



### 02. Circular Definitions

#### From Systems Thinking to Systemic Design

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In a world undergoing rapid transitions and grappling with increasingly complex social and environmental challenges, the role of the architect is evolving profoundly. When we understand the world and our environment as interconnected, dynamic systems, it becomes clear that the architect's influence extends far beyond individual buildings. *Architects are not just creators of spaces; they are participants in intricate systems.* Their decisions ripple through the entire lifecycle of a building- affecting resource extraction, the health and well-being of users and neighbors, ecological impacts, logistics, and even what happens when a building reaches the end of its lifespan.

From a global perspective, architects share responsibility for the entire chain of production they set into motion. Circular design, which emphasizes material reuse and resource efficiency, is just one facet of this responsibility. But to create meaningful, positive effects in a dynamic and complex world, architects need more than technical expertise—they need a systemic mindset.

According to the British Design Council:

*Systemic design is the acknowledgment of complexity and interconnectedness throughout the design thinking and doing process. It is both a mindset and a methodology— considering the structures and beliefs that underpin a challenge.*

One of the early pioneers of systems thinking, Donella Meadows— co-author of the Club of Rome's Limits to Growth— laid the foundation for understanding systems through her methodologies. Her work has inspired a range of approaches to systemic design, helping us see how to identify leverage points and develop interventions that work within these interconnected systems. In practice, systemic design equips architects with the tools to:

- Map existing dynamics,
- Propose effective interventions,
- And predict their broader effects.

It is a versatile skill set that can be applied at any scale—from product design to urban planning and spatial design.

In my practice, we use systemic design through five key components:

1. *System Boundaries* – Define the scope of the project.
2. *Stakeholders* – Identify the actors involved in or affected by the system.
3. *Metabolism* – Understand the flows of resources through the system.
4. *Stakeholder Interaction* – Analyze the relationships and effects between actors and processes.



## Circularity for Educators

5. *Leverage Points* – Discover opportunities for impactful interventions.

Let's look at these components in more detail:

### 1. *System Boundaries*

System boundaries help define the scope and levels of impact a project will address. For spatial design, common boundaries include:

- The building envelope,
- The surrounding neighborhood,
- And the district in which a project is located.

These boundaries not only structure the design process but also provide transparency when researching and presenting the project's impact.

### 2. *Stakeholders*

Stakeholders are the actors in the system—both those directly involved and those affected. They can include people, such as residents and policymakers, but also non-human entities, such as rivers, ecosystems, or animal species.

System boundaries often determine which stakeholders are relevant.

### 3. *Metabolism*

A system's metabolism comprises the flows of resources passing through it. These include both natural and human-made exchanges—such as energy, water, food, money, and materials. A thorough understanding of these flows enables designers to quantify and optimize resource use. While 14 different flow types can be identified, the selection depends on the project's focus.

### 4. *Stakeholder Interaction*

Mapping interactions between stakeholders reveals the positive and negative effects they have on one another. This analysis helps diagnose existing dynamics and identify causal relationships, enabling designers to address root problems, rather than symptoms.

### 5. *Leverage Points*

Leverage points are opportunities for interventions where small changes can create significant impact. By understanding these points, architects can design solutions that are not only functional, but transformative within the system.

An example of a large-scale leverage point is the shifting of taxes from labor to resources. This is seen as a way to make reuse and renovation more feasible compared to demolition and new construction. In architecture, the design of water retention roofs can be considered a leverage point in the flow of rainwater: They prevent flooding of sewage systems, protect buildings from overheating, and contribute to biodiversity in urban environments.

### *The Value of Systemic Design*

Systemic design is a toolset for navigating complexity. By adopting this approach, architects can create designs that not only respond to immediate needs, but also contribute to a healthier, more sustainable, and interconnected world.