

System equilibrium and why systems get stuck | System mapping – Part 3

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Why circular systems are hard to change

In the third part of this series on system mapping, we look at why systems sometimes stubbornly cling to existing patterns. Despite innovation, subsidies and pilot projects, circular business models are struggling to gain a foothold in many sectors and existing practices continue to dominate. From a systems thinking perspective, this is no coincidence. It has to do with how feedback loops reinforce, dampen or balance each other out.

Stability doesn’t mean what you think it does

In system dynamics, stability is often linked to balancing loops: mechanisms that bring the system back into equilibrium. But in the practical reality of industrial transitions – such as circular value retention, energy or product-service systems – that picture often doesn’t hold true. Systems are not always stable because they are in equilibrium, but because different forces are counteracting or reinforcing one another.

Three ways in which systems become stable

1. Classic equilibrium: balancing loops

This is the classic mechanism:

- Higher price ? lower demand ? price falls

The system self-corrects and moves towards a target value. This type of stability is relatively easy to influence, for example through price incentives or capacity.



2. Dynamic equilibrium: competing positive feedback loops

Here, two reinforcing loops work in opposite directions. One example is the competition between new sales and ReX (reuse, repair, refurbish, remanufacture) in the replacement market. You then get:

- Higher ReX share ? greater ReX volume ? more learning experience ? better ReX proposition ? higher ReX share

- Higher proportion of new purchases ? greater volume ? economies of scale in new purchases ? improved new purchases proposition ? higher proportion of new purchases
- Higher proportion of new purchases ? lower proportion of ReX
- Higher proportion of ReX ? lower proportion of new purchases

The system stabilises where the two forces balance each other out. We often see this in circular business models, technological transitions or markets heavily influenced by policy. There is no balancing loop here. Stability arises from competition between forces of growth.

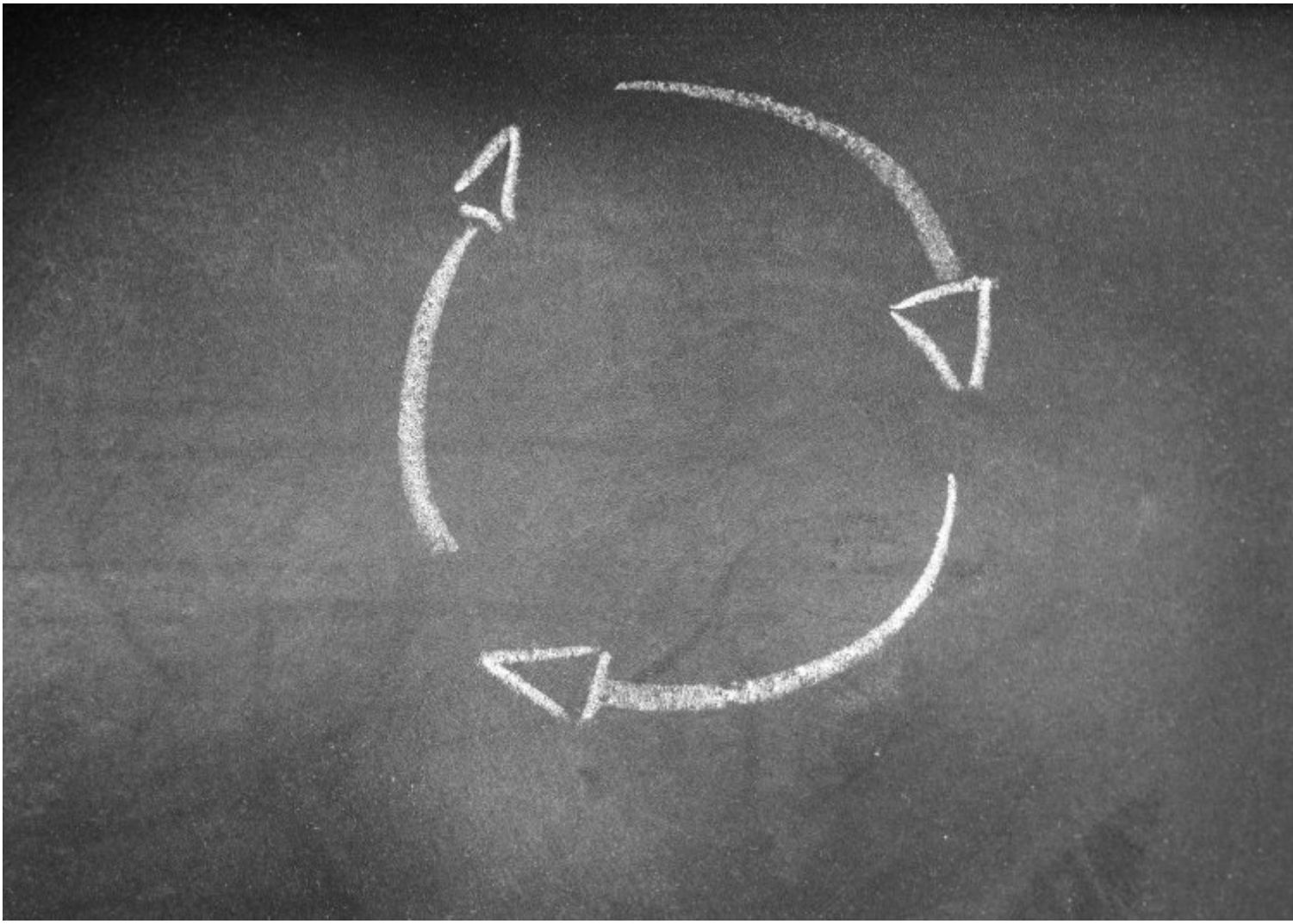
3. Seemingly stable: reinforcing lock-ins

Sometimes a system gets stuck in a self-perpetuating pattern. An example in the context of ReX:

- Low adoption ? limited data and standards ? low trust ? low adoption

This is a self-perpetuating cycle: the system is stable, but at a low level of performance. This is typical of:

- Repair and remanufacturing ecosystems
- New circular markets
- Situations involving a high degree of uncertainty



Why this distinction is crucial

The way in which stability is achieved determines which interventions are effective.

- Do you think the system is “finding a balance”? You will then use parameters such as subsidies or targets to steer the process
- Are you actually in a lock-in or a competition between loops? If so, those procedures will simply be absorbed

Consequence: many well-intentioned measures have little impact.

What does this mean for system mapping (CLDs)?

When drawing up a causal loop diagram:

- Don’t automatically assume that the loops are balanced
- Look at which loops are dominating, not just which ones are present
- Pay attention to delays. These often determine the outcome
- Avoid “magic arrows” and make the underlying mechanisms explicit

The key question is therefore not ‘What loops are there?’, but rather ‘What dynamics determine the system’s behaviour?’

Implications for policy and strategy

The approach varies depending on the pattern:

- Balancing constraint ? lower barriers, such as costs or capacity
- Reinforcing lock-in ? break the system, for example through standards, regulations or public demand
- Competing loops ? amplify the desired dynamics, for example through data, business models or collaboration

In circular transitions, the challenge rarely lies in “striking a balance”, but in shifting dominant feedback loops.

Conclusion

Systems are often stable for the wrong reasons. Not because they are in balance, but because forces either counteract or reinforce one another. If you want to make an impact, this means it is not just the system you must understand, but above all what feedback loops dominate it.

Want to get started with circular systems yourself?

Do you want to accelerate ReX within your business or value chain, with a clear understanding of where action really makes a difference? Bring your ReX challenge and stakeholders together around a single system narrative, identify the levers that make scenarios possible and take targeted steps towards scalable and robust ReX solutions.

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