

CIRCULAR METRICS FOR BUSINESS

Introduction to
the CIRCelligence
indicators framework

November 2021



We work to accelerate the transition towards a circular economy. As an impact organisation, we identify opportunities to turn circular economy principles into practical reality. Our vision is economic, social and environmental prosperity, without compromising the future of our planet. Our mission is to connect and empower a global community in business, cities and governments to create the conditions for systemic transformation.



Boston Consulting Group partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities. As the co-author of the CIRCelligence indicators framework, BCG aims to provide a framework and tools to help organisations become circular companies, thus boosting top-line growth, improving efficiency, and unleashing innovation.

ABOUT THIS DOCUMENT

With the circular economy gaining momentum, more circularity metrics of various shapes and sizes are emerging. To help businesses navigate this increasingly complex landscape, Circle Economy has published a series of white papers on [Circular Metrics for Business](#). Ranging from an overview of the metrics landscape to deep dives into some of the most promising metric frameworks, these publications hope to help businesses identify the best opportunities for moving to circularity.

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1. THE LANDSCAPE OF CIRCULAR METRICS

Our world is only 8.6% circular. As climate breakdown becomes reality, our material use and greenhouse gas (GHG) emissions continue to spiral upwards. We are still heading in the wrong direction. As history shows us, the process of innovation can provide us with the tools to change the current way of doing business. Innovation is a process of trial-and-error: piloting solutions, identifying and improving business models, assessing impacts, and adjusting plans. We need to know what works, what does not and why—and that means turning to metrics. However, it is at this point that the comparison with history stops. The innovation towards circular business models will require different measurements and metrics than the ones developed to monitor and innovate in the linear economy.

METRICS FOR EVERY STEP IN YOUR CIRCULAR JOURNEY

Metrics vary in purpose, scope and audience, among other things. Businesses can use metrics to show the opportunities the circular economy offers shareholders, customers, suppliers and employees. Metrics can also aid the search for and identification of circular solutions most suited to individual businesses—they can assess

the potential of the solutions and build business cases to ensure implementation at scale. Eventually, metrics will be needed to measure and report upon a businesses progress in becoming more circular. For every step of the innovation process, different metrics are needed to point us in the direction of new or improved products and services that are beneficial from an economic, social and environmental viewpoint.

INTRODUCTION INTO CIRCELLIGENCE

CIRCelligence is a proprietary metric and tool developed by Boston Consulting Group (BCG) to support organisations in becoming circular. The holistic CIRCelligence framework analyses the entire value chain from input to end of life, and anchors circular thinking into the business and its ecosystems. For each value cycle step, the type and amount of resources flowing into the company (inflow), the resource use (slow flow) and the type and amount of resources flowing out of the company's boundaries (outflow) are considered. CIRCelligence, therefore, can evaluate the pure material flows of any value cycle, but it also has a qualitative component. This component considers material value and explicitly embeds corporate steering and engagements with the broader business ecosystem (see Figure one).

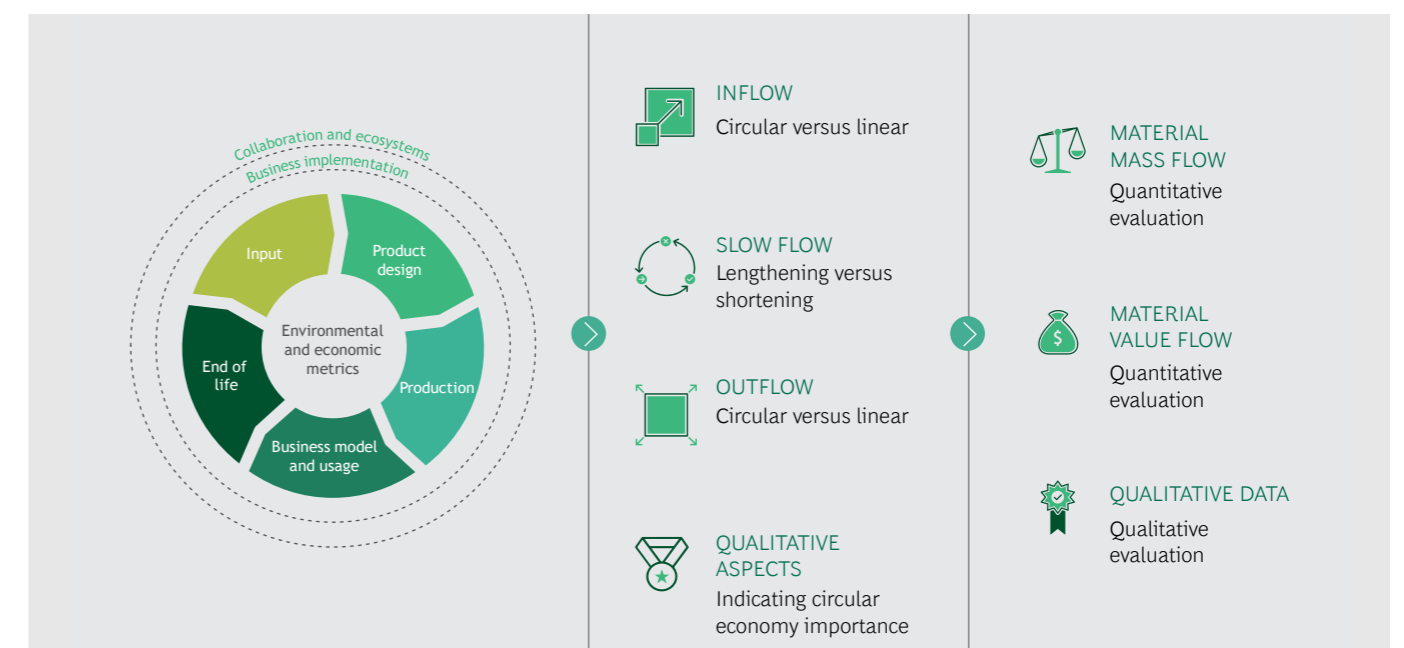


Figure one: Scope of the CIRCelligence framework
Source: CIRCelligence by BCG paper

CIRCelligence is initially applied to an organisation as part of a BCG project involving on-the-ground support from consultants. As such, using the tool's is a first step in the development of a circular strategy, measuring a starting point or understanding as to whether first initiatives can garner the desired impact.

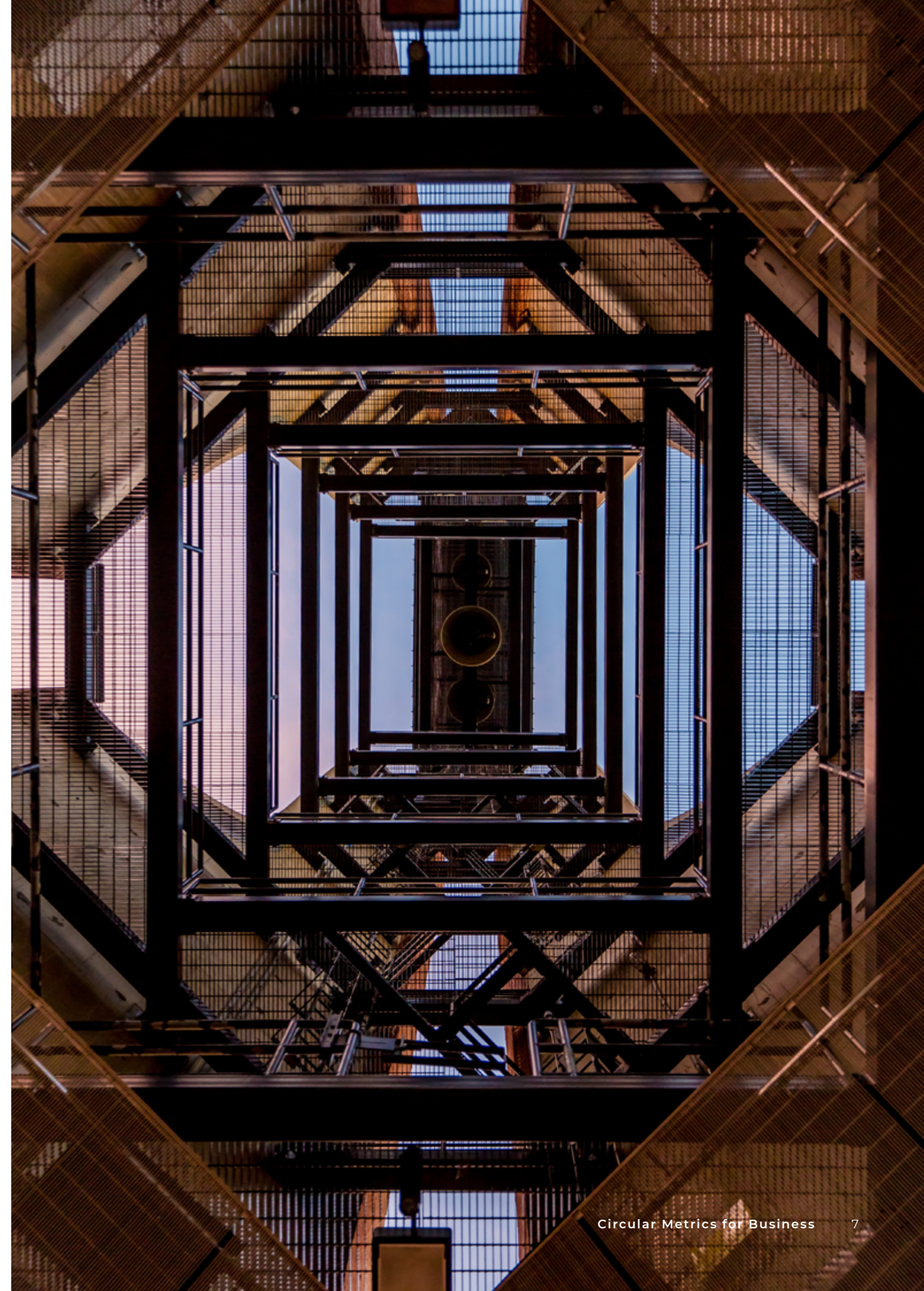
The tool behind the CIRCelligence methodology is partly automated and BCG clients receive a self-assessment version that allows them to monitor progress in the years to come. This repeated use does not require support from BCG or any other external party. The self-assessment tool provides the same flexibility in using the full or a reduced scope of the available analysis logic.

WHO IS IT FOR

CIRCelligence is a strategic approach that enables businesses to integrate a circular strategy into their core business strategy in a way that allows transparent steering and fact-based decision-making. As such, its outcomes are specifically useful for high-level management and executives. Assuming innovation or Corporate Social Responsibility (CSR) managers will be guiding the application of the framework, CIRCelligence will also help these actors to create awareness and understanding among the many internal stakeholders involved. Lastly, the output generated can be used to report on the company's progress to external stakeholders in a consistent and standardised way, making it a tool of interest to investors and shareholders.

UNIQUE SELLING POINTS

For a complete assessment, CIRCelligence requires considerably more input than most circular economy metrics currently available. As a result, however, it gives a more thorough and detailed overview of your organisation's performance in terms of circularity. In addition, the involvement of BCG in the first implementation of the framework is beneficial for the quality and consistency of the outcomes. If desired, a reduced scope analysis is possible: one could exclude the material value analysis, only analyse certain value circle steps or exclude qualitative analysis, for example.



CIRCULAR METRICS DIAGRAM

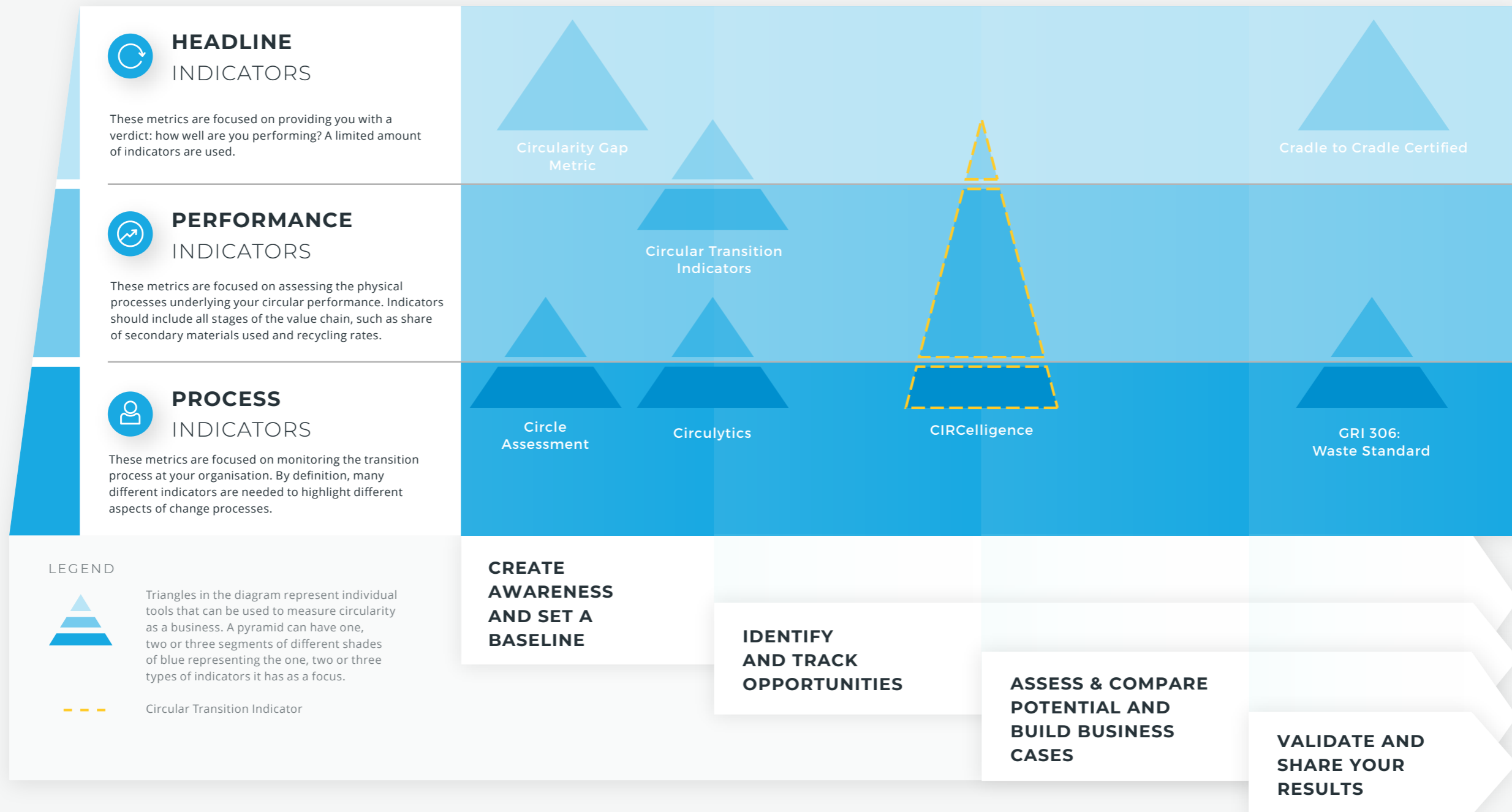


Figure two: The circular economy metrics landscape for business

2. METHODOLOGY

The circular economy is a relatively new knowledge field that is still developing its many definitions and methodologies. Therefore, when selecting circular metrics, it's important to assess the methodology of the metric or indicator and whether it is appropriate for the goal you have in mind. For instance, is it reliable enough to convince your stakeholders? Is it accurate enough to inform your decisions? Does it provide relevant insights to your type of business?

STEP BY STEP APPROACH

CIRCelligence can make circular strategy an integral part of the larger corporate strategy in three main steps. The first creates insights into the status quo levels of circularity across a company's entire value cycle. The second step sets appropriate strategies to reach the company's circularity level ambition. The final step implements the strategies and this is supported by setting out clear KPIs for the company to use at different organisational levels. This is CIRCelligence's three-pronged approach (see Figure three):

Step one: Create transparency. CIRCelligence uses a proprietary calculator to gather quantitative and qualitative data through a web-based survey that is customisable to the company's interests. This survey generates insights for each step of the value cycle and overarching business function. When the answers are collected, the data is reviewed, refined and finally used to calculate the circularity of the company. This creates the required transparency for top management to understand existing competitive advantages and potential gaps regarding the integration of circular thinking across the company.

Step two: Develop an actionable roadmap. Through CIRCelligence, different scenarios for the required activities can be simulated and ambition levels developed. This way, a company can understand what degree of circularity can be reasonably achieved within a certain time frame. BCG then provides actionable recommendations on how to reach this ambition level and embed circular thinking across the organisation.

Step three: Implement key initiatives. BCG identifies key performance indicators (KPIs) that can be tracked to measure performance in terms of circularity goals. Moreover, CIRCelligence can be used for internal and external stakeholder communication from board level to external sustainability reporting. Following the initial BCG supported project, all use-cases are available through the self-assessment tool.

MATURITY

The framework was launched in February 2020 and Circle Economy assisted BCG in the development of the CIRCelligence methodology. The technical development and methodology are completed and several client projects have been carried out. The close cooperation between BCG and the users of the framework enables BCG to constantly check if the framework's methodology and tool suit their client's needs and if adjustments are needed. Possible future improvements entail minor changes in usability, depending on the client's needs, or further additions to the metric, such as new indicators, to capture more aspects in the assessment.

METHODOLOGY READINESS LEVEL

To support the process of selecting the right metric for your business, Circle Economy has developed a framework that allows you to evaluate and communicate the maturity of a metric: the Methodology Readiness Level (MRL). The levels in this framework do not provide a step-by-step description of the development curve of a certain metric. Such a development can occur in loops, skip steps, or even take a few steps back due to the launch of a new edition of a tool. This framework does, however, describe the relative distance between the current maturity of a metric or indicator compared to the ideal situation in which the methodology is fully tested, adopted, made available and standardised. The higher the MRL, the closer it is to the ideal state (see table below).

MRL	DESCRIPTION
1	Theoretical test
2	Tested within a limited set of applications
	Circularity Gap Metric CIRCelligence
3	Tested by a wider community of practitioners Circle Assessment
4	Metric published and widely applicable GRI 306: Waste Standard
5	Metric widely used and easily accessible Circular Transition Indicators Circulytics
6	Metric standardised Cradle to Cradle Certified



Figure 3: CIRCelligence's three hased approach
Source: CIRCelligence by BCG paper

3. DATA

BCG has become increasingly adept in monitoring the production chains of the linear economy. However, much of the information that is relevant for the circular economy is not monitored to the same extent, such as emissions, waste flows, or the value of products and infrastructure currently in use. An important step in the selection of a metric to assess circularity is to assess the data need and the availability of that data. With data being scarce, some metrics might prove difficult, and therefore costly, to apply. Others will require the data to be publicly available or verified by third parties to allow for full transparency, which might not always be a feasible or desirable option for a business.

DATA NEEDS

Overall, the data requirements for a CIRCelligence analysis will require a substantial amount of time and stakeholders contribution. To limit these efforts as much as possible, CIRCelligence uses a customisable web-based survey through which a BCG team collects answers to approximately 50 quantitative questions—with up to 2,500 data points—and 100 qualitative ones. As stated in the methodology chapter, the answers are used to generate insights regarding the inflow, slow flow, outflow and qualitative aspects for each step in the value cycle and overarching business function (see Figure four). The quantitative questions are focused on the resources used across the entire business, which leads to data needs such as the type of input materials, packaging, water use and emissions. The qualitative questions are focused on the overall organisation and collaborations, requesting information on strategic decisions, tools and the enablement of circularity.

DATA AVAILABILITY

The holistic CIRCelligence framework analyses the entire value chain from inputs to end-of-life treatment. This means that the proprietary tool will require data from supply chain partners of the company. Typically, some of the data will be readily available, whereas other data may have been gathered for a different purpose and additional interpretation and preparation may be required. In other instances, additional data requests may be made to suppliers further down the value chain or other value chain partners. Lastly, if data gaps remain, the BCG team will suggest solutions based on sector averages or the use of proxies. As it is a self-assessment method, all data used for the assessment remains in company ownership and there is no need to share the data with third parties to be able to use the tool.

VALUE CHAIN TRANSPARENCY

The degree to which data is widely available and easily accessible can be described in terms of closed or open data, and in terms of public or private data. Public data, described as data owned by the public or made widely available for a greater good, isn't always open data. The level of 'openness' of a dataset describes the way it is designed to be shared, and understood, by third parties. Is it structured in a way that is standardised and easy to read, or mined, by others? There are various levels of data availability: data can be accessible to all, available or understandable for a few selected partners, or shared within a group of organisations depending on the need. In an ideal world, all the data you need is available in an open format, either within your organisation or across your business' ecosystem.

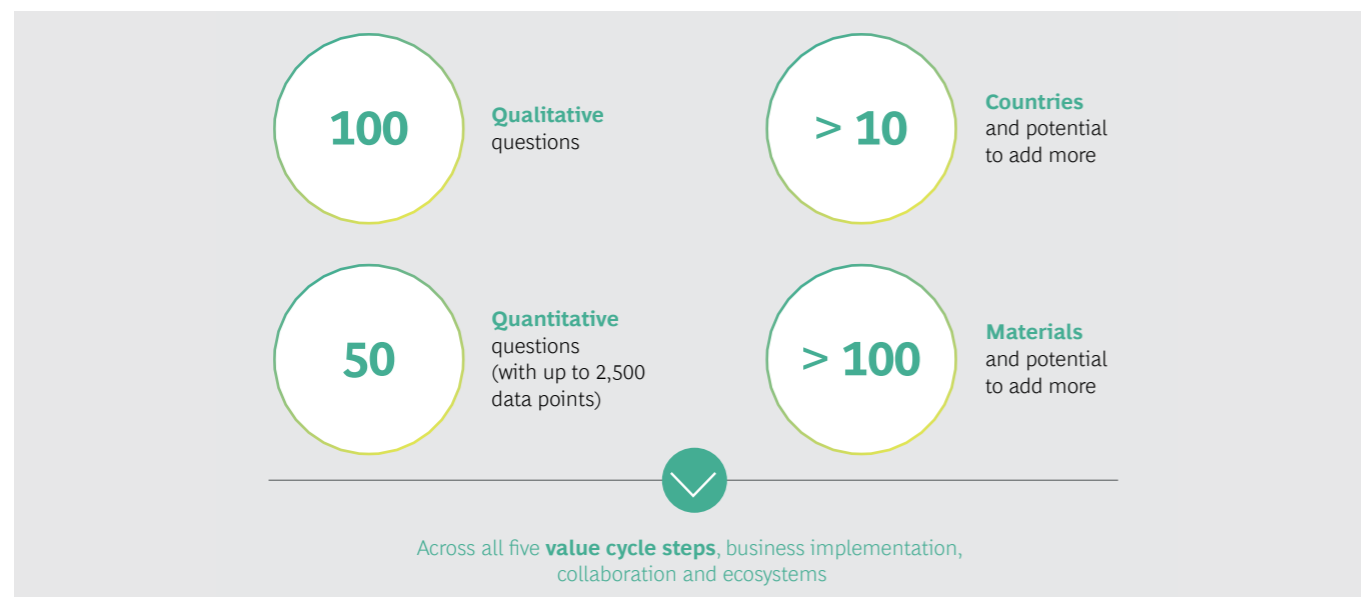


Figure four: Data gathered through CIRCelligence's web-based survey tool
Source: CIRCelligence by BCG paper

	Only in-company data needed	Need for shared data across supply chain partners	Need for shared data and outcomes are intended to be shared
Circle Assessment	Blue		
Circular Transition Indicators		Blue	
CIRCelligence	Yellow	Blue	Yellow
Circulytics		Blue	
Circularity Gap Metric		Blue	
GRI 306: Waste Standard			Blue
Cradle to Cradle Certified			Blue

4. TOOLING

While the methodology or data availability can present challenges to businesses measuring circularity, tooling can help overcome such challenges. When selecting the ideal metric, it is wise to assess the resources available to help in its application, the level of expertise or support of third parties needed, and tools available to ease the workload.

AVAILABLE RESOURCES

The first application of CIRCelligence is always paired with a BCG project, which means that the BCG team will provide all necessary information to the client. This interaction is maintained throughout the project, making additional user manuals or webinars redundant to the service. A condition for a successful project is that the client team of the project consists of at least one member that wishes to be responsible for circular metrics in the future.

SKILLS NEEDED

No skill or prior knowledge on circularity assessment is needed due to the supportive service that BCG offers. The sole requirement is that the project team involved should have broad knowledge on the company's structure and network, which would be needed for setting the right contact links during the data collection phase.

THIRD-PARTY INVOLVEMENT

The first application of the CIRCelligence framework within your organisation must be guided and supported by BCG. The following applications can be pursued by the client without further assistance from third parties and any associated costs. In these applications, CIRCelligence enables the client to edit the underlying data for new calculations in such a way that it is possible to monitor your company's progress.

AUTOMATED TOOLS

To support the adoption of the framework and methodology, a free online tool is available that guides companies through the assessment (see Figure three). The tool not only structures data and computes outcomes, it also supports users to reach out to internal stakeholders and value chain partners for data requests that avoid confidentiality issues.

WIDE VARIETY OF AVAILABLE RESOURCES PER METRIC

Every metric that is publicly accessible usually has at least basic resources available to help in its application, such as a manual, how-to guide or FAQs. Going a few steps further, some solution providers provide webinars, personal guidance or an extended consultancy, although sometimes this comes with a price tag. In specific cases, third party guidance is obligatory to ensure impartiality, such as in certification schemes, or a necessity, because the level of expertise required is not readily available within other organisations. Sometimes a tool or method is specifically designed to be a part of a consultancy offer. Such third party support often requires a more significant budget. As these examples show, assessing

the available resources for the application of metric is as much a question of your personal needs and skill sets available in your organisation, as of available budget. Acknowledging that budget and in-house expertise are often limited, many solution providers have automated part of their metric, sometimes to a level of offering self-assessment tools with little or no need for external involvement or significant budget.

	No third party support needed	Third party support available, not required	Third party support required
Only basic resources publicly available		Circularity Gap Metric	CIRCelligence*
Extensive resources or tooling available	Circle Assessment	Circular Transition Indicators	Cradle to Cradle Certified
	Circulytics	GRI 306: Waste Standard	

**CIRCelligence can be re-used after the first application without third party support*

5. RESULTS

Metrics are there to guide your actions. Once you have selected the metric or metrics for your business, onboarded all the internal and external stakeholders needed, collected the required data and pressed 'calculate' on your metric tool, it is time to disseminate the learnings from your analysis and translate it into a way forward. It is even better if you can turn measuring into monitoring, so you continue to learn and evaluate your progress in transitioning to full circularity.

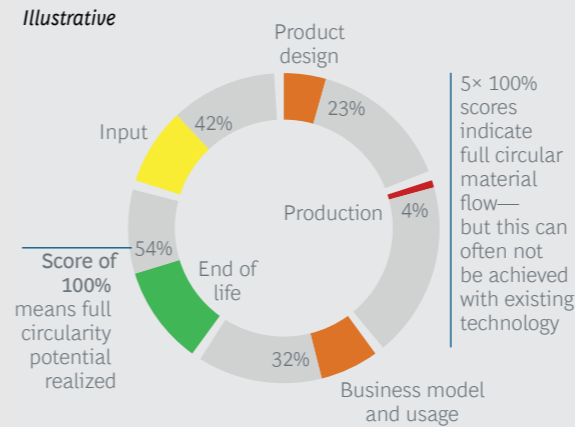
OUTPUT OF THE FRAMEWORK

To develop an actionable roadmap that companies can use to improve their circularity, the BCG team computes multiple indicators based on the gathered input and presents these in a dashboard highlighting key results (see Figure five). The CIRCelligence calculator uses different 'lenses' to focus on circularity at different levels, such as product, product component, packaging, division or company-wide performance. The flexibility of these lenses can uncover the reasons behind specific circularity scores and identify possible solutions at an operational level.

INDICATORS USED

Based on the gathered data, the CIRCelligence calculator generates quantitative and qualitative circularity scores for each value cycle step and business function (see Figure six). Quantitative results are displayed using a scale from 0% to 100% to demonstrate the theoretical ideal of 100% circularity. Both a mass-based and a value-based score can be derived from the analysis, providing the client with the flexibility to tailor the approach to their need and context. Qualitative scores are displayed using grades from A to F to signify the extent to which the company has embedded circular thinking in its processes and governance structure (see Figure six).

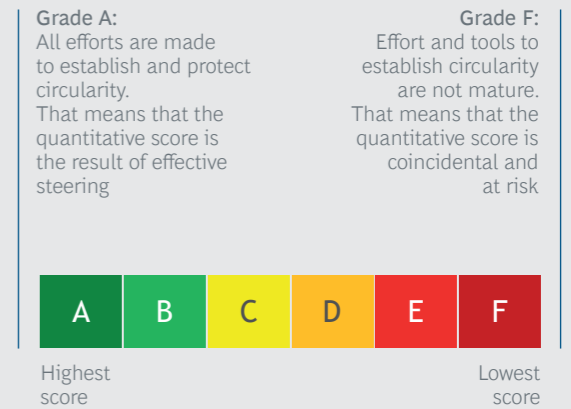
HARD FACTS ABOUT PRODUCT LIFE CYCLE CAPTURED VIA QUANTITATIVE SCORE



Quantitative scores are derived on a mass basis and value basis

The quantitative scores measure the company's circularity for each step of the value cycle and are reported as a percentage, from 0% to 100%

SOFT FACTS ABOUT GOVERNANCE AND TOOLS CAPTURED VIA QUALITATIVE SURVEY



Qualitative scores reflect the governance, current efforts, and tool maturity to manage circularity

This score helps distinguish coincidental from intentional circularity
The results are displayed as a grade system from A to F

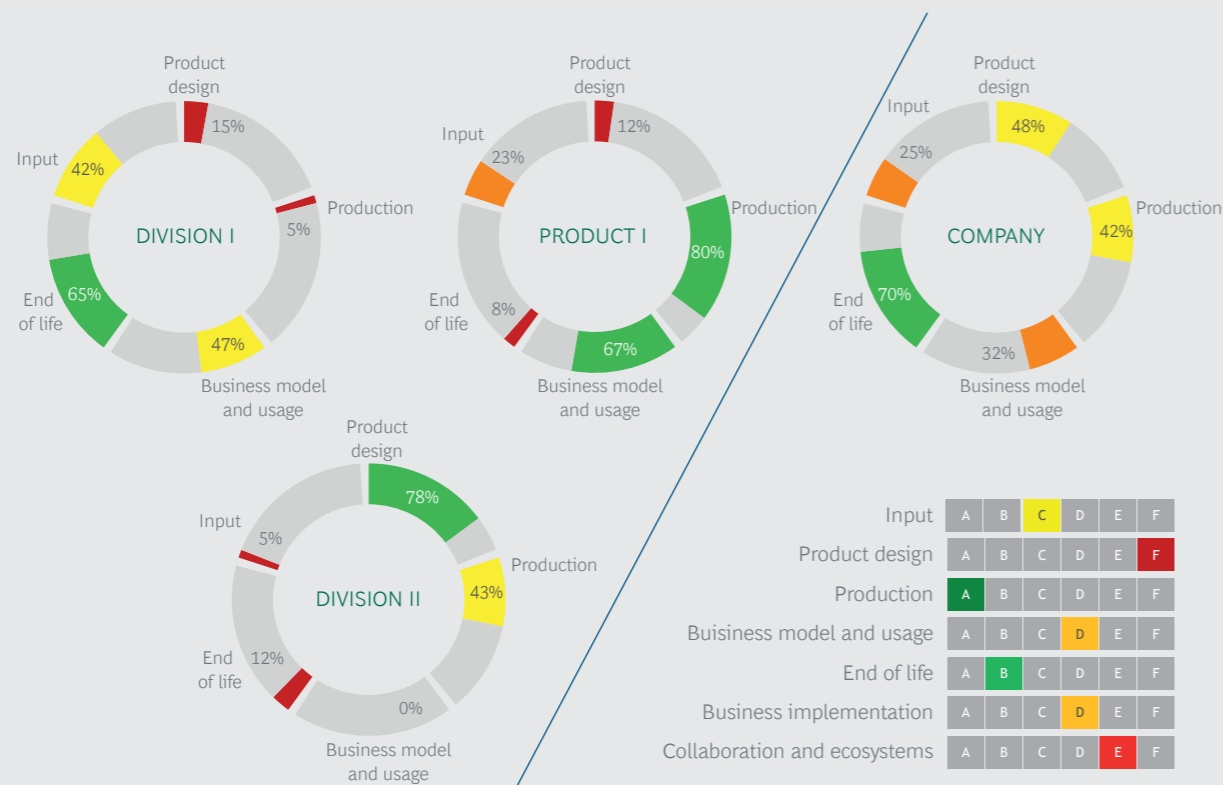


Figure 5: Typical output of the CIRCelligence framework
Source: CIRCelligence by BCG paper

Figure six: CIRCelligence uses a combination of quantitative and qualitative indicators

The framework consists of more than 60 indicators, including:

- A headline indicator (% circularity),
- Performance metrics for each of the value cycle steps, including quantitative scores specific to that value cycle step and qualitative indicators related to 'Decision Making' and 'Tools/Enablement'.
- Process indicators focussing on two specific business functions, which solely contribute to qualitative scores: 'Business implementation' and 'Collaboration & Ecosystems'.



HEADLINE INDICATORS

- % circularity (calculated as average of all performance indicators)



PERFORMANCE INDICATORS

- circularity of the value cycle step "Input" (based on 6 sub-indicators)
- circularity of the value cycle step "Product design" (based on 4 sub-indicators)
- circularity of the value cycle step "Production and sales" (based on 10 sub-indicators)
- circularity of the value cycle step "Business model and usage" (based on 6 sub-indicators)
- circularity of the value cycle step "End of life" (based on 8 sub-indicators)



PROCESS INDICATORS

- Business implementation (based on 12 sub-indicators)
- Collaboration & Ecosystems (based on 9 sub-indicators)

Figure seven: Indicators included in the CIRCelligence framework

INTERPRETING AND COMMUNICATING THE OUTCOMES

As with other alternatives, the main outcomes of the CIRCelligence framework focus on the calculation of indicators. However, as CIRCelligence is designed to pinpoint actions that are likely to produce quick wins, as well as larger scale strategic initiatives, the tool provides the additional functionality of easily simulating different improvement measures and evaluating potential future scenarios. This allows users to explore various options and build a better understanding of their own value chain.

When the proprietary calculator has assessed the data, the circularity results are visualised in a very detailed dashboard with various levels of indicators and cross-sections of results. For starters, the dashboard provides an overview in two dimensions: the whole value chain and each segment within this value chain. The value chain shows the status quo of the company's circularity and the segments allow for more detailed insights. Next to circularity scores and grades across the value chain, the value chain overview also introduces relevant ambition levels and outlines key initiatives for improvement. The segment analyses provide circularity scores and grades based on value and mass, but also provide more detailed sub-scores and -grades and include additional initiatives for improvement. The dashboard results and graphics can be copied for use in presentations, sustainability reports or on the company's website. The value chain overview can serve as a discussion basis for e.g. senior management and the segment analyses provide detailed insights to discuss with e.g. production managers and product designers.

Circularity is just one factor that top executives need to consider alongside other criteria, such as cost and technical feasibility, when making strategic decisions. Therefore, BCG also offers additional cost-benefit assessments to prioritise circularity initiatives that are likely to have the greatest beneficial economic impact for the company with the fewest trade-offs.

6. WHAT'S NEXT

The further development of metrics to measure the circularity of an organisation, value chain or product is set to continue for some time. At the same time, many businesses have already embarked on their innovation journeys and have successfully innovated their product and business models. Rightfully so, as the transition to a circular economy is not without urgency. Worldwide, customers and policymakers are increasingly aware that we need to look differently at our economy and the businesses that keep it running.

FURTHER DEVELOPMENT

As the field of circular metrics is in rapid development, BCG aims to keep their eyes open for further developments that can possibly lead to a second version of CIRCelligence. However, BCG has indicated that any improvements as such will not affect compatibility of results, meaning that any change in result is due to a change in client data or performance. Improvements to the methodology could involve additions to the metric, so more aspects can be captured if desired. Other improvements serve for increased usability such as interface adjustments and minor feature additions.

NEED FOR STANDARDISATION

Metrics are a crucial element of developing a common language to the circular economy transition. It helps to communicate goals, collectively prioritise opportunities and actions and discuss our progress. Currently, we see not one, but multiple languages developing in parallel. Different metrics sometimes have different definitions for the same terms and calculation methods for similar metrics, or different system boundaries. It is likely that efforts will increase over the coming years to standardise terminology, approaches, and methods across the industry to align the outcomes and make them comparable. Standardisation efforts may be reflected in a potential CIRCelligence version two, incorporating possible further developments. To maintain value given by CIRCelligence, BCG has stated that it will try to keep the metrics up to date and reliable.

YOU CAN START TODAY

Is CIRCelligence the metric that your company is looking for? You can start its application today by contacting a local BCG representative and jointly design your innovation journey towards a more circular future.

STILL NOT SURE WHICH METRIC IS RIGHT FOR YOU, OR HOW TO GET STARTED?

Please find more information at:

[CIRCelligence](#)

[Landscape of Circular Metrics for Business](#)

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