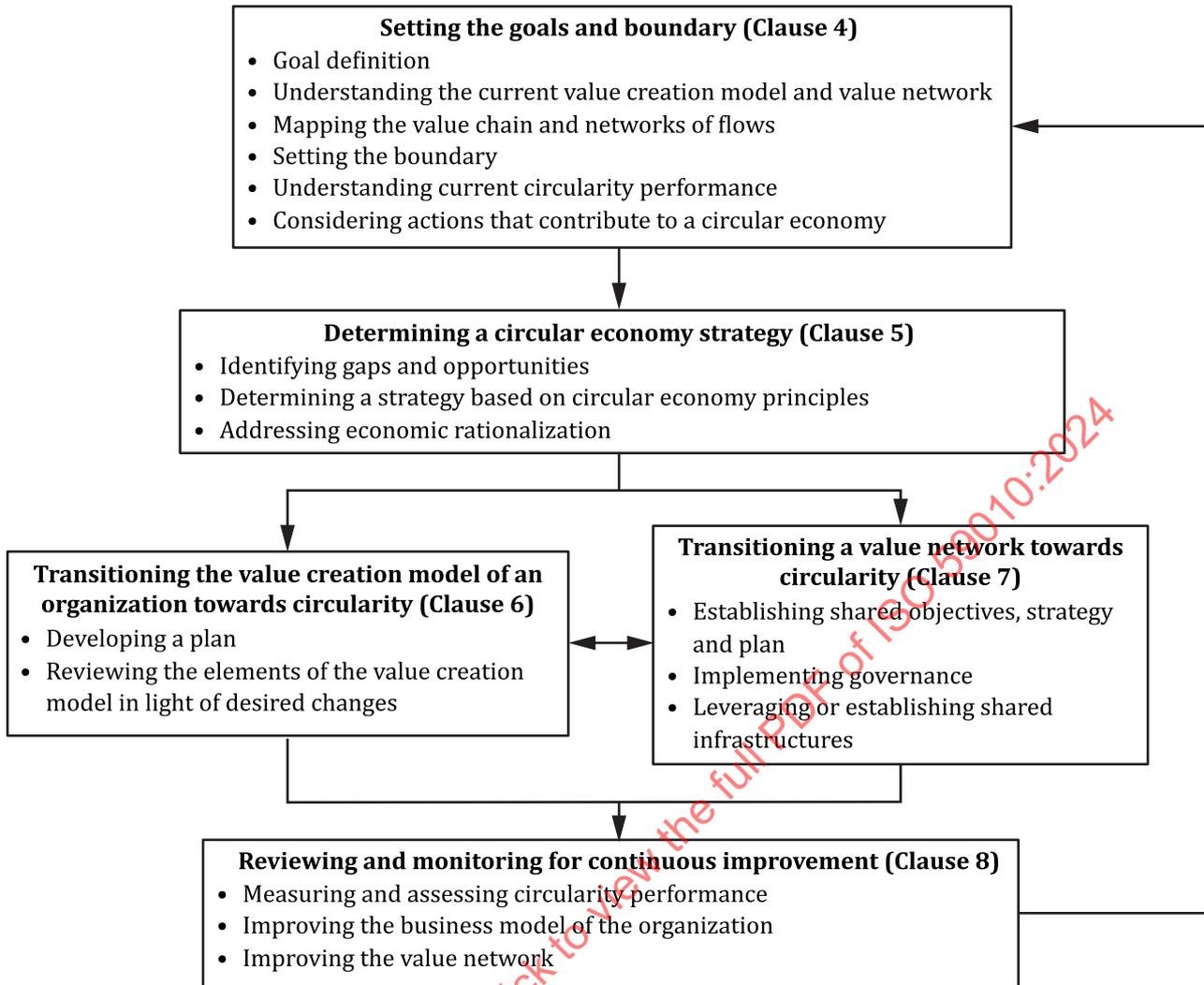


Figure 3 — Main structure of this document

0.4 Correspondence between ISO 59004 and this document

This document seeks to provide a more business-oriented methodology than ISO 59004, by which the transition from linear economy to circular economy is implemented in an actual business strategy. Therefore, as shown in Table 1, the two documents are complementary. This document focuses on business-oriented perspectives at the organizational and inter-organizational levels, while ISO 59004 is more generic and also applies at higher levels.

Table 1 — Correspondence between selected clauses in ISO 59004 and this document

Clauses and subclauses of ISO 59004		Corresponding clauses and subclauses in this document	
7.2	Context and reference situation assessment	4.2	Understanding the current value creation model and value network of the organization
		4.3	Mapping the value chain and networks of flows
		4.4	Setting the boundary for addressing circularity
		4.5	Understanding current circularity performance
6	Actions that contribute to a circular economy	4.6	Considering actions that contribute to a circular economy
7.3	Circular economy purpose, mission, vision and goals definition	4.1	Goal definition
		5.1	Identifying gaps and opportunities
		5.2	Determining a circular economy strategy based on circular economy principles
		5.3	Addressing economic rationalization
7.4	Circular economy strategic priorities and action plan development	6.1	Developing a plan
7.5	Circular economy implementation	6.2	Reviewing the elements of the value creation model in light of desired changes
7.6	Circular economy monitoring, reviewing and reporting	7	Transitioning a value network toward circularity
		8.1	Measuring and assessing circularity performance
		8.2	Improving the value creation model of the organization
		8.2	Improving the value network

STANDARDSISO.COM : Click to view the full PDF of ISO 59010:2024

Circular economy — Guidance on the transition of business models and value networks

1 Scope

This document gives guidance for an organization seeking to transition its value creation models and value networks from linear to circular.

This document is applicable to any organization regardless of size, sector or region.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 59004, *Circular economy — Vocabulary, principles and guidance for implementation*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 59004 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

value creation model

business model

organization's chosen system of interconnected and interdependent decisions and activities that determines how it creates, delivers and captures *value* (3.16)

Note 1 to entry: A value creation model involves external *processes* (e.g. transportation, take back) beyond those of the organization's processes (e.g. education, financing) and the *solutions* (3.14) it provides.

Note 2 to entry: The value creation model can have a focus on the short, medium or long term, or some combination thereof.

[SOURCE: ISO 59004:2024, 3.5.1]

3.2

circular economy

economic system (3.3) that uses a systemic approach to maintain a circular flow of resources, by recovering, retaining or adding to their *value* (3.16), while contributing to sustainable development

Note 1 to entry: *Resources* (3.12) can be considered concerning both stocks and flows.

Note 2 to entry: The inflow of virgin resources is kept as low as possible, and the circular flow of resources is kept as closed as possible to minimize *waste* (3.19), losses and releases from the economic system.

[SOURCE: ISO 59004:2024, 3.1.1]

3.3

economic system

system by which a society organizes and allocates *resources* (3.12)

Note 1 to entry: The economic system can vary depending upon the geographic region or governmental jurisdiction.

Note 2 to entry: This can include the regulation of resources and the production, use and disposal of these resources.

[SOURCE: ISO 59004:2024, 3.1.2]

3.4

extended producer responsibility

EPR

environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle

Note 1 to entry: An EPR policy is characterized by:

- a) the shifting of responsibility (physically or economically; fully or partially) upstream towards the producer and away from government or municipalities;
- b) the provision of incentives to producers to take into account environmental considerations when designing their products.

Note 2 to entry: An EPR can be only financial or can be financial and operational depending on local laws.

[SOURCE: ISO 24161:2022, 3.1.1.2, modified — “local” replaced “national” in Note 2 to entry.]

3.5

governance

principles, policies and framework by which an organization is directed and controlled

[SOURCE: ISO 21505:2017, 3.1]

3.6

interested party

stakeholder

person or organization that can affect, be affected by, or perceive itself to be affected by a decision or activity

Note 1 to entry: To “perceive itself to be affected” means the perception has been made known to the organization.

[SOURCE: ISO 59004:2024, 3.4.2]

3.7

life cycle perspective

life cycle thinking

consideration of the circularity aspects relevant to a *solution* (3.14) during its life cycle which includes consideration of the relevant environmental, social and economic impacts

Note 1 to entry: The main idea in applying a life cycle perspective is to improve the circularity performance of a solution by considering its use of *resources* (3.12) and related emissions in relation to relevant environmental, social and economic impacts. This can facilitate links between the economic, social and environmental dimensions within an organization and through its entire *value chain* (3.17).

Note 2 to entry: In measuring and assessing the circularity performance of a system, a life cycle perspective should be applied.

Note 3 to entry: This perspective should include all stages of technical or biological cycles over appropriate timescales that are related to that system.

[SOURCE: ISO 59004:2024, 3.2.5]

3.8

materiality

information related to *circular economy* (3.2) that is essential for decision-making and can be applied to identify issues that reflect an organization's environmental and social impacts, as well as information that supports *interested party* (3.6) and strategic decision-making

[SOURCE: ISO 14100:2022, 3.1.12, modified — “related to circular economy that is” added.]

3.9

materiality assessment

method to identify and prioritize the issues most important to an organization and its *interested parties* (3.6), and relevant to its *circular economy* (3.2) strategy

3.10

post-consumer material

PCM

material generated by households or by commercial, industrial or institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose

Note 1 to entry: This includes recycled content and returns of material from the distribution chain.

[SOURCE: ISO 1382:2020, 3.373, modified — “post-consumer recycled content” deleted as the preferred term. “including returns of material from the distribution chain” deleted in the definition. Note 1 to entry added.]

3.11

product

physical-based object designed for or utilized with a purpose

Note 1 to entry: A product can be, for example:

- goods of any type;
- hardware (e.g. engine mechanical part, spare parts, consumables);
- electrical or electronic hardware devices or components (e.g. computers, communication equipment and sensors);
- processed materials (e.g. lubricant, cement).

[SOURCE: ISO 59004:2024, 3.2.2]

3.12

resource

asset from which a *solution* (3.14) is created or implemented

Note 1 to entry: Depending on the context, reference to “resource” includes “raw material”, “feedstock”, “material” or “component”.

Note 2 to entry: For the purpose of this document, asset refers to physical resources such as natural resources, virgin resources, recoverable resources and recovered resources.

Note 3 to entry: Resource includes any energy type (e.g. the energy content or energy potential of materials).

Note 4 to entry: Resources can be considered concerning both stocks and flows.

[SOURCE: ISO 59004:2024, 3.1.5]

3.13

service

activity designed or executed with a purpose

Note 1 to entry: Services have intangible elements. Provision of a service can involve, for example:

- an activity performed on a tangible *product* (3.11) supplied to a customer (e.g. automobile to be repaired; the income statement needed to prepare a tax return);

— the creation of ambience for the customer (e.g. in hotels and restaurants).

Note 2 to entry: Knowledge transfer and financial management as well as digital software tools or programs and databases are considered as services.

[SOURCE: ISO 59004:2024, 3.2.3]

**3.14
solution**

product (3.11) or *service* (3.13), or a combination thereof, that fulfils a need of an *interested party* (3.6)

[SOURCE: ISO 59004:2024, 3.2.1]

**3.15
sphere of influence**

range or extent of political, contractual, economic or other relationships through which an organization has the ability to affect the decisions or activities of other individuals or organizations

Note 1 to entry: The ability to influence does not, in itself, imply a responsibility to exercise influence.

[SOURCE: ISO 59004:2024, 3.5.4]

**3.16
value**

gain(s) or benefit(s) from satisfying needs and expectations, in relation to the use and conservation of *resources* (3.12)

EXAMPLE Revenue, savings, productivity, sustainability, satisfaction, empowerment, engagement, experience, public health, trust.

Note 1 to entry: Value is relative to, and determined by the perception of, those *interested party(ies)* (3.6) able to capture it.

Note 2 to entry: Value can be financial or non-financial, e.g. social, environmental, other gains or benefits.

Note 3 to entry: Value is dynamic over time.

[SOURCE: ISO 59004:2024, 3.1.7]

**3.17
value chain**

set of organizations that provide a *solution* (3.14) that results in *value* (3.16) for them

[SOURCE: ISO 59004:2024, 3.5.2]

**3.18
value network**

network of interlinked *value chains* (3.17) and *interested parties* (3.6)

[SOURCE: ISO 59004:2024, 3.5.3]

**3.19
waste**

resource (3.12) that is no longer considered to be an asset as it, at the time, provides insufficient *value* (3.16) to the holder

Note 1 to entry: The holder can choose to retain, discard or transfer the waste.

Note 2 to entry: Value can be assigned to waste as a result of a need from another *interested party* (3.6), at which point the resource is no longer considered waste.

Note 3 to entry: The assignment of value to waste as a resource is linked, in part, to the available technology (e.g. landfill mining).

Note 4 to entry: Some regulations require the holder to dispose of certain types of waste, while others assign value to waste.

Note 5 to entry: Because resources include the energy content or energy potential of materials, such energy, when liberated during a process and not recovered for another use, can be considered a waste.

[SOURCE: ISO 59004:2024, 3.3.6]

4 Setting goals for the transition to a circular economy value creation model and its boundary

4.1 Goal definition

The organization should initially define its goals, i.e. what it seeks to achieve by transitioning to a circular economy value creation model. This goal definition process can include considerations on reductions in resource inflows and outflows, energy consumption and water consumption, as well as other approaches to improve the efficient use of resources.

Setting the organization's goals helps to guide its vision, boundary definition, actions and eventual performance measurement.

To help set measurable goals, an organization can conduct an assessment by reviewing and mapping all its activities and interactions within and between its value chains and broader value network.

Defining the goals early in the solution development process enables circularity aspects to be incorporated in the design of the solution.

4.2 Understanding the current value creation model and value network of the organization

Understanding the organization's current value creation model is the basis to determining the goals. For this purpose, assessing business elements that constitute its current value creation model is useful.

Typical business elements and examples are listed below. However, each organization can have unique value creation models and associated elements.

- a) Value proposition:
 - 1) value the organization delivers to its customers and other interested parties;
 - 2) customers' and interested parties' problems that the organization helps to solve;
 - 3) customers' and interested parties' needs that the organization's value proposition addresses;
 - 4) solutions the organization creates for customers and which address interested parties' needs.
- b) Key activities:
 - 1) activities the organization performs daily to create and deliver its value proposition;
 - 2) activities the organization conducts daily to operate its business, including its governance and risk management.
- c) Key business resources:
 - 1) business resources the organization needs to create and deliver its value proposition, such as raw materials, water, energy, people, suppliers, knowledge, financing and other assets (e.g. logistical infrastructure).
- d) Customer segments:
 - 1) customers' sector, business scale and geographical location in business-to-business (B2B) cases;

ISO 59010:2024(en)

- 2) customers' demographic, geographic and psychographic parameters in business-to-consumer (B2C) cases.
- e) Customer relationships:
- 1) expectations of the organization's customers for help or services it provides to them;
 - 2) factors and their effectiveness in retaining the organization's customers;
 - 3) how the organization communicates with its customers.
- f) Channels:
- 1) pathways used to connect value propositions with the organization's customers and interested parties;
 - 2) places and opportunities where the organization's customers purchase or use its solutions;
 - 3) how the organization delivers the value proposition to its customers.
- g) Costs:
- 1) costs to realize the organization's value proposition, such as costs of purchased materials, labour for service provision, utility fees, waste disposal costs, as well as intangible fees such as for the depreciation of facilities, patent fee, financing and payment of taxes;
 - 2) environmental and social costs.
- h) Revenue streams:
- 1) customers' payment for the value the organization provides to them;
 - 2) revenues earned by trading, treatment or disposal of materials;
 - 3) subsidies from the government.
- i) Key partners:
- 1) partners that cooperate with the organization's business by providing resources such as human resources, financial resources, materials, energy and technology;
 - 2) partners that cooperate with the organization's business by expanding business opportunities;
 - 3) external interested parties putting pressures or expectations on the organization's business.
- NOTE "External" refers to "outside the boundary" (see [4.4](#)).
- j) Other elements:
- 1) public resources the organization uses, including financing schemes and subsidies;
 - 2) infrastructure the organization is dependent upon, such as collection and take-back systems;
 - 3) technologies the organization is utilizing in its operations;
 - 4) ecosystem services provided to the organization at no cost;
 - 5) environmental education;
 - 6) environmental, social and governance (ESG) strategy and its trends/requirements;
 - 7) new laws/regulations that push for the adoption of a circular economy;
 - 8) social and demographic trends (e.g. urbanization, favouring the adoption of product-as-a-service value creation models).

In addition to the above business elements, relevant enablers should be identified and understood for how their availability influences business elements.

4.3 Mapping the value chain and networks of flows

Mapping the organization in its value chain or value network represents an important starting point for exploring collaboration opportunities across the value chain and value network. This activity can be applied through qualitative or quantitative analysis with the participation of stakeholders.

This activity helps to clarify the context in which the organization finds itself in terms of relationships and facilitates decision-making.

However, it should be recognized that the success of collaboration and the achievement of goals often depend on the identification of enablers. These enablers provide the necessary infrastructure and support to foster circular initiatives. They can include shared infrastructure, circular suppliers, academic partnerships, research and development, etc. Therefore, when conducting this mapping activity, organizations should focus on their relationships and assess whether there are sufficient enablers or if others need to be developed.

This holistic approach to mapping helps to clarify the context in which the organization operates and its readiness to embrace circular practices, which ultimately facilitates informed decision-making.

Taking into account the defined goals, the organization should map its existing relationships with other organizations and interested parties up and down the value chain along with associated resource flows. Such mapping helps illustrate, for example, the dependence of resource flows, such as the transfer of water use and emissions within the sphere of influence of the organization's value network (or planned value chain and network if beginning with a new organization). Some illustrative examples are provided in [Annex A](#).

Value chain and network mapping is intended to increase understanding of the organization's operational context in relation to resource and value flows, value chain characteristics of its partners and network, their respective value creation models and other enablers. The information gained from this exercise can be used to set appropriate boundaries for the transition to a circular value creation model and value network.

4.4 Setting the boundary for addressing circularity

Setting the boundary (e.g. a company or group of companies within the value network) will help clarify the scope of actions necessary to achieve an organization's goals. This boundary applies to all of the following clauses and subclauses.

The organization should define a boundary and scope of actions after gaining a clear initial picture of its operational context. The boundary should include all relevant activities, locations, types of solutions and value networks. It should include the portion of the economic system within which the organization operates, collaborates or exercises influence (e.g. supply chain, supply partners), and within which it can drive the circular flow of resources, sustainable development and assess performance.

Theoretically, a value chain and value network can be extensive. However, when setting the boundary, it should align with the boundary of the organization's ambition. Transitioning a wide-ranging value network at the onset can become too complex. A more practical approach is to identify a single value chain (e.g. manufacturing a specific product) and then identify the possible ways to regenerate ecosystems, and retain or add value to the resources in a manner that transforms the linear value chain to a circular one.

For example, a remanufacturer organization can be a key agent for the expansion of a value chain into a value network because a remanufacturer makes a new product from a used product or recovers resources to create new solutions. These activities can establish links between multiple value chains, expanding the entire value network's size and improving its circularity by reducing waste, regenerating ecosystems, and recovering, retaining or adding value to resources.

To set an appropriate boundary, an organization should consider its sphere of influence. Each organization can have different capacities to influence different aspects of circularity within its value network.

The transition of an entire value network versus an individual organization offers greater options for utilizing resources that can otherwise be degraded or lost as waste. These options can include repair, reuse, remanufacture, recycling and recovery.

A more complex governance structure will be needed if the boundary is expanded to include an extensive value network. In addition, a common infrastructure is often used by a value network, which can facilitate an effective collaboration towards circularity. These circumstances are described in [Clause 7](#).

Different options for boundary setting can be measured and assessed for their potential circularity performance using the framework of ISO 59020 (See [4.5](#) and [8.1](#)).

4.5 Understanding current circularity performance

Understanding the current circularity performance by selecting circularity key performance indicators (KPIs) and using those indicators to assess the state of the current value creation model and value network within the boundary are essential to ensure that the defined goals are appropriate.

To measure and assess the circular performance, ISO 59020 provides a taxonomy of circularity indicators to measure resource flows and their impacts within a system under study (described as the “system in focus”). Circularity indicators can be used for any phase of the life cycle, from concept through to design, implementation and operational monitoring.

ISO 59020 categorizes these indicators as follows:

- Resource inflows: The resource inflow circularity indicators represent the circularity performance of resources that flow through the system boundary into the system in focus. All resource inflows except water and energy (which are addressed in separate categories) are accounted for in this category.
- Resource outflows: The resource outflow circularity indicators represent the circularity performance of resources that flow out of the boundary of the system in focus. All resource outflows, including secondary materials produced (see ISO 59014¹⁾) except water and energy (which are addressed in separate categories) are accounted for in this category. This includes outflows accounting for non-recoverable resources (e.g. hazardous waste, for which specific treatment or disposal with no recovery possibility is required) and emissions and other resource outflows that have a significant impact on the circularity performance.
- Energy: The energy circularity indicators represent the fraction of energy used by the system in focus that is renewable energy. Energy recovered (e.g. hot water) from another organization and energy derived from co-products can also be relevant for consideration.
- Water: This is an important resource and a focus of a circular economy. The circularity indicators for water consider water inflows, water outflows, internal water reuse and water quality.
- Economic: The application of economic-related circularity indicators is of high importance for an organization to provide transparency and demonstrate that circular economy strategy and actions are economically feasible. The measurement and evaluation of economic viability will be based on the way economic value can be created and captured and how the realization of related actions affects such value.

NOTE 1 See the core indicators described in ISO 59020.

NOTE 2 The methodology for assessing circular performance can be realized by applying a typical life cycle assessment (LCA), either a full or streamlined LCA, an eco-efficiency assessment, a water footprint assessment or others as referenced in ISO 59020.

Once the current performance is evaluated, the next step is to determine a strategy of improvement as described in [Clause 5](#). The selected KPIs should be continually monitored and evaluated as described in [Clause 8](#).

1) Under preparation. Stage at the time of publication: ISO/FDIS 59014:2024.

4.6 Considering actions that contribute to a circular economy

4.6.1 General

This subclause contains the same content as ISO 59004:2024, Clause 6. Understanding these actions helps to determine the goals and the boundary. This subclause explains actions that contribute to a circular economy (hereafter, referred to as “actions”) and introduces examples of actions that an organization can consider in establishing a strategic framework as described in [Clause 5](#).

These actions are applicable across the entire value chain or value network and can contribute to narrowing, slowing or closing resource flows. They can be related to several circularity aspects.

The actions are not exhaustive, nor necessarily independent and mutually exclusive. They can be implemented individually or combined in any configuration which helps to enable the organization’s circular economy value creation models in accordance with the circular economy principles (see ISO 59004:2024, 5.2).

Innovative approaches (see [4.6.6.3](#)) are important for an organization in transitioning towards a circular economy. Prior to implementing any of the identified actions in this subclause, an organization should have an understanding of where their solutions fit in the value chain.

Organizations should consider refuse and rethink as preliminary actions.

Refusing refers to re-evaluating resource use patterns to ensure that organizations pursue sufficiency and are set up to prevent overusing resources. Refusing can make a solution(s) redundant by demonstrating to an organization that it is not required, or its function can be replaced by a solution with the same function or with a radically different solution.

Rethinking refers to a reconsideration of design and manufacturing decisions with a different mindset (e.g. making service use more intensive, sharing or by putting multi-functional products on the market).

NOTE Depending on the type of organization, some actions can be considered as enablers.

ISO 59004:2024, Annex B, contains a list of examples that illustrate the actions.

ISO 59004:2024, Annex C, provides illustrative questions to check how the sustainable development dimensions can be considered in the implementation of actions that contribute to a circular economy.

Some of the actions can impact resource management. Guidance is provided in [4.6.7](#).

4.6.2 Actions that create added value

4.6.2.1 General

Organizations should rethink solutions, especially at the design stage, and optimize production processes to enable product and resource circulation and prevent the creation of waste and harmful losses and releases. As a priority, organizations should consider the principle of resource stewardship (see ISO 59004:2024, 5.2.4). The design, development and production stages are of special importance in the transition towards a circular economy. These stages set the critical course as to whether and how the resources can be recovered or not. When such interventions take place early in the life cycle, their positive environmental impacts mainly materialize in the use stage and through recovery at the end of use or end of life, resulting in reduced use of virgin resources.

4.6.2.2 Design for circularity

Design for circularity is intended to:

- rethink solutions such that they can easily be repaired, maintained, refurbished, remanufactured, upgraded or reused;
- minimize resource use;

- prolong product lifetime.

This, in turn, allows for reuse as well as product and resource recovery at the end of a use cycle. Optimizing the number of loops and the value recovery process to avoid waste and harmful losses and releases through appropriate design is key in a circular economy.

A systems perspective is used to consider relevant aspects concerning appropriate resource choices. This can include:

- preventing the use or release of substances that can harm human health and ecosystem resilience (see [4.6.2.3](#));
- sustainability aspects throughout the life of the product (e.g. minimizing its negative impact and enhancing its positive impacts along the whole life cycle);
- exploring new relationships with customers, suppliers and partners for the purpose of designing a suitable value creation model.

Design for circularity is a design practice that integrates all the circular economy principles. It allows for the adoption of other actions along the life cycle of solutions aiming to increase, for example, durability or resource recovery. A difference between design for circularity and ecodesign is that design for circularity integrates a process of selection of resources that is consistent with the circular economy principles described in ISO 59004:2024, 5.2.

Important aspects of design for circularity are:

- design for product durability and long use;
- design for product and resource recovery;
- design to minimize resource use and losses;
- design for performance-based approaches.

4.6.2.3 Circular sourcing

The sourcing process, as understood in its broad life cycle approach from resource sourcing to recovery, should be considered throughout the organization when transitioning towards a circular economy, including research and development, and product design.

The sourcing process can also be understood as part of the procurement process, including sourcing of resources but also suppliers' development and management.

When implementing circular sourcing, organizations should minimize resource use and give preference to acquiring recovered and renewable resources while taking into consideration the life cycle impacts of these resources.

Important aspects of circular sourcing are:

- substitute virgin resources in technical and biological cycles;
- the sourcing of all virgin or secondary non-renewable and renewable resources should consider all aspects of sustainability related to the resource;
- substitute substances of concern;
- source with recovered or used resources and products while maintaining safety.

4.6.2.4 Circular procurement

Circular procurement, as part of the broader concept of sustainable procurement (see ISO 20400), encompasses actions at strategic, management and operational levels to embed aspects of circularity into procurement policies and processes.

EXAMPLE 1 Procurement guidelines, acquisition requirements, specifications, contracts, suppliers' assessment tools, sourcing strategy.

In this sense, circular procurement can play a key role in the transition towards a circular economy, engaging suppliers and its solution's value chains and value networks to enable the creation of new markets for organizations and support current markets in the transition from linear to circular.

EXAMPLE 2 Procurement teams assist sourcing and operations to make sure that scrap can be appropriately recovered and recycled to meet zero waste operations goals.

Circular procurement involves looking beyond short-term needs and expected benefits but considering the longer-term circularity impacts of each purchase. This includes questioning whether a purchase should be made at all. Often a service can fulfil the function needed.

The objective is to purchase products, services or solutions that seek to contribute to closed resource cycles within supply chains, while minimizing or avoiding negative societal and environmental impacts and enhancing the positive circularity impacts of the solution(s) across its whole life cycle.

To achieve this, changes in contractual methods should be considered and circular economy principles should be embedded into the requirements for suppliers.

Purchasing decisions made by the procurement department can demonstrate the organization's commitment to its circular economy strategy.

4.6.2.5 Process optimization

In production processes, as well as in supply chains for buildings or regions, large circularity impacts can be achieved by optimizing resource efficiency and changing processes to reduce or eliminate waste as well as harmful losses and releases. The reduction of total resource and energy inflow as well as the sustainable use of water is cost saving and enhances the resilience of the organization.

4.6.2.6 Industrial, regional or urban symbiosis

Symbiosis describes a system that enables circular flows of resources, by engaging traditionally separate organizations in a collective approach to share inflows and outflows and optimize their value networks.

In industrial symbiosis, for example, separated industries or value chains engage to exchange (or share) resources, such as energy, water or by-products due to synergistic possibilities offered by geographical proximity.

In regional or urban symbiosis, multiple cities, regions and other subnational governmental organizations (as well as agencies) exchange or share resources, solutions, information and capabilities (infrastructure and knowledge).

There are additional opportunities for symbiosis (e.g. involving both government and industry).

This type of geospatial collaboration can create advantages and mutually beneficial value creation and provide resource productivity and innovative solutions, while reducing the overall adverse environmental, social and economic impacts from their activities.

4.6.3 Actions that contribute to value retention

4.6.3.1 General

Organizations should invest in activities to retain the value of the resources involved in creating a solution. This should be considered from the design stage of the solution. Activities presented in this clause, such as reuse, leasing, sharing or maintaining, refurbishing and remanufacturing, are meant to help preserve the function of a solution or preserve the product itself through strategies to increase lifetime and use intensity. These activities are strongly dependent on corresponding value creation models.

Organizations should review the actions for resource management to select the most appropriate and viable actions, as suggested in [4.6.7](#).

4.6.3.2 Reduce, reuse and repurpose

Reducing demand for a product helps in lowering the associated resource use. This strategy can also include reduction with the intent to increase efficiency in product manufacturing or by consuming fewer natural resources.

Reusing products or components that a user no longer needs for the same function for which they were originally used over multiple usage cycles is an important measure for reducing resource use and losses and increasing value capture from existing products. To reuse products and components, it is important to provide a method for the non-destructive collection and redistribution of used products and components. Reuse often retains the greatest value in embedded costs such as material, labour, energy and capital, as well as greatest savings in external costs such as greenhouse gas (GHG) emissions, water consumption, etc.

Alternatively, strategies to repurpose can be pursued, where a discarded product or its parts are used in a new product with a different function.

When the negative impact(s) in the use stage exceeds the benefits from new replacement products, the retention value can become insignificant. In this instance, it can be better to replace the product.

4.6.3.3 Maintenance and repair

If a product malfunctions or breaks it cannot be suitable for (re)use and risks being discarded. To avoid that, preventive or predictive maintenance is necessary. To enable maintenance and repair, the availability of spare parts, maintenance and repair instructions as well as services are essential.

Performance of products can be extended or restored with repair and maintenance services to permit the original functions to continue instead of being discarded. These actions can also lead to job creation through needed service providers.

4.6.3.4 Performance-based approaches

Performance-based actions and their associated value creation models are acknowledged as relevant to decouple revenues from the use of resources and make organizations less dependent on the quantity of products delivered.

With the transition to a circular economy, ownership of products can be supplanted by the option to purchase services that focus on the function provided by the product. Ownership of a product then remains with the supplier, but customers are loaned access to the product as part of delivering a service, as an overall solution.

The organization carrying out the service activity retains ownership and responsibility for the upkeep, maintenance and end-of-life management of the product while the user gets access via leasing, pay-per-use, subscription or deposit return schemes. The value creation model should enable these strategies. It is important to ensure that the service is managed in a sustainable way and that higher resource efficiency is achieved by increasing intensity of use, extending the life of products and limiting the amount of non-

recoverable resources after end of use. Moreover, resource efficiency improvements are achieved by avoiding the need for each potential user to buy and own a product (see ISO/TR 59031²⁾).

4.6.3.5 Sharing to intensify use

Sharing durable assets or products can increase their use over time and reduces the number of products that need to be produced by avoiding the need for each potential user to buy and own a product. Digital technologies such as platforms can help to reduce the organizational effort and create a positive experience for the user.

EXAMPLE Software as a service (also referred to as “SaaS”), a clothing borrowing programme, and on-demand transportation service.

This approach is more commonly known as the “sharing economy” (see ISO 42500).

Tools, models and digital platforms created for sharing to intensify the use should include consideration of the overall net resource savings and impact reductions on a life cycle basis (e.g. overall reduction in the pressure on natural resources and non-renewable energy) compared to a new solution. Organizations should focus efforts on promoting the life extension of the product or asset and should not compromise the ability to recover or recycle the product, part, asset or material at the end of a life cycle. Services and sharing platforms should also seek to benefit local workers and communities, whenever possible.

4.6.3.6 Refurbishing

Refurbishing can include activities such as repair, rework, replacement of worn parts, and update of software or hardware, but does not include activities that result in the need for a new product certification and a legal manufacturer status of the refurbisher. Refurbishing does not include restoration after the expected lifetime.

Once immovable assets (e.g. buildings, infrastructure, machines) reach the end of use or their use becomes redundant, refurbishing or repurposing can prolong their use possibilities. Such activities help to put back the assets to their original use, possibly with extended functionalities, or to a state that provides for adaptive repurposing and retrofitting.

4.6.3.7 Remanufacturing

Remanufacturing is performed on products resulting in a new expected service life, new or modified specifications, intended use(s) or legal claims.

By remanufacturing products, components or parts, a company contributes to the circular economy by extending the lifetime of those elements and thus creates additional value for the organization, the customer, the workers and the environment. Remanufactured products or parts can often come with a warranty equivalent to the warranty the product received when new.

4.6.4 Actions that contribute to value recovery

4.6.4.1 General

With the activities listed in this clause, it is possible to recover the value of products, product components and materials with the goal to reintroduce them into new products or processes. These activities are key to closing the loop and preserving resource value.

The value of a recovered resource or product can be determined with the assistance of product information, such as material data sheets, trade information, quantity, quality and composition of the product. Product circularity data sheets (PCDS) can provide additional guidance to the purchaser and assist in identifying an appropriate value for the recovered product, component or material (see ISO 59040³⁾). Efficient management

2) Under preparation. Stage at the time of publication: ISO/CD TR 59031:2021.

3) Under preparation. Stage at the time of publication: ISO/DIS 59040:2023.

and sharing of this information, in alignment with the circular economy principle of resource traceability (see ISO 59004:2024, 5.2.5), can facilitate the process to recover value.

Product collection, sorting and recovery should be implemented efficiently so that existing product value can be extended and resources are recovered in high quality, biological or technical cycles, or both.

Once actions that contribute to value retention have been prioritized, the anthropogenic stocks (e.g. incineration ashes, post-consumer products, sludge sewage, landfill) can be exploited to provide recovered resources. Decommissioning and resource mining can also provide resources for future uses.

Organizations should review the actions for resource management to select the most appropriate and viable actions as suggested in [4.6.7](#)

4.6.4.2 Reverse logistics

Reverse logistics are key to enable a circular flow of resources and products as well as for value recovery. Reverse logistics transports post-use, undesired (in their current location) or unsold products, components or materials back into the same or another value chain or network for further use cycle management. Effective reverse logistics are key to enabling a supply of high-quality recovered resources to circular activities such as reuse, remanufacturing or recycling.

Organizations should consider developing effective and efficient logistics schemes that enable collection or take-back processes and contribute to products or parts or materials being properly brought back in the same or another value chain or network (after processing or not) with an appropriate value.

4.6.4.3 Cascading of resources

4.6.4.3.1 General

Cascading also enables the circular flow of resources. Cascades provide an opportunity for an output to be an input usually starting with the highest value use and decreasing quality and quantity in subsequent cycles. Cascading is a way to use resources more efficiently and for as long as possible. Energy recovery is part of the cascade. Economic value can decrease or increase depending on the context.

Cascading can result in expanded or new value networks. Downcycling (recycling activities that obtain recovered resources with a lower value) can be an element of cascading, although priority should be given to cases where the flow will result in a solution with increased value. The two situations can happen in technical cascades and biobased material cascades, and some products have a material profile that allows inclusion in both cycles. Material information should stay with the products throughout the cascade to define resource quality for the subsequent steps.

The identification and management of contaminants is important for value retention along the cascade due to resources that can no longer be used for their intended purpose or become a hazard or a waste. Managing risks from exposure to harmful substances enables safer disposal or managed release into the environment and enables the use of resources for various applications. Waste that remains at the end of the cascade should be evaluated to limit any harm to humans or the environment. Energy recovery should be considered when the resource is no longer suitable for inclusion in solutions.

4.6.4.3.2 Cascading in technical cycles

In technical cycles, the sequential use of resources for different purposes usually consists of multiple resource cycles before energy recovery operations. The key drivers structuring cascades are economic, regulatory and opportunity driven. Absence of markets for cascaded resources is a key obstacle to sustaining resource cycles and can require establishing new marketplaces or, as a last resort, energy recovery. Re-mining can ultimately be part of technical cascades if the resources are stored in a way that can be recovered when the economic conditions become favourable.

4.6.4.3.3 Cascading of biobased resources

Cascade utilization can provide an opportunity to use biomass more efficiently as an extended carbon storage strategy to create more value with the same amount of biomass, thereby limiting impacts to the environment or competition with food or feed supply. Cascading biobased resources implies subsequent uses for the resource (e.g. bio-chemicals or bio-materials) followed by final energy recovery or other forms of recovery if the resources are compostable or biodegradable.

Providing a dedicated collection infrastructure can facilitate further flows, allowing the cascade to use the biomass more efficiently. Having a dedicated collection system with adequate design makes it easier to prevent contamination. Efficiency of the system is also important. Non-contamination and compliance with qualifying conditions for composting or biodegradation (see ISO 59020:2024, A.3.5) allow for the final cascaded resources to be returned safely to the biosphere to help restore soil fertility.

Anaerobic digestion (with energy production) or aerobic processing (composting) with or without nutrient or biochemical extraction are forms of value creation in the cascade.

4.6.4.4 Recycling

Through recycling, the resource remains in use and the creation of wastes is reduced. Recycling can involve a mechanical, physical, chemical process or biological processes, or a combination of these processes. When considering recycling processes, it is important to assess whether the quality of the resource is maintained (e.g. it can be used for same purpose again) or if it will be cycled to a lower quality during the process. Also, consideration should be given to how much energy is used for the recycling process.

Not all resources should be recycled though, as hazardous substances can accumulate during successive cycles, increasing net toxicity. Successive use of resources within cascades can also be appropriate for technical materials or components, which sometimes provide new opportunities for inputs to support new circular resource flows.

4.6.4.5 Waste management

In a circular economy, waste is minimized by intention. However, waste will still be created throughout the transition towards a circular economy and needs proper management and treatment.

NOTE Waste management, when it complies with national and international laws and treaties, aims to reduce releases into air, water and soil to minimize adverse impacts on human health and the environment.

Within the circular economy, products or components that have insufficient value for the holder are given a temporary waste status in some countries because of regulatory requirements. Nevertheless, they can become a recovered resource if there is an active recovery process in place. Otherwise, they can be intentionally removed from the system through landfilling or incineration. In the case of incineration with energy recovery, resources are effectively removed from the system but their energy content is recovered, see [4.6.4.7](#).

Wherever possible, because of the nature of the recovery options, biodegradable and non-biodegradable resources should be kept as separate as possible or designed for separate recovery at the end of use or end of life, for treatment in appropriate facilities. When biodegradable and non-biodegradable resources cannot be separated, best practice is to ensure their treatment in appropriate facilities that focus on limiting contamination.

4.6.4.6 Material recovery

Material recovery is the method of recapturing and reutilizing recoverable resources specifically for reuse, refurbishing, remanufacturing, recycling or other methods that add or retain value of a resource.

Resources once considered waste can be valuable in resource recovery. For instance, resources can be extracted from landfills or reclaimed from anthropogenic sources, such as unused assets (e.g. abandoned infrastructure). This process adds value to dormant resources.

Accurate information facilitates material recovery. Information that can support material recovery includes data on the quantity and ease of access to the resource, detailed resource specifications and any related product certifications. It's also crucial to understand recovery limitations, including the available methods for resource recovery, logistical challenges in resource collection and any legal, regulatory or technological barriers. Organizations should assess the trade-offs before deciding to recover a specific resource. This evaluation is essential to ensure that the recovery process is not only feasible but also beneficial for the organization and the environment.

4.6.4.7 Energy recovery

Energy recovery is an end-of-life operation deployed to collect and generate heat or power from a resource that has surpassed its ability to flow through the circular economy. Energy recovery is most effective when coupled with an end-of-life resource recovery process, such as anaerobic digestion, which creates conditions to capture nutrients and produce an agricultural input while generating energy. Other energy recovery processes, such as combined heat and power, can produce ash or sludge as a by-product that can be used as an input for yet another recovery process. A residual material input that feeds into the creation of a new fossil-based fuel is also primarily an energy recovery practice.

Organizations should seek to apply actions with the most favourable environmental outcome from a life cycle perspective. Therefore, energy recovery efforts deployed without having considered a material's place in the circular flow and the broader environmental impact when compared to other actions are not considered circular. Energy recovery should be optimized, and the energy should be usefully employed to displace non-renewable alternatives.

Furthermore, in order to support the cascade of biobased materials through to the energy recovery stage, by-products of energy recovery should not be detrimental to the ecosystems to which they are introduced.

4.6.5 Actions to regenerate ecosystems

To align with the principle of ecosystem resilience, regeneration of degraded ecosystems can encompass removal of harmful substances and remediation of soil and water bodies, mitigation and adaptation to climate change impacts, and protection of biodiversity. These actions should ultimately lead to the conservation and continuous renewal of natural resources, improvements in water, soil and air quality, and prevention of land degradation. These activities help to ensure the long-term provision of critical ecosystem services such as food provision, water purification, flood control, carbon sequestration, disease control and nutrient cycling.

Production using regenerative practices that an organization can perform includes agroecology, regenerative agriculture, restorative aquaculture, reforestation and permaculture. Regenerative practices provide food and materials as well as create positive outcomes for the biosphere.

Creating engagement through participation in projects helps people to embrace environmental problems that occur in their region and feel part of the environment that surrounds them. This allows for a better understanding and appreciation of environmental quality and the success of regenerative practices, as well as a better understanding that reducing negative anthropogenic impacts on the environment is central to human survival.

4.6.6 Actions to support a circular economy transition

4.6.6.1 General

The transition towards a circular economy is currently at different stages in different countries. The activities of organizations are influenced by the systems that have been developed for linear production and consumption systems. To improve conditions, relevant actors should participate to enable a systems change towards a circular economy. This also means that subsystems (e.g. education, research, political, legal, economic and financial systems) should be reformed, and support should be provided for the evolution of cultural values and norms.

Depending on the type of organizations, these actions can be considered as enablers.

4.6.6.2 Education and research

Moving from a linear to a circular economy implies that individuals, organizations and interested parties need to learn and implement new types of knowledge and mindsets, and this should include developing an understanding of the differences between a linear and circular economy, the limits of a linear economy and the benefits of the circular economy.

It is important for organizations to take part in initiatives to educate their customers and other interested parties on how they can support the transition from a linear economy towards a circular economy. In many cases, this implies that customer behaviour needs to be changed and become more responsible. This is often called “responsible use and consumption”.

The education, training and research system ensures professional qualifications and lays the foundation for innovations through its research activities.

4.6.6.3 Innovation

Transitioning from a linear economy towards a circular economy can involve a multitude of innovations on different levels. These innovations can be technological (e.g. recycling technologies or product redesign), organizational (e.g. value creation models), institutional (e.g. recycling quotas) or social (e.g. repair cafés, where the do-it-yourself repair of products is promoted).

Relevant actors include schools, vocational training institutions, colleges, universities, non-university research and industry. The success of innovation systems is closely linked to the transfer of knowledge between organizations, universities and research institutions through various channels such as joint research projects.

An important starting point for innovation processes are resource flows. Not only is the transfer of knowledge important at this point, but also the relationships between actors at different stages of the value chain who jointly process these flows (see ISO 56002).

4.6.6.4 Collaboration and networks

Collaboration is key to achieve a circular economy, as highlighted in the principle of value sharing. Successful collaboration can create competitive advantages for all partners and improve circularity performance. It is an essential enabling condition. The design of circular systems, especially, needs the collaboration of different actors within one organization and the development of partnerships between organizations.

Formal and informal networks are important structural elements of innovation systems. The transfer of knowledge within innovation networks and the input of external knowledge are of great importance. The creation of multi-stakeholder initiatives helps to accelerate the transition to a circular economy by providing support at the local, regional and national levels.

4.6.6.5 Helping users change their behaviour

Users play an important role in the success of innovation processes through purchasing decisions, use behaviour and intensity, maintenance, repair, reuse or the choice of disposal route. New use models should be offered such as collaborative use, sharing or take-back systems with easy access for users so that users have alternatives to buying a product. Digital technology such as apps or platforms provide the user with relevant and transparent information about the environmental impact of products and services, the average product life and associated reparability. Social innovations can help to establish more sustainable lifestyles and motivate different societal stakeholders to take an active role.

4.6.6.6 Policy and legal system

A re-examination of the political and legal frameworks can be needed to assist the transition towards a circular economy. Changes in these arenas can influence actions by identifying goals, incentivizing innovation and guiding public procurement. Other legal requirements can set limits and identify organizations responsible for carrying out actions. Of main importance are measures for waste prevention and waste management that ensure the protection of people and the environment in the generation and management

of waste, in particular, non-recoverable resources. The specific obligations should also be clarified in this case by means of legal ordinances.

Product responsibility policies have been implemented in some countries by means of corresponding ordinances. These regulations often include sections on labelling, take back, recovery and financing obligations.

Circular public procurement recognizes the role public authorities can play in supporting the transition towards a circular economy as a driver for innovation.

4.6.6.7 Financial services

All organizations need a mechanism to finance their operations. Engaging financial services to consider the risks of linear value creation models and value circular value creation models can lead to increased capital for circular strategies, including direct or indirect investment from investors, both private and public.

An investment is an allocation of financial means (e.g. buying shares, bonds or property to make profits or gain advantages). Transition towards a circular economy can involve investments with a long-term perspective and embracing a life cycle perspective in new value creation models, production, technologies, techniques, infrastructure, etc. Through their investments, organizations can facilitate their own transition to a circular economy and influence other interested parties.

Traditional and non-traditional investors can also play a role in funding start-up operations, scaling up operations or de-risking new technologies from a resource intensive linear model to a resource productive circular economy. Engaging insurance agencies can also result in benefits related to the circular economy.

Regulatory systems are increasingly prescribing sustainable finance classification systems, which rank investments by merit. Investors are having to evaluate their portfolios of investment against specific sustainability and circular economy criteria, which can impact eligibility for grants, tax benefits or other programmes.

4.6.6.8 Digitalization

Organizations can use digital technology, for example, to share information along the value chain, enhance product design and processes, improve recycling methods, understand resource flows and develop circular value creation models.

As outlined in standards such as ISO 59040 and ISO 59014, transparent and timely documentation facilitates actions that contribute to a circular economy.

4.6.7 Guidance for resource management actions

This resource management guidance is intended to help organizations prioritize actions to increase circularity performance. A life cycle perspective should guide the organization in the identification of the best action for their value creation model and to avoid unwanted trade-offs.

The guidance (see [Table 2](#)) suggests organizations can begin by determining if there is a need to be satisfied and if the need can be met without additional resource use (refuse). If a solution is needed, the guidance suggests that organizations begin with a systemic approach, re-evaluating the concept from the earliest possible stages by designing solutions that use fewer resources (rethink, reduce) and prioritizing the use of recovered resources and sustainably produced renewable resources (circular sourcing).

Organizations should seek to extend the life of solutions by design and by maintaining the solution in use for as long as possible (repair, reuse, refurbish, remanufacture, repurpose) while continuing to provide value.

Finally, organizations should look to use resources in multiple cycles (cascade, recycle), recover the energy if the resource cannot be used again (energy recovery) or source resources from landfills (re-mine).

In general, products should be repaired before they are remanufactured, and remanufactured before they are recycled. However, in cases where applying this guidance does not lead to the best outcome, organizations should consider applying a life cycle perspective to determine the best action.

Organizations can apply this guidance at any stage in their value network.

Organizations with solutions that are currently in the market can use this guidance to increase the circularity of their solutions. Consideration of actions included in this resource management guidance should help organizations build business value creation models consistent with the circular economy principles (see ISO 59004:2024, Clause 5) and accelerate the transition towards a circular economy.

Table 2 — Guidance for resource management actions

Action	Description
Refuse	Make solutions redundant by abandoning its function or by offering the same function with a radically different solution.
Rethink	Reconsider design and manufacturing decisions. Make service use more intensive (e.g. through sharing or by putting multi-functional products on the market).
Circular sourcing	Select recovered or renewable, sustainably sourced or produced resources. Use resources that can be easily recycled or returned to the biosphere. Reconsider formulations.
Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources and materials.
Repair	Restore a defective or damaged product so that it can be used in its original function.
Re-use	Re-use a discarded product which is still in working condition and fulfils its original function.
Refurbish	Restore to a useful condition during expected service life with similar quality and performance characteristics.
Remanufacture	Return an item, through an industrial process, to a like-new condition from both a quality and performance perspective.
Repurpose	Adapt a product or its parts for use in a different function than it was originally intended without making major modifications to its physical or chemical structure.
Cascade	Shift recovered materials from one loop to another to optimize feedstock flows through additional cycles, often with decreasing quality and quantity. When adopting for biobased material, cascading implies repeated use of renewable resources at decreasing quality, with final treatments such as composting, energy recovery or biodegradation, and safe return of the material to the environment.
Recycle	Recover and process material to obtain the same (high grade) or lower (low grade) quality through activities such as recovery, collection, transport, sorting, cleaning and re-processing.
Recover energy	Generate useful energy from recovered resources.
Re-mine	Mining or extraction from landfills and waste plants can be possible in some cases if mining or extraction activities are sustainably managed.

5 Determining a circular economy strategy

5.1 Identifying gaps and opportunities

Having assessed its current circularity performance or the value network within the defined boundary, as described in [Clause 4](#), the organization should next identify the gaps and opportunities to transition its value creation model towards circularity. For this purpose, the elements of the value creation model (shown in the middle-left box of [Figure 4](#)) should be evaluated based on the circular economy principles defined in ISO 59004 (in the top box) to determine a circular economy strategy. The enablers (shown in the bottom box) can be utilized to implement the strategy, but their availability highly depends on regional conditions.

ISO 59010:2024(en)

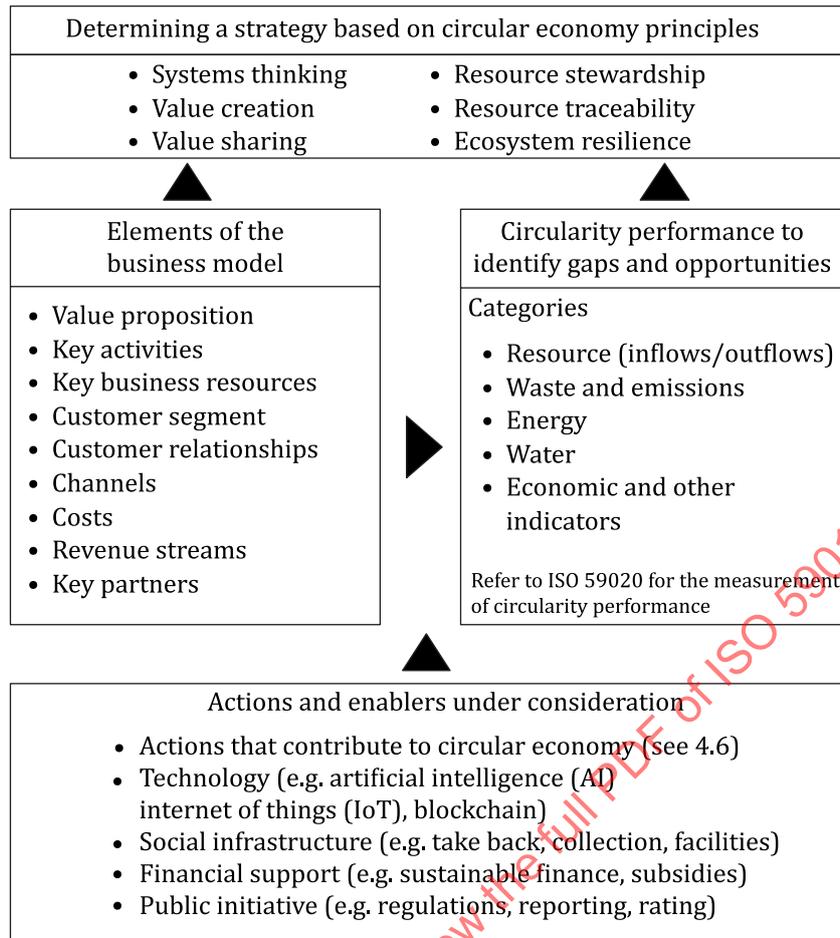


Figure 4 — Framework to determine a circular economy strategy

5.2 Determining a circular economy strategy based on circular economy principles

A strategy for the transition of an organization's value creation model and value network to achieve the goals, i.e. a circular economy strategy, should be determined by considering the organization's purpose, vision, mission, identified gaps and opportunities, its need to reposition within the value chain or the value network, its need to expand its sphere of influence and its desire to achieve a transition towards a more circular value creation model.

The transition towards a more circular value creation model requires a systemic focus on value creation in relation to resource use and losses over time while enabling more sustainable development. The six circular economy principles (system thinking, value creation, value sharing, resource stewardship, resource traceability and ecosystem resilience) and their interconnection provide the basis for this strategy.

The first step in developing the strategy from a long-term and sustainability perspective is to identify what is needed to fulfil the goals by clarifying the value the organization generates and how that value should be shared via its value creation model. This process requires consideration of resource availability as well as the organization's ability to secure long-term resource accessibility and traceability in order to reduce its resource use and risk of losses. In addition, an organization should also ensure that the impact of the strategy associated with its value creation model promotes ecosystem resilience and, therefore, sustainable development.

The resulting circular economy strategy is on a case-by-case basis.

EXAMPLE A car manufacturer can determine repositioning the organization in the value chain from a car manufacturer to a transport solution provider with a strategy that focuses on designing solutions that are easier to share, maintain and refurbish, require few resources and result in lower losses over time. Such an approach implies a focus on system thinking, value creation, value sharing, resource availability, resource traceability and ecosystem resilience.

Economic rationalization (see [5.3](#)) should be addressed in parallel as an organization develops its circular economy strategy. This perspective provides an advantage since optimization of the total life cycle cost and the solution's total environmental impact are considered simultaneously. A solution's use of natural and other resources typically accounts for much of its cost while potentially causing harm to the environment. Cost-optimized solutions designed by taking into account circular economy principles can lower negative environmental impacts. However, this assumption should be confirmed through complementary methods such as those given in ISO 59020.

The design stage significantly determines the environmental impacts (see [Clause A.2](#) for further explanation); therefore, design is crucial in a circular economy strategy. Design for circularity, in conjunction with its associated value creation model, leads to long-term circular economy. New developments beyond traditional product ecodesign (such as specified by IEC 62430:2019) include the design of solutions for value creation and retention, design for a system change (e.g. rethink and reconfigure systems for supporting circular resource flows) and design for closing the loops and multiple life cycles. Design for circularity helps optimize resource utilization by circulating products, components and materials at the highest utility for as long as possible in both technical and biological cycles, avoiding negative effects such as harmful emissions, conserving non-recoverable resources and enhancing natural systems.

Materiality is also a key consideration when developing a circular economy strategy. For example, many organizations conduct materiality assessments to assist in making decisions, especially when considering how to make their operations more sustainable. A common analysis method is to create a matrix with the vertical axis representing interested parties' expectations for the organization and the horizontal axis representing the organization's business priorities. The horizontal axis is often labelled as "growth/market share positions", "practicality/workability", "costs/investments", etc. An example of a materiality matrix is provided in [Clause A.3](#). As part of a materiality assessment, environmental (e.g. carbon) and social value creation can be regarded as a benefit of an organization and can be prudent to consider as part of its strategy. In addition, any negative unintended consequences of the strategy application in environmental and social terms should be considered risks. As described in [Clause 7](#), the circular economy strategy of the organization can be adjusted to align with those of other participants in the value network.

In addition, an analysis of competitors and interested parties can help determine the strategy, as follows:

- Analysing the competitors in the marketplace to determine the strengths and weaknesses of the competitors in the organization's market segment, which helps to identify and articulate how an organization's business can be a significant differentiator from other organizations.
- Mapping the internal and external interested parties (e.g. employees, investors or board members) who rely on the company's success to better understand how the transition to circularity will impact them. Every business can take a different approach with its interested parties. The roles of interested parties differ between businesses, depending on the rules and their responsibilities. Interested parties can become supporters or investors when an organization shifts from linear to circular.

5.3 Addressing economic rationalization

Irrespective of the interested parties' expectations or the organization's desire to shift to a circular value creation model, the actual transition cannot successfully be conducted without economic rationalization. All value creation models presume an ability to realize a profit while taking into account the associated risks. Economic rationalization is also relevant to the costs and revenues business elements described in [4.2](#) and [6.2](#). An example of economic rationalization is provided in [Clause A.4](#).

6 Transitioning the value creation model of an organization towards circularity

6.1 Developing a plan

After a circular economy strategy is set, the next step is to develop a transition plan to shift from the current to the desired future.

An organization's transition plan should include objectives, timelines, actions and anticipated interim results. The objectives and interim results should be expressed in KPIs used to assess the status of circularity as described in [4.6](#). The plan should be in line with the circular economy strategy as described in [5.2](#).

The organization can begin with the circular economy strategy and break it down into specific actions designed to transition its value creation model. In developing the actions, the organization can consider focusing on opportunities arising from individual business elements, as described in [4.2](#), and possible actions, as described in [4.6](#).

For the organization, transitioning is a dynamic process repeatedly looping between [4.2](#) (value creation model as is) and [6.2](#) (improved value creation model).

6.2 Reviewing the elements of the value creation model in light of desired changes

6.2.1 General

The organization should consider changes to its value creation model that are consistent with the developed plan. Examples of such considerations are given in [6.2.2](#) to [6.2.11](#).

6.2.2 Value proposition

A value proposition for circularity includes how the target group's needs can be fulfilled while keeping resources at their highest value for as long as possible. This can be done by considering a product's lifetime over several use cycles in which the maximum value is created by cascading materials through circular actions such as reuse, repair, remanufacturing and recycling.

It is essential in a circular economy to extend the engagement and scope of activities such as communication, customer support, customer service, reverse logistic provision, and all value-generating activities around a product or service, including, for example, a product-service-system (PSS). A circular value proposition through a product or service can offer significant differentiation, making it easier to raise funding and financing for transition, development and scaling.

6.2.3 Key activities

Key activities in circular value creation models can include improvements to product design (e.g. to increase modularity, reparability and recyclability), as well as improvements to process management.

Further activities can include sharing, for example, resources and infrastructure with partners, virtualization or leasing of products and offering complementary services such as repair or refurbishment of goods sold.

The impacts of these activities are accounted for in circular value creation models. Positive impacts are strengthened and shared, while negative impacts are mitigated.

6.2.4 Key business resources

As a key business resource in a circular value creation model, recovered resources obtained via, for example, reusing or recycling products, parts or materials take precedence over virgin resources extracted from the earth.

Another important consideration during the acquisition of resources is their disposal after use (e.g. whether the resources contain harmful materials that hinder their safe reuse or recycling). Minimized resource

use can be achieved by exploring better-performing materials. Value creation models contributing to the restoration of natural capital through regenerative practices ensure long-term resource stewardship.

Multi-disciplinary teams that involve interested parties besides suppliers, such as customers or cooperating organizations within the value network, can ensure effective resource procurement, use and disposal.

New capabilities can be needed to facilitate circular resource flows and feedback mechanisms, so knowledge and skills should be considered a key business resource in circular value creation models.

6.2.5 Customer segments

Identifying customer segments that are open to circular solutions helps to determine appealing circular value creation models and marketing strategies, which also creates opportunities for competitive positioning. For example, customers valuing reliable and durable products can appreciate reparability, upgradability and maintenance services. Customers seeking low upfront investments can find value in sharing or rental models. Expanding beyond traditional segments to include other groups can unlock additional revenue streams.

6.2.6 Customer relationships

Building and maintaining customer relationships can provide suggestions about what solutions the organization can offer. Additionally, switching from selling to recycling, reuse or remanufacturing can enhance social marketing strategies and leverage relationships with community partners.

Improving the circularity performance can strengthen the relationship with an organization's customers who are committed to social and environmental issues. Increasing the organization's transparency and willingness to share circularity performance data with customers can also strengthen relationships and reputations.

Customers can also become suppliers where they are paid for the materials they return to the organization.

Product as a service model or a product take-back system can create long-term links to customers.

6.2.7 Channels

Circular value creation models and value networks benefit from many shared channels for collaboration and communication. Reviewing the relationships and communication channels with all key partners along the value network fosters trust and builds avenues for further collaboration. The review includes evaluating the organization's position in the value network regarding aspects that enable a circular flow of resources, such as reverse logistics. Feedback loops should be built in during the design phase to continuously improve a solution.

6.2.8 Costs

Changes made to each business element are reflected in the cost structure. The cost structure is usually discussed when the potential benefits of the circular economy are addressed. Capital investments in circularity can be associated with cost savings from resource use and reduced exposure to price volatility in sourced materials. Partnerships such as industrial symbiosis can retain value from material flows, and reduce manufacturing costs and investments into infrastructure. Some actions can require less upfront investment, such as transitioning from selling products to a PSS.

6.2.9 Revenue streams

Transitioning to a circular value creation model offers the potential for new revenue streams (e.g. from residual values of products or materials that cannot be exploited within the organization but can be sold on secondary markets). Durable and high-quality circular products can achieve higher profit margins and lead to additional revenues by offering repair and maintenance services or selling parts for upgrade. Value creation models in transition to circularity can explore revenue models different from traditional ownership-based

models, such as pricing per unit of service (e.g. time, number of uses or agreed result). Product-as-a-service value creation models offer great potential for customer retention and recurring revenues via subscriptions.

6.2.10 Key partners

Cooperative networks allow businesses to benefit from suppliers and support an organization's research, product design, marketing, office support, supply routes, financial functions, production processes and management. Thus, collaboration enhances essential resource procurement and the performance of key activities.

EXAMPLE 1 Third parties that specialize in industrial waste collection and material recovery can conduct off-site recycling. Outputs or feedstocks emerging from this processing can then be sold to other industries.

EXAMPLE 2 Consumers can return used food service packaging to a network of participating restaurants for washing and reuse.

Collaborative production, based on cooperation in the production value chain, allows materials to circulate in a closed material loop.

The engagement of other cooperative members in the value network is further addressed in [Clause 7](#).

6.2.11 Other elements

The business environment provided by externalities and enablers is constantly changing. There can be new or amended regulations, radical technology development, disruptions in social infrastructures or the appearance of new finance schemes, which provide opportunities for achieving circularity.

6.2.12 Other considerations

In addition to the considerations listed in [6.2.2](#) to [6.2.11](#) an organization can identify potential risks and opportunities by exploring:

- current/future compliance obligations;
- current solutions that are related to end-to-end processes (life cycle perspective);
- market and societal perspectives of linear value networks;
- potential unintended consequences from implementing circular economy solutions;
- use of renewable energy;
- education and awareness of circular economy objectives.

7 Transitioning a value network towards circularity

7.1 General

In many cases, during the transition to circularity, it is necessary to expand the project's boundary to include a broader perspective beyond the organization's immediate value chain. Expanding the boundary of the existing value chain beyond solely commercial relationships can create opportunities to develop circular flows of resources by regenerating ecosystems, and retaining or adding to their value.

A value network can take many forms of innovative collaborations and relationships. Organizations within the value network can be multi-sectoral and multi-stakeholder, and their relationships can be characterized by new exchanges of materials, financial resources, information, knowledge, technology, etc.

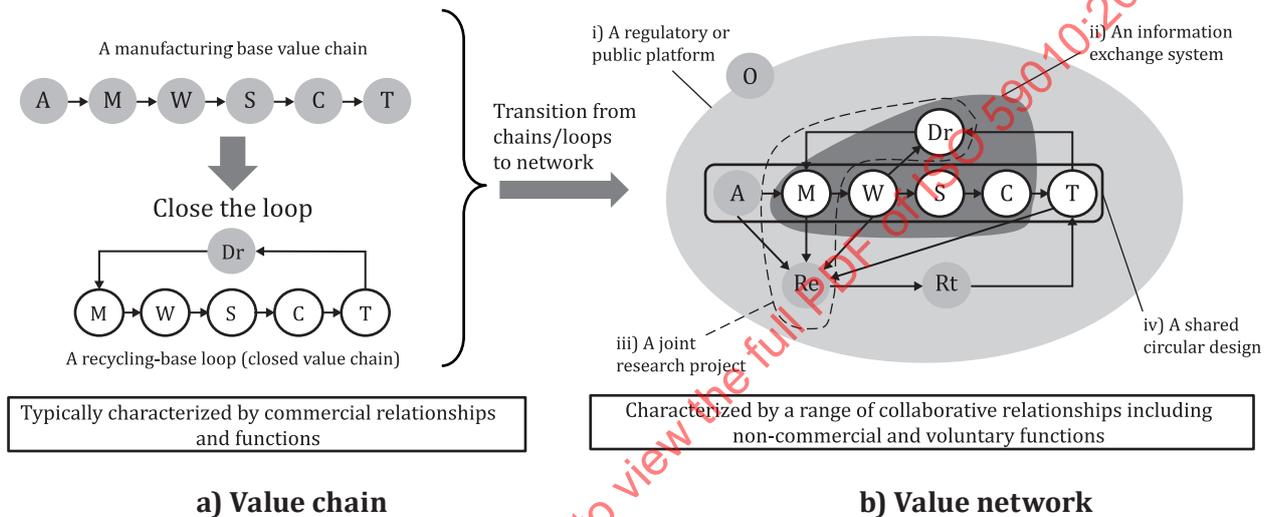
[Figure 5 b](#)) provides an illustrative example of a value network that depicts multiple collaborative relationships, including non-commercial and voluntary functions, distinct from the value chain shown in [Figure 5 b](#)) which is characterized by commercial relationships.

Industrial symbiosis is an example of such collaboration between businesses, which can be facilitated by municipalities, chambers of commerce or companies that discover industrial synergies between different sectors. An example of industrial symbiosis is described in [Clause A.6](#).

The process to transition a value chain or linear value network to a circular value network can be similar to the process used to transition an individual organization’s value creation model and starts with exploring circular value network opportunities.

When a linear value network is transitioned to a circular model, some features can be present such as mutual benefit sharing (including non-economic benefits), innovative synergies between value network organizations, collaboration agreements and confidentiality measures.

Organizations can also collaborate with peers and competitors as represented by their industry associations. Where the circular transition is not a competitive process, the industry can establish a circular economy transition, where association members collaborate. ^[17]



Key

A	raw materials acquisition	T	collection and take back
M	manufacturing	Re	reusing, refurbishing and remanufacturing
W	wholesaling	Rt	retailing
S	service	Dr	disassembling and recycling
C	consumer	O	other (e.g. governance, research, policy and voluntary sector)
→	flows of resources	i)~iv)	examples of collaborative relationships

Figure 5 — An example of the transition from a value chain to a value network

7.2 Establishing shared objectives, strategy and plan

Value network members should determine their shared objectives by considering potential symbiotic opportunities and members’ individual circular objectives. The members can decide to create a shared circular economy strategy based on those shared objectives in addition to each member’s circular economy strategy.

Value network members should break down the shared objectives into actions and create a shared plan with timelines with expected interim results and associated actions to shift their value networks towards circularity. Value network members can consider transitioning specific value creation model elements in their journey to circularity.

Each member will enjoy their own benefits through collaborative activities designed to regenerate ecosystems and maintain and add value to resources. Each member, however, should also aim to create

benefits for all network members. The members should resolve trade-offs potentially arising from individual optimization of the KPIs described in 4.6. Each member can have their own KPIs and a shared set of integrated KPIs agreed upon by all participating members. Participating members of the value network should engage in consistency verification to ensure alignment in objectives, values, governance and decision-making throughout the network. Open communication between the members can be instrumental in resolving any potential misalignments.

7.3 Implementing appropriate value network governance

A governance structure should be implemented in a value network. Depending on the network objectives and strategy, the governance structures can take diverse forms.

EXAMPLE A forum, an alliance, pacts, a consortium, members networks, public-private partnerships.

The following elements should be considered for governance;

- clear roles and responsibilities of members;
- principle of respect for the liberty and free will of each member;
- establishing an advisory group, steering committee or governing board;
- shared by-laws that provide the principles and rules by which shared objectives and strategies are to be achieved;
- clear and active communication channels and protocols between members and external interested parties;
- risk management (member impartiality and inclusivity);
- fostering of trust-building and engagement;
- transparent decision-making processes;
- traceability mechanisms;
- reporting processes to interested parties, community and key partners, especially non-financial disclosure.

7.4 Leveraging or establishing shared infrastructures (physical and digital)

Collaboration between members in a circular value network often requires shared infrastructure, sometimes provided by value network members. Example components of such an infrastructure include:

- an information exchange platform for participating parties and their external interested parties (e.g. block-chain, digital material, product passports);
- shared facilities and assets that achieve shared objectives such as (reverse) logistics, warehouses, treatment of PCM, land and energy recovery;
- leveraged knowledge and skills to deploy relevant technologies and social and capital innovations.

8 Reviewing and monitoring for continual improvement

8.1 Measuring and assessing circularity performance

After selecting actions to improve circularity, an organization should measure and assess the results of those actions as its circularity performance, which aligns with the KPIs described in 4.5.

ISO 59010:2024(en)

Measurement and assessment of circularity performance should be meaningful, i.e. the data needs to be relevant and precise enough for the intended application. Data acquisition should be organized across value chains or value networks, with regard to the amount of data and its quality.

The measurement should include all resource inflows and outflows (including emissions and losses) by applying the core circularity indicators of ISO 59020.

The assessment of impacts on social, environmental and economic aspects is part of the assessment step as explained in ISO 59020. It can be made by applying complementary methods (e.g. ISO 14044 for LCA, ISO 26000 for social responsibility).

The outcome of the measurement and assessment process is specific to a defined time period for which the measurement and assessment are conducted. To monitor progress over time, the organization can choose to carry out periodic assessments.

8.2 Improving the value creation model of the organization

At an appropriate interval, such as when interim results are achieved, the plan as described in [6.1](#) should be reviewed from, but not limited to, the following perspectives:

- a) Achieved performance: the interim results described in [6.1](#) should be checked, and improvement opportunities identified if results are not on target to achieve goals.
- b) Value creation model elements: The value creation model elements investigated in [4.2](#) and [6.2](#) should be reviewed for further continual improvement opportunities.
- c) Access to finance and funding: Finance and funding obtained for the transition towards a circular economy value creation model should be reviewed in terms of their sufficiency for exploring additional opportunities.

8.3 Improving the value network

At an appropriate interval, such as when reviewing interim results, the shared strategic plan described in [7.2](#) should be reviewed by value network members in a transparent, inclusive and impartial manner from, but not limited to, the following perspectives:

- a) The performance achieved: The interim results described in [7.2](#) should be checked, and the potential for improvement explored if outcomes are not on target to achieve the goals described in [4.1](#).
- b) The boundary: Improvement of circularity is possible when the boundary is continually expanded, thus allowing an increasingly larger and more comprehensive set of other external elements and interested parties to be included in the value network's boundary. Expanding the boundary helps mitigate risks and create new cooperation opportunities. Members should review the appropriateness of the boundary, as described in [4.4](#) and [7.1](#), with the objective of scaling up, as illustrated in [Figure 5](#). However, a larger boundary typically can require more financing to support member interactions. A step-by-step approach for value network extension is useful.
- c) The diversity of members: When the diversity in member organizations (e.g. public, private, formal and informal sectors) is large, more versatile actions, such as repurposing, remanufacturing and repair, are possible. Encouraging diversity in members whenever appropriate is important.
- d) Achieving good relationships between members: This is typically a primary goal for a value network. Checking that each member benefits other(s) effectively and making innovative contributions, as described in [7.2](#), supports that goal.
- e) The governance performance and structure: This should be regularly checked against its effectiveness as described in [7.3](#), and members should seek opportunities for further improvement.

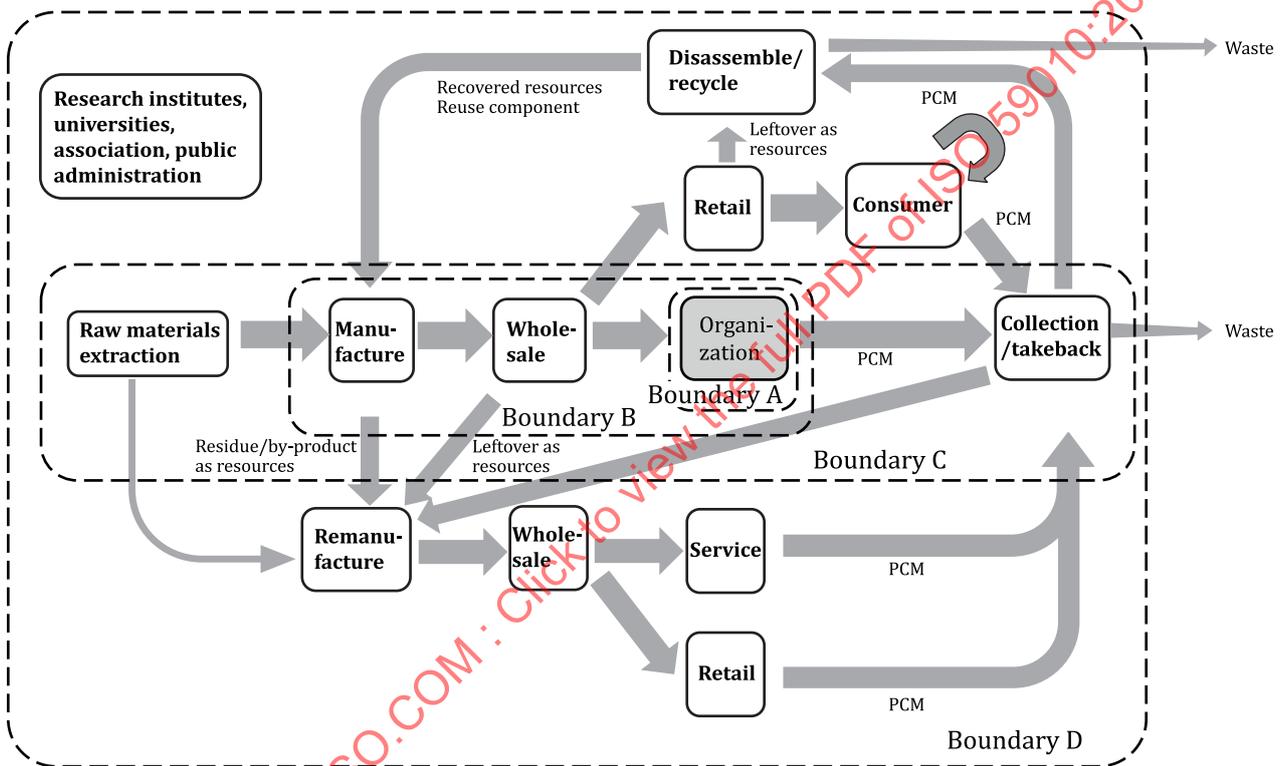
Annex A (informative)

Supplementary examples

A.1 Example for mapping the value chain and network (see 4.4)

This is an example of how to map the current value chain (which is typically linear to start).

Figure A.1 illustrates a hypothetical organization's value network.



Key

PCM post-consumer material

NOTE 1 The arrows indicate the value network's resource flows.

NOTE 2 In this example, research institutes, universities, associations and public administration that are not connected by arrows are organizations that indirectly influence the organization's circular economic activities. They can be mapped based on how they interact with the organization's activities.

Figure A.1 — Illustrative example of a specific value chain and value network

The subject organization can be located anywhere in Figure A.1, depending on the organization's role in the value chain. For example, if the organization is a manufacturer, it is typically positioned upstream in the value chain. If the subject organization provides services, it is typically positioned downstream in the value chain.

Some organizations can have difficulty setting a boundary that extends into their value network because they have a limited sphere of influence. In this case, a small organization (typically a service provider) can start from Boundary A, then expand into Boundaries B, C and D as it gradually moves into its middle- to long-term transition.