MEHRCE

Systems Map

Challenges of reusable packaging systems in Germany

Perspectives from the MEHRCE innovation community

With funding from the:
Federal Ministry of Research, Technology and Space

DATIpilot

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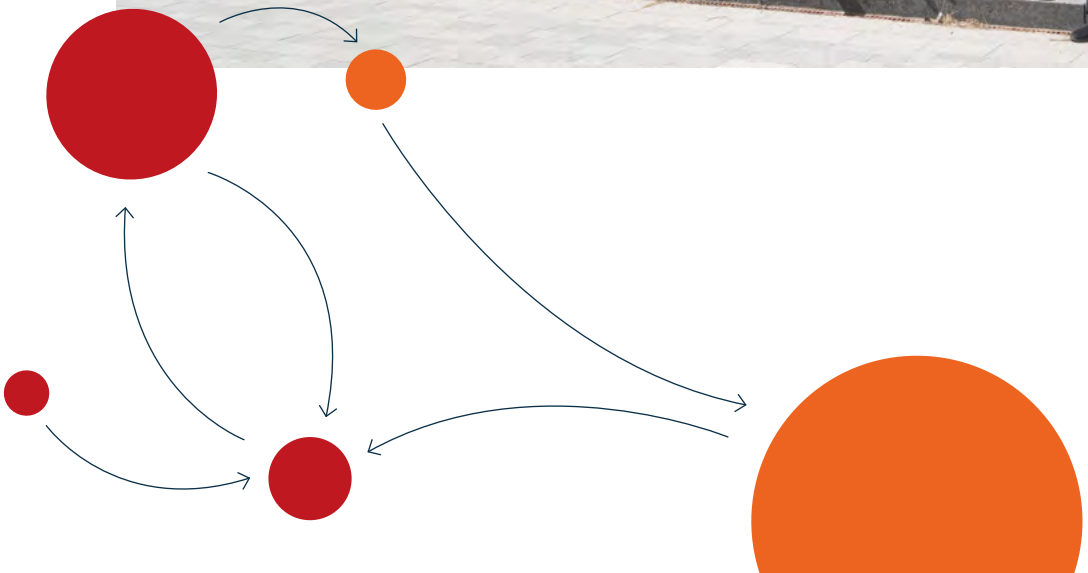
MEHRCE

Scaling reusable packaging systems together

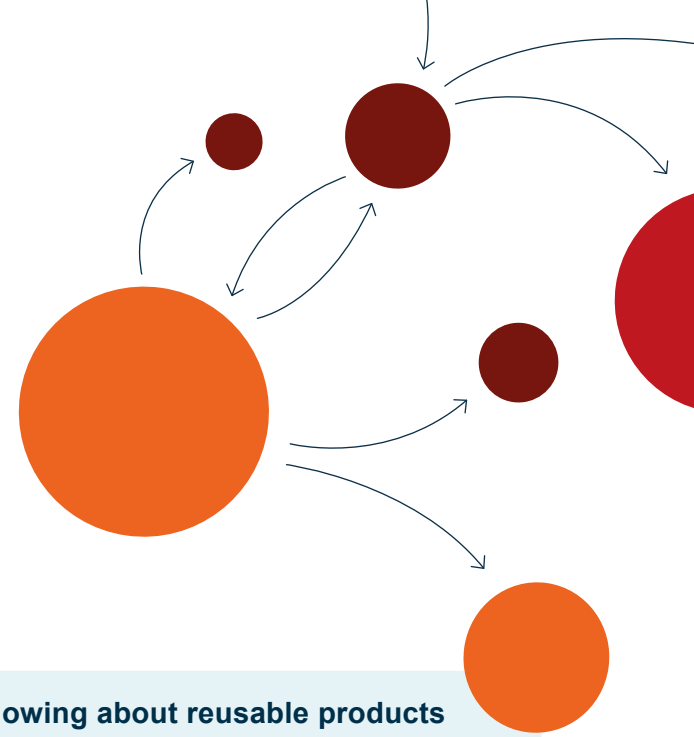
Funded by the Federal Ministry of Research, Technology and Space until 2028, the MEHRCE innovation community is all about making reusable systems the new normal. Some challenges are just too big to tackle alone, so we bring together over 200 members from business, science, and everyday society to team up on practical solutions. We share ideas, spark new projects, and support the entire reusable value chain – from the people running the systems to researchers and service providers. With a €4 million budget fueling three big innovation phases, we are shaking things up for a more sustainable future. Keeping us all on track is a coordination team made up of the Wuppertal Institute, Mehrweg-verband Deutschland e.V., Leuphana University Lüneburg, and Kühne Logistics University.



Executive summary

This brochure was developed for and in collaboration with the MEHRCE innovation community. **We aim to better understand what hinders the packaging transition and where we can take collaborative actions.** Through this visual representation, we seek to highlight connections and dynamics. This form of presentation makes it easier to identify strategic points of intervention and to shift one's own perspective.

The Systems Map is of interest to **political actors**, who can use it to gain an overview of complex, promising, and previously under-recognized leverage points for regulatory approaches. **Researchers** can also use the Systems Map, with its diverse range of topics, as a starting point for further research on the packaging transition.



„Knowing about reusable products doesn't mean you really know about them. We have so many different sub-structures that misconceptions about things that once existed elsewhere or went wrong somewhere can lead to current, effective systems being overlooked or undervalued."

Contribution from a group discussion, Community Call

The biggest challenges

- → Lock-in of the core dynamic – prevalence of reusable options, scale effects, and operating costs
- → Barriers to prevalence of reuse among end-consumers and consumer habits and packaging routines/convenience
- → Fragmentation of reusable systems and a lack of standardization
- → Unclear and complex regulations at various levels (EU, national, regional)
- → High investment and operating costs during implementation and scaling
- → Limited cooperation and insufficient data sharing among stakeholders

The highest leverage

- → Scaling by reaching the economic break-even point of the reusable system
- → Standardization of packaging design, processes, and data
- → User-centered design and communication
- → Effective and understandable regulation and compliance with laws, e.g. through consistent monitoring

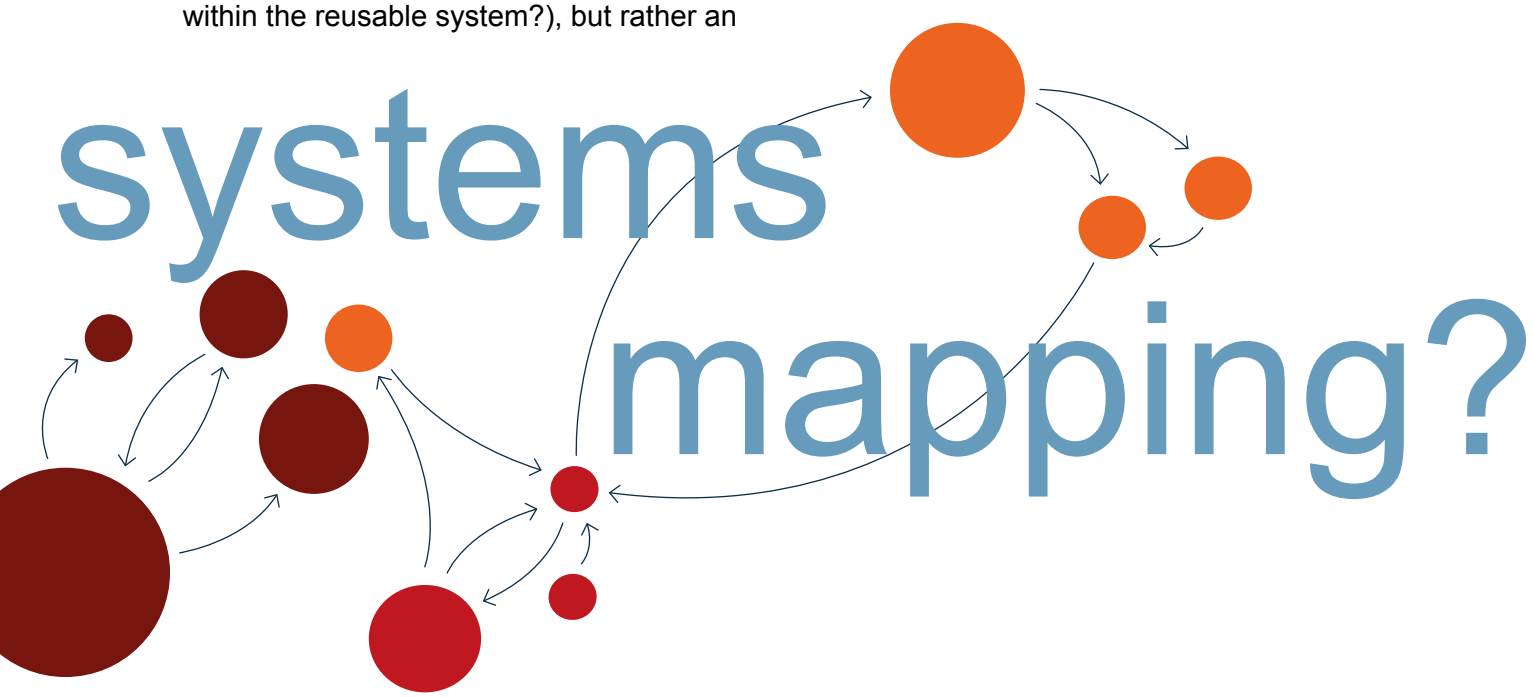
What is systems mapping?

Today's world is complex and consists of various systems. Systems mapping helps us **visualize this complexity**. A system consists of various components that interact with one another. The system as a whole is greater than the sum of its individual parts, which is why analyzing the individual components is often insufficient to explain the big picture. This is where the Systems Map comes in.

> **„From one challenge we need to solve, two new ones emerge"**
>
> *Comment from group discussion, Community Call*

The goal of our Systems Map is to provide a better overview of the **dynamics of reusable systems** by identifying **key challenges and success factors for scaling and making their interactions within the overall system more visible**. It is important for your understanding that our Systems Map is not a process analysis (e.g. How does a cup move within the reusable system?), but rather an **impact analysis** (How do factors influence one another?). Therefore, visualizing the challenges involved in implementing and scaling reusable systems is key. The map makes thoughts more visible and essentially serves as a "mental map".

Systems are defined by their boundaries and purposes. Our map illustrates the challenges identified by the MEHRCE innovation community and shows their potential interactions. To do this, we assume that there are various dynamics that either **promote or hinder** reusable systems. Both B2B and B2C systems are represented in the community. Since there are more B2C systems, the focus is on those. Despite sectoral differences, however, we assume that there are **common challenges**, even if their scope may vary.



If you'd like to learn more about systems mapping, feel free to check this out:
Systems Mapping – unpacking complexity and identifying opportunity for change
https://www.youtube.com/watch?v=fXxFz-Tr6Zg

What did we do?

At our first barcamp in May 2025, we held a **challenge workshop** with the **MEHRCE innovation community** to identify the challenges, hurdles, and barriers to scaling reusable systems that require collaboration among multiple stakeholders to resolve.
We then defined and compiled the challenges identified and used them as the basis for creating an initial version of the System Map. When creating System Maps, it is important to expose them to diverse feedback. Therefore, some of the interconnections were subsequently discussed with a **group of experts in individual interviews**. The resulting version of the Systems Map was presented to and discussed with the MEHRCE innovation community in a third step during a **community call** in January 2026. In two group discussions, participants first engaged in intensive small-group exchanges on one topic area each and then shared their assessments of the map's overall picture. The Systems Map was subsequently finalized – and this is how you can find it now in this **brochure**!

May 2025

Barcamp May 2025:
Challenge workshop with the **MEHRCE innovation community** to identify key obstacles and challenges to scaling reusable systems

December 2025

Feedback & Validation:
Key interconnections were discussed and further developed in **expert interviews.**

March 2026

Finalization of the System Map

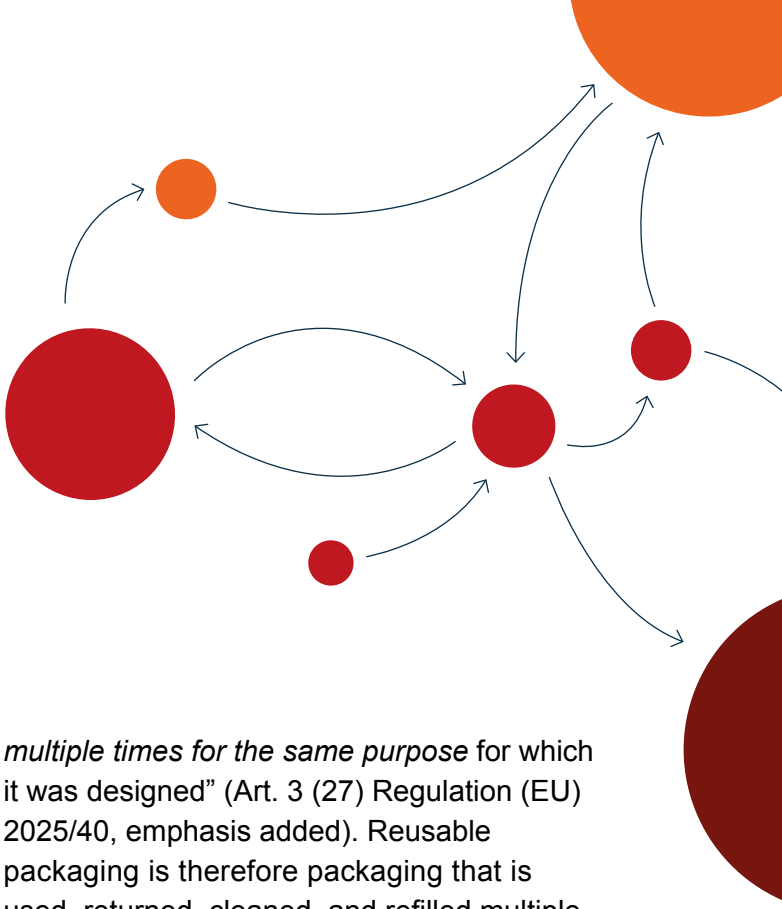
August 2025

Foundation of the Systems Map:
The collected challenges were organized and served as the basis for the first version of the Systems Map.

January 2026

Community Call January 2026:
Discussions in group sessions, feedback on the overall picture

Why reusable packaging?



In 2023, approximately 80 million tons of packaging waste were generated in the EU (Eurostat, 2025). The circular economy is seen as a solution to this problem. In contrast to the traditional linear production and consumption model, the circular economy aims to minimize waste and use resources for as long as possible by employing so-called “R-strategies” such as reuse, repair, and recycling (Kirchherr et al., 2017). Only about two-thirds of packaging waste is recycled; for plastic packaging, the figure drops to just 42%. For household packaging waste (post-consumer), actual rates tend to be even lower (Eurostat, 2025). This is insufficient. Reusable packaging systems are one solution for implementing circular economy principles. According to the EU Packaging Regulation, the reuse of packaging means “all operations whereby packaging, after its intended use, can be used *multiple times for the same purpose* for which it was designed” (Art. 3 (27) Regulation (EU) 2025/40, emphasis added). Reusable packaging is therefore packaging that is used, returned, cleaned, and refilled multiple times. When reusable systems are properly implemented, packaging waste can be reduced and environmental impacts minimized.

A circular economy requires a systemic approach

In our systems map, we illustrate **cause-and-effect relationships** – that is, which factors influence **what and how** (operational mechanism). These mechanisms of action are based on the aggregated assumptions of stakeholders (Powell et al., 2024). This allows us to identify the system’s functioning and challenges and bring them up for discussion. As a result, the map facilitates a general exchange through which stakeholders can better recognize interrelationships between different components (Barbrook-Johnson & Penn, 2022). Many Systems Maps rely on concrete figures. Since our Systems Map synthesizes various reusable systems, we employ a qualitative analysis and focus on creating a shared understanding of complex problems (Dentoni et al., 2023).
Especially in large groups or complex projects, complete (scientific) consensus is often unrealistic. This map therefore does not assume that everyone views the world through the same lens. Its goal is not to dictate a single, indisputable “truth” of how the system works, but to establish a viable **working consensus**. With a **shared understanding of the system** gained in this way – and the resulting redefinition of problems within the system – different solutions can emerge (Sedlacko et al., 2014) that may not have been apparent before. This means: You identify the points on which you agree while simultaneously highlighting the areas where differing views still exist. Because a Systems Map captures the 'big picture' rather than isolated problems, it requires enough depth to mirror real-world complexity.
The ultimate goal is balancing that essential detail with clarity.

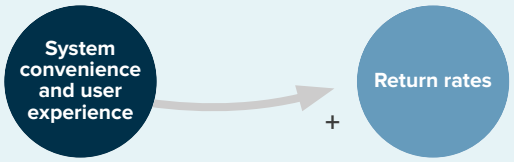
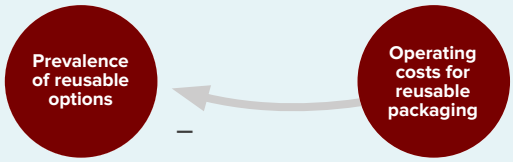
„It’s incredibly complex, which is why it’s easy to get sidetracked if you chat about it for two minutes.“

Comment from a group discussion, Community Call

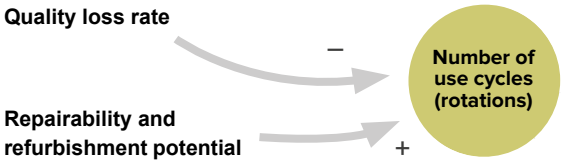
Systems mapping language

Elements are the basic building blocks of the system which can increase or decrease. While some element definitions are intentionally broad to encompass a variety of concepts, others are highly specific. We define the most important elements – the so-called core elements – on page 10 and 13 to ensure that we are all on the same page. The goal of a Systems Map is to identify how the elements within the system influence, reinforce, or block one another.

Cause-and-effect relationships describe how elements influence one another. They are represented by directional arrows, where the arrowhead points from the cause to the effect (A → influences B). Our Systems Map distinguishes between two types of relationships:

Positive Elements develop in the **same direction**	**Negative** Elements have **opposite effects**
→ When A **increases**, B **increases** → When A **decreases**, B **decreases**	→ When A **increases**, B **decreases** → When A **decreases**, B **increases**
Example: When system convenience and user experience **decreases**, the return rate also **decreases**, and vice versa (positive connection)	**Example:** As the operating costs for reusable products rise, the prevalence of reusable options **decreases** (negative connection)
	

Drivers represent factors that are important for understanding how the system works. Their interactions have not been shown in detail to reduce the level of complexity.



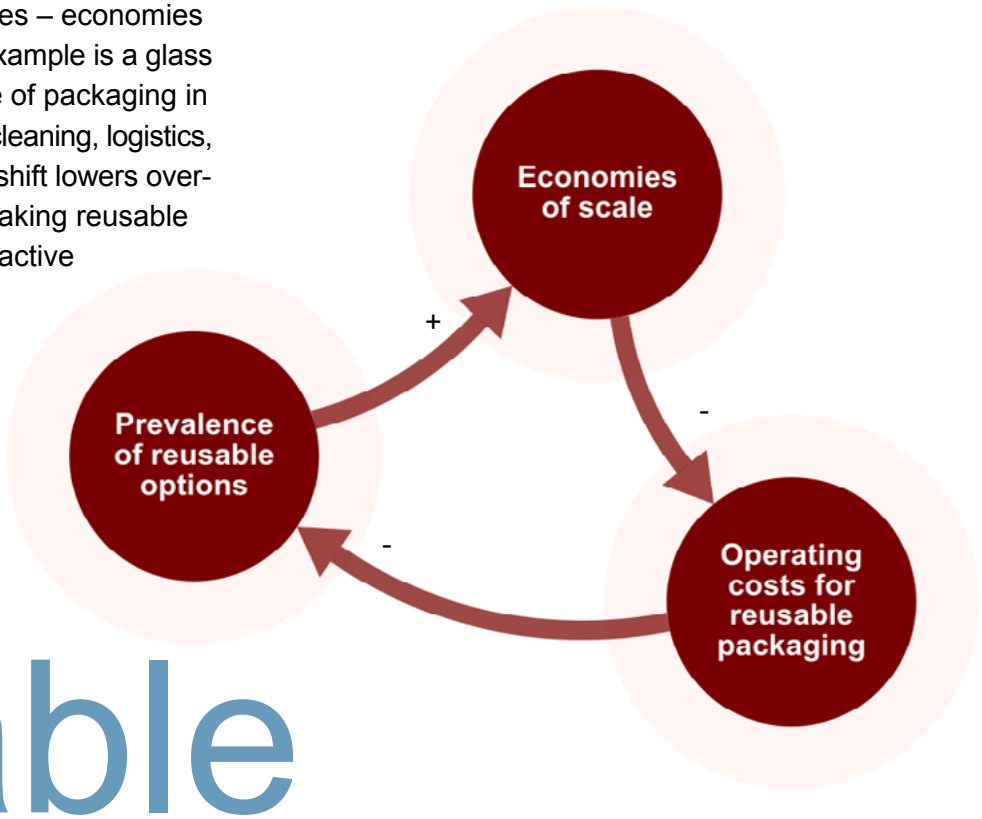
Feedback loops are a specific form of this influence. They refer to a strong mutual influence, amplification, or even blocking of elements that, within the chain of effects, influence themselves in turn. There are different types of those loops, **reinforcing loops** that lead to exponential growth or decline, and **balancing loops** that, in contrast, have a stabilizing effect on the system. It is important to understand whether loops balance each other out or reinforce each other, since, for example, upward spirals can be leveraged positively when the effect is desired. Within a system, those dynamics can easily create a **'lock-in' effect** – a state where systemic change is impossible without intervention, such as a shift in regulation. **Systems mapping provides a holistic view** to break this gridlock. Rather than getting bogged down in isolated details, it reveals how parts influence, reinforce, or block one another, highlighting exactly where to intervene to resolve these **lock-ins**.

The core dynamic of reusable systems

The core dynamic for reusable systems is located at the center of the Systems Map. It consists of the elements "**Prevalence of reusable options", "Scale effects", and "Operational costs for reusable packaging**". These play a central role and offer the greatest leverage, as they are involved in or influence many other challenges. While reusable packaging is well-established in the beverage sector, it remains rare in other industries. Emerging reuse systems are only just developing or scaling, meaning they are often still costly and inefficient.

As reusable packaging systems expands into new product categories – ranging from to-go items and cosmetics to car tires – economies of scale naturally kick in. An example is a glass yogurt jar: as the total volume of packaging in circulation rises, unit costs for cleaning, logistics, and administration drop. This shift lowers overhead costs for businesses, making reusable options significantly more attractive for widespread adoption.

At the same time, a self-reinforcing dynamic emerges that unfortunately slows down the system. This is because if the costs for reusable packaging rise, the adoption rate of reusable options decreases, causing the economies of scale to decline as well. A lower economy of scale then causes the costs of reusable packaging to rise further. This is because economies of scale are **vital** to the survival of a reusable system. Small, isolated solutions often fail due to high fixed operating costs per cycle. Only when the pool is large enough and the facilities are operating at full capacity does the system become economically competitive compared to single-use packaging.



Definitions of core elements

Prevalence of reusable options describes the extent to which reusable solutions have become established across various product categories and economic sectors. It indicates how diverse the range of reusable packaging is in everyday consumer and industrial settings (from the food service industry to drugstore items and industrial goods). In short, it reflects how present reusable packaging is in our daily lives.

Economies of scale are benefits that arise from increasing the adoption rate of a reusable system, such as efficiency gains, marketing advantages, and learning effects. This is particularly relevant for reusable systems, as these effects are especially evident in this context and the cost per use can drop significantly compared to single-use systems.

Operating costs for reusable packaging refer to the ongoing expenses associated with maintaining operational business activities.

Prevalence of reuse among end-consumers refers to the use by those individuals who are “responsible” for returning the reusable packaging after it has been used for its intended purpose and is then sent for cleaning and reconditioning.

Effectiveness of regulation refers to the entire set of measures that impact the reusable system. These can include government regulations and voluntary standards, such as DIN standards. The effectiveness of regulations describes how well those measures support the transition to reuse. We cannot only measure the number of rules, because regulations are only effective if they can be implemented without barriers. If this clarity is lacking, complexity becomes an excuse for inaction and growing efforts coming with more bureaucracy remain ineffective. The effectiveness also declines when there are loopholes in the laws (e.g., cardboard under the EU Packaging and Packaging Waste Regulation (PPWR)) or when implementation is difficult.

Standardization refers to the uniform and transparent design of processes, containers (packaging characteristics and logistics interfaces), and their labeling for identification purposes, e.g., via visual identification such as a uniform reusable packaging logo or digital identification technologies such as QR codes.

→ Continue page 13

What challenges do we face when implementing and scaling reusable systems?

This map is for YOU!
So, feel free to print it out, hang it up and use it to tackle **your reusable packaging challenges!**

With funding from the:
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Federal Ministry of Research, Technology and Space

Click here to get to the online Systems Map

Examples of effective regulation
Enforcement of regulation (e.g. local enforcement)
Diffusion of responsibility
Effectiveness of regulation
Regulation
Pro-Reuse lobbying influence
Marketing potential of reusable packaging
Fragmentation of interests
Demand of product manufacturers
Desire for marketing via packaging design
Initiatives for cooperation (e.g. association activities)
Variety of packaging formats within segments
Dominance of linear packaging systems
Lobbying power of disposable packaging industry
Bureaucracy
Cooperation of distribution partners
Centralization and dissemination of information
Degree of stakeholder cooperation
Fear of penalties (cartel formation)
Competition
Number of reuse system operators
Recycling solutions
Packaging waste accumu-lation
Waste mitigation
Prejudices + concerns
Cognitive overload / analysis paralysis
Necessity of stakeholder collaboration
Stakeholder complexity
Economies of scale
Prevalence of reusable options
Operating costs for reusable packaging
Reuse system operator education /skills
Converting complexity in logistics
Disagreement on the scope and design of standardisation
Standard-ization
Recycled content integration rate
End-of-Life material recapture rate
Sustainability of transport modalities and logistics
Environmental impact
Sorting effort
Efficiency of cleaning + reconditioning processes
Compatibility of logistics
Risk of data misuse and exploitation
Data inter-operability potential
Quality loss rate
Repairability and refurbishment potential
Number of use cycles (rotations)
Investment in reusable packaging systems
Investment risk
Upfront captial investment requirement
Information and data quality management
Automation
Data availability
Voluntary industry standards
R&D Investment in material science and packaging design
Design quality of packaging
Quality of data availability on the behaviour of reusable materials
Investments in marketing and education
Souvenir effect/ Container attachment
Transport distance
Subsidies through unredeemed deposits
Complexity of packaging design
Investment funding
Effort due to data collection + scanning
Digitali-zation
Density of return points per reusable system
Expansion return infra-structure
Risk of misaligned digitalisation investments
Perceived contamination risks
Visibility of reusable packaging
Return rates
Financial incentive through deposit amount
Integration in establi-shed deposit return systems
Development and implementation of standards
Requirement for unique unit traceability
Transparency data handling
Legal requirements
Consumer habits and reusable packaging routines
Impact of reusable systems on retail pricing
Density of return network
Consumer recognition of packaging systems
Interoperability of open-loop return systems
System convenience and user experience
Standardisation of reusable system usage
Uniformity of labeling standards for packaging identification
Prevalence of reuse among end-consumers
Environmental awareness
Packaging weight
Packaging size
Consumer literacy in reusable packaging systems
Information and awareness campaigns
Availability reusable packaging know-how

Legend

- Operating costs
- Effectiveness of regulation
- Environmental impact
- Prevalence of reuse among (end-) consumers
- Degree of stakeholder cooperation
- Digitalization
- Standardization
- Logistics

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→ Continued from page 10

Environmental impact is an umbrella term for all types of positive and negative effects on the environment. Accurately assessing environmental impacts requires a life-cycle perspective – from manufacturing to disposal. This also includes the production of intermediate products or the sourcing of raw materials, as well as the disposal of waste in landfills or its incineration.

Digitalization of reusable packaging systems allows for the accurate tracking of individual containers and overall stock. This visibility relies on technologies like QR codes, RFID chips, or camera scanning.

Degree of stakeholder cooperation refers to both intra-industry and cross-industry collaborations, as well as to how many different stakeholders in the reusable system currently operate in "silos" (i.e., do not cooperate). This includes association-driven reusable systems as well as collaboration among other stakeholders in the reuse cycle. Because this cooperation requires active information exchange and alignment, antitrust safeguards are recommended in some cases to ensure legal certainty.

Efficiency of cleaning and reconditioning processes refers to the procedures required to prepare reusable packaging for reuse and "return it to the loop". These processes vary in terms of effort, logistical requirements, and technical implementation depending on the type and size of the reusable system, as well as the design, contents, and intended use of the packaging. Achieving these operational gains represents a major challenge for modern reusable systems. Process efficiency can be improved, for instance, by automating quality and hygiene controls.

How can you use the map?

The Systems Map as a whole can seem overwhelming, which is okay: reusable packaging systems are complex. You can therefore zoom in on different topic areas and focus on a specific problem to clarify the details.

Example: To take a closer look at the logistics topic area, it's best to start with the core element "Efficiency of cleaning and reconditioning processes". From there, examine what affects this element—that is, which other elements influence, reinforce, or block it. You can see this by looking at the arrows pointing to the element – in this example, these include "Standardization" and "Automation". Both have a positive relationship with the core element. This means: If "Standardization" and "Automation" increase, the "Efficiency of the cleaning and reconditioning processes" also increases. In the next step, we can trace the arrows leading away from the core element to see which other elements it directly influences. In this example, "Efficiency of cleaning and reconditioning processes" has a negative relationship with "Operating costs of reusable packaging"- as process efficiency increases, operating costs decrease (and vice versa).

Overview of topic areas

Prevalence of reuse among (end-) consumers

Changing consumer behavior is a major challenge; to drive adoption, reusable systems need to be as convenient as possible. There are various factors that influence **system convenience and user experience**, such as the density of the return network, the standardization of reusable system usage, and the weight and size of the packaging. **While ease of return** is a critical factor, **greater visibility of reusable solutions** also significantly lowers barriers to adoption. **Regulations** can provide vital support, whereas **consumer habits** with little reusable packaging routines that are rooted in a linear, single-use logic present a **major obstacle**. Reusable systems must be both highly standardized and easy to use. Simultaneously, end consumers must be properly informed and engaged. While environmental awareness certainly influences behavior, personal attitude and education alone are insufficient to ensure widespread adoption. Consequently, the effort required to build market visibility grows significantly when dominant social norms and daily routines continue to reinforce single-use habits:

> **„(If the) reusable culture isn't there yet, it takes a lot more practical support from providers, from the staff who hands out the cups, as a lot more simply hasn't sunk in people's minds yet."**
>
> *Contribution from group discussion, Community Call*

Effectiveness of regulation

> **„Effective governance requires the right balance of legislation and self-regulation. The goal must be an inclusive approach that prevents overregulation without opening the floodgates to greenwashing due to lacking supervisory authorities."**
>
> *Contribution from group discussion, Community Call*

The design of regulatory frameworks has a major impact on the packaging transition, as it can provide uniform guidelines and certainty for action. Regulatory frameworks encompass the entirety of rules, standards, and processes that a company must comply with. These include laws as well as industry and technical standards (DIN, ISO). Increasing effectiveness of regulation can directly increase the overall adoption of reusable packaging and through greater

amount of standardization, a rising demand of product manufacturers and cooperation of distribution partners. Regulation in the form of a mandatory reusable option requirement can also influence end-consumer usage.

Regulation refers to government intervention through regulations, standards, and incentives such as tax benefits or subsidies, which are intended to ensure safety, environmental protection, and innovation in the reusable packaging sector. The effects of regulation are twofold: Rising regulation can enhance the effectiveness of regulatory frameworks. At the same time, excessive regulation can increase the need for cooperation among stakeholders and lead to more bureaucracy. This hinders acceptance among product manufacturers and distribution points for reusable packaging, such as cafés, mail-order businesses. This rising bureaucratic and communicative burden can also increase operational costs of reusable packaging.
Long transition periods or ambiguities in regulation often lead to a “delay” in implementation: Companies pause their own initiatives or rules, even if their actions were effective, because they are waiting for the regulation to level the playing field and create bigger security. This creates an investment barrier, comparable to concerns about investing in a technological solution that might turn out to be obsolete or wrong after a regulation is in place. When the political process lacks coherence, individual hesitation is rational. Combined with a diffusion of responsibility, inaction is justified.
Additionally, the bigger the fragmentation of interests, the less effective the regulatory framework. This is because both the single-use and reusable lobbies influence the effectiveness of regulation. The reusable lobby, for example, is successful when the complexity of the various reusable systems becomes tangible for policymakers:

> **„Understanding the full operational complexity of the various systems in practice is a decisive factor in whether the regulations are ultimately effective or not. When it comes to regulations, clarity and understanding are incredibly important.“**
>
> *Contribution from group discussion, Community Call*

Regulation in the form of a mandatory reusable packaging policy can also influence the usage by end consumers.

Standardization

Establishing common standards can increase the adoption of reusable packaging and thus reduce costs. At the same time, the initial development and implementation of standards involve costs. The uniformity of labeling standards for packaging identification, increases the **data interoperability potential**, which is conducive to the **degree of stakeholder cooperation**.
What oftentimes hinders a broad standardization is the desire for **branding and marketing via packaging design**, that is particularly high in B2C markets. This can lead to a higher variety of packaging formats within segments, which in turn makes standardization more difficult. This variety is potentially increasing the number of reuse system operators, resulting in increased competition. Higher levels of competition reduce the degree of standardization. Standards can be mandated through regulation or implemented through voluntary collaboration in the form of cooperation among stakeholders. For example, a shared return infrastructure could be established resulting in standardized interfaces for all participating systems.

> **„What does standardization mean? – Is it the existence of DIN standards, their use, a government-mandated minimum technical standard, or technology enforced by a monopolist? – Depending on the context, aspects can vary."**
>
> *Expert interview*

Potential for standardization can be seen in various areas, and different stakeholders hold differing views on what needs to be standardized and to what extent. The greater the disagreement regarding the nature of standardization, the lower the likelihood of actual implementation. Additionally, path dependencies come into play: if stakeholders have already invested in different solutions, it is more difficult to achieve uniformity.

Environmental impact

Environmental impact refers to the ecological factors associated with reusable systems. The lower the environmental impact, the greater the potential for **waste reduction**. The map depicts return rates, and the map depicts return rates and transport distances as essential factors of influence Preparing a comprehensive life cycle assessment and verifying it is a highly context-dependent and timeconsuming process. On top, the environmental impact is also difficult to determine – this complexity cannot be fully captured by our map. This is in part because only item-level traceability provides an accurate data basis for actual circulation figures, which, however, only makes ecological and economic sense once a certain scale is reached. Nevertheless, the environmental impact influences the adoption rate of reusable systems: It is important that the impact is as low as possible and **at least lower than the environmental impact of the single-use packaging alternative**, as reusable packaging would – from a sustainability point of view – otherwise fail to justify its existence.

„The actual number of cycles achieved is decisive in many applications of reusable packaging. So, it's not about some technical durability of the packaging or its repairability or anything like that, but in many cases simply the question of whether consumers return it and to what extent we can actually change consumer behavior."

Contribution from group discussion, Community Call

„The more cycles we achieve, the smaller the actual impact of the recycled content rate and recyclability on the environmental impact. So, if we have 100 cycles, it becomes increasingly irrelevant whether we incinerate or recycle it afterward; the effect is marginal. However, the situation is different when it comes to the sustainability of transportation, because that applies to every cycle – so if we succeed in transporting reusable packaging in an ecologically optimized way, that has a significantly greater impact on the environmental footprint."

Contribution from group discussion, Community Call

Digitalization

The extent to which a system is digitalized depends heavily on legal requirements or voluntary industry standards. A high degree of digitalization stands or falls on the **information and data management quality** that includes the efficiency of the IT systems.

„Digitalization isn't an end in itself. [...] So, where it helps me to exchange data and standardize processes, great. [...] If it doesn't help me, then I don't have to integrate it"

Contribution from group discussion, Community Call

If these are well-designed, operating costs decrease and data exchange between different partners is significantly easier. Despite the advantages, stakeholders often have reservations: **High investment risks** fuel fears of financial losses, especially because of **misaligned digitalization investments**. **Risks of data misuse and exploitation** or competitive disadvantages often make companies less willing to share information. **Operational costs** rise because manually scanning containers and maintaining data that is needed in certain forms of digital tracing create additional work and expenses. This can slow down the adoption of digital solutions.

„But capturing [data] digitally so that less effort is required later on – a lot is going on here. You always need those courageous people who take a step forward, test it, and make it suitable for mass adoption."

Contribution from group discussion, Community Call

Degree of stakeholder cooperation

The amount of cooperation among stakeholders in the reusable system has mixed effects on the entire system. On the one hand, greater cooperation may require more coordination, which increases **operating costs**. At the same time, the **degree of stakeholder co-operation is seen as a key factor in driving standardization** and improving the efficiency of cleaning and reconditioning processes, which in turn reduces **operating costs**:

„Systems shouldn't compete; instead, we need cooperation models in logistics. If everyone were to organize their own return trips and their own washing centers, it simply wouldn't be worth it. That's why we've been trying to do this for a long time, and it's difficult to bring partners together."

Contribution from group discussion, Community Call

A higher level of cooperation can also increase **the potential for data exchange**. However, in a highly competitive environment, intensified collaboration can also increase the **risk of data misuse and exploitation**. At the same time, a higher degree of cooperation strengthens **the pro-reuse lobbying influence**.
Additionally, a rising degree of cooperation facilitates coordinated information sharing, which increases acceptance of reusable packaging transfer hubs by reducing their workload. This is because reuse system operator education and skills can not only reduce stakeholders' prejudices and concerns, but can also result in cognitive overload and analysis paralysis, that can be reduced through centralization and dissemination of information:

**„Well, I notice that in many places there is actually a willingness to cooperate, but people are overwhelmed.
And to alleviate this feeling of being overwhelmed, in many cases more centralized coordination is needed to take that burden off people's shoulders"**

Contribution from group discussion, Community Call

Operating costs

Operating costs in reusable systems are influenced by various factors. Reusable systems are only financially and environmentally viable once they have reached a **prevalence of reusable options**: if the supply of reusable products remains low, there are no **economies of scale** that could increase efficiency.

„The learning curve in this field is already enormous, so knowledge alone isn't enough. It is actually the economic aspect that is at the forefront for decision-makers. Nevertheless, ecological aspects can also be seen in large companies."

Contribution from group discussion, Community Call

If efficiency remains low, operating costs for reusable products rise, which in turn reduces competitiveness and thus further limits the supply of reusable products. Greater **prevalence of reusable options** reduces the **investment risk**.

„It's just a theory for now, but [scaling and the associated cost efficiency] is the issue alongside legislation and policy. One measure isn't enough. Everyone has to pull in the same direction."

Contribution from group discussion, Community Call

„Every single glass bottle has to go back to the brewery. And that's the Achilles' heel of costs and efficiency in the system."

Contribution from group discussion, Community Call

Logistics

Logistics is closely linked to **automation** and **data availability**. Here, too, a higher standardization in the reusable packaging and processes leads to efficiency gains in washing and transport logistics. Simultaneously, setting up the required logistic networks and processes can be **costly** at the outset and can be somewhat daunting due to an increasing investment risk, especially when there is no certainty regarding the scaling that this specific reuse system can reach. This reveals another lock-in dynamic. The return infrastructure is closely tied to washing and transport logistics. Depending on the converting complexity in logistics, that are partly influenced by stakeholder complexity, these adjustments can incur upfront capital investment.

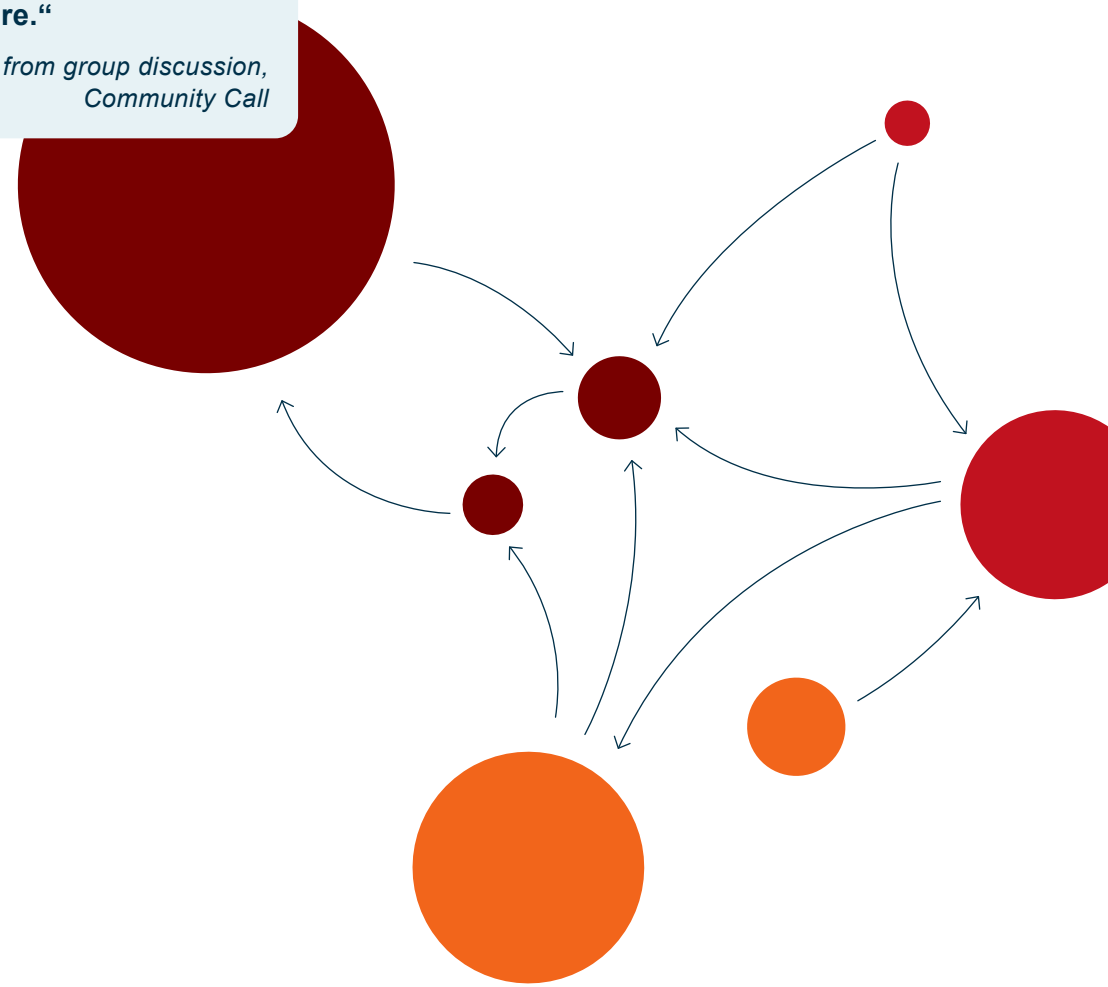
„I know that [logistics] is an important issue and a hurdle on the path to scaling and the economic viability of reusable systems. How do we manage to automate washing and sorting to reduce costs? There is significant cost pressure, which is still preventing us from being more affordable in the future.“

Contribution from group discussion, Community Call

Additionally, the **expansion of return infrastructure** is necessary to design the return of reusable containers with as little effort as possible for users. However, there are limits to efficiency gains for logistics through cooperation and standardization; certain systems will always have to operate separately from one another.

„The system operators who buy containers have to invest, and that’s a chicken-and-egg problem. So, cleaning becomes cheaper through automation, but automation depends heavily on the container. You can’t build a system that’s automated for everything, and if you build a system that’s automated for a specific container, then you’ll need a certain volume of those containers returning continuously over the next few years.“

Contribution from group discussion, Community Call



So, what now?

What can the innovation community take away for the future?

What have we learned from creating the Systems Map and the validation processes?

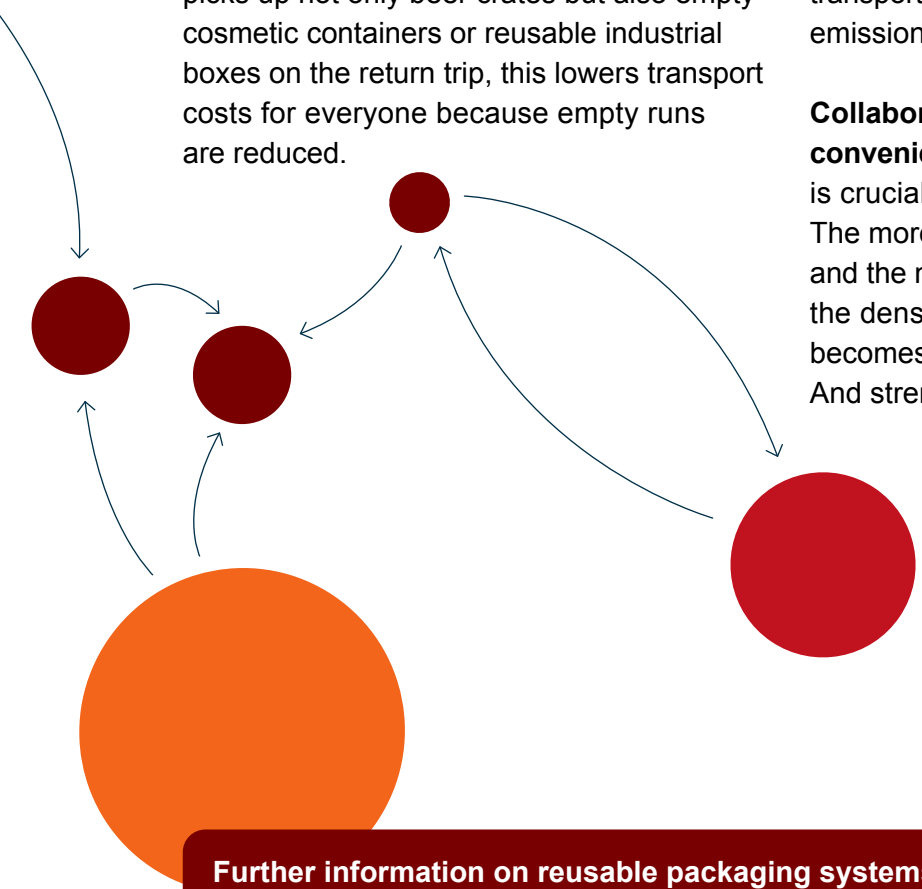
Why reusable packaging becomes more cost-effective when everyone participates?

The Ellen MacArthur Foundation (2023) analyzed this in a study for France by simulating and comparing three different scaling scenarios:

Collaboration through shared infrastructure: Shared collection, sorting, cleaning, and transport can increase the efficiency of these processes and reduce operational costs. For example, if a truck picks up not only beer crates but also empty cosmetic containers or reusable industrial boxes on the return trip, this lowers transport costs for everyone because empty runs are reduced.

Collaboration through standardization: A modern cleaning facility is expensive. However, if it runs not just for two hours in the morning but washes items all day long, the cost per washed item drops significantly. This works with large volumes, which can also be achieved through the standardization of packaging for similar contents. Labels and closures can be used to distinguish between brands and product lines. In addition, transportation distances and the associated emissions and costs are reduced.

Collaboration increases return rates and convenience for everyone: A high return rate is crucial for this type of business model. The more compatible the return systems are and the more players use reusable packaging, the denser the network of return locations becomes. This saves time, travel, and money. And strengthens sustainability efforts.



Further information on reusable packaging systems: *https://wegweiser-mehrweg.de/* *https://www.mehrwegverband.de/publikationen/#map* *https://www.mehrwegverband.de/*

Insights for the innovation community

The Systems Map shows that **reusable packaging is not an isolated packaging problem**, but rather a **systemic transformation challenge**. Scaling is not achieved through individual measures, but through the interplay of regulation, standardization, cooperation, digitalization, and user behavior.

- → Reusable packaging is a socio-technical systemic problem and therefore complex
- → Scaling is a key (positive) tipping point – once a certain level of adoption is reached, this has a reinforcing effect on desired dynamics
- → Standardization affects not only technical development but also, for example, how consumers behave when returning items, e.g. can containers be returned to the same location?
- → Cooperation among various stakeholders requires institutional support and coordination, either by the stakeholders themselves or by other entities
- → Data and knowledge are power – and a prerequisite for systemic thinking and collective learning
- → Visibility, communication and highlighting benefits to consumers helps increase acceptance
- → Flagship projects serve as positive examples to learn though making processes transparent and sharing insights honestly

Our recommendations and expectations for policymakers

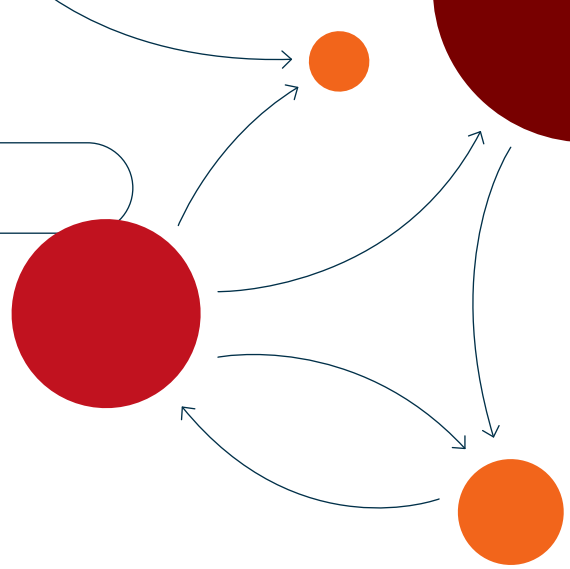
Throughout this process, we have observed that certain challenges can be addressed most effectively through policy measures and ensure effective regulation.

For this reason, we are setting forth our recommendations to policymakers on the next pages, which you are welcome to share.

Waste prevention and the systematic expansion of reusable systems are not tasks for isolated individual initiatives – they require decisive, coordinated action at the structural level. In particular, the development of efficient reusable infrastructure – from pooling systems to comprehensive return processes and efficient washing logistics, all the way to mandatory standardization – requires joint planning, the strategic pooling of financial and organizational resources, and uniform quality and performance standards.

Without such coordination, there is a risk of fragmentation and parallel isolated solutions, resulting in inefficient and redundant (infra-) structures. The result would be limited economies of scale, a lack of cost-effectiveness, and a significantly weakened steering effect – even if formal obligations exist. Only a coordinated approach can provide the necessary scale, reliability, and system effectiveness needed to establish reusable packaging as a viable standard.

Regulatory clarity & oversight



- Existing loopholes must be closed, such as exemptions for certain materials that effectively favor single-use products or undermine environmental goals.
- Clear, binding, and ambitious reusable quotas with transparent target pathways are needed. These should be accompanied by standardization of systems and labeling to provide guidance, planning certainty, and investment security for both businesses and consumers.
- Harmonized definitions and standards are essential at the global, especially European and local levels.
- Effective enforcement of existing laws is required through the allocation of sufficient (local) resources. Without systematic monitoring and sanctioning, even ambitious targets will remain ineffective.

Increase ambition

- The introduction of an effective local tax on single-use items helps internalize environmental costs and makes reusable alternatives more economically attractive.
- Mandatory reusable systems should be introduced in selected sectors. Voluntary solutions have so far been insufficient in causing significant change.
- Mandatory, comprehensive return systems are also needed in public spaces to effectively close the loop and ensure a high return rate. These should be accessible, consumer-friendly, and organized uniformly across the country.

Strengthening cities & municipalities as role models

- Cities and municipalities play a key role. They can set an example through sustainable procurement, requirements for reusable containers at public events and in municipal facilities, municipal taxes on single-use packaging, and targeted information campaigns.

„When you consider how all the single-use manufacturers used to rail against reusable products, large companies are now in the process of changing their product ranges to include reusable cups or products. So, this shift toward reusable over single-use is definitely having a positive impact.“

Contribution from group discussion, Community Call

List of Abbreviations

B2B = Business relationships between two companies (Business-to-Business)

B2C = Relationships between businesses and end consumers (Business-to-Consumer)

DIN = German Institute for Standardization

ISO = International Organization for Standardization (international standards organization)

PPWR = EU Packaging and Packaging Waste Regulation

QR-Code = A two-dimensional version of the classic barcode for fast and reliable data capture (Quick Response Code)

RFID = Method for the automatic identification of objects via radio (Radio Frequency Identification)

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MEHRCE

Click here for the digital Systems Map

Use it to tackle **your reusable packaging challenges**

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If you want to keep in touch, we are happy to exchange thoughts and ideas on an international level as well!

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