

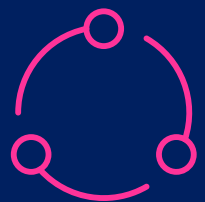
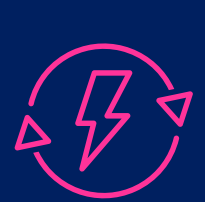
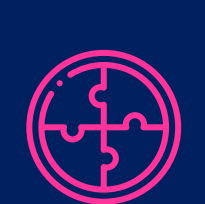


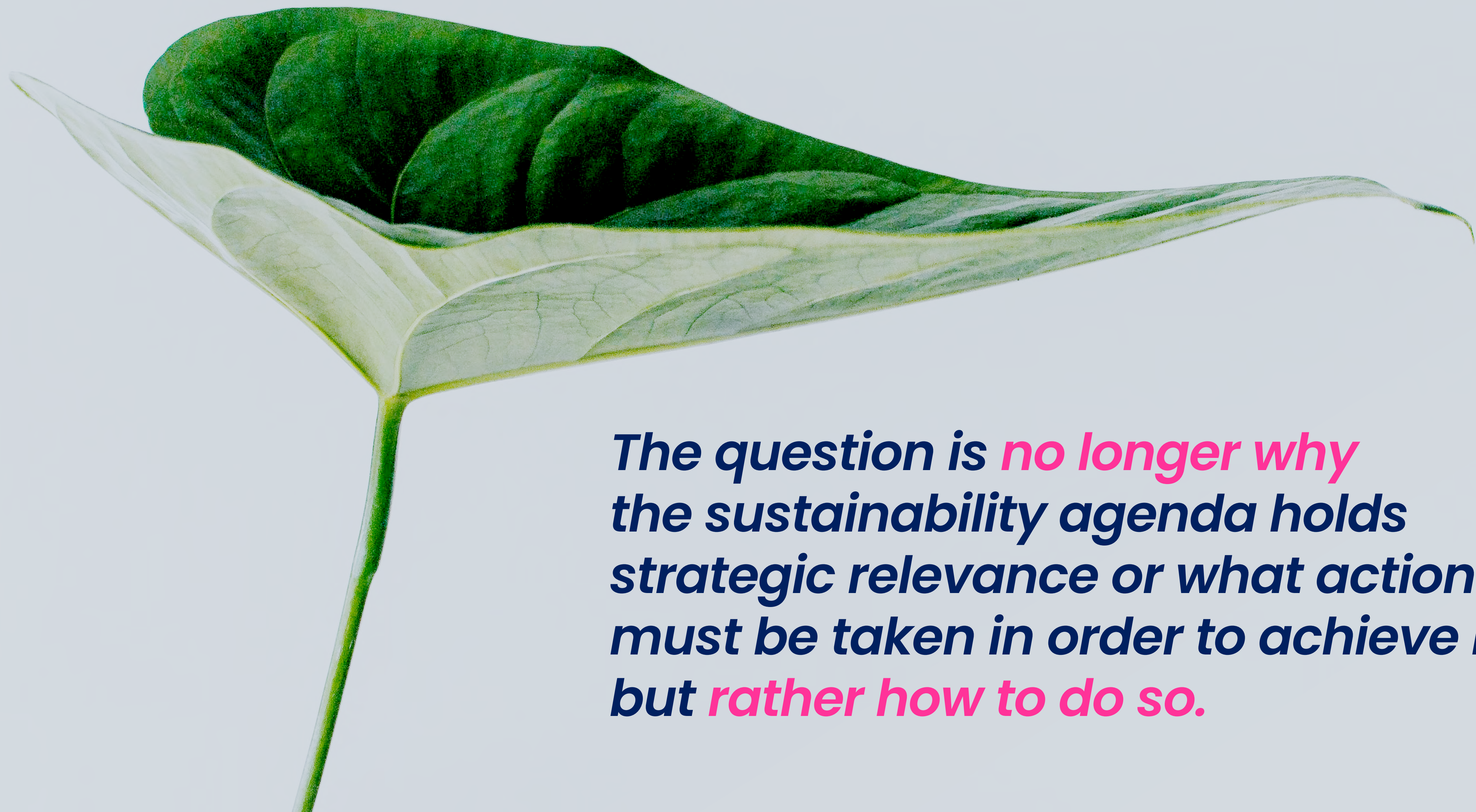
Embed Good Stewardship into Product & Service Design

This toolkit is for those who want to embed good stewardship into product and service design.

This toolkit contains an overview of five key sustainable design principles, their importance, methodology, and additional resources to support your journey from strategic design to innovation roadmapping.

To evolve and transition to more sustainable, regenerative product and service alternatives, innovation teams must strive to emulate the following design principles:

	CIRCULAR
	BIOMIMICRY
	LEAN
	CLEAN
	INCLUSIVE



*The question is **no longer why** the sustainability agenda holds strategic relevance or what action must be taken in order to achieve it, but **rather how to do so.***

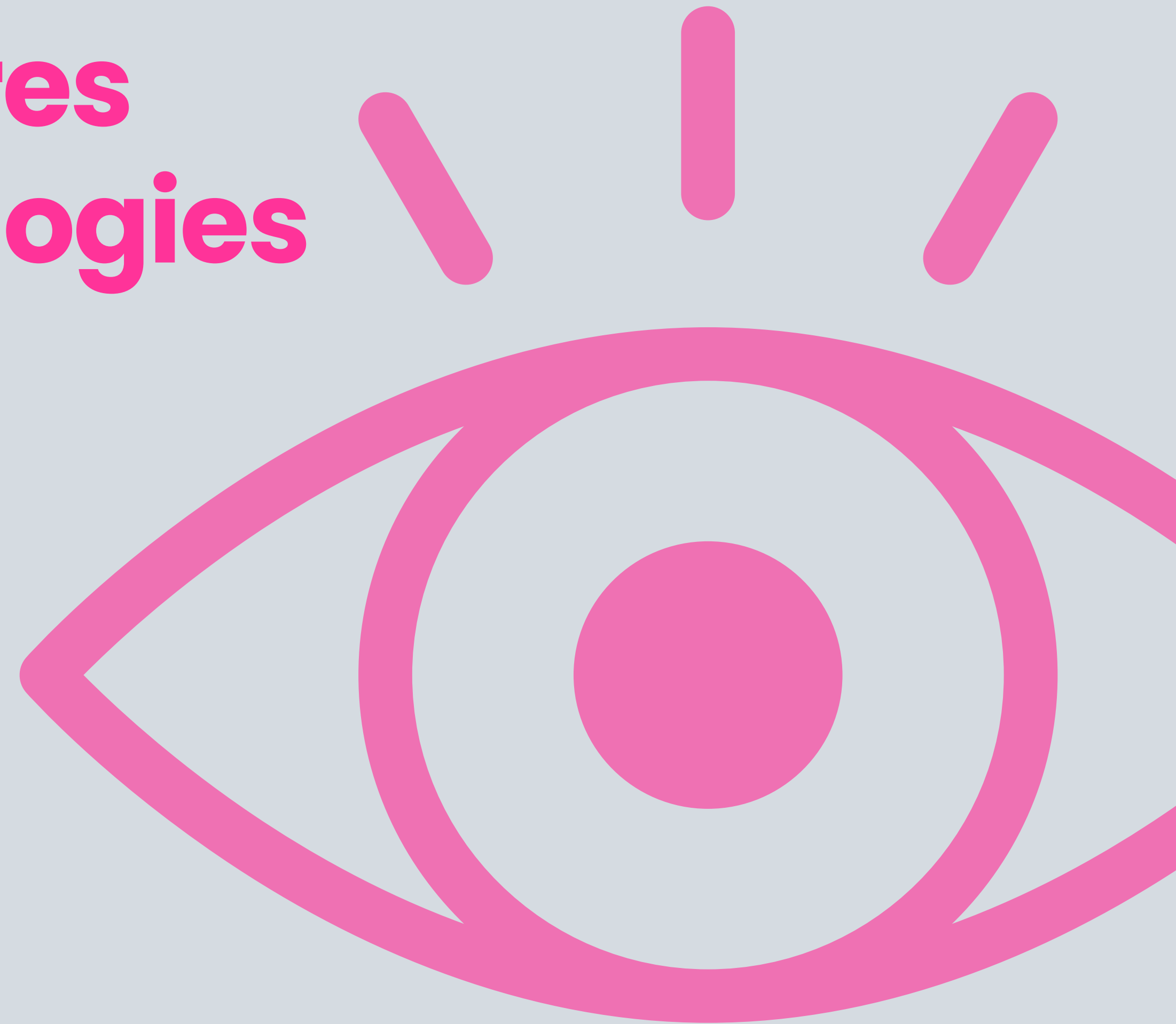
Innovation teams must embed good stewardship

as a fundamental practice to product and service design to discover new avenues to create business value while being good for the environment and society.

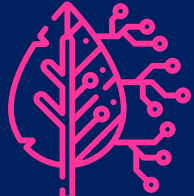
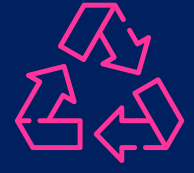
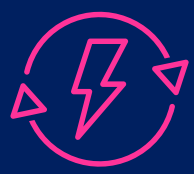


Good stewardship explores various design methodologies and different materials

to meet consumer expectations
while controlling cost, using fewer
resources and complying with
environmental regulations.



Explore Design Principles

	CIRCULAR
	BIOMIMICRY
	LEAN
	CLEAN
	INCLUSIVE



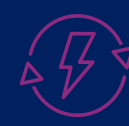
CIRCULAR



BIOMIMICRY



LEAN



CLEAN



INCLUSIVE

Circular Design

Circular design moves away from the traditional take-make-waste model and continuously repurposes resources to achieve a closed loop.

Circularity prioritizes the re-design of products and business models to promote the reduction, repair, reuse, redistribution, and recycling of products.

Imperative

Each year, humans consume **1.75 times more resources** than the Earth can naturally regenerate.

On this trajectory, resource consumption is projected to **more than double by 2050.**

Currently, **only 8.6%** of these materials are cycled back into our economies.

Circular practices are projected to be **worth \$4.5 trillion by 2030.**

Source: World Economic Forum; UpLink

Principles

1. Designing for inner loops

Prioritize approaches such as reuse, sharing, remanufacturing, and refurbishment that are closer to the center of the multiple material loops—as opposed to recycling which represents a less valuable approach.

2. Moving from products to service

Shift from ownership to access by understanding customers' needs and responding with access models such as rental, subscription, sharing or leasing.

3. Product life extension

Design products that are both physically and emotionally durable, can be reused multiple times perhaps by multiple users, or that adapt to users' changing needs over time.

Principles

4. Safe and circular material choices

Use materials that are safe and circular—free from components or chemicals that are harmful to humans or the environment.

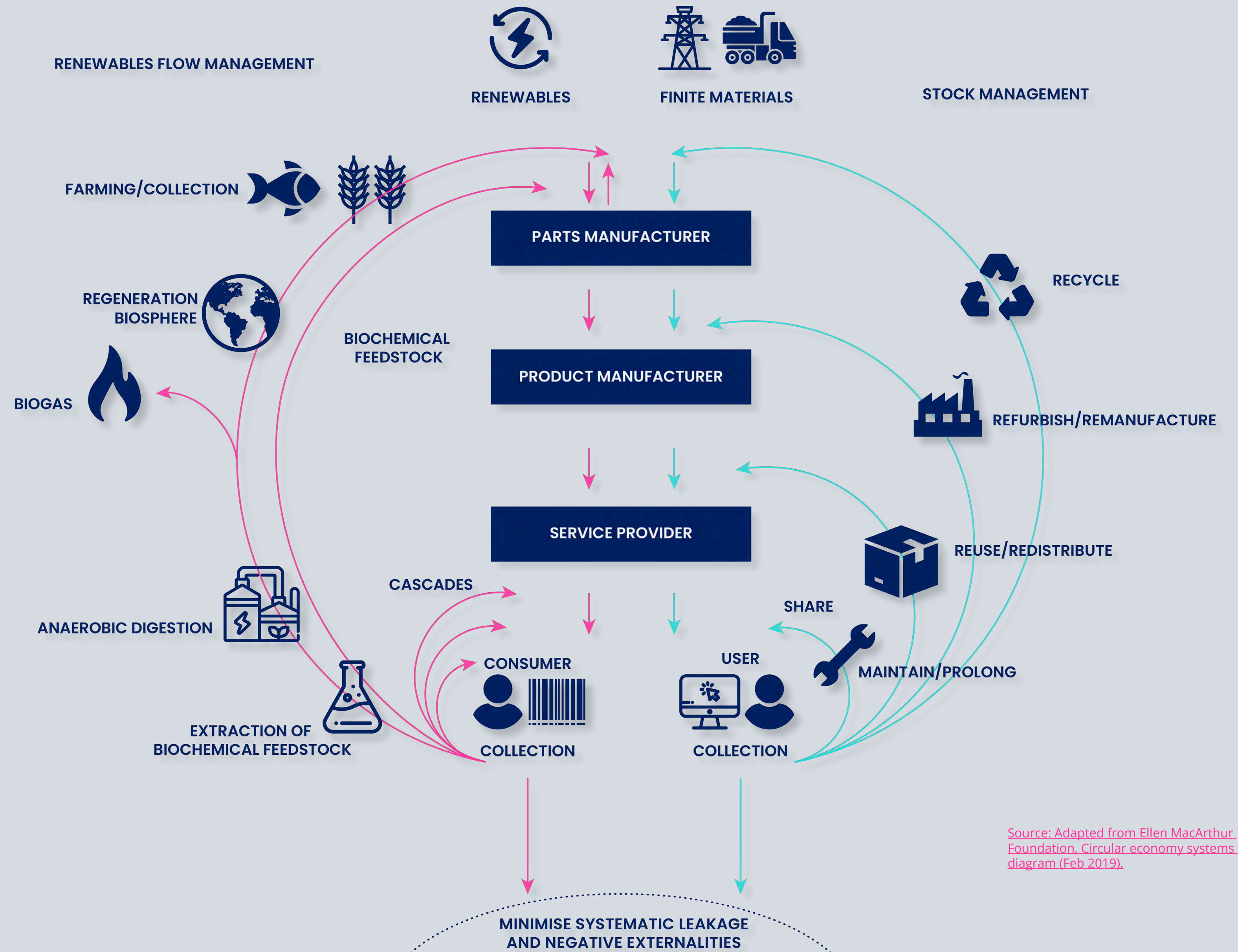
5. Dematerialization

Minimize the physical material and resource requirements of your product or service, e.g., by offering a digital alternative to a once physical product.

6. Modularity

Design products that can be repaired, remanufactured and upgraded by ensuring they are easy to disassemble, provide replaceable components, and are customizable to prevent obsolescence.

Principles



Source: Adapted from Ellen MacArthur Foundation, Circular economy systems diagram (Feb 2019).

Inspirations



[Outerknown](#), in partnership with The New Denim Project, has launched its new collection of knit and woven clothing made from post-industrial and post-consumer garments.



San Francisco-based startup [Remoov](#) picks up and sells unwanted items from people's homes. The unsold items are donated to charity or taken to recycling centers.



Dutch social enterprise [Fairphone](#) has announced a list of 14 materials with high usage in electronics that will guide its responsible sourcing and recycling efforts.

Resources

[The Ellen MacArthur Foundation Course: From Linear to Circular](#)

[The Circular Design Guide](#)

[Circulytics Measurement Tool](#)

[Material Circularity Indicator](#)

[World Economic Forum Circular Economy Report](#)

Biomimicry

Biomimicry is an approach that involves searching for solutions to technical problems by studying those already found in nature.

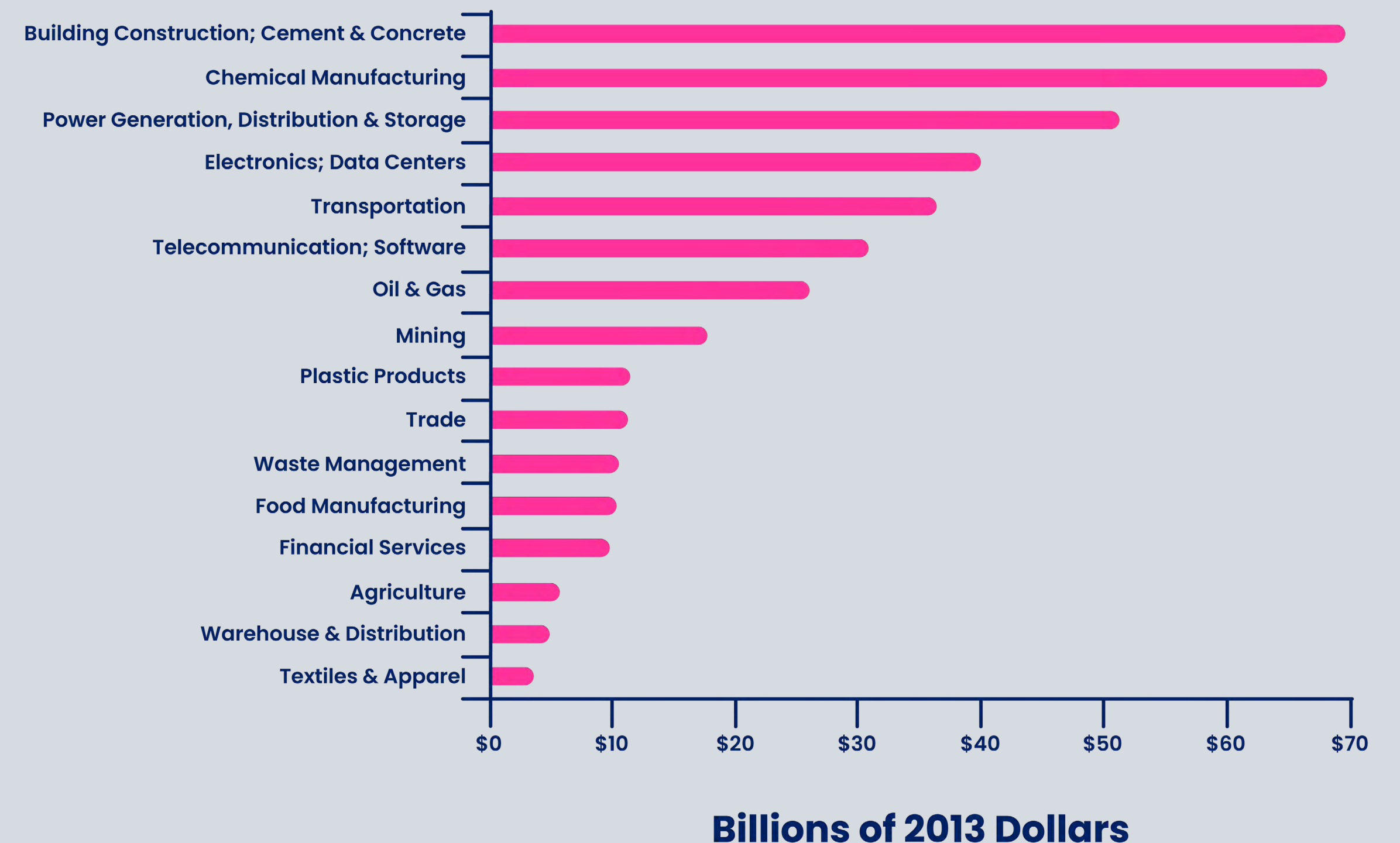
The theory promotes learning from and then emulating natural forms, processes, and ecosystems to create more sustainable and healthier human technologies and designs.

Imperative

The study from Human Spaces “The Global Impact of Biophilic Design in the Workplace” shows that workers in offices with natural elements, such as greenery and sunlight; are **6% more productive**, report **15% higher level of well-being**, and are **15% more creative**.

[Source: Biomimicry Institute](#)

Bioinspired Innovation’s Forecasted Impact on GDP in 2030



Principles

1. Evolve to Survive

Incorporate the unexpected and replicate successful strategies.

2. Resource efficiency

Prioritize low-energy and material processes.

3. Adaptive capacity

Build resilience through diversity, redundancy, and decentralization.

Principles

4. Sustainable Development

Sustain growth by building from the bottom-up and integrating modular and nested components.

5. Locally Responsive

Adapt to local environment and available resources, foster cooperative relationships and feedback loops.

6. Life-Friendly Chemistry

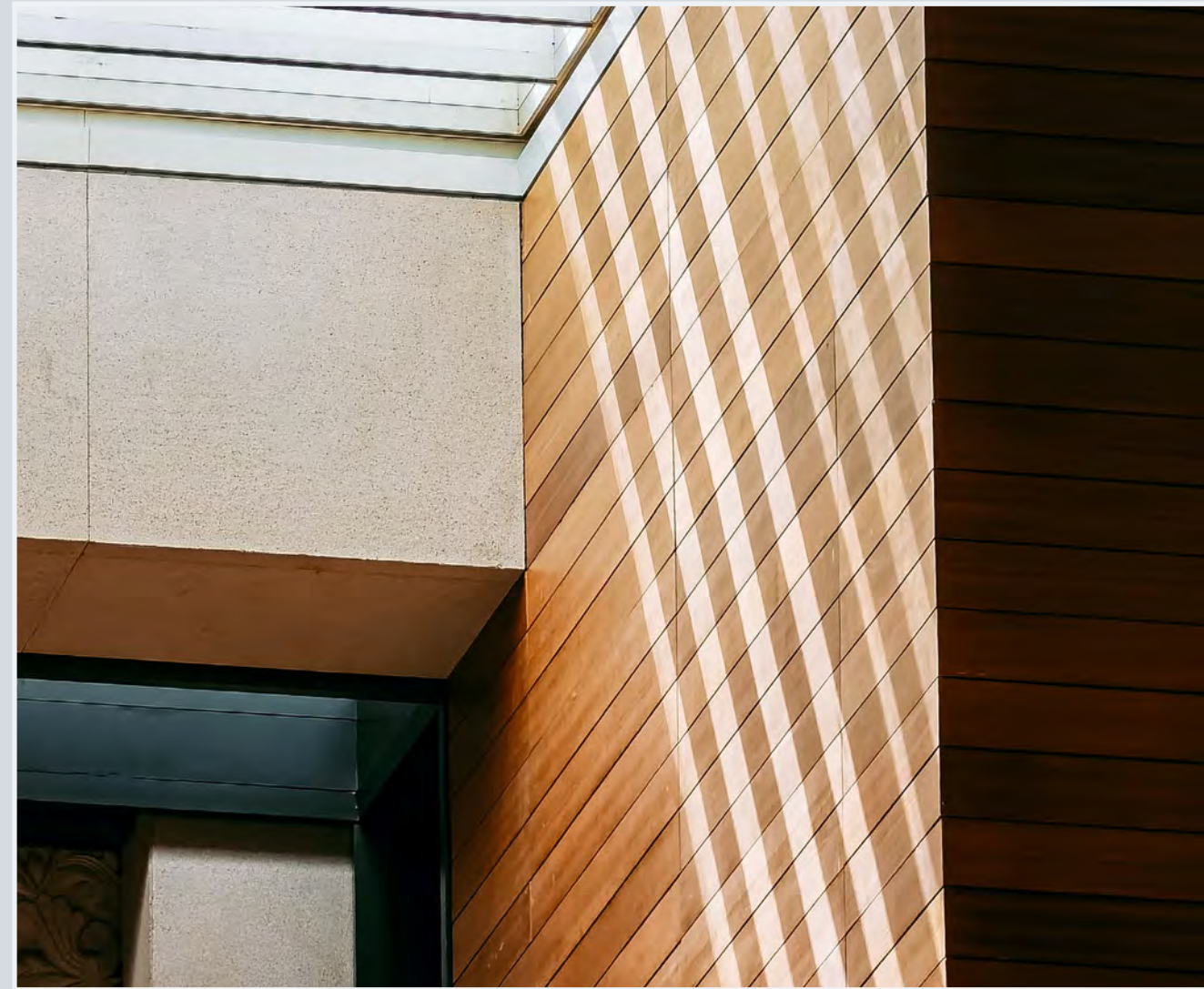
Employ chemical processes found in nature that breakdown chemicals into safe, reusable building blocks

Source: Biomimicry 3.8

Inspirations



[Amazon Spheres](#), the company's new Seattle campus, is a jungle-inspired workplace, featuring lush living walls and exotic plant species contained within three geodesic glass domes.



Architecture and engineering firm Stantec has created a practical solution called [LIGHTGLASS](#) to facilitate circadian lighting for use in windowless spaces.



Singapore's new hotel [Parkroyal Collection Marina Bay](#) incorporates a grand indoor lobby garden containing a landscaped green wall and more than 2,400 different plant species.

Resources

[The Biomimicry Institute Course](#)

[Biomimicry Professional Training](#)

[Synapse by Biomimicry 3.8 Resources](#)

[Ask Nature Biological Intelligence Database](#)

Lean Design

The central idea that underpins the lean approach is to minimize waste while increasing customer value. The lean approach challenges the focus of reducing waste through individual operations, technologies, and initiatives, to view waste reduction as an end-to-end business transformation.

Considering how all processes and operations can transform to reduce negative ecological impact should also consider change beyond elimination.

Imperative

Digital transformation in manufacturing is projected to be worth **\$642 billion by 2025**.

Organizations that invest in smart factory initiatives report **10-12% gains** across manufacturing output, factory utilization, and labor productivity.

Lean Design and Manufacturing improve:

- Product quality
- Lead times
- Employee productivity and satisfaction
- Sustainability
- Profits

Source: Lean Enterprise Institute; Impact

Principles

The LEAN approach started as a result of the demand for greener manufacturing processes. It has evolved to include principles that all organizations can utilize and encourages continuous transformation.

1. Define Value

Identify value from the standpoint of the end customer.

2. Map the Value Stream

Use the customer's value expectation, map all the activities and processes that add value, and eliminate steps that do not add value.

Principles

3. Create Flow

Create the value-stream steps as a smooth flow for all entities in the value-stream.

4. Establish Pull

The pull-based system aims to enable processes that align at every step with the needs of the customers. Resources should be 'pulled' as and when required.

5. Pursue Perfection

Maintain the gains from steps 1-4 through continuous organizational performance and pursuing perfection.

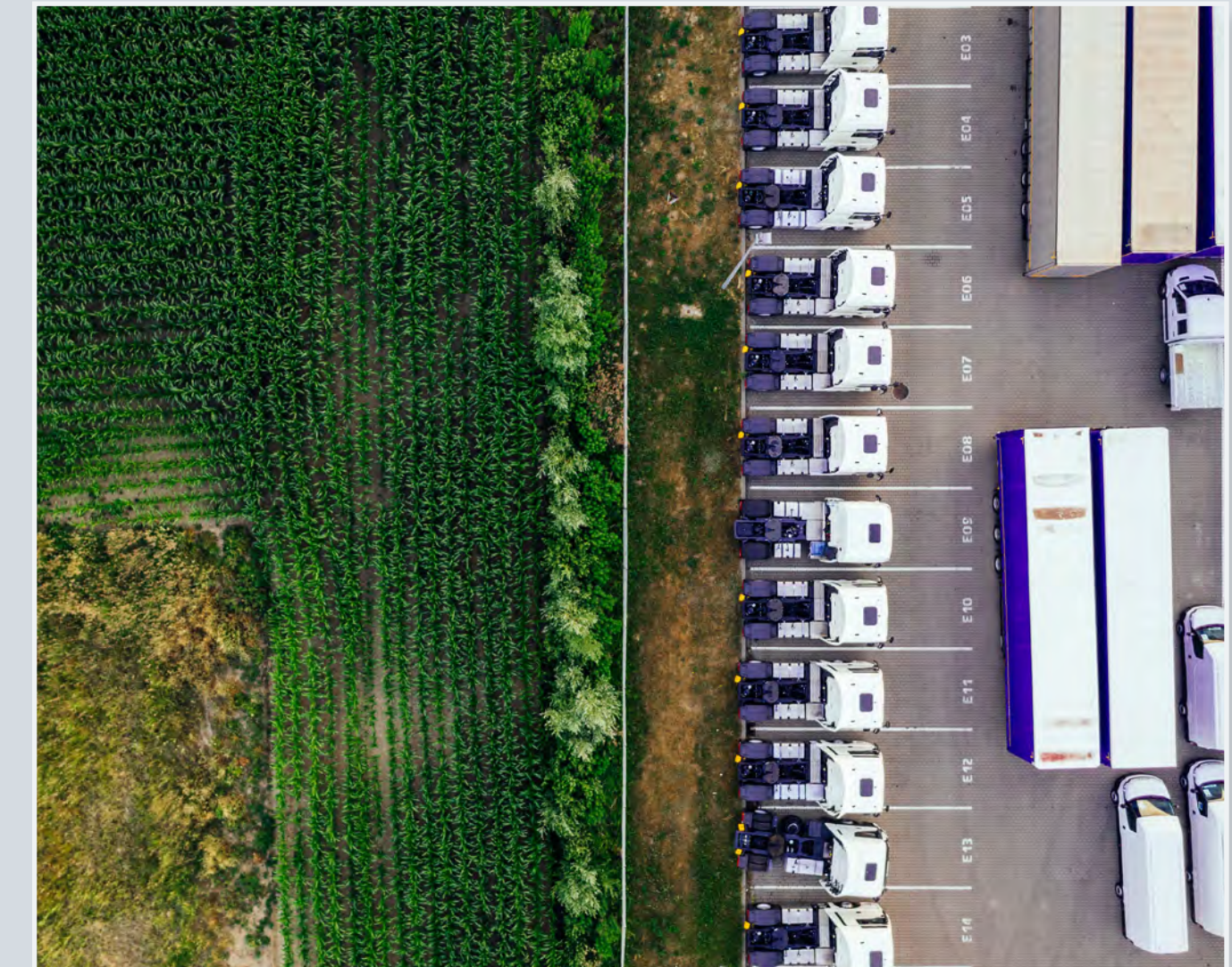
Inspirations



Jaguar Land Rover's venture capital arm InMotion has invested in block-chain technology firm, Circular, to track raw materials through the supply chain to guarantee sustainability.



Tetra Pak and Rockwell Automation have joined hands to bring AI-powered solutions to powders manufacturing to enhance the sustainability and cost-effectiveness for powder manufacturers.



Canadian Tire Corp., NuPort Robotics, and the Ontario government are undertaking an automated trucking project that provides a safe, efficient, and low-emissions transportation solution.



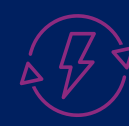
CIRCULAR



BIOMIMICRY



LEAN



CLEAN



INCLUSIVE

Resources

[The Lean Enterprise Institute 101 Learning Path](#)

[Lean Principles and Optimizing Flow: Case Studies](#)

[Collection of free Lean Design tools](#)

Clean Design

Clean design prioritizes energy efficiency, pollution control and sustainable resource-use systems, and negative emissions technologies.

Working towards a net-zero emission future, clean design creates investable opportunities in response to demand for low-carbon products and infrastructure. The transition to a cleaner economy requires a move to lower emissions as well as a more sustainable relationship with nature.

Imperative

Current global greenhouse gas emissions are in the region of **50 billion tons**.

To avoid devastating and irreversible impacts of climate change, the world must halve this amount and **limit global warming to 1.5°C** in the **next ten years**.

Current trajectories show us overshooting this mark and reaching **3-4°C temperature rises within this century**.

This gives organizations and industries **just 1-2 business cycles** to embrace transformative change towards **net zero**.

Source: PWC

Principles

Much like Circular Design, Clean Design strives towards a net zero carbon approach and must consider the full value chain and product or service life cycle.

1. Measure and reduce carbon footprint

Determine the baseline energy and resource demand of a product or service and identify the places where energy-efficient processes and sustainably-sourced raw materials can be swapped in.

2. Uncover efficiencies through technology

Streamline and automate processes for greater energy savings using (lean) tech applications like AI, IoT, and predictive maintenance.

Principles

3. Collaborate with cleaner partners

Build a network of suppliers and stakeholders who are committed to the net zero journey.

4. Consider use-case scenarios

Dissect the inputs (energy and resources) required during the use phase of a product or service.

5. Minimize end-of-life losses

Design products that are—firstly, resilient—and additionally, easy to repair, reuse, remanufacture, or recycle.

Inspirations



In its aim to build 10,000 “green” outlets by 2025, [Starbucks](#) launched its first sustainably-constructed, near-zero drive-thru store in Canada, designed by Nexii Building Solutions.



[DS Automobiles](#), in collaboration with French designers EGONlab and London-based design studio Post Carbon Lab, has launched a CO2-absorbing and oxygen-releasing fashion collection.



Chasing net zero, [Nike](#) establishes a new, agile distribution center that runs on five renewable energy sources, embedding sustainability throughout its supply chain operations.

Resources

[BEAMA Net Zero by Design Report and Case Studies](#)

[McKinsey & Company Insights: Net Zero](#)

[PWC Guide to Net Zero](#)

Inclusive Design

Inclusive Design seeks to optimize the functionality of an environment, product, or service so that it can be accessed and used by as many people as possible, regardless of age, gender, and level of ability.

Where Universal Design attempts to create a singular experience that is ideal for as many people as possible (one size fits all), Inclusive Design seeks to take into account specific needs and tailor specific products or services to those user groups (one size fits one).

Imperative

Disabilities & Needs: The World Bank Reported in 2018 that around **1 billion people** have some type of disability; this equates to **15%** of the **global population**. Around **190 million** of these people experience a “severe” disability.

Untapped Demographics: According to Forrester’s Inclusive Design Imperative research, the data shows that surveyed **companies market to only 80% of their users whilst ignoring the remaining 20%** who may have some type of disability or accessibility issue.

Principles

1. Understand your Demographic

To adequately undertake Inclusive Design, companies need to be apprised of the different types of difficulties that consumers may face when using the product or service. These constraints can range from severe to mild, and include a myriad of factors such as visual impairment or intermittent access to the internet. Hence, a thorough needs analysis is imperative to Inclusive Design.

2. Accessibility + Usability + Identity = Inclusive Design

The ability to adequately access and navigate a product is not the sole factor in Inclusive Design. Companies also need to make factors such as cultural identity, gender, and age key to their product and service offering.

Principles

3. Optimize the Human Experience

Understanding that humans react differently and emotionally to a product, the key is to embed human nature into the user experience. A key way to do this is to include as many perspectives and voices in the Inclusive Design process.

4. Embrace the Paradox of Specificity

As counterintuitive as it may sound, the best products are the ones that are designed for the minority, as they often end up having the ideal user experience for the majority. Hence, the more specific you are in your Inclusive Design strategy, the more broad appeal your product is likely to end up having.

Sources: [Cambridge University Inclusive Design Toolkit](#); [Blueclaw](#); [Microsoft Inclusive Design Framework](#)

Inspirations



[Microsoft's](#) gaming developers will send games to players with disabilities for test feedback that will be incorporated into updated accessibility guidelines.



[Tulsa International Airport](#) (TUL) becomes the United States' first dementia-friendly airport, improving access, assistance and signage for travelers with cognitive decline.



As part of [Airbnb's](#) design department, the company developed an "anti-discrimination" team, which looks at every aspect of user experience to reduce biases and increase accessibility.

Resources

[The Microsoft Inclusive Design Framework](#)

[The Cambridge University Inclusive Design Toolkit](#)

[Towards Usability & Identity \(BlueClaw\)](#)

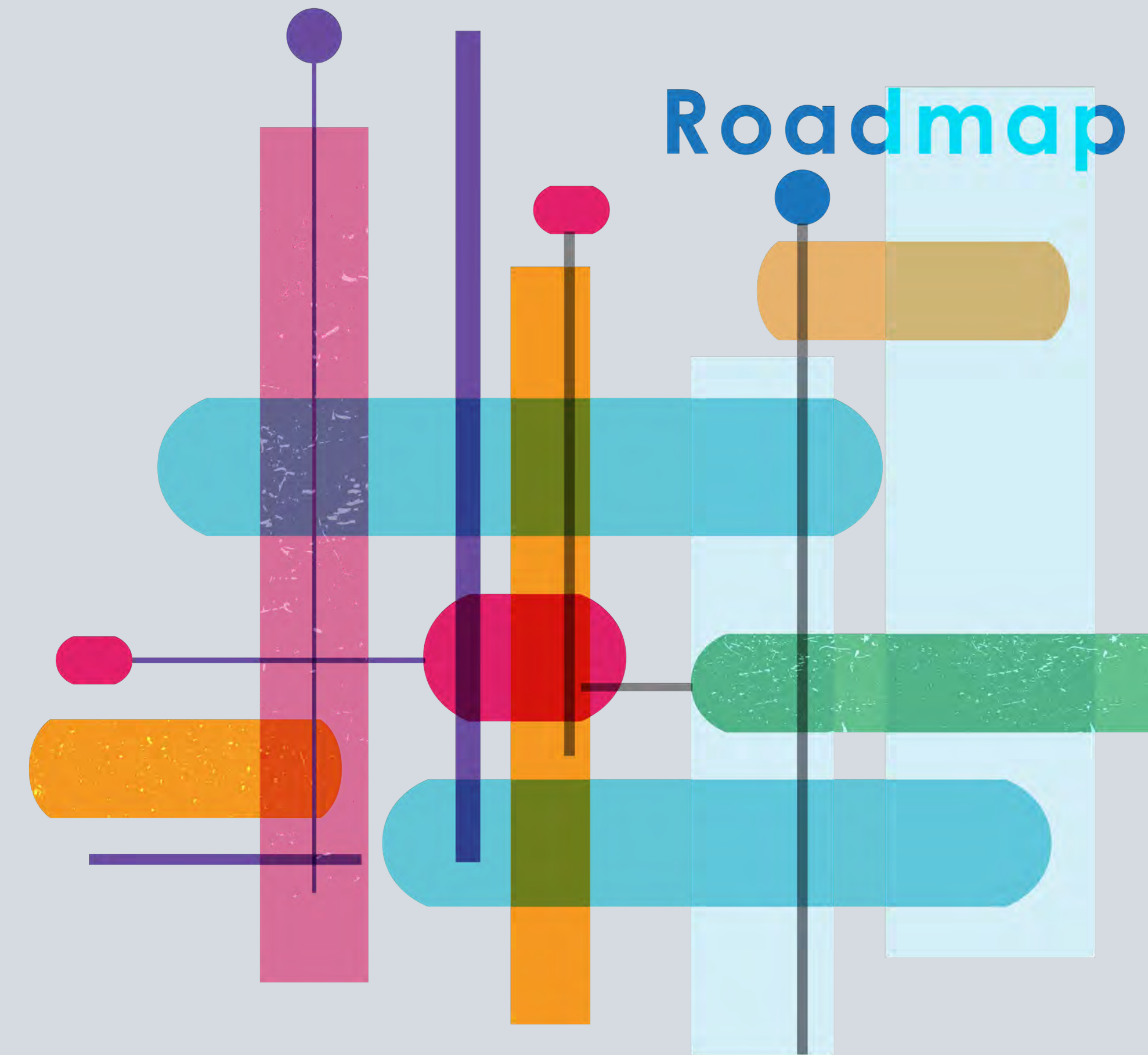
[Understanding the Inclusive Design Process](#)

From Design To Roadmapping

Bring Sustainable Design to Life with ITONICS Roadmap

Embedding good stewardship into products and services begins at the design stage. Delivering on those designs requires integrated strategic planning.

ITONICS Roadmap is an agile and collaborative tool that enables organizations to plan future product development, build internal consensus, and identify the key technologies, resources and capabilities needed for development.



What's next?

Your digital toolbox for game-changing innovation

- Industry-specific Trend and Technology Radars
- Strategic Roadmaps that guide you into the future
- Lean Portfolios to manage your innovations, technologies, projects, and opportunities

Free insights & content

- Access to 6 million+ signals to uncover insights at large scale
- 120+ trends, 100+ technologies, 2200+ curated inspirations in the platform
- Periodically updated market and technology trend insights

Innovation advisory services

- Tailor-made onboarding sessions with our consulting team
- Access to our international innovation community
- Free innovation maturity assessment



DOWNLOAD NOW

Discover more

Read more from ITONICS on how to capture the true value of the sustainability imperative, and establish competitive advantage for your business models in the long term.

[Reevaluating and Optimizing the Value Chain and Full Lifecycle for Net Positivity](#)

[Aligning Strategic Goals to Coincide with International Imperatives](#)

[Innovating a Greener World Starts with Understanding Your Current World](#)

[Systematic Innovation Management to Advance the Sustainable Development Agenda](#)

ITONICS Sustainability Radar

Explore the ITONICS Sustainability Radar to identify the trends, technologies and risks that are relevant to your organization, customers and future development.



About ITONICS

We build AI-powered SaaS to innovate, grow, and disrupt.

Our data-driven software platform helps organizations around the globe to identify emerging technologies, trends and market potentials and to translate them into powerful growth strategies. Supported by artificial intelligence, companies can manage their entire innovation process in a modular software suite to efficiently achieve their

business goals and remain future-proof.

Working with global teams to innovate new products, services and business models, ITONICS professional services inspire, guide and accompany organizations on their innovation journey.

With more than 100 experts on 4 continents, we support innovation leaders such as adidas, Audi, CISCO, Intel, Johnson & Johnson and SAP.

As a strategic partner to key market players across all industries, we systematically advance the topics of innovation, strategy, and digitization.

